

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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BETWEEN USER INTERFACES

DECLARATION OF DR. LOREN TERVEEN

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I, Loren Terveen, PhD, declare as follows:

I. INTRODUCTION

1. I have been retained as a technical expert by counsel on behalf of Apple Inc. (“**Apple**”/“**Petitioner**”). I understand that Apple is requesting that the Patent Trial and Appeal Board institute an *inter partes* review (“**IPR**”) proceeding with respect to U.S. Patent No. 10,656,754 (“**the ’754 patent**”) (EX1001).

2. I have been asked to provide my independent analysis of the ’754 patent in light of certain prior art publications, and I have done so based on my personal knowledge and experience.

3. I am not, and never have been, an employee of Apple. I received no compensation for this Declaration beyond my normal hourly compensation based on my time actually spent analyzing the ’754 patent, the prior art publications cited below, and various issues related thereto. I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the ’754 patent.

II. QUALIFICATIONS

4. In formulating my opinions, I have relied on my knowledge, training, and experience in the relevant field. My education and experience are described more fully in the attached curriculum vitae (Appendix A). For ease of reference, I have highlighted certain information below.

5. I received a B.A. in Computer Science, Mathematics, and History from the University of South Dakota in 1984. I received an M.S. in Computer Sciences from the University of Texas in 1988. I further received a Ph.D. in Computer Sciences from the University of Texas in 1991.

6. I am a Distinguished McKnight University Professor at the University of Minnesota in the Department of Computer Science and Engineering, and I have substantial experience with human computer interaction and user interfaces, including well before August 5, 2011, the date I have been informed is the alleged invention date of the '413 patent at issue in this matter. I was a Member of Technical Staff at AT&T Bell Laboratories from 1991 to 1996, and then a Principal Member of Staff at AT&T Labs – Research from 1996 to 2002. I was honored by the Association for Computing Machinery (ACM) as a Distinguished Scientist in 2009 and served as the president of ACM's Special Interest Group on Computer-Human Interaction (ACM SIGCHI) from 2015-2018, was elected to the ACM SIGCHI Academy in 2019, and received the SIGCHI Lifetime Service Award in 2023.

7. I have taught numerous courses at the University of Minnesota related to human-computer interaction and user interface design. Additionally, I have published over 150 peer-reviewed articles, a book, contributed chapters in six additional books, and have given over 50 presentations all across the United States

and internationally. My published works revolve around the fields of human-computer interaction, user interface design, and social computing.

8. I am also a named inventor on ten U.S. patents related to user interfaces, interactive data analysis, and methods for selecting and displaying information to users. My publications and patents have addressed many aspects of searching for information on the World Wide Web, including algorithms to gather information from the World Wide Web, additional algorithms to parse and analyze the HTML content of web pages, data structures to represent this information, and user interfaces that allowed people to access the information my systems collected. Much of my research also involved graphical user interface techniques, for example: enabling users to navigate large information structures (including the World Wide Web), specify multimodal interfaces including for interactive voice systems, interact with online maps, and tailor the performance of recommender systems.

9. I have served as Chair of the leading conferences in Human-Computer Interaction, served on four different editorial boards, and have sat on well over 20 program committees, including well over a dozen times on the program committee for the ACM Conference on Human Factors in Computing Systems (the CHI Conference), the leading international conference in Human-Computer Interaction.

III. LEGAL PRINCIPLES

10. In forming my analysis and conclusions expressed in this Declaration, I have applied the legal principles described in the following paragraphs, which were provided to me by counsel for the Petitioner.

A. Person of Ordinary Skill in the Art

11. I understand that the factors considered in determining the ordinary level of skill in a field of art include: the level of education and experience of persons working in the field; the types of problems encountered in the field; the teachings of the prior art regarding solutions to such problems; and the sophistication of the technology at the time of the alleged invention. I understand that a person of ordinary skill in the art (“**POSITA**”) is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above and knowledge of all relevant prior art references, including the references I cite below.

B. Obviousness

12. I have been informed that a patent claim is invalid as “obvious” in light of one or more prior art references if it would have been obvious to a POSITA at the time of the alleged invention, taking into account (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any so called “secondary considerations” of non-obviousness, which include: (i) “long-felt but unresolved need” for the claimed

invention, (ii) commercial success attributable to the claimed invention, (iii) unexpected results of the claimed invention, and (iv) “copying” of the claimed invention by others.

13. While I do not know the exact date that the alleged invention of the ’754 patent was made, I do know that the ’754 patent’s earliest claimed priority date is August 5, 2011. For purposes of my obviousness analysis, I have applied a date of August 5, 2011 as the date of the alleged invention (“**Critical Date**”), although in many cases the same analysis would hold true even if the date of the alleged invention were earlier or later.¹

14. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. To be obvious in light of a single prior art reference or multiple prior art references, there must be a reason that would have prompted a POSITA to modify or supplement the single prior art reference, or to combine two or more references, in a manner that provides the elements of the claimed invention. This reason may come from a teaching, suggestion, or motivation to combine, or may come from the reference(s) themselves, the knowledge or “common sense” of a POSITA, or from the nature of the problem to

¹ I am not a lawyer so I did not offer an opinion on whether the ’754 patent is entitled to its earliest claimed priority date.

be solved, and this reason may be explicit or implicit from the prior art as a whole. I have been informed that, under the law, the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand it is improper to rely on hindsight in making the obviousness determination.

15. I understand that an obviousness determination also requires that a POSITA would have had a reasonable expectation of success. This concept has been explained to me as relating to the relative likelihood or predictability—from the perspective of a POSITA—of successfully modifying the prior art in a manner that would meet the claimed limitations of the patent being challenged (here the '754 patent). I understand that the expectation of success need only be “reasonable” and, thus, does not require the absolute certainty gleaned from physically creating the proposed prior art modification.

C. Claim Interpretation

16. I understand that, for purposes of my analysis in this *inter partes* review proceeding, the terms appearing in the patent claims should be interpreted according to their “ordinary and customary meaning.” In determining the ordinary and customary meaning, I understand that the words of a claim are first given their plain meaning that those words would have had to a person of ordinary skill in the art at the time of the alleged invention. I also understand that the structure of the claims,

the specification and file history may be used to better construe a claim. Moreover, I understand that even treatises and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by a person of ordinary skill in the art to a claim term.

IV. MATERIALS CONSIDERED

17. My analysis in this Declaration is based on my knowledge and experience. Based on my above-described qualifications in Section II, the Patent Trial and Appeal Board should consider me to be an expert in the field. Also, based on my experiences, I understand and know of the capabilities of persons of ordinary skill in this field.

18. As part of my independent analysis for this Declaration, I have considered the following: the '754 patent (EX1001) and its prosecution history (EX1002); the background knowledge/technologies that were commonly known to persons of ordinary skill; my own knowledge and experience gained from my work in the field; my experience in teaching and advising others in this field; and my experience working with others involved in this field. In addition, I have analyzed the following publications and materials:

EX1004	U.S. Appl. Pub. No. 2008/0207188 to Hye Sang Ahn <i>et al.</i> ("Ahn")
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EX1005	U.S. Appl. Pub. No. 2007/0150842 to Imran Chaudhri <i>et al.</i> (“Chaudhri ’842”)
EX1006	U.S. Appl. Pub. No. 2011/0209093 to Kenneth P. Hinckley and Koji Yatani (“Hinkley”)
EX1007	U.S. Appl. Pub. No. 2006/0015818 to Imran A. Chaudhri et al. (“Chaudhri ’818”)
EX1008	Robert Kosara <i>et al.</i> , “Semantic Depth of Field,” IEEE Symposium on Information Visualization 2001, pp. 97-104 (2001)
EX1009	NEW OXFORD AMERICAN DICTIONARY (3 rd Ed. 2010)
EX1010	U.S. Appl. Pub. No. 2012/0304133 to Jennifer Nan et al. (“Nan”)
EX1011	Certified translation of JP Published Patent Application No. 2002-55750 (“Hisatomi”), published February 20, 2002
EX1012	Internet Archive Capture of https://en.wikipedia.org/wiki/Acutance from Nov. 2, 2010 (available at https://web.archive.org/web/20101102045925/https://en.wikipedia.org/wiki/Acutance)
EX1013	U.S. Appl. Pub. No. 2010/0095240 to Daniel Marc Gatan Shiplacoff <i>et al.</i> (“Shiplacoff”)

19. Note that for my citations to patent literature, I’ve used the column/line numbers or paragraph numbers. Note also that, unless I’ve indicated otherwise, all emphasis (bold/italics/underline) in any quoted text are ones I have added.

20. Although I cite and quote to selected portions of various references in this Declaration, the reader should understand that these citations are representative

examples. A POSITA would have viewed each reference in its entirety and in combination with other references. Accordingly, I intend the references identified in this Declaration to be viewed as incorporated in their entireties.

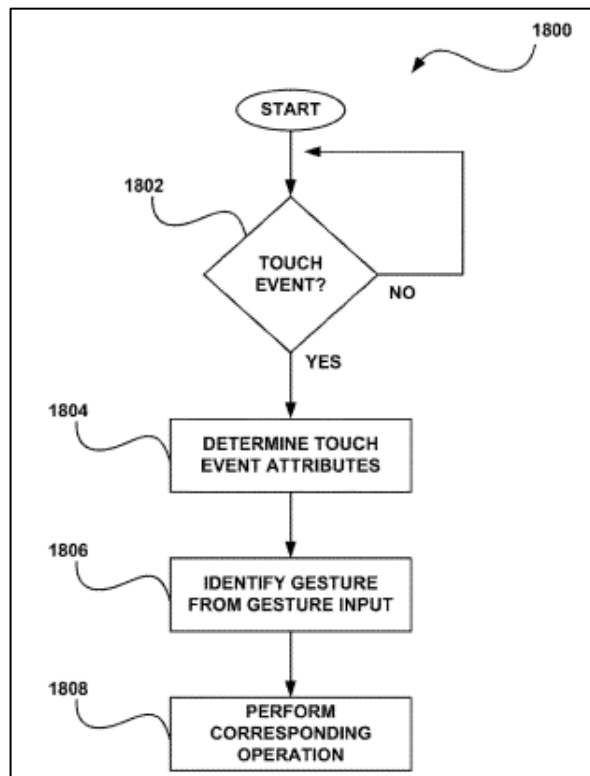
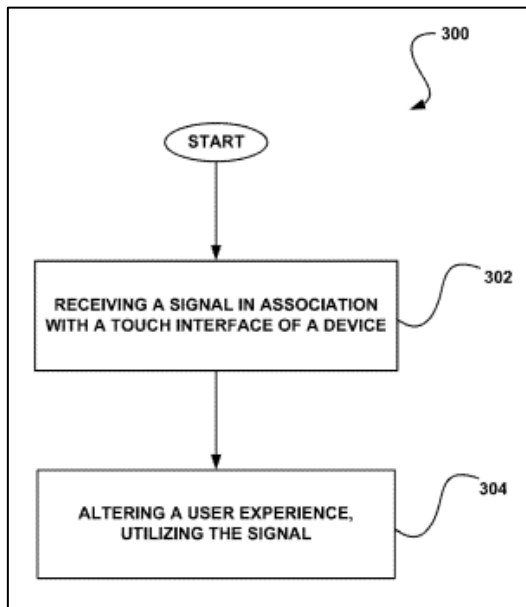
V. THE '754 PATENT

A. Pertinent Disclosure

21. The '754 patent “generally relate[s] to touch screens” and describes embodiments where “a user experience [with a touch screen device] may be altered” based on a “touch signal.” EX1001, 1:35-36, 14:31-15:64, Figure 3. The claims of the '754 Patent generally relate to a hodge podge of touch screen gestures (*e.g.*, swipe and tap gestures) and various display functions on the user interface associated with those gestures (*e.g.*, blurring or moving displayed objects). *See, e.g.*, EX1001, 95:35-53 (Claims 2-4). However, as discussed below, the support for these claimed gestures and claimed user interface functions is scattered throughout the specification of the '754 Patent, often without explanation about any relationship between the disparate teachings or their utilization together in a single embodiment. Nonetheless, as will be described in Section VI, *infra*, the claimed gestures and user interface functions were well-known well before the '754 Patent.

22. In one part of the specification, the '754 Patent describes a method that involves performing operations that correspond to identified gestures. *See* EX1001,

56:24-57:10. “If it is determined that a touch event has occurred, then the initial touch event attributes are determined,” and “the gesture is identified from gesture input.” EX1001, 56:34-38. According to the ’754 Patent, “gesture input refers to the collection of inputs, flags, and signals by which a gesture is identified and parameterized,” and is thus broadly defined. EX1001, 56:39-41. “For example, in one embodiment, a two-finger pinch gesture may be identified by two contact points combined with their motion with respect to each other, and parameterized by the extent of the motion.” EX1001, 56:41-45. “Once the gesture has been identified, the corresponding operation is performed.” EX1001, 57:9-10.



EX1001, FIG. 3 (left), FIG. 18 (right)

23. The '754 Patent describes that “[p]attern-based gestures may be simple to perform and easy for a user to remember.” EX1001, 65:37-39. One such gesture is a “pinch slide gesture.” *See* EX1001, 66:17-27. The pinch slide “gesture may be performed by pinching the device, then sliding the pinch across the interaction surfaces while maintaining contact.” EX1001, 66:21-24. In one embodiment, “a pinch slide gesture may be used to display menus of common operations or applications.” EX1001, 66:64-66. “For example, in one embodiment, a pinch slide gesture which begins near an edge of a display and then moves inward may cause a menu or window to slide in from that edge of the display.” EX1001, 66:66-67:2.

24. Separately, the '754 Patent describes embodiments that utilize a “3D layered user interface” in which “displayed objects may exist in one of a plurality of layers.” EX1001, 67:66-68:10. “[A] 3D layered user interface may be implemented in a device having single layer displays through the use of virtual display layers.” EX1001, 68:37-39. “[A] virtual display layer refers to a collection of display elements which have all been assigned the same apparent depth within the 3D layered user interface.” EX1001, 68:39-42. In some embodiment, “virtual display layers may be given the appearance of depth through the use of 3D depth cues.” EX1001, 68:58-60. “For example, in one embodiment, a 3D depth cue may be a blur operation, such that layers located at successively greater depths may appear blurrier than those closer to the user.” EX1001, 68:63-66.

25. Notably, the '754 Patent does not explicitly describe the aforementioned edge menus with respect to the virtual display layers, nor the manner in which such menus would operate with respect to the virtual display layers. Rather, the '754 Patent describes its 3D layered user interface more generically with respect to “objects” or “display elements” and collections thereof. *See generally* EX1001, 67:44-71:39. These “objects” are described as including, but not limited to, “digital objects (i.e. images, text boxes, UI control widgets, selections, etc.), subject matter objects (i.e. people within a photograph, letters and/or words within text, etc.), and/or any other type of identifiable visual object.” EX1001, 68:48-57. While the '754 Patent describes that these general “objects” or “elements” may be “located in a virtual display layer” (*see* EX1001, 68:55-57), there is sparse detail about how specific “objects” or “elements” are assigned to a particular virtual display layer, and no clear discussion of whether or how “objects” or “elements” may be reassigned or otherwise moved between virtual display layers. *See generally* EX1001, 67:44-71:39. Rather, the '754 Patent focuses on the ability of a user to “move” visually between layers and providing visual cues that provide the appearance of such “movement” (“i.e. magnifying and fading display layers as they are passed by, sharpening previously blurry display layers as they grow closer, etc.”), which is a distinct concept. EX1001, 70:64-71:9

B. Prosecution History

26. On June 11, 2019, the Applicant (P4TENTS1, LLC) filed the '753 patent as U.S. Appl. No. 16/438,455 accompanied by a Request for Prioritized Examination under 37 C.F.R. §1.102(e). EX1002, 933, 937-940. In the first non-final Office Action dated August 1, 2019, the Examiner rejected the claims under 35 U.S.C. § 101 and for both statutory and non-statutory double patenting. EX1002, 713-721. No prior art rejections were made.

27. In a response dated September 6, 2019, the Applicant filed a terminal disclaimer with respect to U.S. Patent No. 10,345,961, made minor amendments to original independent claim 1, cancelled original claims 8-16, and added new claims 17-202. EX1002, 671-712. Shortly thereafter, the Applicant filed a supplemental amendment and response on September 23, 2019, in which the Applicant filed a more extensive terminal disclaimer, additionally cancelled original claims 2-7, more extensively amended original independent claim 1 to include features related to “blur,” and replaced the new claims with a different set of new claims 17-237. EX1002, 603-660.

28. After an interview on November 19, 2019 in which the Examiner proposed cancelling then-new claim 237 to “expedite a NOA,” the Examiner issued a Notice of Allowance (NOA) with an Examiner’s Amendment that made relatively minor amendments to the independent claims. EX1002, 336-369. In the Notice of

Allowance, the Examiner identified the following feature recited in issued independent claims 1 and 2 that was alleged to distinguish the prior art:

during detection of at least a portion of the gesture before a completion thereof is detected, **blur, based on a change in a magnitude of the gesture** being detected on the display, at least a portion of the at least one other object

EX1002, 365 (emphasis in original).

VI. PERSON OF ORDINARY SKILL IN THE ART

A. A POSITA's Ordinary Level of Skill

29. Based on my knowledge and experience in the field and my review of the '754 patent and its file history, I believe that a POSITA would have included a Bachelor of Science degree in computer science, computer engineering, electrical engineering, human-computer interaction, or a comparable field and at least two years of professional experience in the design and development of graphical user interfaces (GUIs), human-computer interfaces, or equivalents thereof. Such experience could be obtained through research and study in a graduate program or through comparable exposure through industry employment, and additional years of experience could substitute for the advanced-level degree.

30. My analysis and conclusions expressed in this Declaration are based on the perspective of a POSITA having this level of knowledge and skill. My education, technical expertise and personal knowledge discussed in Section II shows that I meet the qualifications of a POSITA.

VII. OVERVIEW OF CONCLUSIONS FORMED

31. This Declaration explains the conclusions that I have formed based on my independent analysis. Based upon my knowledge and experience, and my review of the materials listed above, I believe that Claims 1, 2, 8, 10, 16, 24-30, 32-38, 40, 42-44, 46, 47, 52, 54, 57-83, 88, 90, 94, 95, 97-101, 104, 117, 122, 186, 187, 189, 191, 192, 197, 199-204, 208-216, 223-225, 230 of the '754 Patent are obvious in view of Ahn (EX1004), Chaudhri '842 (EX1005), Hinkley (EX1006), and Shiplacoff (EX1013). *See* Sections VIII-XII.

VIII. OVERVIEW OF REFERENCES AND COMBINATIONS

A. Ahn (EX1004)

32. Ahn generally relates to a “method of displaying a menu in a mobile communication terminal.” EX1004, Abstract, [0004]. More specifically, Ahn describes a method of displaying different menus on a display of the mobile communication terminal based on a “selected direction” of user input. *See* EX1004,

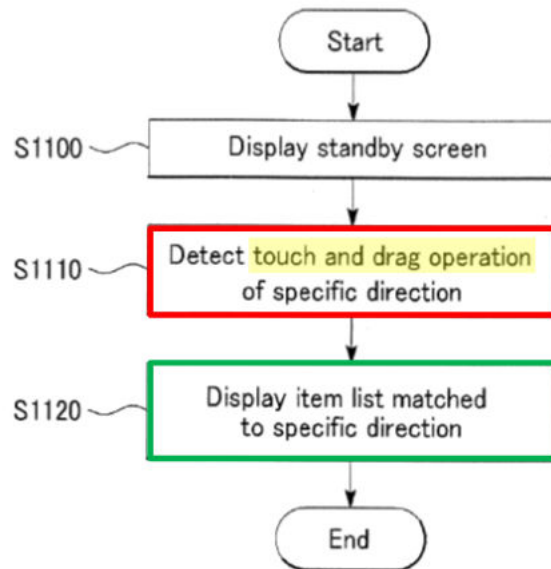
[0032]-[0033]. Ahn describes that the mobile communication terminal 100 illustrated in FIG. 1 includes touch input device 10 (*e.g.*, a “touch screen”) through which “a user inputs various information or instruction with a touch method.” EX1004, [0027]-[0028].

33. With respect to FIGS. 3A-10, Ahn describes various methods for displaying menus on the mobile communication terminal including that “the user can select a direction using any input device that can select a direction, such as . . . a touch screen” EX1004, [0072]. EX1004, [0027]-[0028]. And Ahn provides several additional figures that focus on using a touch screen 10 as an input for the display of menus. *See generally* EX1004, [0095]-[0119].

34. Specifically, with respect to FIGS. 11-18, Ahn describes “a method of displaying a menu in a mobile communication terminal having a touch input device,” in which a menu is displayed in response to a “touch and drag operation.” EX1004, [0095]-[0099]. Initially, a controller 50 of the mobile communication terminal “detects a touch and drag operation of a specific direction on the touch screen 10 (S1110).” EX1004, [0098]. A POSITA would have understood and found obvious that Ahn’s touch and drag operation is a type of gesture performed by the user in relation to the touch screen. “As the touch and drag operation is detected, the controller 50 controls to display an item list matched to the specific direction in the display 40 (S1120).” EX1004, [0099]. The “item list” may be for example, a menu

list or a file list. EX1004, [0099]. Each different direction of a touch and drag operation may be associated with a different menu or file list. EX1004, [0099].

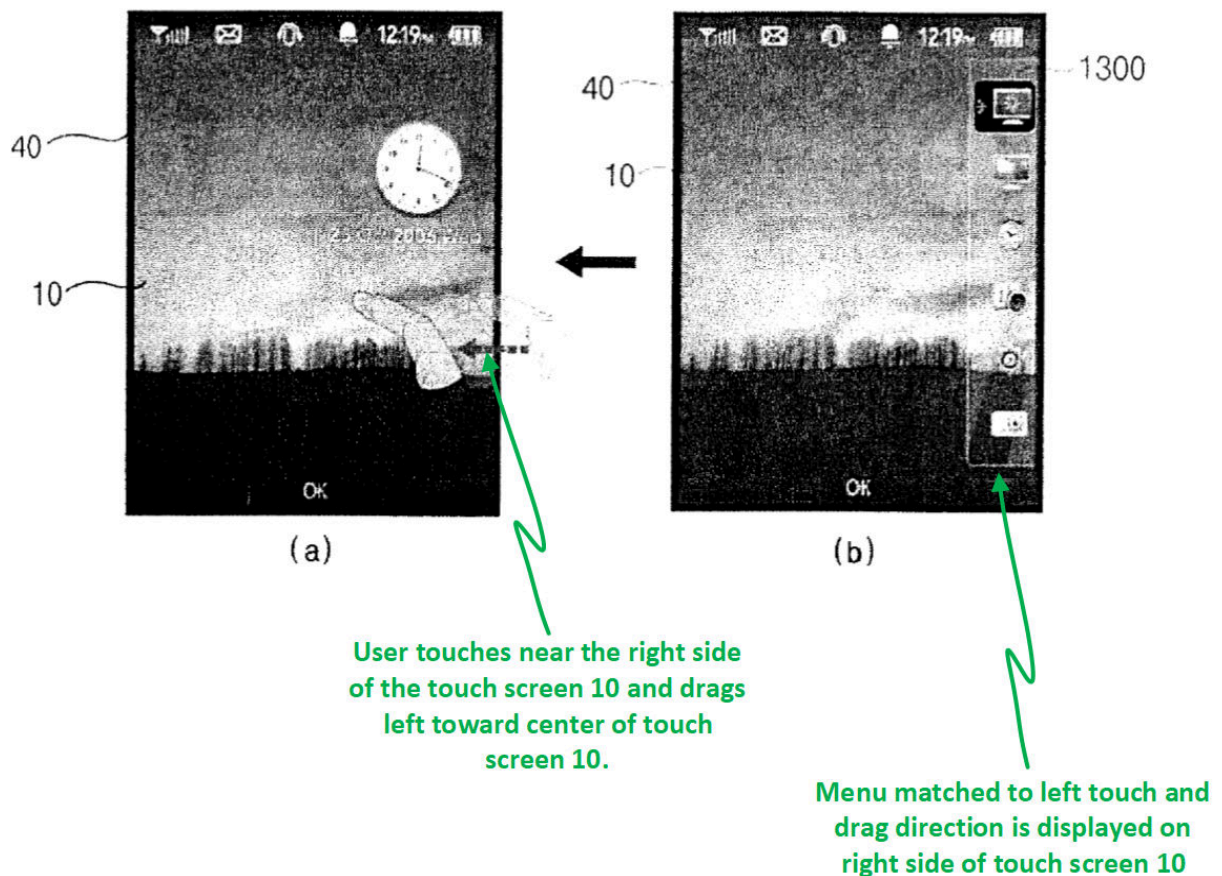
FIG. 11



EX1004, FIG. 11 (annotated).

35. In one example illustrated in FIGS. 13a and 13b, “if the user touches a specific position of the touch screen 10 and drags the touch in a left direction a menu list 1300 matched to a left direction is displayed in the display 40.” EX1004, [0102]. As can be seen in FIG. 13a, a user initially touches near the right side or edge of the touch screen 10 and initiates the drag gesture to open the menu. *See* EX1004, FIG. 13a, [0102]. As a result of controller 50 detecting the gesture, “a menu list matched to a left direction is set to be displayed at the right side of the display 40 (FIG. 13(b)).” EX1004, [0104].

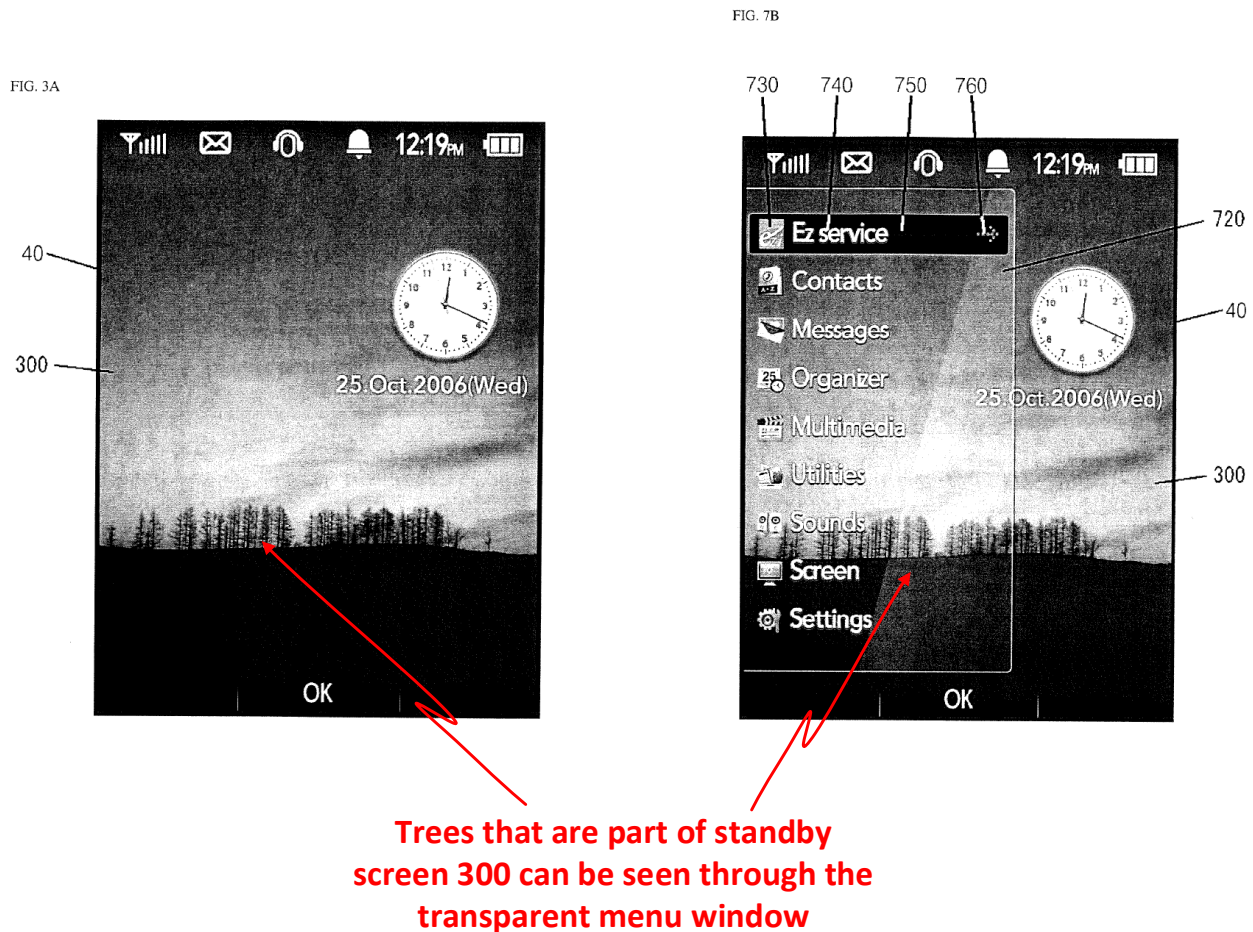
FIG. 13



EX1004, FIGS 13a and 13b (annotated).

36. Ahn describes that the displayed menus may be “transparently displayed on the standby screen 300.” EX1004, [0070]. This can be seen, for example, by comparing FIG. 3A, which shows standby screen 300 without any menus, and FIG. 7B, which shows the basic setting menu list 720 “displayed in a transparent window form in a left area of the standby screen 300.” EX1004, [0064]. Ahn describes that transparent menu windows ensure that “the preset standby screen

300 is not hidden by the pop-up menu window 340.” EX1004, [0039]. However, Ahn is not limited to these transparent menu windows.



EX1004, FIGS. 3A and 7B (annotated)

37. Ahn teaches at least two ways that its user interface may utilize blur. First, Ahn teaches that, instead of a transparent form, its menus “can be embodied in a translucent form or an opaque form, depending on implementation.” EX1004, [0070] (emphasis added). A POSITA would have known and found it obvious that, when differentiated from “transparent” and “opaque” in the manner they are used by

Ahn, the word “translucent” means “allowing light, but not detailed images, to pass through; semitransparent.” EX1009, 6. A POSITA would have understood not transmitting detail as a type of blurring, because the word “blur” means to “make or become unclear or less distinct.” EX1009, 3. In other words, a POSITA would have known and found it obvious that Ahn contemplates that, when embodied in translucent form, its menus would have blurred at least a portion of the background standby screen (*e.g.*, shown in FIG. 12).

FIG. 3A

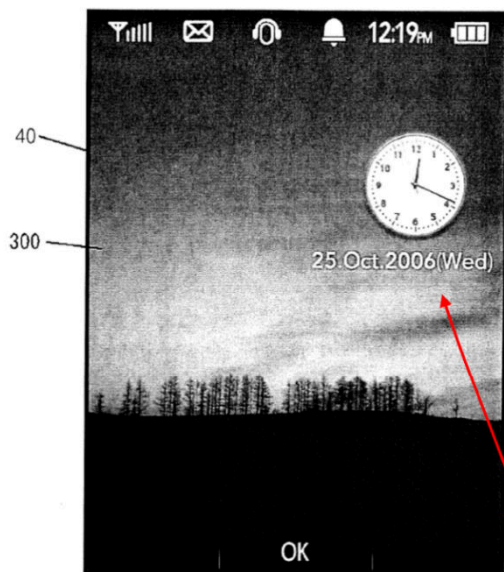
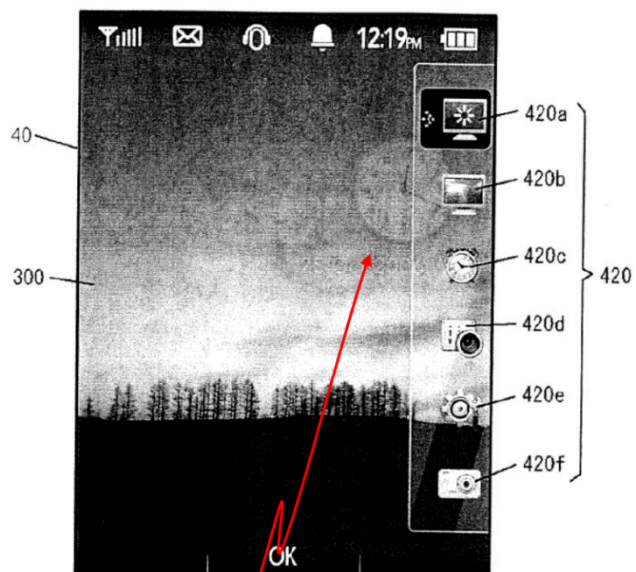


FIG. 4B



**Clock widget is blurred when user
menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated).

38. Second, Ahn explicitly shows that opening a menu can blur at least a portion of the standby screen 300. In FIG. 3A “a standby screen 300 set by a user is

displayed in the display 40 of the mobile communication terminal 100.” EX1004, [0036]. Ahn illustrates that a clock widget is part of the background standby screen 300. *See* EX1004, [0036], FIG. 3A. A similar clock widget is shown as part of the background standby screen 300 in FIGS. 12 and 13a. *See* EX1004, [0097], [0102], FIGS. 12, 13a. As can be seen in FIG. 4B, when the user menu 420 is opened, Ahn illustrates that the clock widget is blurred, which is pointed out with red arrows in the above annotation of FIGS. 3A and 4B. *See* EX1004, [0102], FIG. 13a. A similar blurring effect of the clock widget can also be seen in FIGS. 10 and 13B. *See* EX1004, FIGS. 10, 13B.

39. Ahn does not explicitly explain the purpose of blurring the clock widget or otherwise limit the implementation details a POSITA might utilize in providing this effect. Thus, a POSITA would have naturally turned to teachings like those provided by Chaudhri '842 when developing the blurring shown in FIGS. 4B, 10, and 13B.

B. Chaudhri '842 (EX1005)

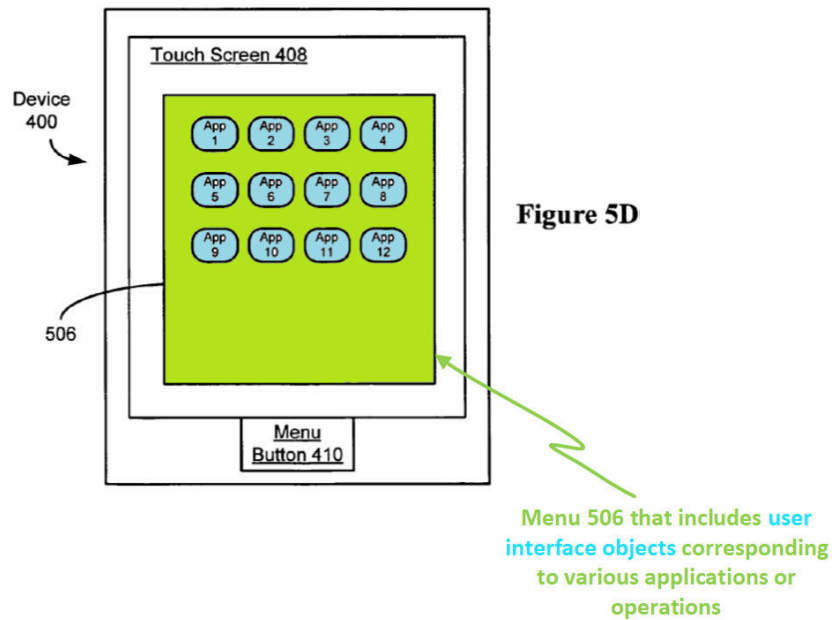
40. Like the '754 Patent and Ahn, Chaudhri '842 “relate[s] generally to user interfaces that employ touch-sensitive displays.” EX1005, [0002]. Chaudhri '842 recognized that “there is a need for more efficient, user-friendly procedures for transitioning such devices, touch screens, and/or applications between user interface states (*e.g.*, from a user interface state for a first application to a user interface state

for a second application, between user interface states in the same application, or between locked and unlocked states).” EX1005, [0006]. In one embodiment described in greater detail below, Chaudhri ’842 describes supplying visual feedback to a user who is transitioning between user interface states on a touch screen by providing “visual differentiation between the user-interface object and the background, based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof.” See EX1005, [0085]. Through this embodiment, Chaudhri ’842 provides at least one possible set of implementation details particularly relevant to the blurring shown in Ahn.

41. Like Ahn’s mobile communication terminal, Chaudhri ’842 describes a portable electronic device 100 that includes a touch screen 126. EX1005, [0026]. “The touch screen 126 provides both an output interface and an input interface between the device and a user.” EX1005, [0033]. The portable electronic device also includes “one or more processors 106 run various software programs and/or sets of instructions stored in the memory 102 to perform various functions for the device 100 and to process data.” EX1005, [0028]. The “software components include an operating system 132, a communication module (or set of instructions) 134, a contact/motion module (or set of instructions) 138, a graphics module (or set of instructions) 140, a user interface state module (or set of instructions) 144, and one or more applications (or set of instructions) 146.” EX1005, [0037].

42. “The contact/motion module 138 includes various software components for performing various operations related to detection of contact with the touch screen 122, such as determining if contact has occurred, determining if there is movement of the contact and tracking the movement across the touch screen, and determining if the contact has been broken (i.e., if the contact has ceased).” EX1005, [0040]. “The graphics module 140 includes various known software components for rendering and displaying graphics on the touch screen 126.” EX1005, [0041]. The graphics module 140 may also include an optical intensity module 142 that “controls the optical intensity of graphical objects, such as user-interface objects, displayed on the touch screen 126.” EX1005, [0042]. “The user interface state module 144 controls the user interface state of the device 100.” EX1005, [0043].

43. “The device 100 may have a plurality of user interface states.” EX1005, [0048]. While many of the figures in Chaudhri ’842 focus on a transition between a locked and unlocked state, Chaudhri ’842 is clear that its disclosure applies more generally to any transitions between user interface states, such as states of a plurality of applications. *See* EX1005, [0006], [0048], [0079], [0081]. In at least one example, a user interface state transition described by Chaudhri ’842 involves the display of a menu that “includes interactive user-interface objects corresponding to various applications or operations.” EX1005, [0076], FIG. 5D.



EX1005, FIGS 5D (annotated).

44. With respect to FIG. 6 (reproduced below), Chaudhri '842 describes “a process 600 for indicating progress towards satisfaction of a user input condition.” EX1005, [0080]. “While an electronic device is in a first user-interface state, progress is detected (602) towards satisfaction of a user input condition needed to transition to a second user-interface state.” EX1005, [0081]. “While the device is in the first user-interface state, progress is indicated (604) towards satisfaction of the condition by transitioning an optical intensity of one or more user interface objects associated with the second user-interface state.” EX1005, [0082].

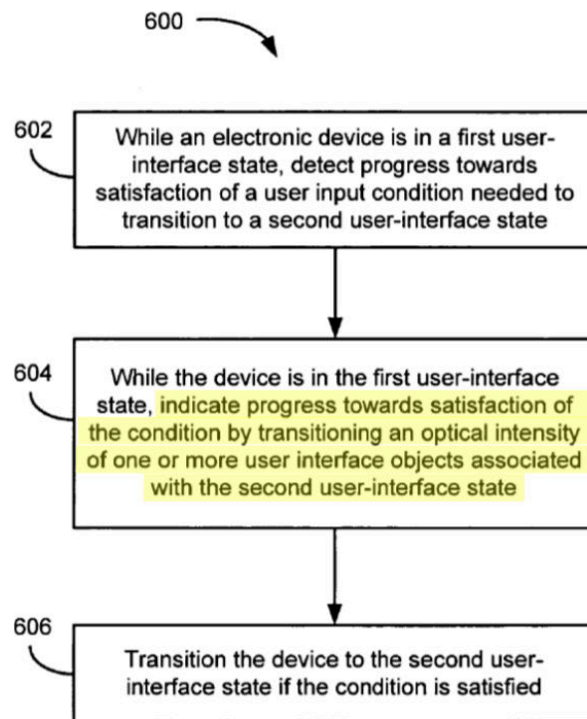


Figure 6

EX1005, FIGS 6 (annotated).

45. Chaudhri '842 describes that “the optical intensity may be the visual differentiation between the *user-interface object* and the *background*, based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof.” EX1005, [0085]. Among the various types of user-interface objects contemplated by Chaudhri '842 are, “without limitation, text, images, icons, soft keys (or ‘virtual button’), pull-down menus, radio buttons, check boxes, selectable lists, and so forth.” EX1005, [0060]. Accordingly, Chaudhri '842 explicitly

describes differentiating between a menu and a background displayed on the touch screen during its user interface state transition process.

46. The changes “in optical intensity of the user-interface objects provide[] a user with sensory feedback of the progress in transitioning between user interface states.” EX1005, [0082]. As shown above in FIG. 6, the transition between user interface states is dictated by “satisfaction” of a “user input condition.” EX1005, [0081]; *see also* EX1005 [0047] (“The predefined set of functions that are performed exclusively through the touch screen and the touchpad include navigation between user interfaces”). Chaudhri ’842 describes that this user input condition may include “a predefined gesture” and that “progress of the gesture may be defined in terms of how much of the gesture is completed.” EX1005, [0088]. The predefined gesture may include, for example, the user “dragging an image to a predefined location.” EX1005, [0089]. In these examples, as the user completes the predefined gesture (*e.g.*, dragging an image), Chaudhri ’842 teaches that changing the optical intensity of user interface objects helps the user see and understand that their gesture is causing a transition in user interface states and the progress they are making. *See* EX1005, [0082].

47. In one example, Chaudhri ’842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user”

to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state “fade in” while objects associated with the first user interface state “fade out.” *See* EX1005, [0079], [0087].

C. Hinkley (EX1006)

48. Like the '754 Patent, Ahn, and Chaudhri '842, Hinkley relates to user input for touch displays. *See* EX1006, [0001], [0003]. More specifically, Hinkley describes “bezel gestures for touch displays.” EX1006, [0003], [0039]. “The bezel is made up of the frame structure adjacent the device’s display” and “forms part of the device’s housing.” EX1006, [0044]. Hinkley seeks to utilize these bezel gestures in order to “provid[e] enhanced functionality for users, without necessarily permanently manifesting the functionality as part of the ‘chrome’² of a device’s user interface.” EX1006, [0001], [0003].

49. Hinkley describes its bezel gestures in the context of a computing device 102 that may take the form of a handheld device or wireless telephone that

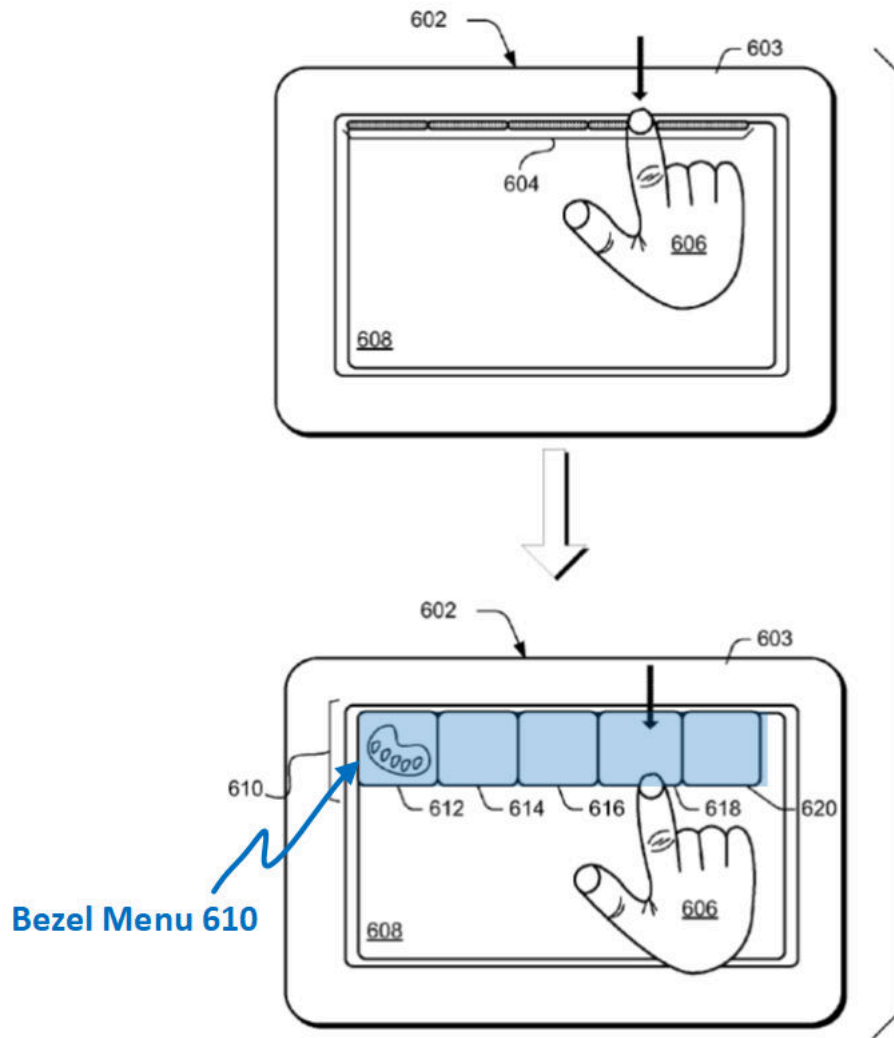
² In this context, a POSITA would have understood and found obvious that the “chrome” of a device’s user interface accounts for all of the visible graphical interface features of an application and/or the overall visible and usable display space.

utilizes a touchscreen display. *See* EX1006, [0043]-[0051]. The computing device 102 includes a “gesture module 104 [that] may be configured to recognize a touch input, such as a finger of a user's hand 106a as proximal to display device 108 of the computing device 102 using touchscreen functionality.” EX1006, [0045]. The computing device 102 also includes a “bezel gesture module 105 [that] can be configured to recognize a touch input, such as a finger of a user's hand 106b, that initiates a gesture on or adjacent bezel 103 and proceeds onto display device 108.” EX1006, [0045]. Hinkley describes that gesture modules 104 and 105 “are representative of functionality” and may be implemented in software. EX1006, [0044].

50. While Hinkley contemplates that the computing device 102 may include “sensing elements” that “extend underneath bezel 103,” Hinkley also recognizes an alternative embodiment in which the touchscreen “does not extend underneath bezel 103, but rather lies flush with the bezel,” and “bezel gesture module 105 can detect the changing contact profile of the user's finger as it emerges onto display device 108 from bezel 103.” EX1006, [0046]. In this regard, a POSITA would have recognized and found obvious that Hinkley's bezel gestures may be used with mobile devices that do not have special “bezel” hardware, and can instead utilize just a touch screen, like the one used in Ahn. *See* EX1006, [0046], [0057] (“The features of the gesture techniques described below are platform-independent,

meaning that the techniques may be implemented on a variety of commercial computing platforms having a variety of processors”).

51. Like Ahn, Hinkley describes associating inputs received on certain parts of the touchscreen of a computing device with different functionalities. *See* EX1006, [0061]. “For example, input received on the right side of the bezel might be mapped to a first functionality; input received on the left side of the bezel might be mapped to a second functionality and so on.” EX1006, [0061]. With respect to FIG. 6, for instance, Hinkley describes an embodiment in which a user utilizes a bezel gesture to access a bezel menu—a menu displayed along the side/edge/bezel of the display like the menus described in Ahn. *See* EX1006, [0072]-[0081].

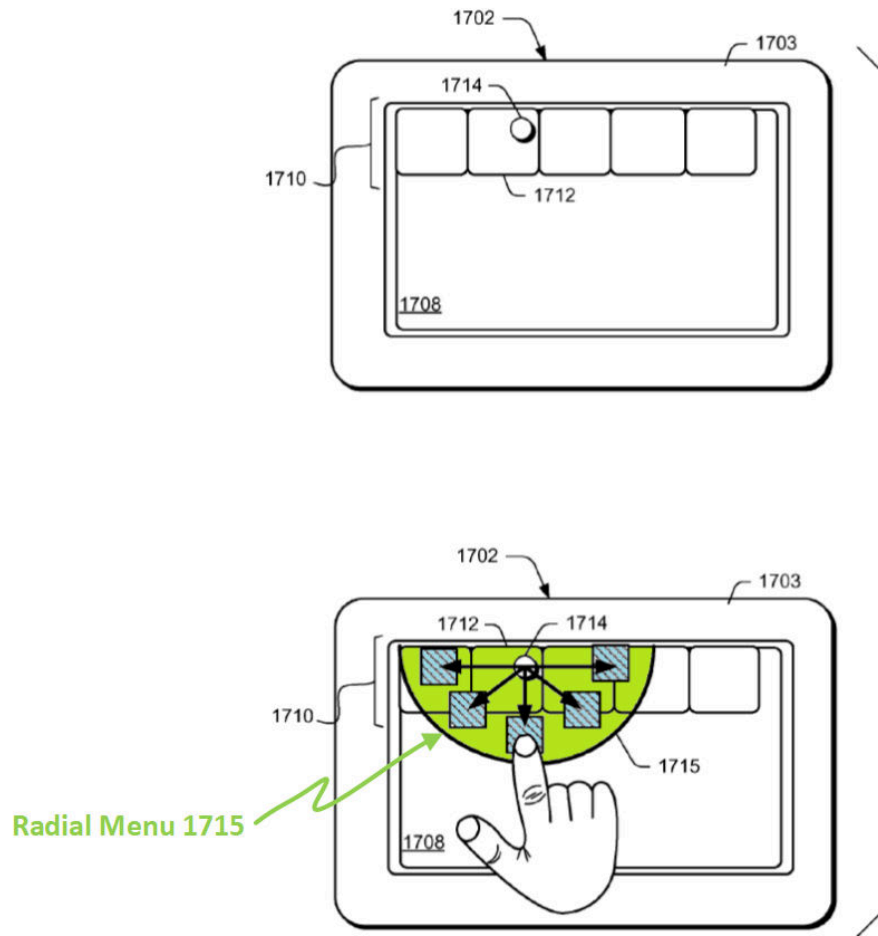


EX1006, FIG. 6 (annotated).

52. Specifically, “the bezel menu can be accessed through a bezel gesture in which a finger of user’s hand 606 touches the bezel and then moves across the bezel and onto the display device 608 in the direction of the illustrated arrow.” EX1006, [0073]. The “bezel menu 610 includes multiple selectable icons or slots 612, 614, 616, 618, and 620,” each of which is “associated with a different functionality.” EX1006, [0074]. “In the novice mode, after the user gestures to

reveal the bezel menu 610, the user can lift their finger, whereupon the bezel menu can remain open for a configurable interval (or indefinitely).” EX1006, [0077]. “The user may then tap on a desired item associated with one of the icons or slots 612, 614, 616, 618, and 620,” which causes “the functionality associated with a particular icon or slot can be accessed.” EX1006, [0077].

53. “In at least some embodiments, so-called radial menus can be utilized in connection with menus such as bezel menus.” EX1006, [0105]. An example of a bezel menu is shown in FIG. 17. EX1006, [0105], FIG. 17. In this example, “bezel menu 1710 includes multiple selectable icons or slots,” and “[e]ach of the icons or slots is associated with a different functionality.” EX1006, [0106].



EX1006, FIG. 17 (annotated).

54. “[I]con or slot 1712 includes a radial menu icon 1714 that gives a clue to the user that one or more radial menus, for example radial menu 1715, is associated with this particular icon or slot.” EX1006, [0107]. In some implementations, “[t]he radial menus 1715 can be accessed through a tap-and-hold of the pen or finger on or near the radial menu icon 1714.” EX1006, [0107]. “In some embodiments, tapping on the radial menu icon triggers a default action which may or may not be different than the action associated with tapping on the bezel

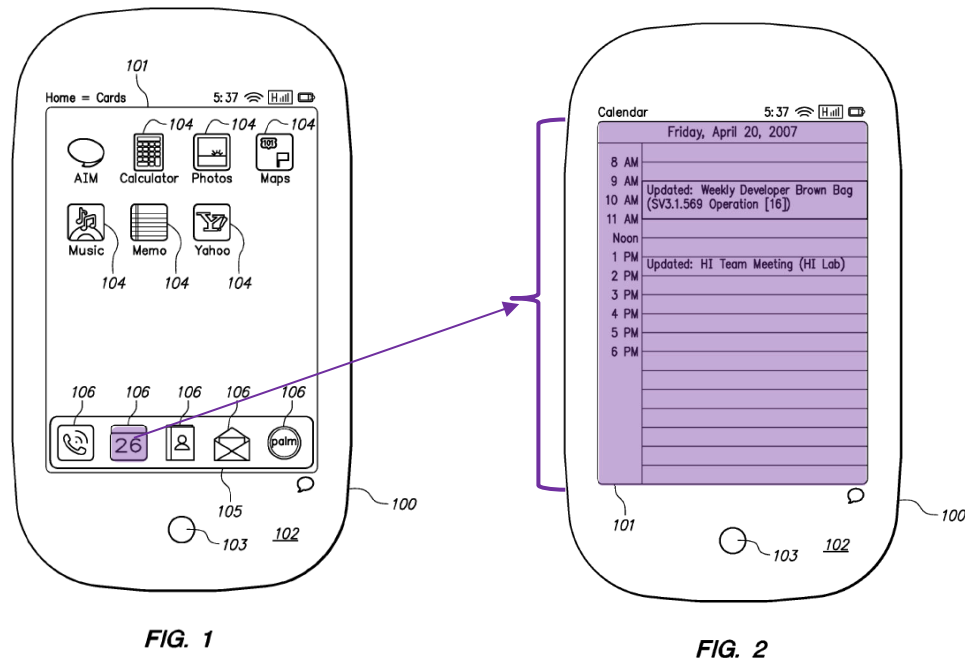
menu slot.” EX1006, [0107]. Thus, in at least one implementation, tapping the icon 1712 will trigger one action, while a tap-and-hold on the radial menu icon 1714 portion of icon 1712 will trigger a different action (i.e., opening the radial menu 1715).

D. Shiplacoff (EX1007)

55. Like the ’754 Patent, Ahn, and Chaudhri ’842, Shiplacoff relates to a device 100 with a touch-sensitive screen 101 that accepts “gesture-based commands” so that “so that a user can activate an application or function.” EX1013, [0064]. Shiplacoff teaches that “[m]any currently available computing devices run operating systems that offer users the opportunity to run several applications at the same time, and even to perform several activities simultaneously, within a single application and/or among two or more applications.” EX1013, [0005]. These computing devices include “[m]obile devices such as smartphones, personal digital assistants, music players, handheld computers, and the like.” EX1013, [0010]. Managing and navigating between multiple active applications was “accomplished by the use of multiple overlapping windows within a graphical user interface,” but the conventional windows-based techniques did “not function very well on mobile devices” due to “insufficient screen space to display multiple overlapping windows.” *See* EX1013, [0006]-[0010]. To solve this problem, Shiplacoff teaches user interface structures called “cards” that provide a visualization of active applications

and that allow a user to better “navigate among activities” on a mobile device.
EX1013, [0010], [0012]-[0013], [0060].

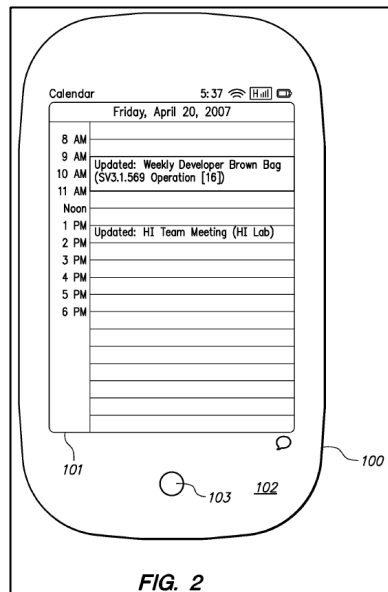
56. Like standby screen 300 of Ahn (*see* EX1004, [0036], FIG. 3A) and the home menu of Chaudhri '842 (*see* EX1005, [0047], [0076], FIG. 5D), Shiplacoff teaches a launch screen (illustrated in FIG. 1, which is reproduced below), which includes “several icons 104 representing applications that can be opened by the user.” EX1013, [0063], [0099]. “[S]creen 101 is touch-sensitive, so that a user can activate an application or function by touching a displayed icon 104, 106.” EX1013, [0064]. For example, by selecting the calendar icon 106, a card corresponding to a calendar application can be displayed in full screen, as shown in FIG. 2. EX1013, [0077]-[0078].



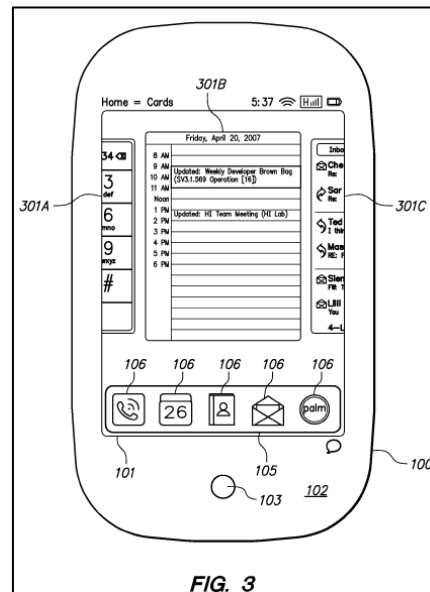
EX1013, FIGS. 1 (left), 2 (right)

57. Shiplacoff “provides techniques for displaying and manipulating representations of activities on an electronic device using a card metaphor.” EX1013, [0060]. “Cards” refer to “areas of the screen that can be moved and manipulated by the user.” EX1013, [0060]. “Users interact with cards to launch, terminate, and reorder activities, as well as to navigate among activities and perform other operations.” EX1013, [0060].

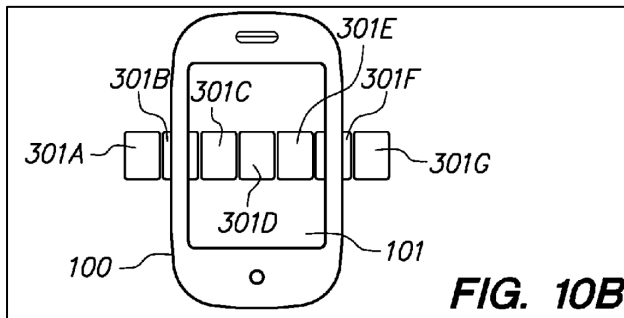
58. Shiplacoff also implements several display modes for navigating among the cards including a full-screen mode, a card mode, a shuffle mode, and a grid mode. EX1013, [0068]-[0073]. Examples of a full-screen mode are shown in FIG. 2, a card mode in FIG. 3, a shuffle mode in FIG. 10B, and a grid mode in FIG. 10G.



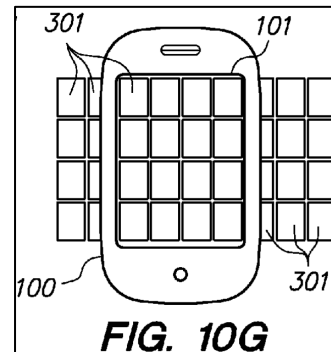
Full screen mode



Card Mode



Shuffle Mode



Grid Mode

EX1013, FIGS. 2 (top left), 3 (top right), 10B (bottom left), 10G (bottom right)

59. The “full-screen mode is optimized for maximum use of screen space for interacting with a single activity; [and the] card mode is optimized for easily switching focus from one activity to another and for easily initiating and terminating activities.” EX1013, [0074]. In other words, the card mode is a multitasking interface, as it allows a user to navigate between multiple activities.

60. In one or more of the modes (*e.g.*, the card mode), the device “can receive input from the user ... to switch from one display mode to another, and/or to reposition displayed cards in response to user input specifying a switch to another card.” EX1013, [0073], [0077]. In one example, a user can perform a “swipe up” gesture to “switch[] from full-screen mode to card mode, or from card mode to a launcher screen.” EX1013, [0127]. This allows the user to easily use gestures to navigate between different interfaces. For example, “the user can launch additional activities by returning to the launch screen as shown in FIG. 1.” EX1013, [0099].

E. The Combinations, Reasons to Combine, & Expectation of Success

61. Like the '413 patent, the respective disclosures of Ahn, Chaudhri '842, Hinkley, and Shiplacoff all seek to improve the usability of mobile devices with relatively small display screens. Accordingly, the Ahn-Chaudhri, Ahn-Chaudhri-Hinkley, Ahn-Chaudhri-Shiplacoff, and Ahn-Chaudhri-Hinkley-Shiplacoff combinations represent the predictable and expected result of applying in the context of Ahn's touch screen mobile device: [a] the user interface state transition techniques described by Chaudhri '842; [b] Hinkley's bezel gestures and associated user interface elements, including the bezel menus and radial menus; and [c] Shiplacoff's card metaphor multitasking interface. From a POSITA's perspective in 2011, integrating the supplemental teachings of Chaudhri '842, Hinkley, and Shiplacoff with Ahn's disclosure would have involved nothing more than applying known solutions to known problems in the field of computer interfaces and applications to achieve predictable outcomes. The fundamental aspects of Ahn's disclosure would remain intact, bolstered by the well-known, complementary and beneficial teachings of Chaudhri '842, Hinkley, and Shiplacoff to successfully arrive at the '754 patent's claimed invention.

1. Applying Chaudhri '842's teachings about user interface state transition in the context of Ahn's touch screen mobile device

62. A POSITA would have been motivated to use interface state transition techniques described by Chaudhri '842 in the context of Ahn's touch screen mobile device. The predictable result of this Ahn-Chaudhri combination is a mobile device that changes an optical intensity of one or more user interface objects as a function of progress towards satisfaction of a user's gesture input that transitions the mobile device from one user interface state to another. The following independent reasons support the Ahn-Chaudhri combination.

63. First, Chaudhri '842 provides one example of implementation details that are lacking for a feature otherwise disclosed in Ahn. As discussed in Section VIII.A, *supra*, Ahn already illustrates in FIGS. 3A and 4B that the process of opening the edge menus may cause user interface objects that are displayed as part of the standby screen 300 (*e.g.*, a clock widget) to be blurred when the edge menu is opened and displayed on the screen. However, Ahn does not provide further details about this blurring process and leaves the implementation details to POSITAs.

64. Chaudhri '842 provides one example of implementation details a POSITA would have found obvious to utilize when implementing the blurring already specifically taught in Ahn. Specifically, as discussed in Section VIII.B, *supra*, Chaudhri '842 provides details for utilizing transitions in optical intensity

during transitions in user interface state. A POSITA would have understood and found obvious that the opening of the edge menus described in Ahn are a form of transition in user interface state. Furthermore, a POSITA would have recognized that the touch and drag gesture described in Ahn for opening the edge menus is akin to the dragging gestures described in Chaudhri '842 for transitioning between user interface states. *See, e.g.*, EX1004, [0099] (“As the touch and drag operation is detected, the controller 50 controls to display an item list matched to the specific direction”); EX1005, [0075] (“performing the gesture by moving her finger, which is in continuous contact with the touch screen 408, in the direction of movement 504”). In the context of these related gestures and transitions, Chaudhri '842 provides additional details about the use of varying optical intensity for user interface objects that a POSITA would have found helpful to implement the optical effects shown but not otherwise described in Ahn (e.g., with respect to the clock widget in FIGS. 3A and 4B).

65. Second, Chaudhri '842 teaches that the “change in optical intensity of the user-interface objects provides a user with sensory feedback of the progress in transitioning between user interface states.” EX1005, [0082]. Based on these teachings a POSITA would have understood and found obvious that, as a user is performing a predefined gesture, for example, the changes in optical intensity provide the user a visual indication that they are performing a particular operation

(*e.g.*, the optical intensity changes help the user see more clearly that the user interface state is changing), what the operation is doing (*e.g.*, the optical intensity changes help the user visualize what is changing as a result of the gesture), and how far the user is in completing the gesture that will effectuate the change in user interface states. *See* EX1005, [0006], [0082], [0088]-[0089], [0108]. To help direct a user with respect to successfully performing the predefined gesture, Chaudhri '842 teaches that the user interface may additionally include “cues” to help the user know what gesture to utilize and whether they are correctly performing the gesture (*e.g.*, graphics such as movable images that, when combined with the transition in optical intensity, help the user visualize the correct gesture and how to complete it successfully). *See* EX1005, Abstract, [0054], [0062], [0073]. Furthermore, Chaudhri '842 teaches that changes in optical intensity help to create “visual differentiation between the user-interface object and the background,” which a POSITA would have understood and found obvious would have been visually helpful to a user both during the predefined gesture and after it is complete. *See* EX1005, [0085]. A POSITA would have understood and found obvious that these explicit benefits of Chaudhri '842's techniques would have been directly applicable to Ahn's mobile terminal and the opening of its edge menus.

66. Third, a POSITA would have known that transparency, translucency/blurring, and other “focus and context” techniques may be utilized in

user interfaces to help draw a user's attention to the most relevant part of a user interface. *See* EX1008, 1-2. Focus and context “techniques enable the user to investigate specific details of the data while at the same time also providing an overview over the embedding of the data under investigation within the entire dataset.” EX1008, 1. One type of focus and context technique (called “cue methods”) allows a “user to select objects in terms of their features, not their spatial relations; usually by assigning a certain visual cue to them,” which “make it possible to query the data for information which is not immediately visible in the initial visualization, while keeping the original layout, and thus not destroying the user's mental map.” EX1008, 1. These focus and context techniques utilize, for example, blur, transparency, and/or color saturation to help a user navigate through complex and multi-layer user interfaces by drawing the user's attention to the most relevant layers. *See* EX1008, 1-2. A POSITA would have understood and found obvious that this focusing technique is at least one reason for blurring the clock widget in Ahn's standby screen 300 so as to focus the user's attention on and not distract from the open edge menu (*e.g.*, menu 1300 in FIG. 13b). By utilizing the optical intensity variation described in Chaudhri '842, a POSITA would have recognized that they would have been better focusing a user's attention on the most relevant object (*i.e.*, the now opened menu).

67. Fourth, a POSITA would have known that varying optical intensity for a user interface object (*e.g.*, the blurring of Ahn's clock widget) as a function of the magnitude of the user's touch and drag gesture would have been one of a limited number of ways of implementing the blurring effect that's explicitly shown in FIGS. 4B, 10, and 13B of Ahn. Either a POSITA could have implemented the blurring effect in a binary fashion (*e.g.*, toggling instantaneously between unblurred and blurred) or progressively varied the blur as a function of the user's gesture, as taught by Chaudhri '842.

2. Applying Hinkley's teachings about bezel gestures and associated user interface elements in the context of the Ahn-Chaudhri touch screen mobile device

68. A POSITA would have been motivated to integrate Hinkley's teachings about bezel gestures and associated user interface elements, including the bezel menus and radial menus, in conjunction with the Ahn-Chaudhri touch screen mobile device. The predictable result of this Ahn-Chaudhri-Hinkley combination is a mobile device that utilizes various gestures on a touchscreen and techniques for discerning between them to implement, among other user interface objects, bezel menus and radial menus. A POSITA would have recognized and found obvious that Ahn's touch input device 100, memory 20, display 40, and controller 50 would have been capable of implementing the gesture functionality and user interface objects described by Hinkley, because Hinkley describes its gestures in the context of a

similar computing device 102 (*see* EX1006, [0043]), and describes that the functionality can be embodied in software stored in memory (*see* EX1006, [0044]) using a touchscreen display that does not require special hardware under the bezel (*see* EX1006, [0046]). However, a POSITA would have found it equally obvious to integrate into Ahn's mobile communication terminal 100 any of the hardware or software described by Hinkley that better or more fully supports the gesture functionality and user interface objects described by Hinkley (*e.g.*, sensing elements that extend underneath bezel). *See* EX1006, [0045]. The following independent reasons support the Ahn-Chaudhri-Hinkley combination.

69. First, a POSITA would have recognized that the side menus described in Ahn and the bezel menus described in Hinkley are similar user interface objects, and therefore that the techniques described in Hinkley with respect to its bezel menus would have been equally beneficial in the context of Ahn's side menus, and would have provided beneficial implementation details otherwise left unspecified in Ahn. For example, Hinkley describes "different gestural modes can be utilized to access functionality associated with the bezel menu." EX1006, [0076]. In a novice mode, the gestures are "visually guided . . . based on direct manipulation of a widget." *See* EX1006, [0077]-[0080], [0110]. In an expert mode, as the user becomes more familiar with the interface, the same or a similar gesture can be performed "based on ballistic motion driven by procedural memory" to allow the user to more quickly

perform actions on the user interface without waiting for the visual guides to appear. *See* EX1006, [0077]-[0080], [0110]. “The concept succeeds because the novice way of using it helps to learn and encourage the expert way of working with it.” EX1006, [0079]. A POSITA would have recognized that implementing Hinkley’s different user interaction modes in the context of Ahn’s mobile communication terminal would have created a user interface that adapts to a user’s experience level and created a more intuitive, efficient, and pleasing experience for a user.

70. Furthermore, Hinkley describes that its techniques for identifying a user’s input relative to the bezel of the computing device “are usable to differentiate the touch input from other touch inputs recognized by the gesture modules 104, 105.” EX1006, [0046]. “This yields the general benefit that gestures that start from the bezel and enter onto the screen are, in general, distinguishable from other ostensibly similar gestures that access on-screen content.” EX1006, [0046]. “Hence, normal direct manipulative gestures, even for objects near the screen boundaries, are still possible and do not interfere with bezel gestures and vice versa.” EX1006, [0046]. A POSITA would have recognized that implementing Hinkley’s specific gesture recognition techniques in the context of Ahn’s mobile communication terminal would have yielded these same general benefits in gesture distinction described by Hinkley.

71. Additionally, Hinkley describes that its bezel gestures allow a user to “readily access enhanced functions of a computing device in an efficient and intuitive manner.” EX1006, [0040]. One efficiency gained through the use of such bezel gestures and associated menus is that a user gains access to enhanced functions “without necessarily permanently manifesting the functionality as part of the ‘chrome’ of a device’s user interface.” EX1006, [0001]. In other words, Hinkley’s techniques allow for the conservation of valuable screen real estate, particularly on mobile devices. Again, a POSITA would have recognized that these benefits would have been equally applicable to the similar context of Ahn’s mobile communication terminal.

72. Second, given the similarity of context and the problems being solved in each of Ahn and Hinkley (*e.g.*, intuitively and efficiently displaying user interface elements such as menus on a touch screen computing device), and the similar manner in which each of Ahn and Hinkley describe solving that problem (*e.g.*, touching and dragging/swiping a finger on the touch screen in a particular direction and/or from a particular location), a POSITA would have understood that utilizing the techniques described in Hinkley with respect to the gesture module 104 and bezel gesture module 105 (*e.g.*, the implementation and operation of the bezel menus and radial menus) would have been a simple substitution of one known element for another to obtain predictable results.

3. Applying Shiplacoff's teachings about a card metaphor multitasking interface in the context of the Ahn-Chaudhri touch screen mobile device

73. Like the '754 patent, the respective disclosures of Ahn, Chaudhri '842, and Shiplacoff all seek to improve the usability of mobile devices with relatively small display screens. A POSITA would have found it obvious and been motivated to integrate Shiplacoff's teachings about its card metaphor in conjunction with the Ahn-Chaudhri touch screen mobile device. The predictable result of this Ahn-Chaudhri-Shiplacoff combination is a mobile device that utilizes gestures on a touchscreen for launching and navigating between multiple active activities. *See also* EX1013, [0175]-[0184] (describing Shiplacoff's teachings "are not inherently related to any particular computer, virtualized system, or other apparatus"). The fundamental aspects of Ahn's disclosure would remain intact, bolstered by the well-known, beneficial, and complementary teachings of Chaudhri '842 (*e.g.*, transitions in optical intensity during transitions in under interface states to provide visual cues and feedback to the user) and Shiplacoff (*e.g.*, for launching and navigating between multiple active applications/functions/activities).

74. A POSITA would have been motivated to incorporate the teachings of Shiplacoff into the Ahn-Chaudhri touch screen mobile device, because Shiplacoff provides one example of implementation details that are lacking for a feature otherwise disclosed in Ahn. Generally, Ahn describes "displaying a standby screen

in a display of the mobile communication terminal, selecting one of a plurality of specific directions through an input device of the mobile communication terminal, and displaying each menu corresponding to the selected specific direction on the standby screen.” EX1004, Abstract. However, Ahn does not provide many details about or otherwise limit how its mobile device handles selection of various of its menu items and activation of their associated function. For example, with respect to user menu 420, Ahn describes that selection of the brightness setting menu 420a causes the display of a corresponding window (*see* EX1004, [0053], FIG. 5A), but Ahn does not illustrate similar windows for more complex functions or applications, such as the “Messages” menu item illustrated in FIG. 7B. *See* EX1004, [0062]-[0072]. Nor does Ahn describe or otherwise limit the manner in which a user would activate multiple tasks simultaneously or navigate between them.

75. A POSITA would have understood and found obvious that implementing Shiplacoff’s card metaphor in the context of Ahn’s mobile terminal would have provided a user interface paradigm that would have allowed Ahn’s mobile terminal to more easily and efficiently “offer users the opportunity to run several applications at the same time, and even to perform several activities simultaneously,” as was common in mobile devices available before the Critical Date. *See* EX1013, [0005]-[0010], [0060]. A POSITA would have been motivated to make the Ahn-Chaudhri-Shiplacoff combination based on these express benefits.

76. A POSITA would have found it obvious that at least one way to implement the Ahn-Chaudhri-Shiplacoff combination would have been to associate one of the directions of Ahn's touch-and-drag gesture with the navigation between the different card navigation "modes," consistent with the teachings of Shiplacoff. *See* EX1013, [0127]-[0128]. For example, in one obvious implementation of the Ahn-Chaudhri-Shiplacoff combination, a POSITA would have found it obvious that activities/applications/functions would have been selected/launched from Ahn's menus (e.g., the "Organizer" activity/application/function illustrated in FIG. 7B) and/or from icons displayed on the standby screen 300, consistent with the teachings of Chaudhri '842 (*see* EX1005, [0047], [0076], FIG. 5D) and Shiplacoff (*see* EX1013, [0063], [0099], FIG. 1). The selected/launched activity would have been displayed in a full screen card, as taught by Shiplacoff. *See* EX1013, [0077]-[0078]; When a user performs a touch-and-drag gesture in the upward direction (akin to the "swipe-up" gesture described by Shilacoff), instead of displaying the service provider additional service menu 620 shown in FIG. 6B, the mobile terminal would "switch[] from full-screen mode to card mode, or from card mode to a launcher screen." *See* EX1013, [0127].

4. The Combination of Ahn, Chaudhri, Hinkley, and Shiplacoff

77. As discussed in Section VIII.E.1, *supra*, a POSITA would have found it obvious and been motivated combine the teachings of Ahn and Chaudhri '842 to,

e.g., integrate the transitions in optical intensity taught by Chaudhri '842 during the transitions in user interface states described by Ahn to provide visual cues and feedback to the user. As discussed in Section VIII.E.2, *supra*, a POSITA would have found it obvious and been motivated combine the teachings of Ahn and Hinkley to, *e.g.*, integrate into Ahn device implementation details related to edge gestures and menus taught by Hinkley and otherwise absent from Ahn that help distinguish between a variety gestures and permit a user to progressively learn faster and more efficient gestures. And, as discussed in Section VIII.E.3, *supra*, a POSITA would have found it obvious and been motivated combine the teachings of Ahn and Shiplacoff to, *e.g.*, provide details for launching and navigating between multiple active applications/functions/activities. A POSITA would have understood and found obvious that each of these combinations would have improved a distinct aspect of Ahn's mobile terminal, and therefore their teachings are complementary and additive to the teachings of Ahn together in the same manner as individually. Thus, the POSITA would have been motivated to combine Chaudhri, Hinkley, and Shiplacoff together with Ahn for the same reasons described above.

IX. GROUND 1A: AHN AND CHAUDHRI '842, RENDER CLAIMS 2, 8, 10, 16, 24, 26-30, 32-38, 40, 42-44, 46, 47, 52, 54, 57-64, 67-79, 186, 187, 189, 191, 192, 197, 199-204, 223-225, and 230 OBVIOUS

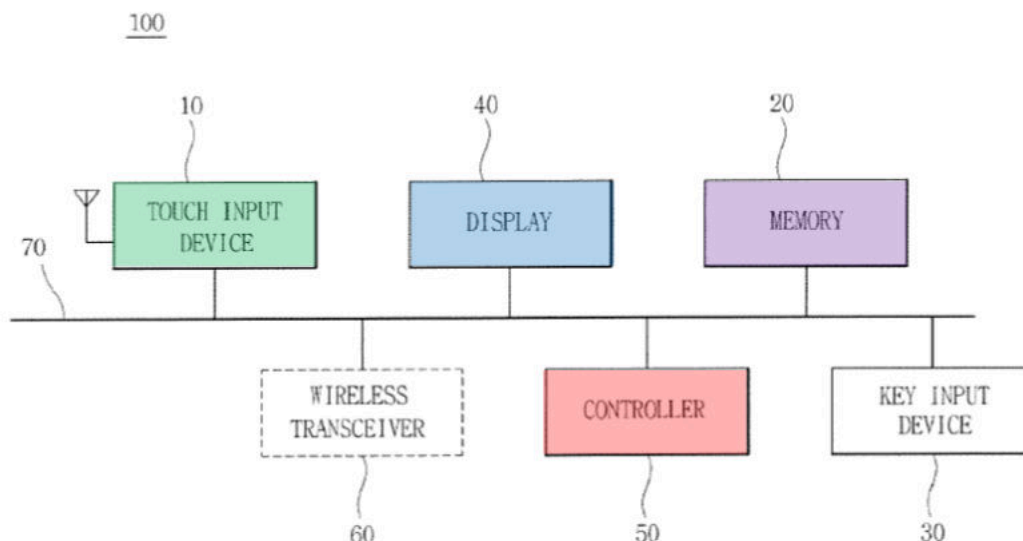
A. Claim Element Analysis

1. Claim 2

[2.a] An apparatus, comprising: at least one non-transitory memory; a touch screen; and one or more processors in communication with the at least one non-transitory memory, and the touch screen, wherein the one or more processors execute instructions in the at least one non-transitory memory to cause the apparatus to . . .

78. The Ahn-Chaudhri combination renders obvious Element [2.a]. For example, Ahn describes a mobile communication terminal 100 that comprises “a **touch input device 10**, a **memory 20**, a key input device 30, a display 40, a **controller 50**, and a wireless transceiver 60.” EX1004, [0027], FIG. 1.

FIG. 1



EX1004, FIG. 1 (highlighted).

79. “The **memory 20** comprises a program memory and a data memory. Programs for controlling a general operation of the mobile communication terminal 100 are stored in the program memory.” EX1004, [0029]. A POSITA would have understood or found obvious that Ahn’s **memory 20** is *at least one non-transitory memory*, as recited in [1.a].

80. The **touch input device [10]** is a device in which a user inputs various information or instruction with a touch method. The touch input device [10] comprises, for example, a touch screen or a touch pad.” EX1004, [0028]. When described with respect to FIGS. 13-15, Ahn explains that the user provides input (e.g., a touch and drag operation) through the touch screen 10, and display 40 is illustrated as being collocated with the touch screen 10 so that it can “match” the display of menus with these gestures. See EX1004, FIGS. 13-15, [0101]-[0104]. Though Ahn describes the touch screen 10 and **display 40** as separate elements, a POSITA would have understood and found obvious that these elements may be the same physical device, consistent with the description of FIGS. 13-15. Indeed, Chaudhri ’842 addresses similar user interface problems for similar mobile touchscreen devices, and Chaudhri ’842 describes that its portable electronic device includes a “touch screen 126 [that] provides both an output interface and an input interface between the device and a user.” EX1005, [0033]. A POSITA would have

understood or found obvious that Ahn's **touch input device 10** is a *touch screen*, as recited in [2.a].

81. “The **controller 50** controls a general operation of the mobile communication terminal 100.” EX1004, [0032]. Ahn does not explicitly describe hardware implementation details for controller 50. However, **controller 50** is described, for example, as interfacing with **memory 20** (see EX1004, [0099]-[0100]), controlling the **display 40** (see EX1004, [0099], [0106], [0108]), and detecting a touch and drag operation input via **touch input device 10** (see EX1004, [0099], [0107], [0109]). A POSITA would have understood and found obvious that Ahn's description of controller 50 is indicative that at least one known hardware implementation for controller 50 would have been *one or more processors*, as recited in [1.a]. Indeed, Chaudhri '842 addresses similar user interface problems for similar mobile touchscreen devices, and Chaudhri '842 describes that their respective devices comprise *one or more processors*, as recited in [2.a]. See EX1005, [0026] (portable electronic device “includes a memory 102, a memory controller 104, one or more processing units (CPUs) 106, a peripherals interface 108, RF circuitry 112, audio circuitry 114, a speaker 116, a microphone 118, an input/output (I/O) sub system 120, a touch screen 126, . . .”). Furthermore, Ahn describes that each of the **memory 20**, **touch input device 100**, and **controller 50** “may be connected by a bus 70.” EX1004, [0027]. Thus, a POSITA would have

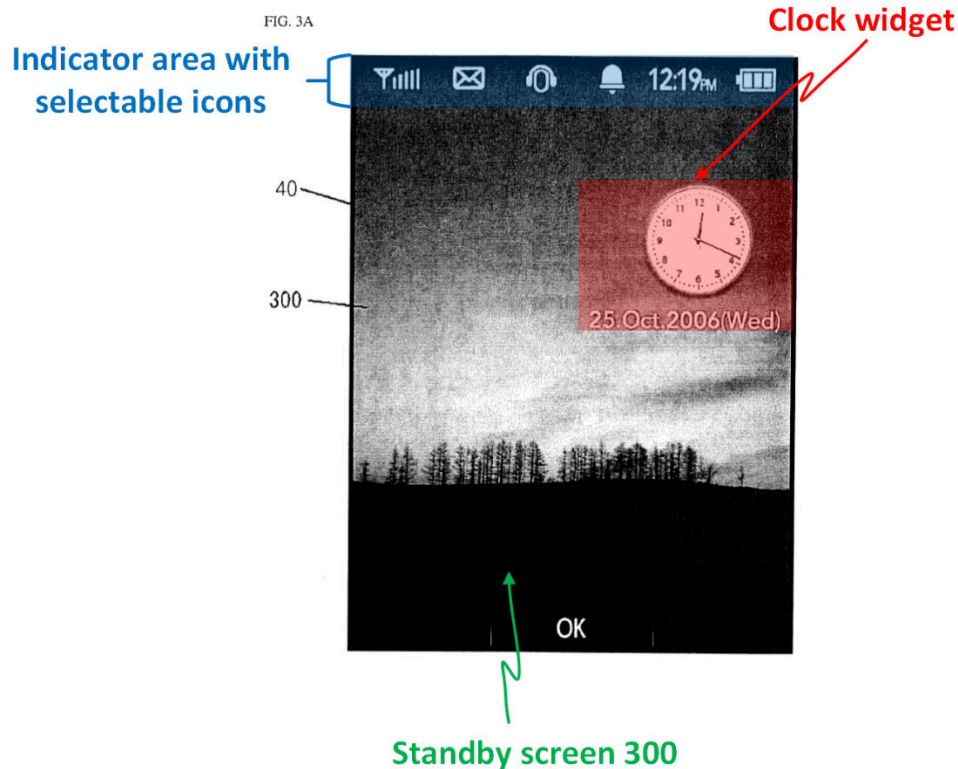
understood and found obvious that Ahn's **controller 50** is *one or more processors in communication with the at least one non-transitory memory, and the touch screen*, as recited in [2.a].

82. Furthermore, a POSITA would have understood or found obvious that Ahn's "programs for controlling a general operation of the mobile communication terminal [] stored in the program memory" of **memory 20** are *instructions in the at least one non-transitory memory*, as recited in [2.a]. EX1005, [0029]. Indeed, Chaudhri '842 address similar user interface problems for similar mobile touchscreen devices, and Chaudhri '842 describes that its respective devices comprise *one or more processors execute instructions in the at least one non-transitory memory*, as recited in [2.a]. See EX1005, [0028] ("The one or more processors 106 run various software programs and/or sets of instructions stored in the memory 102 to perform various functions for the device 100 and to process data."). Accordingly, a POSITA would have understood and found obvious that *the one or more processors (e.g., Ahn's **controller 50**) execute instructions (e.g., Ahn's "programs") in the at least one non-transitory memory (e.g., Ahn's **memory 20**) to cause the apparatus* to perform Elements [2.b]-[2.d], as recited in [2.a].

[2.b] display an object and at least one other object;

83. The Ahn-Chaudhri combination renders obvious Element [2.b].

84. For example, with respect to FIG. 3A, Ahn describes that “a standby screen 300 set by a user is displayed in the display 40 of the mobile communication terminal 100.” EX1004, [0036]. Ahn illustrates a clock widget as part of this standby screen 300. *See* EX1004, FIGS. 3A, 12 and 13a. Ahn also illustrates that several menu items are displayed at the top of the standby screen 300. *See* EX1004, FIGS. 3A, 3C, 12 and 13a, [0040]. Ahn describes these menu items are part of an “indicator area 320 [that] comprises a signal intensity icon 330a, a message notification icon 330b, a background music setting icon 330c, a reception mode setting icon 330d, a watch icon 330e, and a battery residual quantity display icon 300f, for example.” EX1004, [0040]. And, unlike other menus that are only displayed after a specific gesture, “various icons can be displayed in the indicator area 320 on the standby screen 300.” EX1004, [0040].



EX1004, FIG. 3A (annotated)

85. Indeed, for the touch interface embodiments described with respect to FIGS. 11-18, Ahn does not include a separate discussion of opening the indicator area 320, as it does with regard to the menus associated with the bottom and right and left sides of the display. *See generally* EX1004, [0095]-[0119]. Thus, a POSITA would have thus understood and found obvious that the standby screen 300 includes indicator area 320 and that a user would have been able to directly activate and interact with its various icons directly from the standby screen 300.

86. A POSITA would have understood and found obvious that at least one of the icons in the indicator area 320 and the clock widget displayed on display 40

of Ahn's mobile communication terminal 100 are *an object and at least one other object*, respectively, as recited in [2.b]. Indeed, Chaudhri '842 describes menus and the background screen as "objects." See EX1005, [0003] ("A device may display one or more soft keys, menus, and other user-interface objects on the touch screen"), [0041] ("Note that the term 'graphics' includes any object that can be displayed to a user, including without limitation text, web pages, icons (such as user-interface objects including soft keys), digital images, videos, animations and the like."), [0060] ("The user-interface objects are objects that make up the user interface of the device and may include, without limitation, text, images, icons, soft keys (or 'virtual buttons'), pull-down menus, radio buttons, check boxes, selectable lists, and so forth."), [0076] ("The menu 506 includes interactive user-interface objects corresponding to various applications or operations. A user may interact with the user-interface objects to activate an application or perform an operation.").

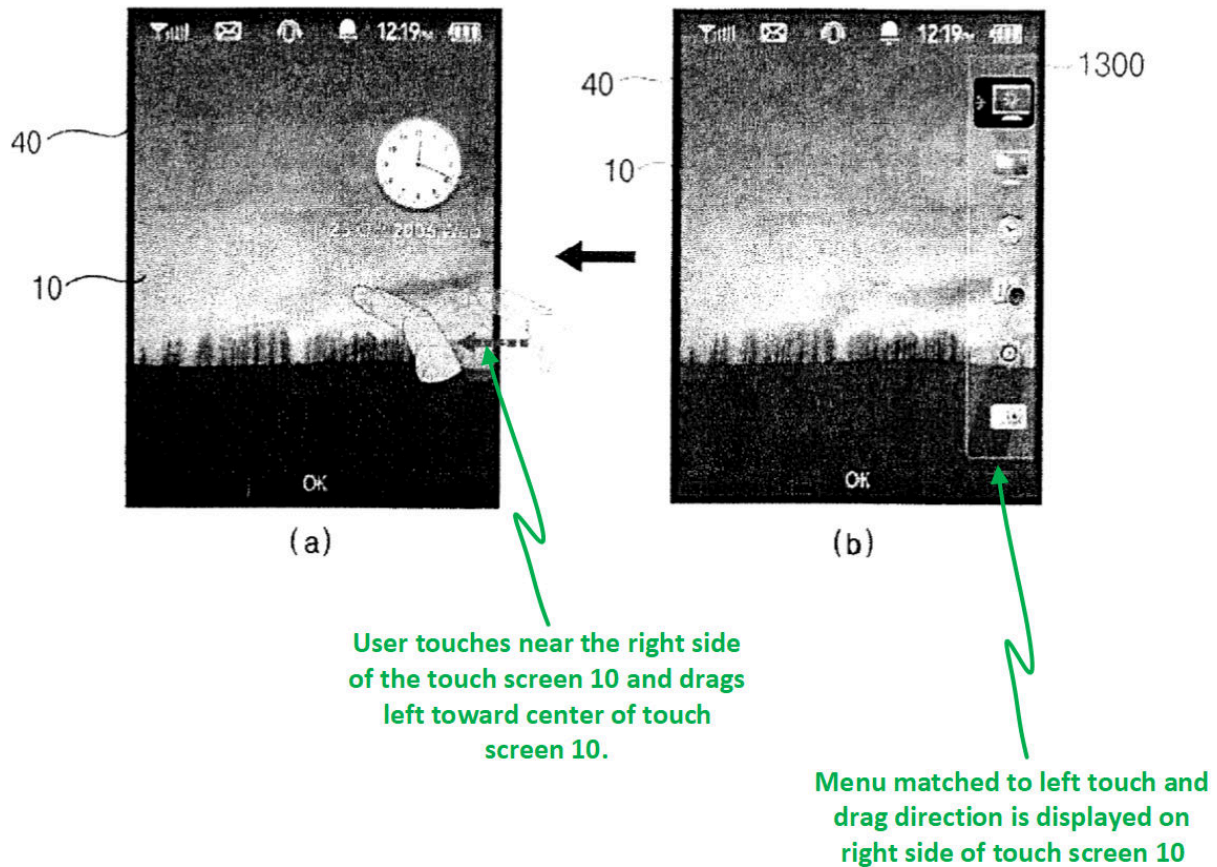
87. From at least these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri would have *display[ed] an object* (e.g., icons displayed as part of standby screen 300) *and at least one other object* (e.g., the clock widget of standby screen 300), as recited in [2.b].

[2.c] detect at least part of a gesture on the touch screen; and

88. The Ahn-Chaudhri combination renders obvious Element [2.c].

89. For example, as discussed in Section IV.A.1, *supra*, Ahn describes “a method of displaying a menu in a mobile communication terminal having a touch input device,” in which a menu is displayed in response to a “touch and drag operation.” EX1004, [0095]-[0099]. Initially, a controller 50 of the mobile communication terminal “detects a touch and drag operation of a specific direction on the touch screen 10 (S1110).” EX1004, [0098].

FIG. 13



EX1004, FIGS. 13a and 13b (annotated)

90. In one example illustrated in FIGS. 13a and 13b, “if the user touches a specific position of the touch screen 10 and drags the touch in a left direction a menu list 1300 matched to a left direction is displayed in the display 40.” EX1004, [0102]. As can be seen in FIG. 13a, a user initially touches near the right side or edge of the touch screen 10 and initiates the drag gesture that moves inward toward the center of the display. *See* EX1004, FIG. 13a, [0102]. A POSITA would have understood and found obvious that Ahn’s “touch and drag operation” is a gesture. *See* EX1005, [0055] (“As used herein, a gesture is a motion of the object/appendage making contact with the touch screen. For example, the predefined gesture may include a contact of the touch screen on the left edge (to initialize the gesture), a horizontal movement of the point of contact to the opposite edge while maintaining continuous contact with the touch screen, and a breaking of the contact at the opposite edge (to complete the gesture).”)

91. Thus, as shown in at least FIGS. 13a and 13b and described with respect thereto, Ahn explicitly teaches, ***detect[ing] at least part of a gesture on the touch screen***, as recited in [2.c].

[2.d] during detection of at least a portion of the gesture before a completion thereof is detected, blur, based on a change in a magnitude of the gesture being detected on the touch screen, at least a portion of the at least one other object.

92. The Ahn-Chaudhri combination renders obvious Element [2.d].

93. As discussed in Section VIII.A, *supra*, Ahn describes the use of blurring in at least two ways. First, Ahn describes that the displayed menus may be “displayed on the standby screen 300. . . in a translucent form” EX1004, [0070] (emphasis added). A POSITA would have known and found it obvious that, when differentiated from “transparent” and “opaque” in the manner they are used by Ahn, the word “translucent” means “allowing light, but not detailed images, to pass through; semitransparent.” EX1009, 6. A POSITA would have understood not transmitting detail as a type of blurring, because the word “blur” means to “make or become unclear or less distinct.” EX1009, 3. This is consistent with the ’754 Patent’s use of the word “blur” in its claims, because dependent claim 61, for example, recites that “the blur includes changing a translucency of the at least portion of the at least one other object.” EX1001, 99:51-53. In other words, a POSITA would have known and found it obvious that Ahn contemplates that, when embodied in translucent form, its menus would have blurred at least a portion of the background standby screen (*e.g.*, shown in FIG. 12) by rendering the portion under which it is displayed as unclear or less distinct.

94. A POSITA would have understood and found obvious that, as a user utilizes the dragging gesture to open a given translucent menu, the translucent menu would progressively slide onto the display as a function of the magnitude of the user’s dragging gesture. With respect to FIG. 18, Ahn describes that the display 40

may utilize “a graphical display for notifying a start position of a touch and drag operation to a user,” and clearly shows “a graphical shadow 1800” displayed at a first edge of the display (e.g., the left edge in this example) that indicates the start position of the touch is along the first edge. *See* EX1004, [0118]-[0119]. Ahn explains that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, EX1004, [0118]. Similarly, Chaudhri ’842 describes moving displayed graphics in correspondence with the magnitude of gestures associated with those graphics in order to provide the user who is performing the gesture a visual confirmation of the gesture and help direct them on how to complete the gesture. *See* EX1005, [0054] (describing the display of “visual cue(s)” to provide “hints or reminders” regarding the action necessary to transition between user interface states), [0060] (describing that the “user may interact with the user-interface objects by making contact with the touch screen at one or more touch screen locations corresponding to the interactive objects with which she wishes to interact” and the “device detects the contact and responds to the detected contact by performing the operation(s) corresponding to the interaction with the interactive object(s)”), [0062] (describing that a visual cue, such as an image, may move along with the gesture as the gesture is detected). A POSITA would have understood and found obvious from these teachings that, in at least implementations like those described with respect to FIG. 18, Ahn’s menu list would have been

graphically displayed as sliding onto the display based on a change in a magnitude of the “touch and drag” gesture being detected on the touch screen.

95. A POSITA would have understood and found obvious that, as a translucent menu slides onto the screen in correspondence with the magnitude of the touch and drag gesture, the translucent menu would correspondingly progressively blur the portion of the background over which the menu is displayed (including, *e.g.*, the clock widget) as it slides onto the screen. Accordingly, when displayed as a translucent window (as opposed to a transparent window), Ahn’s menu would have, ***during detection of at least a portion of the gesture before a completion thereof is detected, blur[red], based on a change in a magnitude of the gesture being detected on the touch screen, at least a portion of the at least one other object***, as recited in [2.d].

96. Second, Ahn additionally illustrates blurring at least a portion of background standby screen 300 (*e.g.*, a clock widget) as a result of a user opening one of the menus. *See* EX1004, FIGS. 4B, 10, 13B. In FIG. 3A, Ahn illustrates that a clock widget is part of the background standby screen 300. *See* EX1004, [0036], FIG. 3A. A similar clock widget is shown as part of the background standby screen 300 in FIGS. 12 and 13a. *See* EX1004, [0097], [0102], FIGS. 12, 13a. As can be seen in FIG. 4B, when the user menu 420 is opened, Ahn illustrates that the clock widget becomes blurred, which is pointed out with red arrows in the below

annotation of FIGS. 3A and 4B. *See* EX1004, [0036], FIGS. 3A, 4B. A similar blurring effect of the clock widget can also be seen in FIGS. 10 and 13B. *See* EX1004, FIGS. 4B, 10. As above, a POSITA would have understood the illustration of the clock widget in FIGS. 4B, 10, and 13B as “blurred,” consistent with the usage of that word in at least dependent claim 61 of the ’754 Patent. *See* EX1001, 99:51-53 (“the blur includes changing a translucency of the at least portion of the at least one other object”); EX1009, 3 (“blur” means “make or become unclear or less distinct”), 6 (“translucence” means “allowing light, but not detailed images, to pass through; semitransparent”).

FIG. 3A

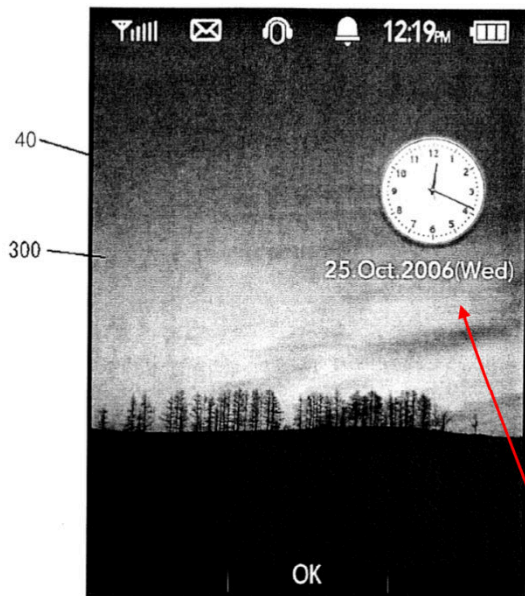
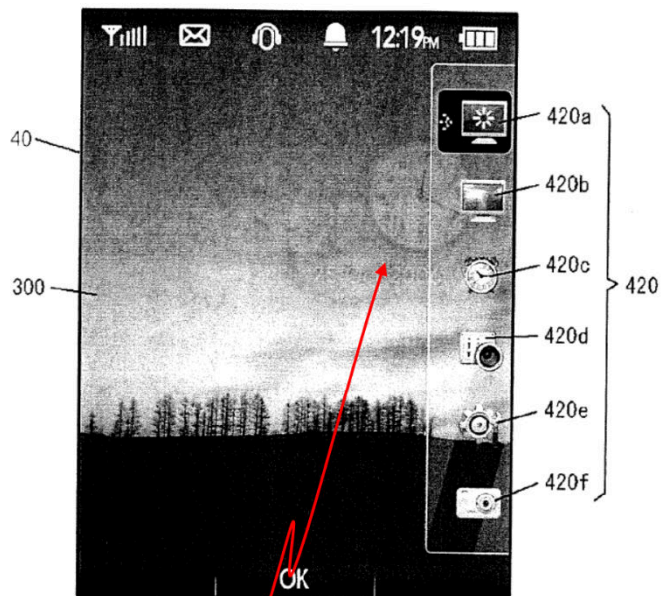


FIG. 4B



**Clock widget is blurred when user
menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

97. Ahn does not specify or otherwise limit the manner in which a POSITA would have implemented the above-described blurring of its clock widget. For the reasons described in Section VIII.E, *supra*, a POSITA would have found it obvious to apply Chaudhri '842's user interface state transition techniques—particularly the use of transitioning optical intensity to provide visual feedback regarding the progress of a transition between user interface states as a result of detecting a user's input of a predefined gesture—in the context of Ahn's mobile communication terminal 100.

98. As discussed in Section VIIIB, *supra*, Chaudhri '842 describes “a process 600 for indicating progress towards satisfaction of a user input condition.” EX1005, [0080]. “While an electronic device is in a first user-interface state, progress is detected (602) towards satisfaction of a user input condition needed to transition to a second user-interface state,” and “progress is indicated (604) towards satisfaction of the condition by transitioning an optical intensity of one or more user interface objects associated with the second user-interface state.” EX1005, [0081]-[0082].

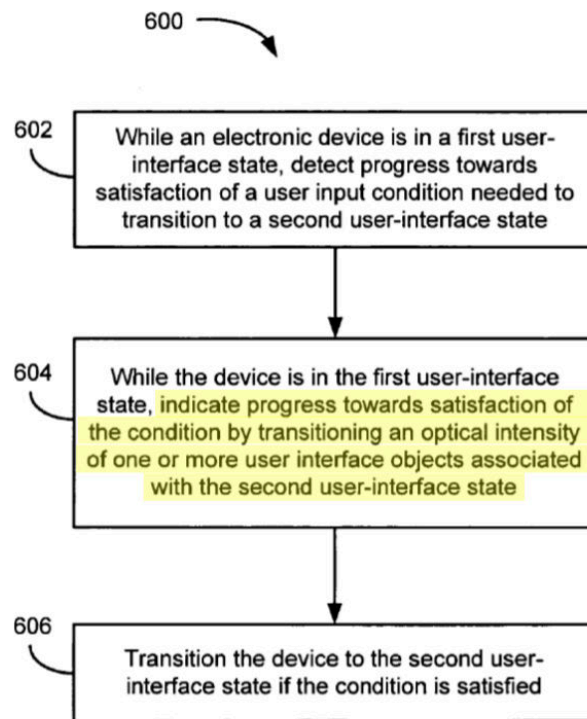


Figure 6

EX1005, FIG. 6 (annotated)

99. Chaudhri '842 describes that “the optical intensity may be the visual differentiation between the *user-interface object* and the *background*, based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof.” EX1005, [0085]. Among the various types of user-interface objects contemplated by Chaudhri '842 are, “without limitation, text, images, icons, soft keys (or ‘virtual button’), pull-down menus, radio buttons, check boxes, selectable lists, and so forth.” EX1005, [0060]. Accordingly, Chaudhri '842 explicitly describes differentiating between a menu and a background displayed on the touch screen during its user interface state transition process.

100. Chaudhri '842 describes that the optical intensity, and thus “the indication of progress towards completion of the user input condition[,] is a function of the user’s satisfaction of the condition.” EX1005, [0087]. “If the user input condition includes a predefined gesture then the indication of progress of the gesture may be defined in terms of how much of the gesture is completed and how much of the gesture is remaining.” EX1005, [0088]. As the user input condition (*e.g.*, a gesture) progresses, the optical intensity can correspondingly vary in magnitude based on the magnitude of the progress toward gesture completion according to both linear and non-linear functions, such as those illustrated in FIGS. 8A-8C. *See* EX1005, [0087]-[0088].

101. Applying at least the above teachings of Chaudhri '842 in the context of Ahn's "touch and drag" gesture and Ahn's corresponding transition between a user interface state where the standby screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary, according to the teachings of Chaudhri '842, the optical intensity of the standby screen or at least portions thereof (*e.g.*, the blurring of the clock widget, as shown in FIGS. 4B, 10, and 13b) as a visual indication of a user's progress in completing Ahn's "touch and drag" gesture. *See* EX1005, [0080]-[0089]. In addition to providing a visual indication to the user of their progress in completing the gesture, utilizing this progressive translucency or blurring effect would have helped differentiate between the user-interface object (*e.g.*, the menu list 1300) and the background (*e.g.*, the standby screen and/or clock widget). *See* EX1005, [0085].

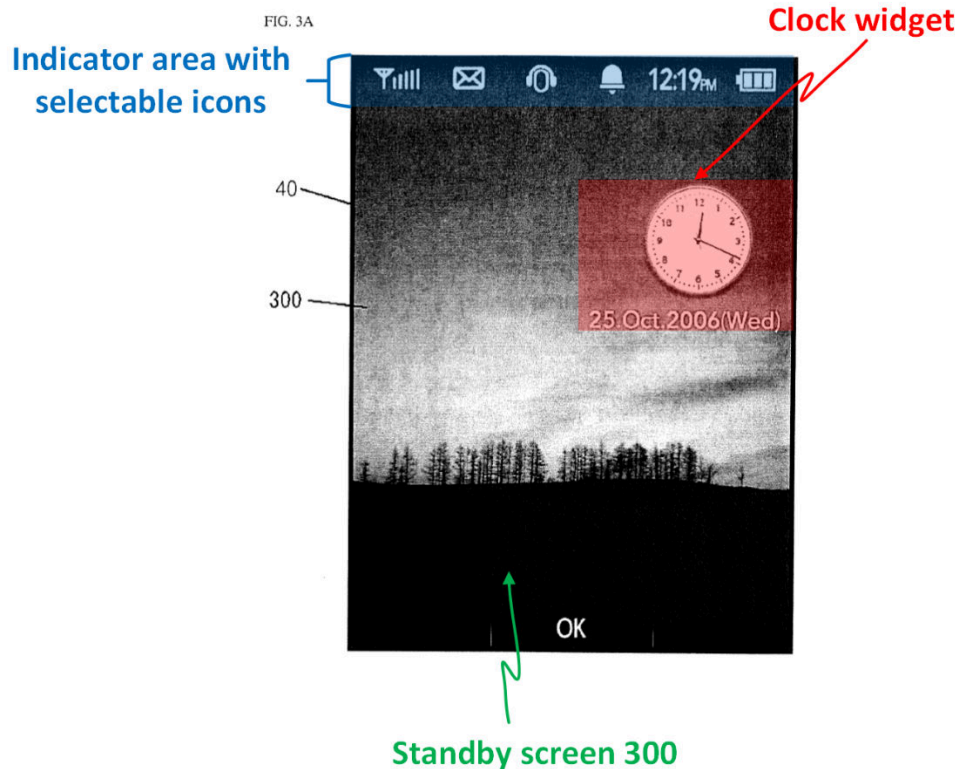
102. Implemented in this or a similarly obvious way, a POSITA would have thus found it obvious based on these combined teachings that the mobile device of the Ahn-Chaudhri combination would have, ***during detection of at least a portion of the gesture before a completion thereof is detected, blur[red], based on a change in a magnitude of the gesture being detected on the touch screen, at least a portion of the at least one other object***, as recited in [2.d].

2. Claim 8

[8] The apparatus of claim 2, wherein the apparatus is configured such that the object and the at least one other object are displayed via an interface for selecting among a plurality of applications, where the interface, including the at least portion of the at least one other object, is blurred.

103. The Ahn-Chaudhri combination renders obvious Claim [8].

104. As discussed with respect to Element [2.b], *supra*, Ahn describes that “a standby screen 300 set by a user is displayed in the display 40 of the mobile communication terminal 100.” EX1004, [0036]. Ahn illustrates a clock widget as part of this standby screen 300. *See* EX1004, FIGS. 3A, 12 and 13a. Ahn also illustrates that several menu items are displayed at the top of the standby screen 300. *See* EX1004, FIGS. 3A, 12 and 13a, [0040]. Ahn describes these menu items are part of an “indicator area 320 [that] comprises a signal intensity icon 330a, a message notification icon 330b, a background music setting icon 330c, a reception mode setting icon 330d, a watch icon 330e, and a battery residual quantity display icon 300f, for example.” EX1004, [0040]. And, unlike other menus that are only displayed after a specific gesture, “various icons can be displayed in the indicator area 320 on the standby screen 300.” EX1004, [0040].



EX1004, FIG. 3A (annotated)

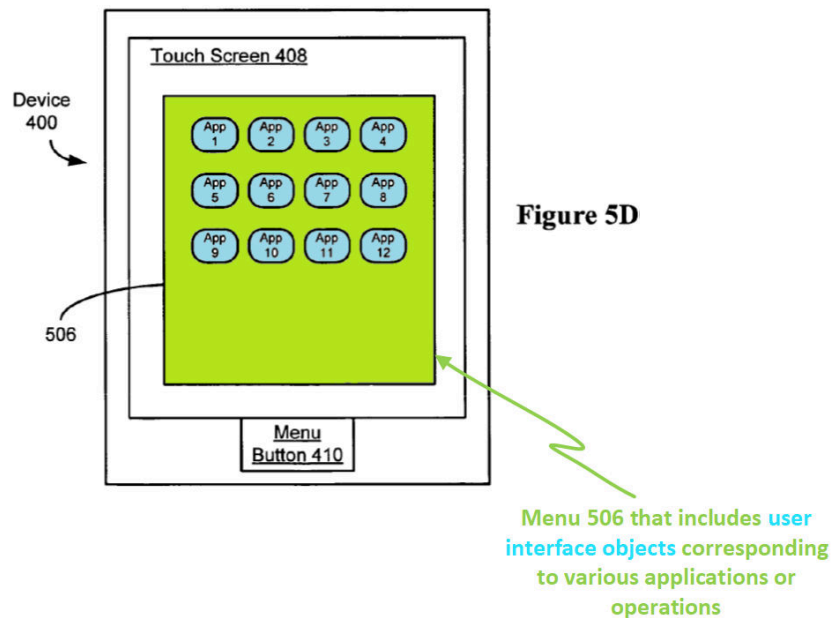
105. Indeed, for the touch interface embodiments described with respect to FIGS. 11-18, Ahn does not include a separate discussion of opening the indicator area 320, as it does with regard to the menus associated with the bottom and right and left sides of the display. *See generally* EX1004, [0095]-[0119]. Thus, a POSITA would have thus understood and found obvious that the indicator area 320 and that a user would have been able to directly activate and interact with its various icons directly from the standby screen 100.

106. While Ahn describes a “program memory” and “[p]rograms for controlling a general operation of the mobile communication terminal 100,” Ahn

does not explicitly describe the “menus” and “sub-menus” with which it associates icons as “applications.” *See, e.g.*, EX1004, [0051], [0064], [0067], [0076]. However, a POSITA would have understood and found obvious that at least some of the functions that Ahn refers to as “menus” and/or “sub-menus” would have been implemented as applications.

107. For example, Ahn illustrates that “the indicator area 320 comprises . . . a message notification icon 330b, [and] a background music setting icon 330c . . .” *See* EX1004, [0040], FIG. 3C. A POSITA would have understood and found obvious that selecting the “message notification icon 330b” and/or “background music setting icon 330c” would have launched an application associated with that functionality. For example, Chaudhri ’842 describes that its device 100 includes software components such as “one or more applications (or set of instructions) 146,” which “include any applications installed on the device 100, including without limitation, a browser, address book, contact list, email, instant messaging, word processing, keyboard emulation, widgets, JAVA-enabled applications, encryption, digital rights management, voice recognition, voice replication, location determination capability (such as that provided by the global positioning system (GPS)), a music player (which plays back recorded music stored in one or more files, such as MP3 or AAC files), etc.” EX1005, [0037], [0044].

108. Additionally, Chaudhri '842 describes that menus such as the indicator area 320 need not be confined to the top of the screen as illustrated in Ahn, but can be incorporated into the main screen of the user interface as a plurality of icons. *See* EX1005, FIG. 5D, [0076]. Specifically, Chaudhri '842 describes that, when unlocked, “the device 400 displays a menu 506” that “includes interactive user-interface objects corresponding to various applications or operations.” EX1005, [0076]. “A user may interact with the user-interface objects to activate an application or perform an operation.” EX1005, [0076]. Based on these teachings, a POSITA would have at least found it obvious that one or more of the icons displayed as part of indicator area 320 or standby screen 300 could be displayed throughout the standby screen 300 like the menu of icons shown in FIG. 5D of Chaudhri '842.



EX1005, FIGS 5D (annotated)

109. When implemented in this fashion and for the same reasons discussed above with respect to Element [2.d], *supra*, a POSITA would have at least found it obvious that at least a portion of the standby screen 300 including, for example, the clock widget and one or more of the selectable icons would have been progressively blurred when one of Ahn's menus is opened with a touch and drag gesture. As discussed above with respect to Element [2.d], *supra*, a POSITA would have at least found it obvious to vary, according to the teachings of Chaudhri '842, the optical intensity of the standby screen or at least portions thereof (*e.g.*, the blurring of the clock widget, as shown in FIGS. 4B, 10, and 13b) as a visual indication of a user's progress in completing Ahn's "touch and drag" gesture. *See* EX1005, [0080]-[0089]. In addition to providing a visual indication to the user of their progress in completing the gesture, utilizing this progressive translucency or blurring effect would have helped differentiate between the user-interface object (*e.g.*, the menu list 1300) and the background (*e.g.*, the standby screen and/or clock widget). *See* EX1005, [0085]

110. As discussed in Section IV.A.3, *supra*, focus and context techniques like those disclosed in Ahn and Chaudhri '842 utilize, for example, blur, transparency, and/or color saturation to help a user navigate through complex and multi-layer user interfaces by drawing the user's attention to the most relevant layers. *See* EX1008, 1-2. The relevance of any object or set of objects (and thus to

extent to which each object or set of objects is blurred or displayed sharply in focus) was a known design choice, and was known to be settable by the system in accordance with a designers programming or even by the user. *See* EX1008, 3-4. It was thus known and obvious that any objects deemed most relevant could be displayed sharply and any other objected deemed less relevant could be blurred in order to better direct a user's attention to the more relevant objects. *See* EX1008, 3-4. Therefore, while Ahn illustrates that opening a side menu 420 or 1300 causes the clock widget to be blurred, it would have been equally obvious to a POSITA to blur the entire standby screen 300 (including all of the user interface objects displayed as part of it, such as the clock widget and selectable icons) so as to more definitively draw the user's attention to the layer of the user interface containing the icons displayed as part of the now-open menu. *See* EX1008, 2-7. "If we display sharp objects in a blurred context, the viewer's attention is automatically guided to the sharp objects." EX1008, 2.

111. Based at least on these teachings a POSITA would have understood and found obvious that, in at least some embodiments, the mobile device of the Ahn-Chaudhri combination would have been *configured such that the object* (e.g., icons displayed as part of standby screen 300) *and the at least one other object* (e.g., the clock widget of standby screen 300) *are displayed via an interface for selecting among a plurality of applications* (e.g., the user is able to select at least some of the

icons to open an application, such as a messaging application or a music application), ***where the interface, including the at least portion of the at least one other object, is blurred*** (e.g., blurring the entire standby screen 300 when a touch and drag gesture causes a side menu to be opened in order to draw a user's attention to the now opened menu), as recited in Claim [8].

3. Claim 10

[10] The apparatus of claim 2, wherein the apparatus is configured such that the object and the at least one other object are displayed via an interface for selecting among a plurality of applications, where the interface, including the at least portion of the at least one other object, is blurred, without the object being blurred.

112. The Ahn-Chaudhri combination renders obvious Claim [10].

113. As discussed with respect to Claim [8], *supra*, a POSITA would have thus understood and found obvious that the indicator area 320 and that a user would have been able to directly activate and interact with its various icons directly from the standby screen 100, and that at least some of the functions that Ahn refers to as “menus” and/or “sub-menus” with respect to indicator area 320 would have been implemented as applications.

114. In at least the embodiment illustrated in FIG. 4B, Ahn illustrates that the clock widget portion of standby screen 300 is blurred, but the icons illustrated as part of indicator area 320 are not blurred. *See* EX1004, FIG. 4B. As discussed in Section VIII.E.1, *supra*, focus and context techniques like those disclosed in Ahn

and Chaudhri '842 utilize, for example, blur, transparency, and/or color saturation to help a user navigate through complex and multi-layer user interfaces by drawing the user's attention to the most relevant layers. *See* EX1008, 1-2. The relevance of any object or set of objects (and thus to extent to which each object or set of objects is blurred or displayed sharply in focus) was a known design choice, and was known to be settable by the system in accordance with a designers programming or even by the user. *See* EX1008, 3-4. It was thus known and obvious that any objects deemed most relevant could be displayed sharply and any other objected deemed less relevant could be blurred in order to better direct a user's attention to the more relevant objects. *See* EX1008, 3-4. "If we display sharp objects in a blurred context, the viewer's attention is automatically guided to the sharp objects." EX1008, 2.

115. Based at least on these teachings a POSITA would have understood and found obvious that, in at least some embodiments, the mobile device of the Ahn-Chaudhri combination would have been *configured such that the object* (e.g., icons displayed as part of standby screen 300) *and the at least one other object* (e.g., the clock widget of standby screen 300) *are displayed via an interface for selecting among a plurality of applications* (e.g., the user is able to select at least some of the icons to open an application, such as a messaging application or a music application), *where the interface, including the at least portion of the at least one other object, is blurred, without the object being blurred* (e.g., blurring the clock widget portion

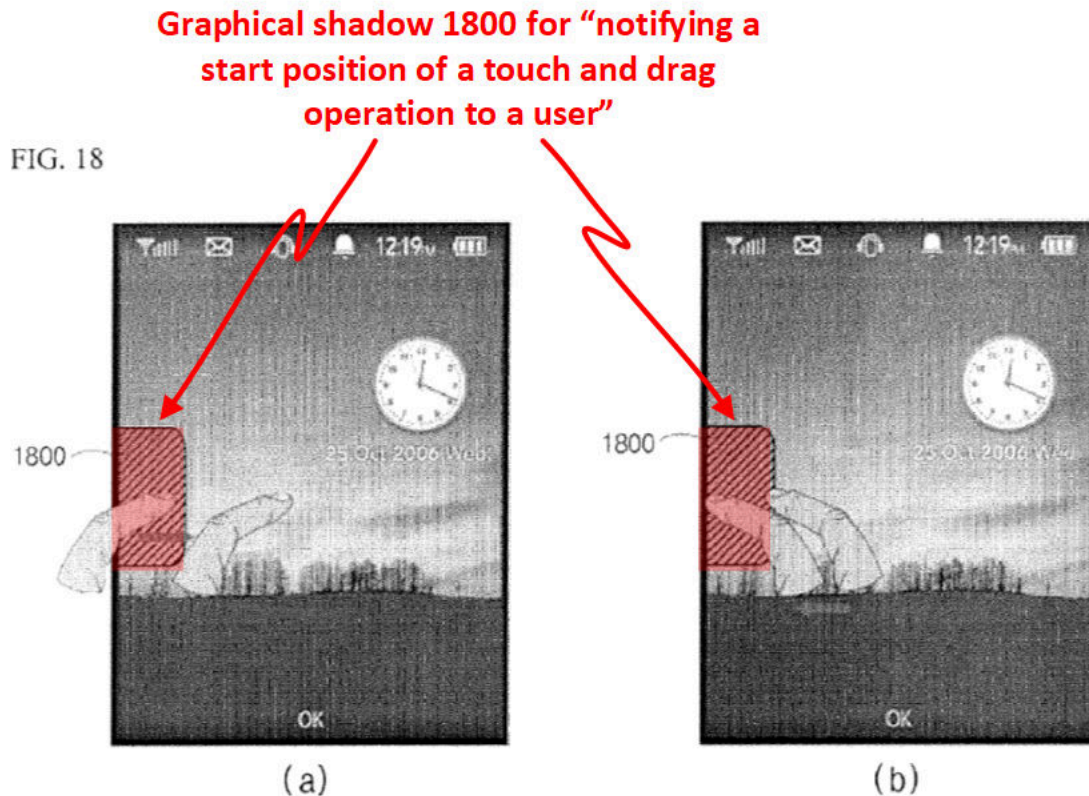
of standby screen 300 when a touch and drag gesture causes a side menu to be opened but leaving the icons displayed as part of standby screen 300 unblurred as shown in FIG. 4B), as recited in Claim 10.

4. Claim 16

[16] The apparatus of claim 2, wherein the apparatus is configured such that, during the detection of the at least portion of the gesture before the completion thereof is detected, the object is no longer displayed.

116. The Ahn-Chaudhri combination renders obvious Claim [16].

117. With respect to FIG. 18, Ahn describes that the display 40 may utilize “a graphical display for notifying a start position of a touch and drag operation to a user,” and illustrates “a graphical shadow 1800” displayed at an edge of the display. *See* EX1004, [0118]-[0119]. Ahn explains that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, EX1004, [0118]. A POSITA would have understood and found obvious that in those implementations that include a graphical shadow 1800, it is also an *object*, as recited in Element [2.b]. *See* Element [2.b], *supra* (describing a POSITA’s understanding of the term “object”).



EX1004, FIG. 18 (annotated)

118. With respect to the graphic shadow 1800, Ahn teaches:

[R]eferring to FIG. 18(b), if the user touch drags to the left, the menu list 1500 shown in FIG. 15(b) can be displayed in the display 40. In this case, as the user may press the graphic 1800 with a finger, the graphic 1800 gradually disappears in the display 40, and the menu list 1500 can be displayed as emerging from the left side of the display 40 while the graphic 1800 disappears in the display 40.

EX1004, [0119]. Ahn does not dictate or otherwise limit the exact rate at which “the menu list 1500 can be displayed as emerging” or “the graphic 1800 disappears,” other than that the period for each at least partially overlaps (*i.e.*, “while”). *See*

EX1004, [0118]-[0119]. It would have been an obvious design choice for the graphic 1800 to completely disappear before the menu is completely open and the gesture is complete. Indeed, a POSITA would have known that configuring the mobile communication terminal 100 to cause the graphic 1800 to disappear before the menu is completely open was one of a limited number of ways of implementing the disappearance explicitly described in Ahn. Either a POSITA could have implemented the disappearance to coincide with the full opening of the menu or to precede the full opening of the menu.

119. Furthermore, it was known in the context of edge-based pull-out menus, like those disclosed in Ahn, for the device to be configured to allow the user to continue the gesture that causes the menu to be opened even after the menu has been fully opened. *See* EX1011, [0052] (“Furthermore, when the menu pull-out amount x exceeded the maximum pull-out amount, the process of pulling out the pull-out menu will be stopped, the maximum pull-out amount will be maintained (S110), and the detected coordinate value will be ignored (S111).”). Therefore, even if a POSITA were to implement Ahn such that the graphic 1800 fully disappears at the same time as the menu is fully open, it would have been obvious to POSITA to design the device such that it allows for a user to continue a gesture beyond the length of the finger drag at which the menu is fully exposed.

120. Accordingly, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri combination would have been *configured such that, during the detection of the at least portion of the gesture before the completion thereof is detected, the object* (e.g., the graphic 1800) *is no longer displayed*, as recited in Claim [16].

5. Claim 24

[24] The apparatus of claim 2, wherein the apparatus is configured such that the blurring indicates a movement of the object between a first virtual layer including the at least one other object and a second virtual layer.

121. The Ahn-Chaudhri combination renders obvious Claim [24].

122. As discussed in Section V.A, *supra*, the '754 Patent describes that “virtual display layer refers to a collection of display elements which have all been assigned the same apparent depth within the 3D layered user interface.” EX1001, 68:39-42. “For example, in one embodiment, a 3D layered user interface may have a virtual foreground display layer and a virtual background display layer.” EX1001, 68:44-47. In some embodiments, “virtual display layers may be given the appearance of depth through the use of 3D depth cues.” EX1001, 68:58-60. However, the '754 Patent does not teach specific software and or hardware implementation details for achieving these “apparent” visual effects, and instead acknowledges that they “may be implemented in any desired environment.” EX1001, 67:66-68:17. In light of these teachings, a POSITA would have understood

a “virtual display layer” to be present whenever one or more display elements appear at “the same apparent depth” of display, regardless of the software and/or hardware mechanisms used to achieve this visual appearance.

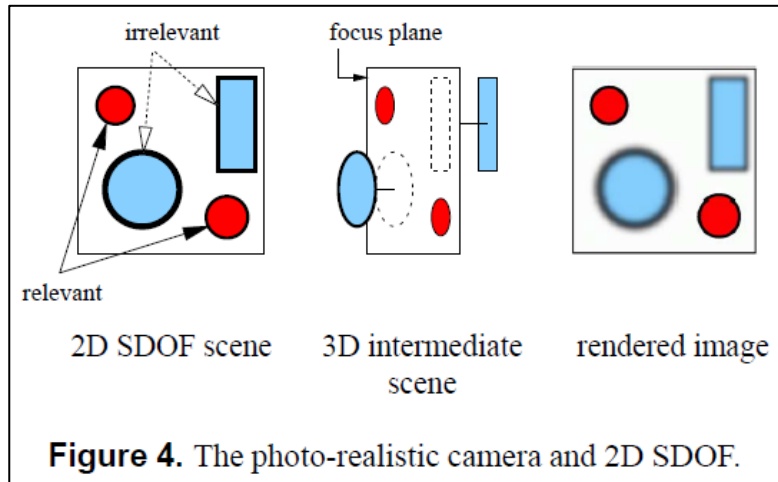
123. Ahn describes that the various menus may be “transparently displayed on the standby screen 300,” such that preset standby screen 300 is not completely “hidden” by the menus. EX1004, [0039]; *see also* EX1004, [0070] (“menus displayed on the standby screen 300 can be embodied in a translucent form or an opaque form”). Similarly, Ahn describes that the menus are “displayed in a transparent window form” in various areas “of the standby screen 300.” EX1004, [0064]. In order to display the menus “on” the standby screen 300 using “window forms,” a POSITA would have understood and found obvious that the menu window is and would be displayed in a “virtual display layer,” as that term is broadly used in the ’754 Patent, and that the virtual display layer containing the menu is displayed “on” at least one other virtual display layer that contain(s) the various elements of the standby screen 300. *See* EX1004, FIGS. 3A, 4B, [0064], [0070].

124. Indeed, it was known that, “[w]hen several 2D layers of information are put on top of each other, it is possible to provide the user with an intuitive way of choosing how much and which information to display crisply.” EX1008, 3-4. Indeed, there were user interface systems going back as early as 1991 where “up to 26 layers of information can be displayed at the same time” and where “[e]ach layer

has an interest level associated with it that the user can change,” and “[t]he interest level is [visualized as] a combination of blur and transparency.” EX1008, 2, 8. When a user interface object was displayed in a layer on top of another layer with other user interface objects, the top layer could be made transparent and therefore not necessarily visible beyond its constituent objects, so that components on the lower layer (e.g., a desktop) can still be seen. *See* EX1007, [0082]. Based on these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri combination displayed the various user interface objects as part of virtual layers.

125. Furthermore, at least one known technique for determining which objects to blur and which objects to display sharply—known as Semantic Depth of Field (SDOF)—was to assign each object a semantic depth (e.g., related to the virtual layer in which the object is associated) and a relevance value that depends on the level of display on which the user is currently focused, such that objects within the current layer of focus are assigned the highest relevance and displayed sharply, and objects within layers at progressively different layers of depth are assigned progressively lower relevance and displayed with greater blur. *See* EX1008, 2-7. And, as discussed with respect to Claims 8 and 10, *supra*, the relevance of any object or set of objects (and thus the extent to which each object or set of objects is blurred or displayed sharply in focus) was a known design choice, and was known to be

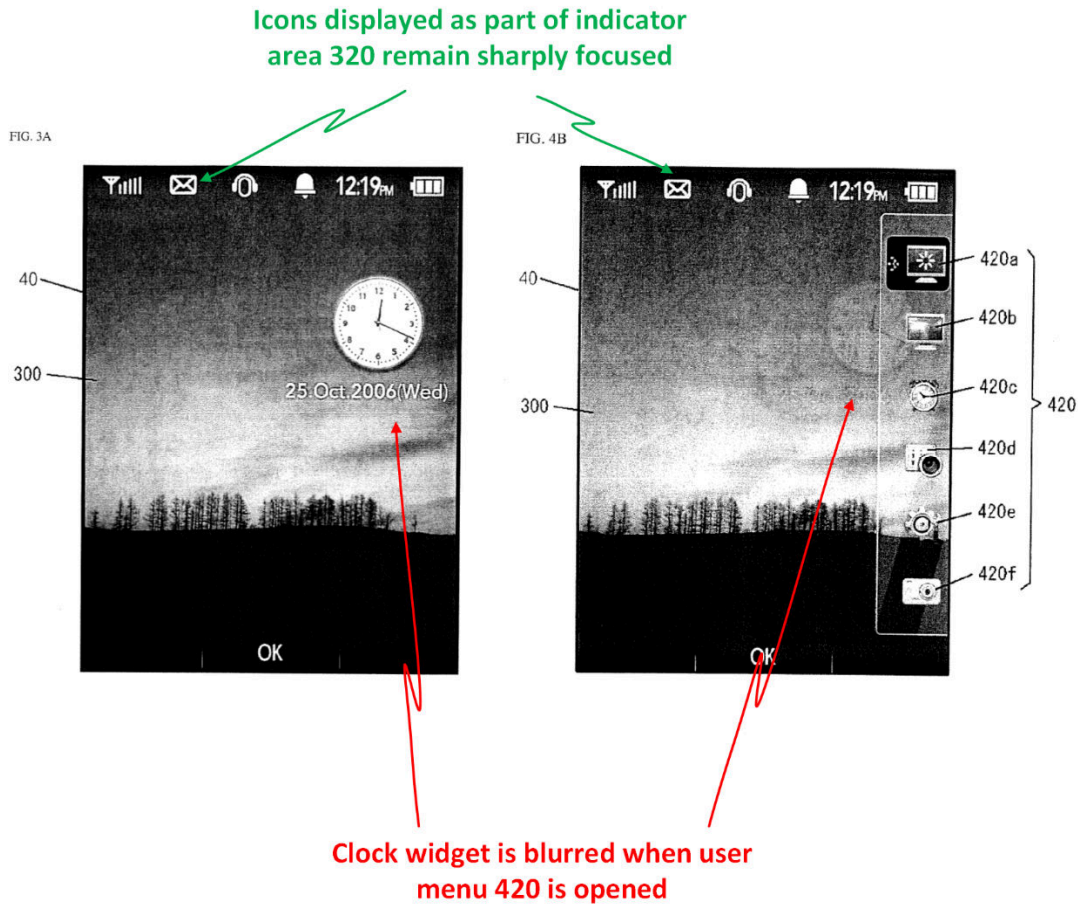
settable by the system in accordance with a designer's programming or even by the user. *See* EX1008, 3-4. This is illustrated in the following figure, in which the red objects are assigned to the layer on which a user is currently focused and the light blue objects are assigned to "lower" or "higher" layers of semantic depth from the focus layer, and are therefore assigned a lower relevance value based on their semantic distance from focus layer and blurred based on this lower relevance value. *See* EX1008, 3-4.



EX1008, FIG. 4

126. Applying this known technique for determining the degree of blur utilized in displaying user interface objects to the teachings of Ahn, a POSITA would have found it obvious that where in Ahn objects are displayed with the same apparent depth, they are assigned the same semantic depth (*e.g.*, virtual display layer) and the same associated relevance and blur values. *See* EX1008, 2-7. Thus, in FIGS. 3A-3B, for example, it would have at least been obvious to a POSITA that all elements

of the standby screen 300 that appear at the same apparent depth are part of a virtual layer at the same semantic level of depth and assigned the same relevance and sharpness/blur level (*e.g.*, the background and icons displayed as part of indicator area 320), whereas elements having different apparent depths (*i.e.*, foreground vs. background) are in one or more other, different display layers (*e.g.*, the menu 420 appearing in the foreground and above the blurred clock screen widget). *See* EX1004, FIG. 3A. Similarly, as shown in FIG. 3C, indicator area 320 now appears to have been reassigned to a different apparent depth than the background in response to user input as compared to the same depth in FIG. 3A. *See* EX1004, FIGS. 3A, 3C. As another example, once user menu 420 is opened in FIG. 4B, it would have at least been obvious to a POSITA that icons in indicator area 320 are effectively “moved” or reassigned to a virtual layer with the user menu 420 that is at a semantic depth corresponding to the current focus of the user (and thus are displayed sharply), whereas the clock widget remains at a different virtual layer that is at a lower semantic depth and therefore assigned a lower level of relevance and displayed as blurred. *See* EX1004, FIG. 4B.



EX1004, FIGS. 3A and 4B (annotated)

127. Based at least on these teachings a POSITA would have understood and found obvious that, in at least some embodiments, the mobile device of the Ahn-Chaudhri combination would have been *configured such that the blurring indicates a movement of the object between a first virtual layer including the at least one other object and a second virtual layer*, as recited in Claim [24].

6. Claim 26

[26] The apparatus of claim 2, wherein the apparatus is configured such that the at least one other object remains blurred after detection of the completion of the gesture.

128. The Ahn-Chaudhri combination renders obvious Claim [26].

129. As discussed with respect to Element [2.d], *supra*, Ahn additionally illustrates blurring at least a portion of background standby screen 300 (e.g., a clock widget) as a result of a user opening one of the menus. *See* EX1004, FIGS. 4B, 10, 13B. In FIG. 3A, Ahn illustrates that a clock widget is part of the background standby screen 300. *See* EX1004, [0036], FIG. 3A. A similar clock widget is shown as part of the background standby screen 300 in FIGS. 12 and 13a. *See* EX1004, [0097], [0102], FIGS. 12, 13a. As can be seen in FIG. 4B, when the user menu 420 is opened, Ahn illustrates that the clock widget becomes blurred, which is pointed out with red arrows in the below annotation of FIGS. 3A and 4B. *See* EX1004, [0036], FIGS. 3A, 4B. A similar blurring effect of the clock widget can also be seen in FIGS. 10 and 13b. *See* EX1004, FIGS. 4B, 10, 13b. A POSITA would have understood that FIGS. 4B, 10, and 13b show the menu exposed after completion of Ahn's touch and drag gesture. *See* EX1004, FIG. 11 (showing that the process ends with detection of the gesture and display of the item list), [0095]-[0100]. Thus, a POSITA would have understood that ***the apparatus is configured such that the at***

least one other object remains blurred after detection of the completion of the gesture, as recite in [26].

FIG. 3A

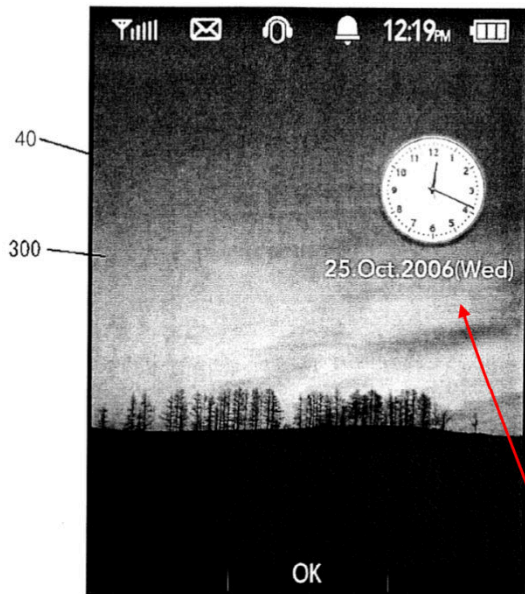
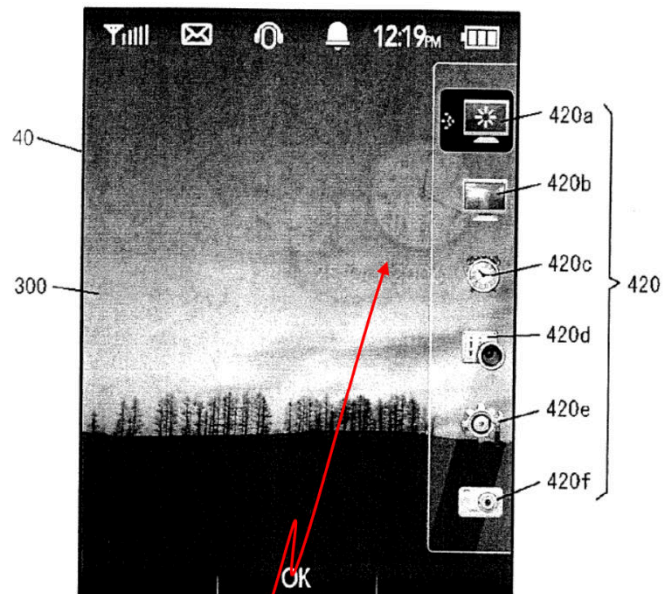


FIG. 4B



**Clock widget is blurred when user
menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

130. In addition to the explicit teachings of Ahn, a POSITA would have understood and found obvious that the menu would remain open after completion of the gesture, so that the user could browse the menu and make a selection of the one or more menu items. *See* EX1004, [0097]-[0100]. Indeed, it was known in similar systems with edge menus to leave a menu open after the user completed the gesture associated with the menu. *See, e.g.,* EX1006, [0077] (“[A]fter the user gestures to

reveal the bezel menu 610, the user can lift their finger, whereupon the bezel menu can remain open for a configurable interval (or indefinitely). The user may then tap on a desired item associated with one of the icons or slots 612, 614, 616, 618, and 620.”); EX1011, [0052] (“when the menu pull-out amount x exceeded the maximum pull-out amount, the process of pulling out the pull-out menu will be stopped, the maximum pull-out amount will be maintained (S110), and the detected coordinate value will be ignored (S111).”). In this regard, FIG. 4B (above) shows the user menu 420 after the user has completed the touch and drag gesture that opens user menu 420, and the user menu 420 remains opened and clock widget remains blurred. *See* EX1004, FIG. 4B.

131. Based at least on these teachings a POSITA would have understood and found obvious that, in at least some embodiments, the mobile device of the Ahn-Chaudhri combination would have been *configured such that the at least one other object* (e.g., the clock widget displayed as part of standby screen 300) *remains blurred after detection of the completion of the gesture*, as recited in Claim [26].

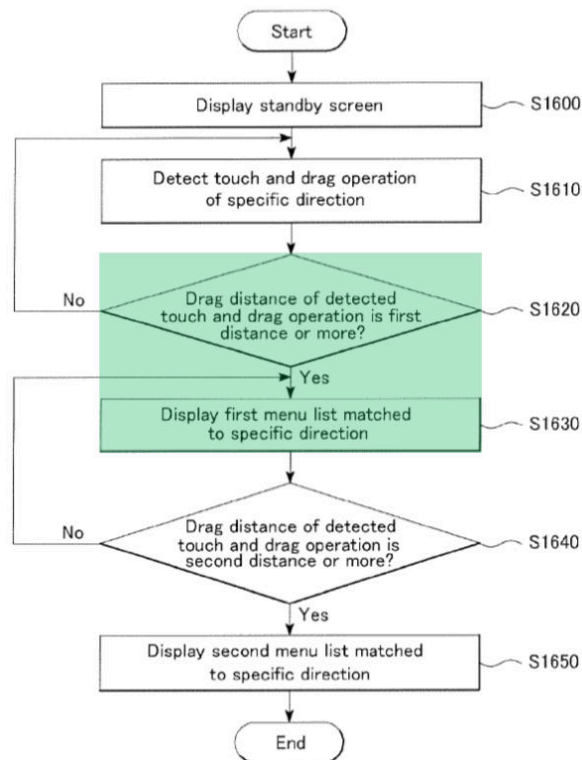
7. Claim 27

[27] The apparatus of claim 2, wherein the apparatus is configured such that, when the magnitude, including a distance magnitude, of the gesture detected on the touch screen is detected to increase above a distance threshold, a menu is displayed with at least one option.

132. The Ahn-Chaudhri combination renders obvious Claim [27].

133. For example, in one embodiment, Ahn describes that “controller 50 controls to sequentially display a plurality of specific menu lists according to a distance of the detected touch and drag operation.” EX1004, [0108].

FIG. 16



EX1004, FIG. 16 (highlighted)

134. Specifically, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. Accordingly, Ahn teaches that *the apparatus is configured such that, when the magnitude, including a distance*

magnitude, of the gesture detected on the touch screen is detected to increase above a distance threshold, a menu is displayed with at least one option, as recited in Claim [27].

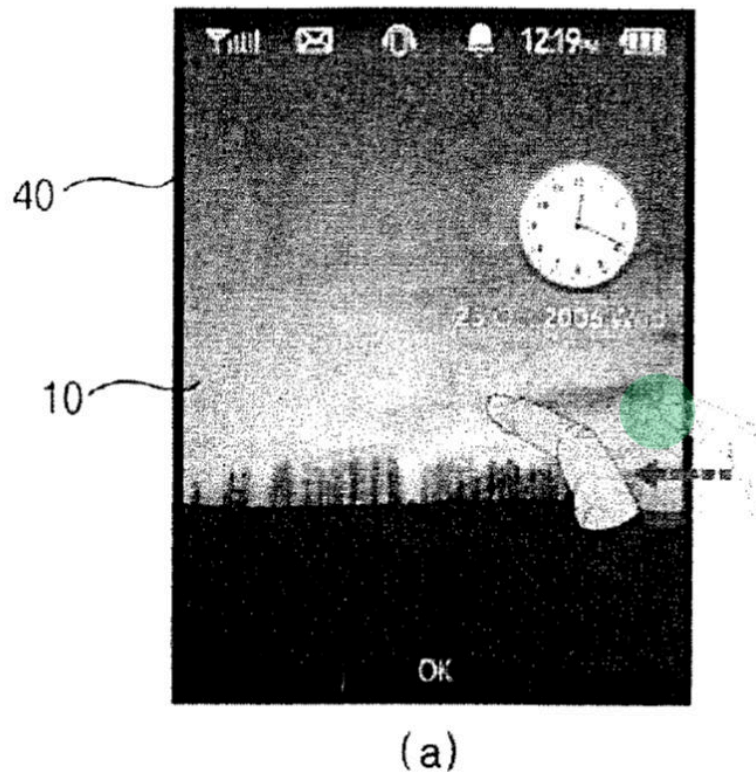
8. Claim 28

[28] The apparatus of claim 27, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen at an edge of the touch screen.

135. The Ahn-Chaudhri combination renders obvious Claim [28].

136. In one example illustrated in FIGS. 13a and 13b, “if the user touches a specific position of the touch screen 10 and drags the touch in a left direction a menu list 1300 matched to a left direction is displayed in the display 40.” EX1004, [0102]. As illustrated in FIG. 13a, the “specific position” at which the user’s finger touches the touch screen 10 is *at an edge of the touch screen*, as recited in Claim 28.

FIG. 13



EX1004, FIG. 13a (highlighted)

137. Moreover, with respect to FIG. 18, Ahn describes that the display 40 may utilize “a graphical display for notifying a start position of a touch and drag operation to a user,” and clearly shows “a graphical shadow 1800” displayed at a first edge of the display (e.g., the left edge in this example) that indicates the start position of the touch is *at an edge of the touch screen*. See EX1004, [0118]-[0119]. Ahn explains that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, EX1004, [0118].

138. A POSITA would have understood and found obvious from these teachings that, in at least implementations like those described with respect to FIG. 18, *the apparatus is configured such that the at least part of the gesture is detected on the touch screen at an edge of the touch screen*, as recited in Claim [28].

9. Claim 29

[29] The apparatus of claim 27, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen adjacent an edge of the touch screen.

139. The Ahn-Chaudhri combination renders obvious Claim [29].

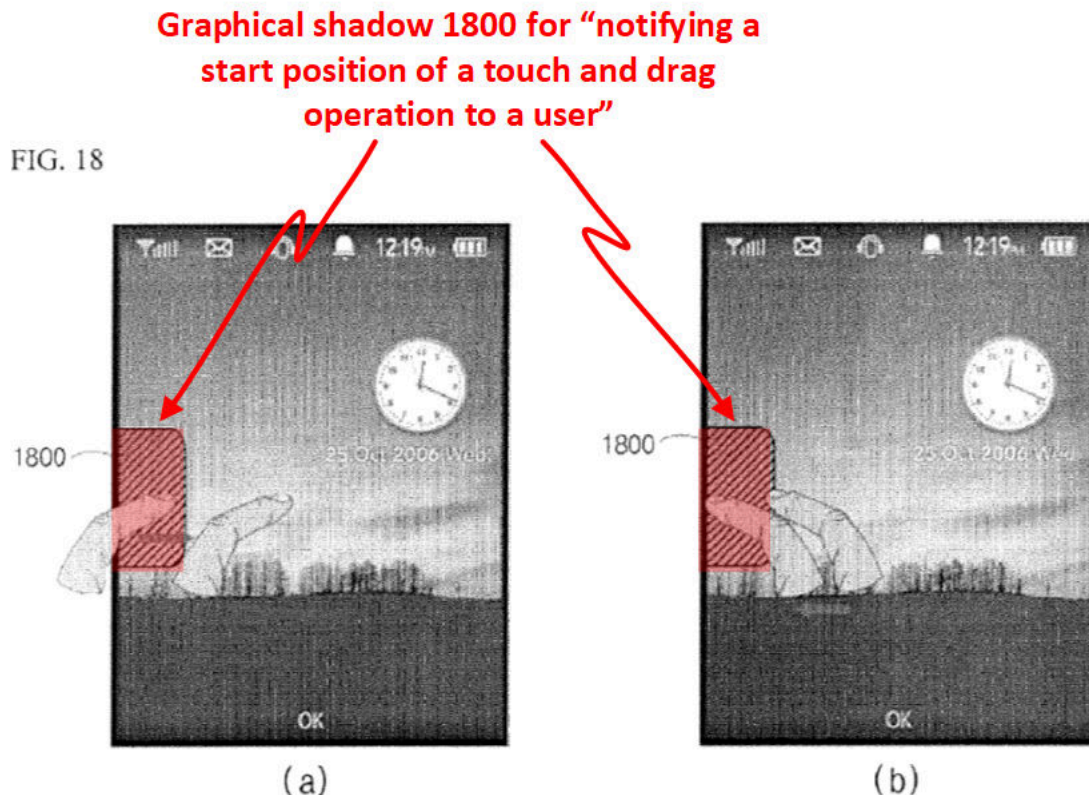
140. As discussed with respect to Claim [28], *supra*, based on the teachings with respect to FIGS. 13a and 18, a POSITA would have understood and found obvious from these teachings that, in at least implementations like those described with respect to FIG. 18, *the apparatus is configured such that the at least part of the gesture is detected on the touch screen at an edge of the touch screen*, as recited in Claim 28. *See* Claim [28]. Because a gesture that is detected “at an edge” is also “adjacent an edge,” the Ahn-Chaudhri combination renders obvious Claim [29] for at least the same reasons as Claim [28].

10. Claim 30

[30] The apparatus of claim 27, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen on the object.

141. The Ahn-Chaudhri combination renders obvious Claim [30]. With respect to FIG. 18, Ahn describes that the display 40 may utilize “a graphical display

for notifying a start position of a touch and drag operation to a user,” and illustrates “a graphical shadow 1800” displayed at an edge of the display. *See* EX1004, [0118]-[0119]. Ahn explains that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, EX1004, [0118]. A POSITA would have understood and found obvious that in those implementations that include a graphic shadow 1800, it is also an *object*, as recited in Element [2.b]. *See* Element [2.b], *supra* (describing a POSITA’s understanding of the term “object”).



EX1004, FIG. 18 (annotated)

142. Accordingly, Ahn teaches that *the apparatus is configured such that the at least part of the gesture is detected on the touch screen on the object*, as recited in Claim [30].

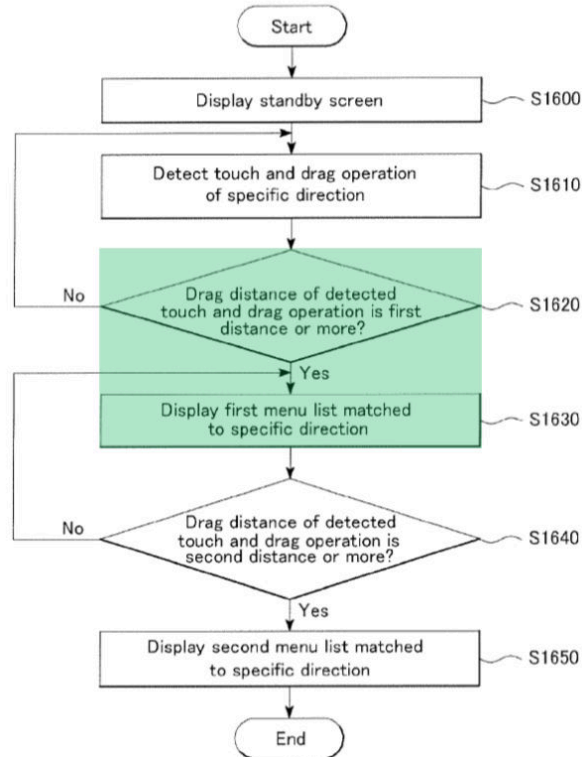
11. Claim 32

The apparatus of claim 27, wherein the apparatus is configured such that the distance magnitude of the gesture is detected to increase above the distance threshold and the menu is displayed for a first gesture in a first use scenario, and the distance magnitude of the gesture is not detected to increase above the distance threshold and the menu is not displayed for a second gesture in a second use scenario.

143. The Ahn-Chaudhri combination renders obvious Claim [32].

144. As discussed with respect to Claim [27], *supra*, in one embodiment, Ahn describes that “controller 50 controls to sequentially display a plurality of specific menu lists according to a distance of the detected touch and drag operation.” EX1004, [0108].

FIG. 16



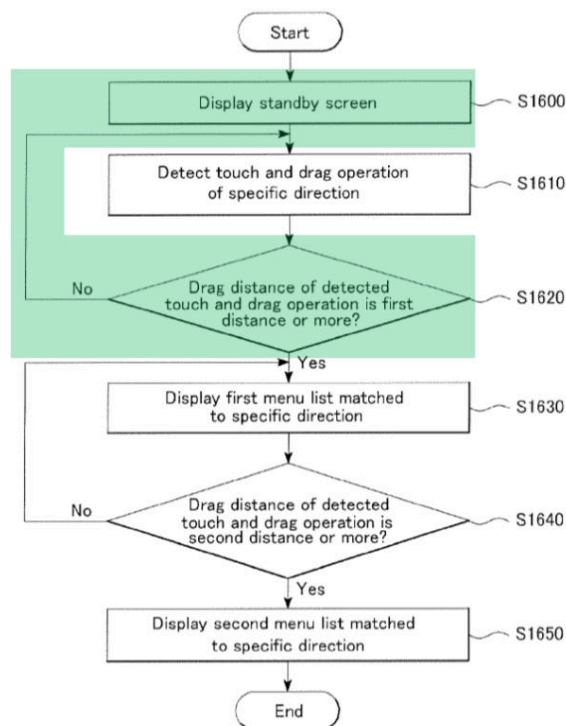
EX1004, FIG. 16 (highlighted)

145. Specifically, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. Based on at least these teachings, a POSITA would have understood and found obvious that *the apparatus is configured such that the distance magnitude of the gesture is detected to increase above the distance threshold* (e.g., “[i]f a drag distance of the detected touch and drag operation is a first distance or more”) *and the menu is displayed for a first*

gesture in a first use scenario (e.g., a first touch and drag gesture that exceeds a first distance or more), as recited in claim 32.

146. In FIG. 16 (reproduced below), when a distance magnitude of the touch and drag gesture has not yet reached the threshold of the “first distance or more,” the standby screen 300 remains displayed and no menu is opened. *See* EX1004, [0107]-[0109]. And a POSITA would have understood and found obvious that the process illustrated in FIG. 16 would simply end and/or never move beyond step S1620 in a case where the user disengages with the touch screen before reaching the threshold of the “first distance or more.” *See* EX1004, FIG. 16, [0107]-[0109].

FIG. 16



EX1004, FIG. 16 (highlighted)

147. Based on these teachings, a POSITA would have understood and found obvious that the apparatus is configured such that *the distance magnitude of the gesture is not detected to increase above the distance threshold and the menu is not displayed for a second gesture in a second use scenario* (e.g., a separate touch and drag gesture that never goes beyond the “first distance or more” before the user disengages with the touch screen), as recited in Claim [32].

12. Claim 33

[33] The apparatus of claim 27, wherein the apparatus is configured such that the at least one other object is displayed via a first virtual display layer and the menu is displayed in a second virtual display layer that appears above the first virtual display layer.

148. The Ahn-Chaudhri combination renders obvious Claim [33].

149. As discussed with respect to Claim [24], *supra*, in order to display the menus “on” the standby screen 300 using “window forms,” as taught by Ahn, a POSITA would have understood and found obvious that the menu window would be displayed in a “virtual display layer,” as that term is broadly used in the ’754 Patent, and that the virtual display layer containing the menu is displayed “on” one or more virtual display layers that contain(s) the various elements of standby screen 300. *See* EX1004, FIGS. 3A, 4B, [0064], [0070]. As shown in FIG. 4A, the virtual display layer containing the menu “appears above” the layer containing the standby

screen 300, which we can tell because the standby screen 300 is blurred, indicating it is ‘below’ and ‘further away’ than the menu layer.

150. Accordingly, based on the teachings of Ahn and his/her own knowledge of the user interface art, a POSITA would have at least found it obvious to implement the mobile device of the Ahn-Chaudhri combination such that *the apparatus is configured such that the at least one other object (e.g., the clock widget of standby screen 300) is displayed via a first virtual display layer and the menu is displayed in a second virtual display layer that appears above the first virtual display layer*, as recited in Claim 33.

13. Claim 34

[34] The apparatus of claim 27, wherein the apparatus is configured such that the menu fades-in when displayed.

151. The Ahn-Chaudhri combination renders obvious Claim [34].

152. For example, as discussed in Section IV.A.2, *supra*, Chaudhri ’842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. Chaudhri ’842 further describes that, “[w]hile an electronic device is in a first user-interface state, progress is detected (602) towards satisfaction of a user input condition needed to transition

to a second user-interface state.” EX1005, [0081]. “While the device is in the first user-interface state, progress is indicated (604) towards satisfaction of the condition by transitioning an optical intensity of one or more user interface objects associated with the second user interface state.” EX1005, [0082].

153. In other words, the transition may appear to a user as though objects associated with the second user interface state (*e.g.*, the menu that’s opened in Ahn) “fade in” while objects associated with the first user interface state (*e.g.*, the clock widget in Ahn) “fade out.” *See* EX1005, [0079], [0087]. Furthermore, Chaudhri ’842 teaches that the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include multiple simultaneous effects. EX1005, [0085]. Indeed, it was well known to combine blur with other “focus and context” visual cues, including transparency, to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”). Accordingly, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been ***configured such that the menu fades-in when displayed***, as recited in Claim 34.

14. Claim 35

[35] The apparatus of claim 27, wherein the apparatus is configured such that the menu is displayed simultaneously with the blurring of the at least portion of the at least one other object.

154. The Ahn-Chaudhri combination renders obvious Claim [35].

155. As discussed with respect to Element [2.d], *supra*, Applying at least the above teachings of Chaudhri '842 in the context of Ahn's "touch and drag" gesture and Ahn's corresponding transition between a user interface state where the standby screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary, according to the teachings of Chaudhri '842, the optical intensity of the standby screen or at least portions thereof (*e.g.*, the blurring of the clock widget, as shown in FIGS. 4B, 10, and 13b) as a visual indication of a user's progress in completing Ahn's "touch and drag" gesture. *See* EX1005, [0080]-[0089]. Because a POSITA would have understood and found obvious that the blurring of the standby screen or at least portions thereof happens simultaneously with the sliding of the menu as it is opened with the "touch and drag" gesture, a POSITA would have understood and found obvious that ***the apparatus is configured such that the menu is displayed simultaneously with the blurring of the at least portion of the at least one other object***, as recited in Claim 35.

15. Claim 36

[36] The apparatus of claim 27, wherein the apparatus is configured such that, based on the change in the magnitude of the gesture being detected on the touch screen, a location of the object is moved before the menu is displayed.

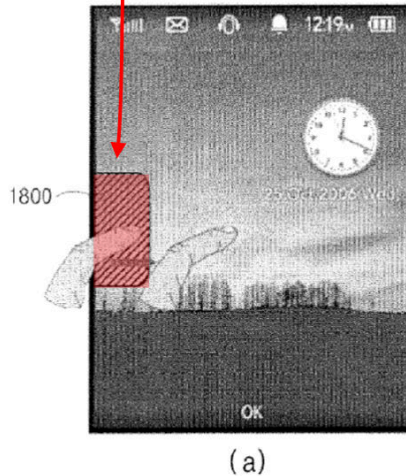
156. The Ahn-Chaudhri combination renders obvious Claim [36].

157. As discussed with respect to Claim [30], *supra*, a POSITA would have understood and found obvious that in those implementations that include a graphic shadow 1800, graphic 1800 is ***the object***.

158. Ahn describes that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, [0118]. In other words, Ahn describes that the graphic 1800 moves (*i.e.*, is “dragged”) in response to and along with a user’s touch and drag gesture on the touch screen. *See* EX1004, [0118]. As shown in FIG. 18a, graphic 1800 is initially displayed alone, without any portion of its corresponding menu (*e.g.*, menu 1500) displayed. *See* EX1004, FIG. 18a. A POSITA would have understood and found obvious that the graphic 1800 would begin, at least momentarily, its dragging movement in response to a user’s gesture before the corresponding menu 1500 is initially displayed, and certainly before the entire menu is displayed.

**Graphic 1800 being displayed
without menu**

FIG. 18



EX1004, FIG. 18a (annotated)

159. Based on these teachings, a POSITA would have understood and found obvious that *the apparatus is configured such that, based on the change in the magnitude of the gesture being detected on the touch screen, a location of the object is moved before the menu is displayed*, as recited in Claim [36].

16. Claim 37

[37] The apparatus of claim 27, wherein the apparatus is configured such that the menu is sharpened and magnified when displayed.

160. The Ahn-Chaudhri combination renders obvious Claim [37].

161. Chaudhri '842 describes that "the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,"

such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state (e.g., the menu that’s opened in Ahn) “fade in” while objects associated with the first user interface state (e.g., the clock widget in Ahn) “fade out.” See EX1005, [0079], [0087]. Furthermore, Chaudhri ’842 teaches that the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include multiple simultaneous effects, at least several of which a POSITA would have understood as “sharpening”³ the display. EX1005, [0085]. Accordingly, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been *configured such that the menu is sharpened when displayed*, as recited in Claim 37.

162. Consistent with the above teachings of Chaudhri ’842, it was well known to combine blur with other “focus and context” techniques, including

³ The ’754 Patent does not use the word “sharp” or “sharpened” outside of the claims. However, a POSITA would have understood the word “sharp” in a graphical context to be a subjective perception that is related to edge contrast.

EX1012, 1.

transparency, to help direct a user's attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer's attention, together with brighter colors, etc., or as a completely separate dimension of data display”). One set of known “focus and context” techniques were “distortion oriented or spatial methods” in which “geometry of the display is distorted to allow a magnification of interesting information without losing the (less magnified) context.” EX1008, 1. “Distortion-oriented techniques are usually used in an explicit way, by actively bringing the interesting objects into focus, *e.g.* by clicking on objects or dragging them around.” EX1008, 1. Thus, a POSITA would have found at least found it obvious based on their broader knowledge of “focus and context” techniques in the user interface art to combine the sharpening described in Chaudhri '842 with other techniques such as magnifying of the relevant object to help better draw the user's attention to the most interesting part of the display. *See* EX1008, 1-2. Accordingly, a POSITA would have at least found it obvious ***that that the menu is sharpened and magnified when displayed***, as recited in Claim 37.

17. Claim 38

[38] The apparatus of claim 27, wherein the apparatus is configured such that the distance magnitude includes a length magnitude, and the distance threshold includes a length magnitude.

163. The Ahn-Chaudhri combination renders obvious Claim [38].

164. As discussed with respect to Claim [27], *supra*, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. A POSITA would have understood and found obvious that the “first distance” includes *a length magnitude* and Ahn’s detection of whether touch and drag operation is a first distance or more is a *distance threshold* [that] *includes a length magnitude*, as recited in Claim 38.

18. Claim 40

[40] The apparatus of claim 27, wherein the apparatus is configured such that a magnitude of the blurring is progressively increased as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen.

165. The Ahn-Chaudhri combination renders obvious Claim [40].

166. As discussed with respect to Element [2.d], *supra*, applying the teachings of Chaudhri ’842 in the context of Ahn’s “touch and drag” gesture and Ahn’s corresponding transition between a user interface state where the standby

screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary, according to the teachings of Chaudhri '842, the optical intensity of the standby screen or at least portions thereof (*e.g.*, the blurring of the clock widget, as shown in FIGS. 4B, 10, and 13b) as a visual indication of a user's progress in completing Ahn's "touch and drag" gesture. *See* EX1005, [0080]-[0089]. In addition to providing a visual indication to the user of their progress in completing the gesture, utilizing this progressive translucency or blurring effect would have helped differentiate between the user-interface object (*e.g.*, the menu list 1300) and the background (*e.g.*, the standby screen and/or clock widget). *See* EX1005, [0085].

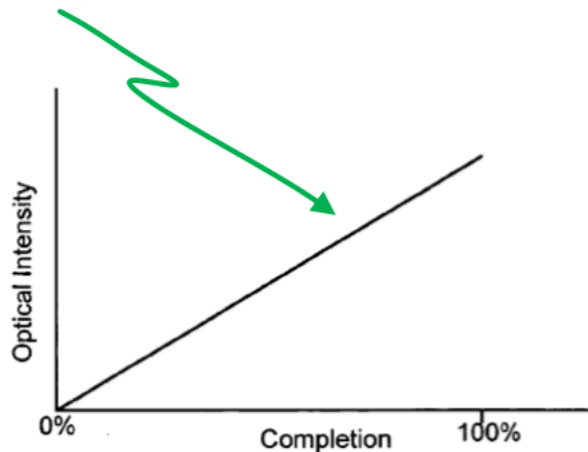
167. With respect to FIGS. 8A-8C, Chaudhri '842 provides "graphs illustrating optical intensity as a function of the completion of the user input condition." EX1005, [0095]. For example, Chaudhri '842 teaches:

In FIG. 8A, the optical intensity is a linear function of the completion of the user input condition. At 0% completion, the optical intensity is at an initial value (in this case, the initial value is 0). As the completion percentage increases, the optical intensity increases linearly with the completion percentage, until it reaches the final value at 100% completion.

EX1004, [0095].

**Progressively changing optical intensity as a
continuous function of a change in magnitude
of gesture being detected**

Figure 8A



EX1005, FIG. 8A (annotated)

168. Applied in the context of Ahn's transition between a user interface state where the standby screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary the optical intensity (*e.g.*, the blur) of the standby screen 300 or at least the clock widget portion thereof such that *a magnitude of the blurring is progressively increased as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen*, as recited in Claim 40.

19. Claim 42

[42] The apparatus of claim 40, wherein the apparatus is configured such that the magnitude of the blurring is progressively decreased as a continuous function of a reversal of a direction of the gesture being detected on the touch screen.

169. The Ahn-Chaudhri combination renders obvious Claim [42].

170.]. In the example of FIG. 8C, Ahn describes that, “[i]f the user selects the leftward direction key 38, . . . a basic setting menu list 820 of the mobile communication terminal 100 shown in FIG. 8C is displayed in a left area of the standby screen 300.” EX1004, [0075]-[0076]. From FIG. 8C, “if the user presses the leftward direction key 38 or a termination key, the basic setting menu list 820 disappears, and the screen returns to an initial standby screen state shown in FIG. 8A.” EX1004, FIG., 9A, [0080]. In other words, if a user mirrors the action that opens the basic setting menu list 820, the menu is closed.

171. Ahn does not specify or otherwise limit how menus are closed with respect to the touch screen interface. However, based on the above-noted teachings with respect FIG. 9A, a POSITA would have understood and found obvious that mirroring the touch and drag gesture that opens a menu either during the original touch and drag operation or in a separate, subsequent touch and drag operation in the opposite direction—would close the menu. Indeed, in other known pull-out edge menus, mirroring the dragging gesture that opens an edge menu will close the menu. *See, e.g.*, EX1006, [0077] (“The user may close the bezel menu by sliding it back

off of the screen (an on-screen-to-offscreen gesture)"); EX1011, [0053] ("FIGS. 13 and 14 are the flow charts which show the processing procedures for closing the displayed pull-out menu."), [0054]-[0063] ("after the menu pull-out amount x became smaller than the predetermined definition amount, if it became OFF, it will be regarded as that the user intends to turn off the display of the pull-out menu, and the pull-out menu display will be stopped (S209)."). Accordingly, a POSITA would have understood and found obvious that reversing the dragging gesture—either during the original touch and drag operation or in a separate touch and drag operation in the opposite direction—would have closed the menus.

172. As part of reversing the dragging gesture to close the menu, it further would have been obvious that the blurring would also be reversed in the same manner as it was initially presented. Ahn describes that when a menu is closed, "the screen returns to an initial standby screen state," which shows that the clock widget is not blurred. *See* EX1004, [0076], FIG. 8A. And Chaudhri '842 describes that "[c]ontrolling the optical intensity may include increasing or decreasing the optical intensity of a graphical object," and that "the increase or decrease may follow predefined functions." EX1005, [0042]. Furthermore a POSITA would have recognized and found obvious that transitioning from an open menu to a closed menu is a transition in user interface state in the same manner that transitioning from a closed menu to an open menu, so Chaudhri '842's teachings with respect to varying

optical intensity would be equally as applicable for closing the menu as opening the menu. *See* EX1005, [0080]-[0087]. In other words, “reversing” the blurring is natural and intuitive, because this means that the visual effect (blurring) continues to be consistent with the function: as the menu opens, blur increases proportionally; and as the menu closes, blur decreases proportionally.

173. Based on at least these teachings, a POSITA would have at least found it obvious that the apparatus of the Ahn-Chaudhri combination would have been *configured such that the magnitude of the blurring is progressively decreased as a continuous function of a reversal of a direction of the gesture being detected on the touch screen*, as recited in Claim 42.

20. Claim 43

[43] The apparatus of claim 40, wherein the apparatus is configured such that the magnitude of the blurring is progressively decreased as a continuous function of another change in the magnitude of the gesture being detected on the touch screen.

174. The Ahn-Chaudhri combination renders obvious Claim [43].

175. As discussed with respect to Claim [42], *supra*, a POSITA would have understood and found obvious that mirroring the touch and drag gesture that opens a menu—either during the original touch and drag operation or in a separate, subsequent touch and drag operation after the menu has been opened—would close the menu. When this mirroring is done as a continuation of the opening gesture, a

POSITA would have understood and found obvious that, without picking up his/her finger from the surface of the touch screen, the user would reverse the direction of motion of their finger and drag the menu back to the edge of the display from which the menu originated. In this example, the *change in the magnitude of the gesture* recited in [2.d] is the initial change in distance from the edge of the display toward the center that opened the menu, and *the another change in the magnitude of the gesture being detected on the touch screen* recited in Claim [43] is the change in distance from the point where the user stopped swiping their finger away from the edge and then reversed the direction of motion back to the edge of the display to close the menu. As discussed with respect to Claim [42], a POSITA would have recognized and found obvious that transitioning from an open menu to a closed menu is a transition in user interface state in the same manner that transitioning from a closed menu to an open menu, so Chaudhri '842's teachings with respect to varying optical intensity would be equally as applicable for closing the menu as opening the menu. *See* EX1005, [0080]-[0087].

176. Based on at least these teachings, a POSITA would have at least found it obvious that the apparatus of the Ahn-Chaudhri combination would have been *configured such that the magnitude of the blurring is progressively decreased as a continuous function of another change in the magnitude of the gesture being detected on the touch screen*, as recited in Claim [43].

21. Claim 44

[44] The apparatus of claim 40, wherein the apparatus is configured such that the magnitude of the blurring is progressively decreased as a continuous function of a change in a magnitude of another gesture being detected on the touch screen.

177. The Ahn-Chaudhri combination renders obvious Claim [43].

178. As discussed with respect to Claim [42], *supra*, a POSITA would have understood and found obvious that mirroring the touch and drag gesture that opens a menu—either during the original touch and drag operation or in a separate, subsequent touch and drag operation after the menu has been opened—would close the menu. When this mirroring is done as a separate, subsequent closing gesture, a POSITA would have understood and found obvious that, after picking up his/her finger from the surface of the touch screen, the user would reengage the touch screen and drag the menu back to the edge of the display from which the menu originated. In this example, the ***change in the magnitude of the gesture*** recited in [2.d] is the change in distance from the edge of the display toward the center that opened the menu, and the ***change in a magnitude of another gesture being detected on the touch screen*** recited in [44] is the change in distance from where the user reengages the touch screen back to the edge of the display to close the menu. As discussed with respect to Claim [42], a POSITA would have recognized and found obvious that transitioning from an open menu to a closed menu is a transition in user interface state in the same manner that transitioning from a closed menu to an open menu, so

Chaudhri '842's teachings with respect to varying optical intensity would be equally as applicable for closing the menu as opening the menu. *See* EX1005, [0080]-[0087].

179. Based on at least these teachings, a POSITA would have at least found it obvious that the apparatus of the Ahn-Chaudhri combination would have been *configured such that the magnitude of the blurring is progressively decreased as a continuous function of a change in a magnitude of another gesture being detected on the touch screen*, as recited in Claim [44].

22. Claim 46

[46] The apparatus of claim 27, wherein the apparatus is configured such that a magnitude of the blurring is continuously increased as a function of a continuous increase in the change in the magnitude of the gesture being detected on the touch screen.

180. Claim [46] is substantially the same as Claim [40]. Furthermore, in FIGS. 8A-8C of Chaudhri '842, the change of the optical intensity in the illustrated functions is both progressive and continuous. *See* EX1005, [0095]-[0098], FIG. 8A-8C. Because the optical intensity is directly correlated with the progression of the gesture, an increase in the change in the magnitude of the gesture (e.g., an acceleration of the gesture) would similarly result in an acceleration of the change in optical intensity commensurate with the gesture. *See* EX1005, [0095]-[0098], FIG. 8A-8C. Thus, the Ahn-Chaudhri combination renders obvious Claim [46] for

at least similar reasons described above with respect to Claim [40]. *See* Claim [40], *supra*.

23. Claim 47

[47] The apparatus of claim 46, wherein the apparatus is configured such that the magnitude of the blurring is continuously decreased as a function of a continuous reversal in the change in the magnitude of the gesture being detected on the touch screen.

181. Claim [47] is substantially the same as Claim [42]. The Ahn-Chaudhri combination renders obvious Claim [47] for at least the same reasons described above with respect to Claim [42]. *See* Claim [42], *supra*.

24. Claim 52

[52] The apparatus of claim 27, wherein the apparatus is configured such that a magnitude of the blurring is increased as a function of an increase in the change in the magnitude of the gesture being detected on the touch screen.

182. Claim [52] is substantially the same as Claims [40] and [46]. Thus, the Ahn-Chaudhri combination renders obvious Claim [52] for at least the same reasons described above with respect to Claims [40] and [46]. *See* Claims [40], [46].

25. Claim 54

[54] The apparatus of claim 52, wherein the apparatus is configured such that the magnitude of the blurring is decreased as a function of a reversal of a direction of the gesture being detected on the touch screen.

183. Claim [54] is substantially the same as Claim [42]. Thus, the Ahn-Chaudhri combination renders obvious Claim [54] for at least the same reasons described above with respect to Claim [42]. *See* Claims [42].

26. Claim 57

[57] The apparatus of claim 52, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen on the object, and the magnitude of the blurring is decreased as a function of a change in a magnitude of another gesture being detected on the touch screen at a location that does not correspond to the object.

184. The Ahn-Chaudhri combination renders obvious Claim [57].

185. As discussed with respect to Claim [30], a POSITA would have understood and found obvious that in those implementations that include a graphic shadow 1800, ***at least part of the gesture is detected on the touch screen on the object*** (*i.e.*, graphic 1800). *See* Claim [30], *supra*.

186. Ahn describes that “as the user may press the graphic 1800 with a finger, the graphic 1800 gradually disappears in the display 40, and the menu list 1500 can be displayed as emerging from the left side of the display 40 while the graphic 1800 disappears in the display 40.” EX1004, [0119]. Thus, once the menu is open, the graphic 1800 is no longer displayed on the screen. Therefore, in order to close the menu, a POSITA would understand and find obvious that the user would have needed to directly engage with the menu, and not ***the object*** (*e.g.*, graphic 1800). *See, e.g.*, EX1006, [0077] (“The user may close the bezel menu by sliding it back off of the screen (an on-screen-to-offscreen gesture)”); EX1011, [0053] (“FIGS. 13 and 14 are the flow charts which show the processing procedures for closing the displayed pull-out menu.”), [0054]-[0063] (“after the menu pull-out

amount x became smaller than the predetermined definition amount, if it became OFF, it will be regarded as that the user intends to turn off the display of the pull-out menu, and the pull-out menu display will be stopped (S209).”).

187. As discussed with respect to Claim [42], *supra*, a POSITA would have understood and found obvious that mirroring the touch and drag gesture that opens a menu—either during the original touch and drag operation or in a separate, subsequent touch and drag operation after the menu has been opened—would close the menu. When this mirroring is done as a separate, subsequent closing gesture, a POSITA would have understood and found obvious that, after picking up his/her finger from the surface of the touch screen, the user would reengage the touch screen and drag the menu back to the edge of the display from which the menu originated. In this example, the *change in the magnitude of the gesture* recited in [2.d] is the change in distance from the edge of the display toward the center that opened the menu, and the *change in a magnitude of another gesture being detected on the touch screen* recited in [57] is the change in distance from where the user reengages the touch screen back to the edge of the display to close the menu. As discussed with respect to Claim [42], a POSITA would have recognized and found obvious that transitioning from an open menu to a closed menu is a transition in user interface state in the same manner that transitioning from a closed menu to an open menu, so Chaudhri '842's teachings with respect to varying optical intensity would be equally

as applicable for closing the menu as opening the menu. *See* EX1005, [0080]-[0087].

188. Based on at least these teachings, a POSITA would have at least found it obvious that the apparatus of the Ahn-Chaudhri combination would have been ***configured such that the at least part of the gesture is detected on the touch screen on the object*** (e.g., opening the menu by dragging graphic 1800, which disappears as the menu opens), ***and the magnitude of the blurring is decreased as a function of a change in a magnitude of another gesture being detected on the touch screen*** (e.g., a separate, subsequent closing gesture that mirrors the opening gesture) ***at a location that does not correspond to the object*** (e.g., by engaging the menu itself to drag it closed), as recited in [57].

27. Claim 58

[58] The apparatus of claim 52, wherein the apparatus is configured such that the blur is accompanied by a fading.

189. The Ahn-Chaudhri combination renders obvious Claim [58].

190. For example, as discussed in Section VIII.B, *supra*, Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the

transition may appear to a user as though objects associated with the second user interface state “fade in” while objects associated with the first user interface state “fade out.” *See* EX1005, [0079], [0087]. Furthermore, Chaudhri ’842 the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include multiple simultaneous effects. EX1005, [0085]. Indeed, it was well known to combine blur with other “focus and context” visual cues, including transparency, to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”).

191. Accordingly, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been *configured such that the blur is accompanied by a fading*, as recited in claim 58.

28. Claim 59

[59.a] The apparatus of claim 42, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen on the object, and

192. Element [59.a] is substantially the same as Claim [30]. Thus, the Ahn-Chaudhri combination renders obvious Element [59.a] for at least the same reasons described above with respect to Claim [30]. *See* Claim [30].

[59.b] the blurring indicates a movement of the object between a first virtual display layer including the at least one other object, and a second virtual display layer.

193. Element [59.b] is substantially the same as Claim [24]. Thus, the Ahn-Chaudhri combination renders obvious Element [59.b] for at least the same reasons described above with respect to Claim [24]. *See* Claim [24], *supra*.

29. Claim 60

[60] The apparatus of claim 27, wherein the apparatus is configured such that the blur includes changing a transparency of the at least portion of the at least one other object.

194. The Ahn-Chaudhri combination renders obvious Claim [60].

195. A POSITA would have understood and found obvious that FIGS. 4B, 10, and 13B illustrate that at least the clock widget portion of standby screen 300 becomes more blurred and transparent as a menu is opened. *See* EX1004, FIGS. 3A, 4B, 10, 13B.

FIG. 3A

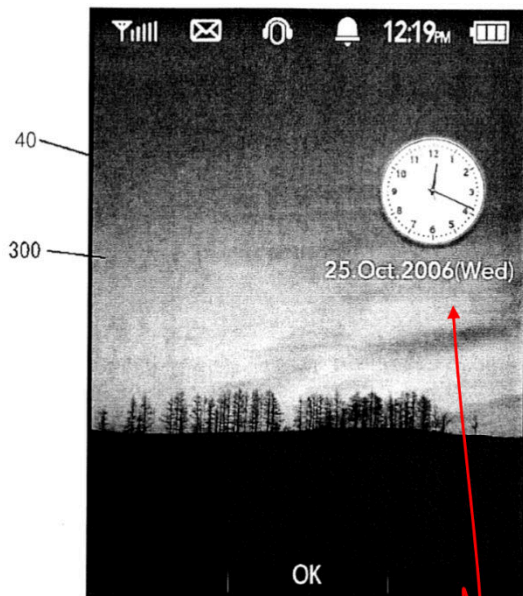
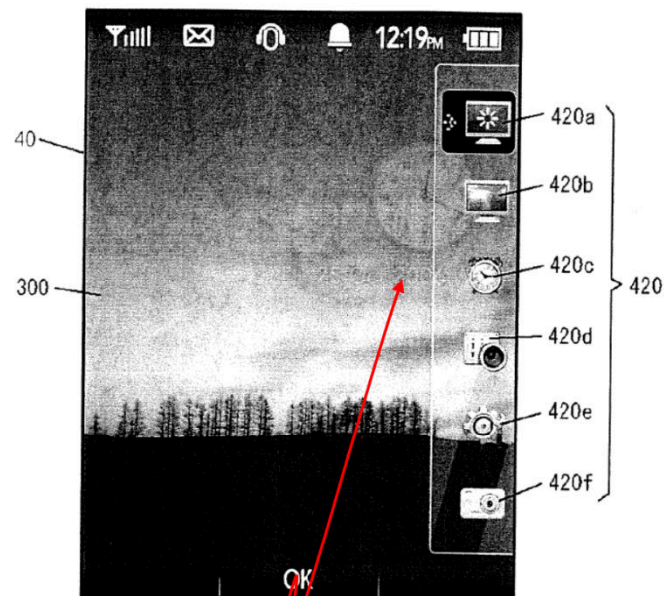


FIG. 4B



**Clock widget appears blurred and
more transparent when user menu
420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

196. Furthermore, as discussed with respect to Claim [58], *supra*, it was well known to combine blur with other “focus and context” visual cues, including transparency, to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”). And

197. Accordingly, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been *configured such that the blur includes changing a transparency of the at least portion of the at least one other object*, as recited in Claim [60].

30. Claim 61

[61] The apparatus of claim 27, wherein the apparatus is configured such that the blur includes changing a translucency of the at least portion of the at least one other object.

198. The Ahn-Chaudhri combination renders obvious Claim [61].

199. As discussed in Section IV.A.1 and with respect to Element [2.d], “translucence” means “allowing light, but not detailed images, to pass through; semitransparent,” and “blur” means to “make or become unclear or less distinct.” EX1009, 3, 6. In other words, “translucence” is at least one type of “blur.” A POSITA would have understood and found obvious that FIGS. 4B, 10, and 13B illustrate that at least the clock widget portion of standby screen 300 becomes more translucent as a menu is opened. See EX1004, FIGS. 3A, 4B, 10, 13B. Thus, Ahn teaches that *the apparatus is configured such that the blur includes changing a translucency of the at least portion of the at least one other object*, as recited in Claim [61].

FIG. 3A

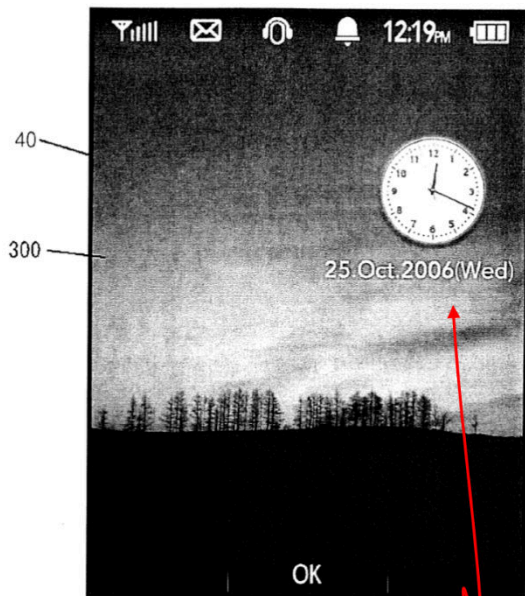
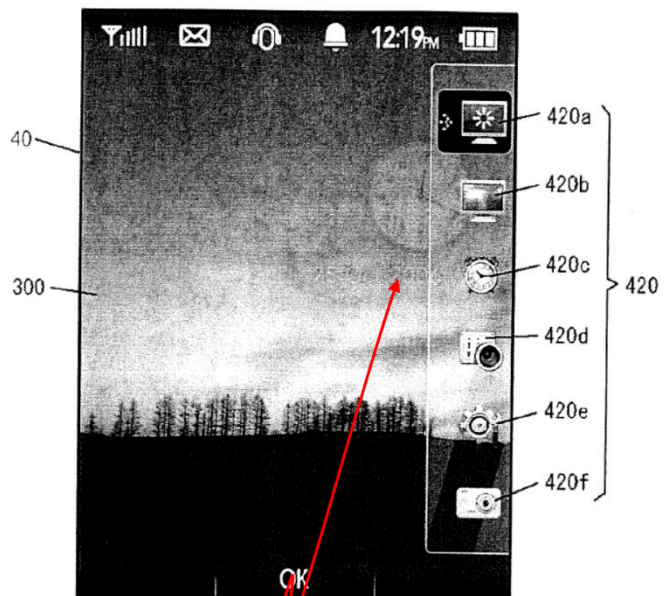


FIG. 4B



**Clock widget appears translucent
when user menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

200. Furthermore, as discussed with respect to Claim [58], it was well known to combine blur with other “focus and context” visual cues to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”); EX1005, [0085] (the transition in optical

intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof”).

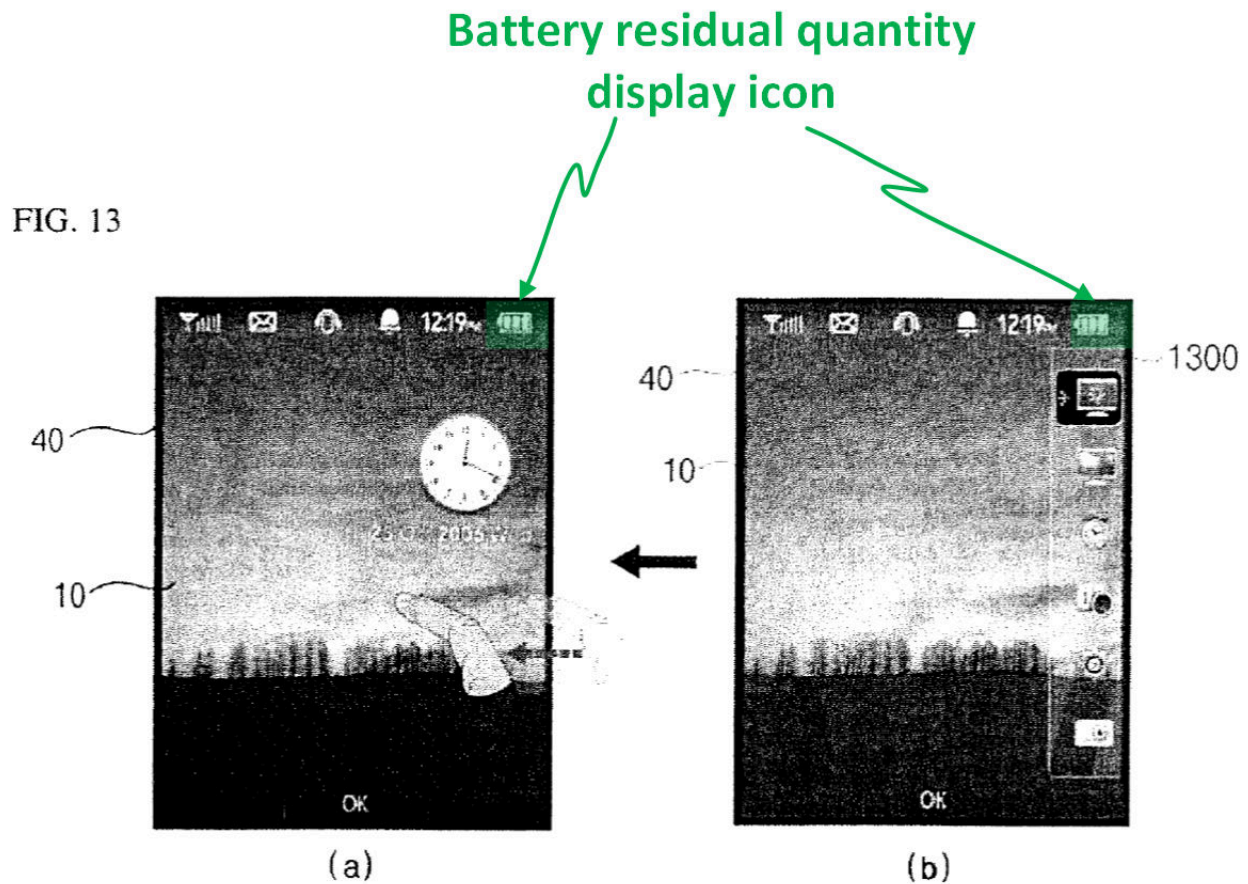
201. Accordingly, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been *configured such that the blur includes changing a translucency of the at least portion of the at least one other object*, as recited in Claim [61].

31. Claim 62

[62] The apparatus of claim 27, wherein the apparatus is configured such that the object includes a battery-related icon.

202. The Ahn-Chaudhri combination renders obvious Claim [62].

203. As discussed with respect to Element [2.b], *supra*, Ahn’s indicator area 320 “comprises a signal intensity icon 330a, a message notification icon 330b, a background music setting icon 330c, a reception mode setting icon 330d, a watch icon 330e, and a battery residual quantity display icon 300f, for example.” EX1004, [0040].



EX1004, FIGS. 13a and 13b (annotated)

204. Accordingly, a POSITA would have understood and found obvious that the device of the Ahn-Chaudhri combination would have been *configured such that the object includes a battery-related icon*, as recited in Claim [62].

32. Claim 63

[63] The apparatus of claim 27, wherein the apparatus is configured such that the gesture includes a swipe gesture, the at least part of the gesture is detected on the touch screen on the object, and the object is displayed to move with the swipe gesture.

205. The Ahn-Chaudhri combination renders obvious Claim [63].

206. As discussed with respect to Claim [30], *surpa*, a POSITA would have understood and found obvious that in those implementations that include a graphic shadow 1800, graphic 1800 is *the object*.

207. Ahn describes that, “if the user drags in a right direction after touching the screen, a graphical shadow 1800 is displayed in the display 40, and the menu list 1500 shown in FIG. 15(b) can be displayed in the display 40.” EX1004, [0118]. A POSITA would have understood Ahn’s touch and drag gesture to be a “swipe.” Further, Ahn describes that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, [0118]. In other words, Ahn describes that the graphic 1800 moves (*i.e.*, is “dragged”) in response to and along with a user’s touch and drag gesture on the touch screen. *See* EX1004, [0118]. Based on these teachings a POSITA would have understood and found obvious that *the apparatus is configured such that the gesture includes a swipe gesture (e.g., Ahn’s touch and drag gesture), the at least part of the gesture is detected on the touch screen on the object (e.g., the graphic 1800), and the object is displayed to move with the swipe gesture (e.g., the graphic 1800 is “dragged” with the gesture)*, as recited in Claim [63].

33. Claim 64

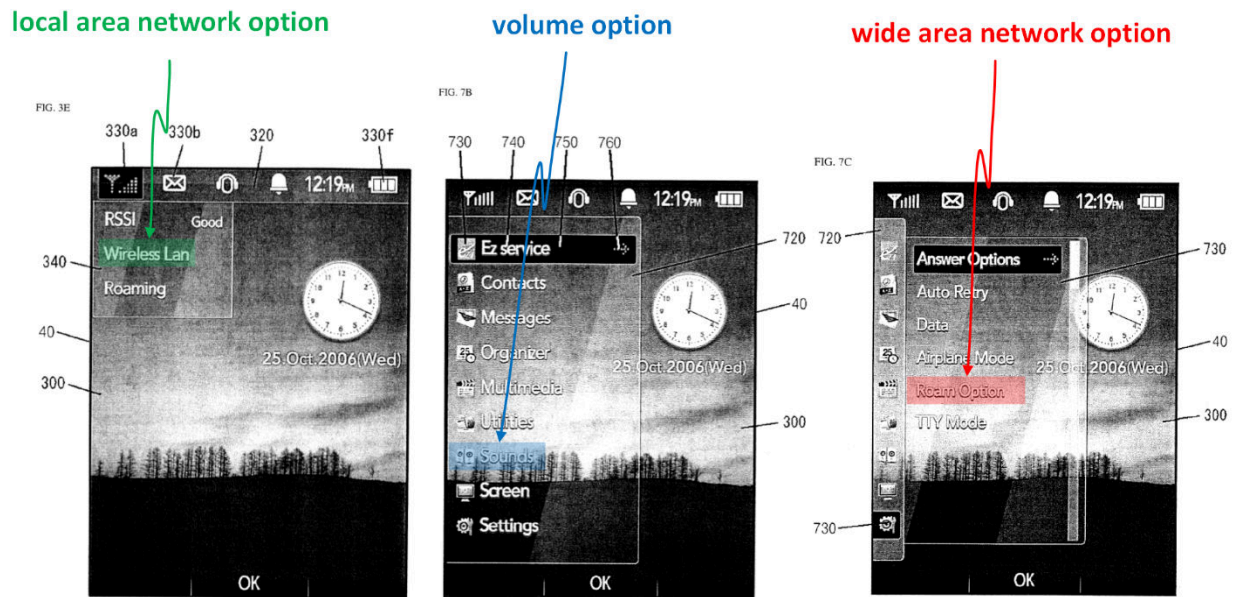
[64] The apparatus of claim 27, wherein the apparatus is configured such that the menu fades-in, and includes a wide area network option, a local area network option, and a volume option.

208. The Ahn-Chaudhri combination renders obvious Claim [64].

209. As discussed with respect to Claim [58], *supra*, Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state “fade in” while objects associated with the first user interface state “fade out.” *See* EX1005, [0079], [0087]. Furthermore, Chaudhri '842 the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include multiple simultaneous effects. EX1005, [0085]. Indeed, it was well known to combine blur with other “focus and context” visual cues, including transparency, to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc.,

or as a completely separate dimension of data display”). Accordingly, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination *is configured such that the menu fades-in*, as recited in Claim [64].

210. Furthermore, Ahn teaches that the “item list” displayed when a touch and drag gesture is detected “comprises, for example, a menu list or a file list,” and leaves the contents of each list/menu open to the designer and the user. *See* EX1004, [0051] (“The user menu 420 comprises sub-menus set by the user in order for the user to easily enter a menu in which the user frequently uses.”), [0071] (“Please note however that this is an exemplary illustration, and various menus can be displayed, depending on implementation”), [0099]. Thus, the designer or the user can include whatever sub-menus and/or functions they want within an opened list/menu. As illustrated in various of its figures (reproduced below), among the possible sub-menus and/or functions, Ahn teaches or at least suggests that a list/menu may include a wide area network option, a local area network option, and a volume option. *See* EX1004, FIGS. 3E, 7B, 7C.



EX1004, FIGS. 3E, 7B, 7C (annotated)

211. Based on these teachings, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been configured such that a single menu (*e.g.*, user menu 420 that Ahn teaches a user may set to include their most frequently used functions) ***includes a wide area network option, a local area network option, and a volume option***, as recited in Claim [64].

34. Claim 67

[67] The apparatus of claim 27, wherein the apparatus is configured such that the blur includes decreasing a translucency of a virtual display layer overlaying the at least one other object.

212. The Ahn-Chaudhri combination renders obvious Claim [67].

213. As discussed with respect to Claim [24], *supra*, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri

combination would have displayed the various user interface objects as part of virtual layers.

214. Further, as discussed with respect to Claim [58], Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state (*e.g.*, a menu that is opened in Ahn) “fade in” while objects associated with the first user interface state (*e.g.*, Ahn’s clock widget) “fade out.” *See* EX1005, [0079], [0087]. Furthermore, Chaudhri '842 the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include multiple simultaneous effects. EX1005, [0085]. Indeed, it was well known to combine blur with other “focus and context” visual cues, including transparency, to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”).

215. Based on these teachings, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been configured *such that the blur includes decreasing a translucency of a virtual display layer overlaying the at least one other object* (e.g., the virtual display layer containing the menu fading in as the menu is opening), as recited in Claim [67].

35. Claim 68

[68] The apparatus of claim 27, wherein the apparatus is configured such that the blur includes decreasing a transparency of a virtual display layer overlaying the at least one other object.

216. The Ahn-Chaudhri combination renders obvious Claim [68].

217. As discussed with respect to Claim [24], *supra*, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri combination would have displayed the various user interface objects as part of virtual layers.

218. Further, as discussed with respect to Claim [58], Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state (*e.g.*, a menu that is opened in Ahn) “fade in” while objects associated

with the first user interface state (e.g., Ahn's clock widget) "fade out." *See* EX1005, [0079], [0087]. Furthermore, Chaudhri '842 the transition in optical intensity can be "based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof," meaning the transition can include multiple simultaneous effects. EX1005, [0085]. Indeed, it was well known to combine blur with other "focus and context" visual cues, including transparency, to help direct a user's attention to the most relevant information. *See* EX1008, 2 ("The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time"), 4 (blur "can serve as an additional aid to guide the viewer's attention, together with brighter colors, etc., or as a completely separate dimension of data display").

219. Further, As discussed with respect to Element [2.d], *supra*, the word "translucent" means "allowing light, but not detailed images, to pass through; semitransparent." EX1009, 6. A POSITA would have understood not transmitting detail as a type of blurring, because the word "blur" means to "make or become unclear or less distinct." EX1009, 3. And since 'translucent' is synonymous with 'semitransparent', it is axiomatic that increasing blur decreases transparency.

220. Based on these teachings, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been ***configured such that the blur includes decreasing a transparency of a virtual***

display layer overlaying the at least one other object (e.g., the virtual display layer containing the menu fading in as the menu is opening), as recited in Claim [68].

36. Claim 69

[69] The apparatus of claim 27, wherein the apparatus is configured such that a magnitude of the blurring is continuously increased as a function of a continuous increase in the change in the magnitude of the gesture being detected on the touch screen, until a predetermined amount of an interface including the at least one other object is completely obscured by an overlaying virtual display layer.

221. The Ahn-Chaudhri combination renders obvious Claim [69].

222. As discussed with respect to Claim [24], *supra*, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri combination would have displayed the various user interface objects as part of virtual layers.

223. Further, as discussed with respect to Claim [40], *supra*, Chaudhri '842 teaches “[c]ontrolling the optical intensity may include increasing or decreasing the optical intensity of a graphical object” and “the increase or decrease may follow predefined functions,” such that a POSITA would have at least found it obvious to vary the optical intensity (e.g., the blur) of the standby screen 300 or at least the clock widget portion thereof such that a magnitude of the blurring is progressively increased as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen. EX1005, [0042]; *see also* Claim [46]. For at least similar reasons, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination *is configured such that a*

magnitude of the blurring is continuously increased as a function of a continuous increase in the change in the magnitude of the gesture being detected on the touch screen, as recited in Claim [70].

224. As shown in FIGS. 4B, 10, and 13b, once the touch and drag gesture fully opens a corresponding menu, at least the clock widget portion of the standby screen 300 is both blurred and is obscured by the open menu.

FIG. 3A

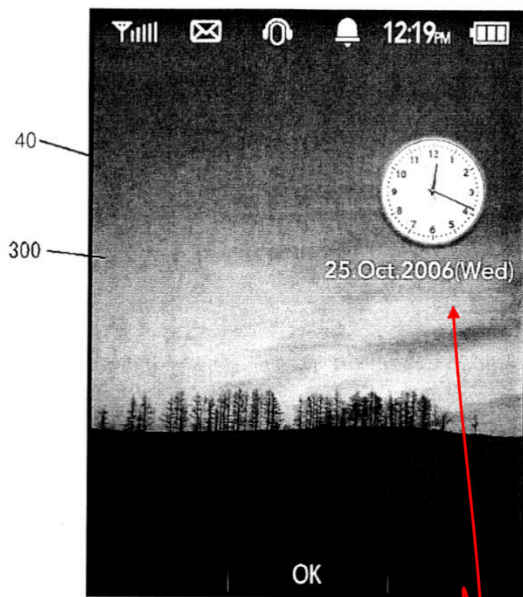
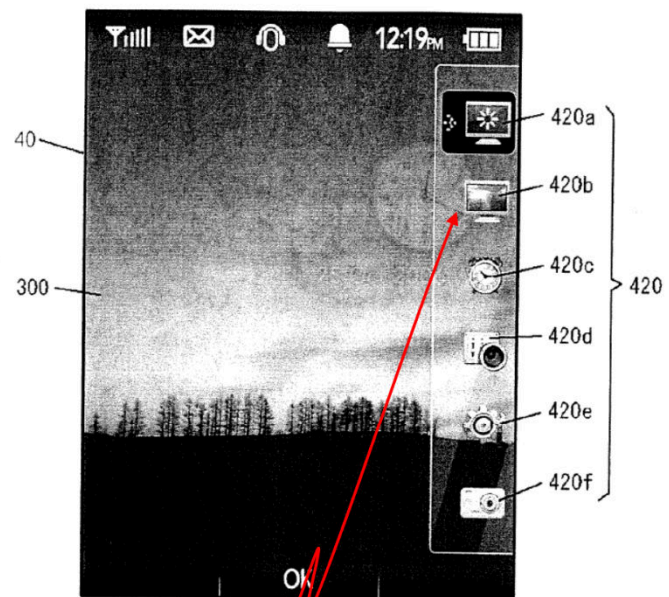


FIG. 4B



**Clock widget blurred and obscured
when user menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

225. Though the menu in FIG. 4B shows only a portion of the clock widget is obscured, other of the menus taught in Ahn are larger (*e.g.*, the basic setting menu list 720) and take up a larger portion of the display, so a POSITA would have understood and found obvious that, in some implementations, the menu associated with the left direction would be larger to accommodate a larger list of menu items (*e.g.*, menu 720), which would overlap the entire clock widget. *See* EX1004, FIG. 7B. Furthermore, Ahn describes that “menus displayed on the standby screen 300 can be embodied in a translucent form or an opaque form, depending on implementation.” EX1004, [0070]. Thus, in an implementation where the menu associated with the left direction would have been made larger to accommodate a larger list of menu items (*e.g.*, menu 720) and embodied in an opaque form, a POSITA would have understood and found obvious that the entire menu would obscure the entire clock widget.

226. Based on these teachings, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been configured such that the blurring is continuously increased ***until a predetermined amount of an interface including the at least one other object is completely obscured by an overlaying virtual display layer***, as recited in Claim 69.

37. Claim 70

[70] The apparatus of claim 27, wherein the apparatus is configured such that a magnitude of the blurring is continuously increased in a first virtual display layer as a function of a continuous increase in the change in the magnitude of the gesture being detected on the touch screen, until a predetermined amount of an interface including the at least one other object is obscured by an overlaying second virtual display layer.

227. The Ahn-Chaudhri combination renders obvious Claim [70].

228. As discussed with respect to Claim [24], *supra*, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri combination would have displayed the various user interface objects as part of virtual layers.

229. Further, as discussed with respect to Claim [40], *supra*, Chaudhri '842 teaches “[c]ontrolling the optical intensity may include increasing or decreasing the optical intensity of a graphical object” and “the increase or decrease may follow predefined functions,” such that a POSITA would have at least found it obvious to vary the optical intensity (*e.g.*, the blur) of the standby screen 300 or at least the clock widget portion thereof such that a magnitude of the blurring is progressively increased as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen. EX1005, [0042]; *see also* Claim [46].

230. For at least similar reasons, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination ***is configured such that a***

magnitude of the blurring is continuously increased in a first virtual display layer (e.g., a virtual display layer with the clock widget) as a function of a continuous increase in the change in the magnitude of the gesture being detected on the touch screen, as recited in Claim [70].

231. As shown in FIGS. 4B, 10, and 13b, once the touch and drag gesture fully opens a corresponding menu, at least the clock widget portion of the standby screen 300 is both blurred and is obscured by the open menu, which as a predetermined width, set by the interface designer.

FIG. 3A

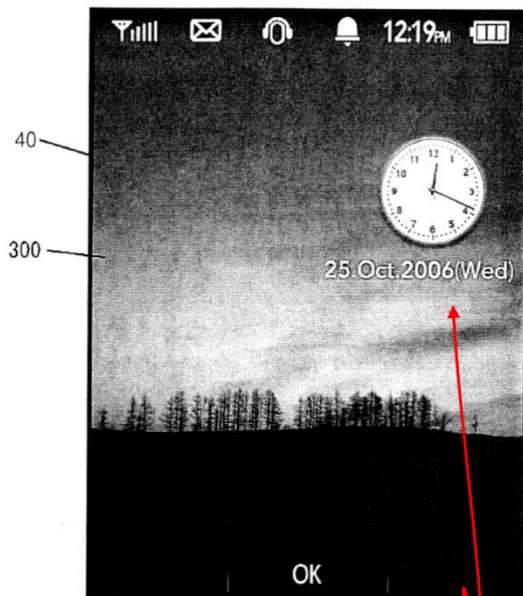
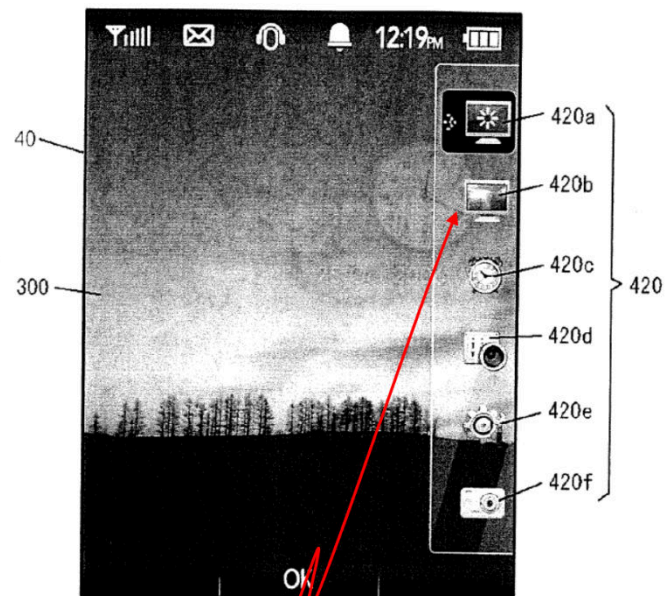


FIG. 4B



**Clock widget blurred and obscured
when user menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

232. Based on these teachings, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been configured such that the blurring is continuously increased *until a predetermined amount* (e.g., the width of the menu) *of an interface including the at least one other object is obscured by an overlaying second virtual display layer* (e.g., a virtual display layer including the menu), as recited in Claim 70.

38. Claim 71

[71] The apparatus of claim 27, wherein the apparatus is configured such that the at least one other object is blurred by continuously decreasing a magnitude of a translucency of a virtual display layer overlaying the at least one other object as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen.

233. The Ahn-Chaudhri combination renders obvious Claim [71].

234. As discussed with respect to Claim [33], *supra*, it would have been obvious in the Ahn-Chaudhri combination that *the apparatus is configured such that the at least one other object is displayed via a first virtual display layer.*

235. As discussed with respect to Claim [67], Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear

to a user as though objects associated with the second user interface state (*e.g.*, a menu that is opened in Ahn) “fade in” while objects associated with the first user interface state (*e.g.*, Ahn’s clock widget) “fade out.” *See* EX1005, [0079], [0087];

236. Furthermore, Chaudhri ’842 teaches that the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include multiple simultaneous effects. Consistent with the above teachings of Chaudhri ’842, it was well known to combine blur with other “focus and context” techniques, such as transparency, to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”). In other words, it would have at least been obvious that, as the menu is slide onto the display, the menu would “fade in” (*e.g.*, by continuously decreasing a magnitude of a translucency of a virtual display layer containing the menu, particularly in those implementations in which the menu is embodied in a translucent window, as taught by Ahn). A POSITA would have understood that a “fade in” of the menu alone would have achieved an effect sufficiently similar to the blurring shown in Ahn’s FIG. 4A and meeting the benefits taught by Chaudhri ’842.

This is because as the menu "fades in" due to its translucency decreasing, the underlying layer would blur directly in proportion to the decrease in translucency in the menu. Indeed, a POSITA would have similarly found it obvious to apply optical intensity changes to either or both layers to achieve the goals set forth in Chaudhri '842

237. Thus, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been configured such that the blur includes decreasing a translucency of a virtual display layer overlaying the at least one other object (*e.g.*, the virtual display layer containing the menu fading in as the menu is opening).

238. As discussed with respect to Claim [40], *supra*, Chaudhri '842 provides "graphs illustrating optical intensity as a function of the completion of the user input condition." EX1005, FIGS. 8A-8C, [0095]. Applied in the context of Ahn's transition between a user interface state where the standby screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to continuously vary the optical intensity (*e.g.*, the translucency) of the standby screen 300 or at least the clock widget portion thereof, as well as the menu that's being dragged onto the display, in order

to achieve the above-described “fade in” and “fade out” effect described in Chaudhri ’842.

239. Based at least on these teachings, a POSITA would have found it obvious that the device of the Ahn-Chaudhri combination would have been *configured such that the at least one other object (e.g., the clock widget) is blurred by continuously decreasing a magnitude of a translucency of a virtual display layer overlaying the at least one other object (e.g., a “fade-in” of the virtual display layer containing the menu that is being opened) as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen (e.g., the continuous functions taught in Chaudhri ’842’s FIGS. 8A-8C), as recited in Claim [71].*

39. Claim 72

[72] The apparatus of claim 71, wherein the apparatus is configured such that the virtual display layer moves to appear like a window shade.

240. The Ahn-Chaudhri combination renders obvious Claim [72].

241. As discussed with respect to Claim [24], *supra*, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri combination would have displayed the various user interface objects (e.g., menus) as part of “virtual display layers,” as that term is used in the ’754 Patent.

242. Further, with respect to FIG. 18, Ahn describes that the display 40 may utilize “a graphical display for notifying a start position of a touch and drag operation to a user,” and illustrates “a graphical shadow 1800” displayed at an edge of the display. *See* EX1004, [0118]-[0119]. Ahn explains that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, EX1004, [0118]. Based on these teachings, a POSITA would have understood and found obvious from these teachings that, in at least implementations like those described with respect to FIG. 18, the menu list 1500 is displayed such *that the virtual display layer* (e.g., the virtual display layer that includes the “dragged” menu) *moves to appear like a window shade*, as recited in [72].

40. Claim 73

[73] The apparatus of claim 27, wherein the apparatus is configured such that the at least one other object is blurred by continuously decreasing a magnitude of a transparency of a virtual display layer overlaying the at least one other object as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen.

243. Claim [73] is substantially the same as Claim [71]. Ahn teaches that menus can be implemented with either “translucent” or “transparent” graphic effects, demonstrating that its mobile terminal supports both and they are interchangeable. *See* EX1004, [0070]. Thus, the Ahn-Chaudhri combination renders obvious Claim [73] for at least the same reasons described above with respect to Claim [71]. *See* Claim [71], *supra*.

41. Claim 74

[74] The apparatus of claim 73, wherein the apparatus is configured such that the virtual display layer moves in response to the change in the magnitude of the gesture being detected on the touch screen, so as to appear as a window shade.

244. Claim [74] is substantially the same as Claim [72]. Thus, the Ahn-Chaudhri combination renders obvious Claim [74] for at least the same reasons described above with respect to Claim [72]. *See* Claim [72], *supra*.

42. Claim 75

[75] The apparatus of claim 27, wherein the apparatus is configured such that, when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to not increase above the distance threshold, a home screen for choosing among a plurality of applications is displayed.

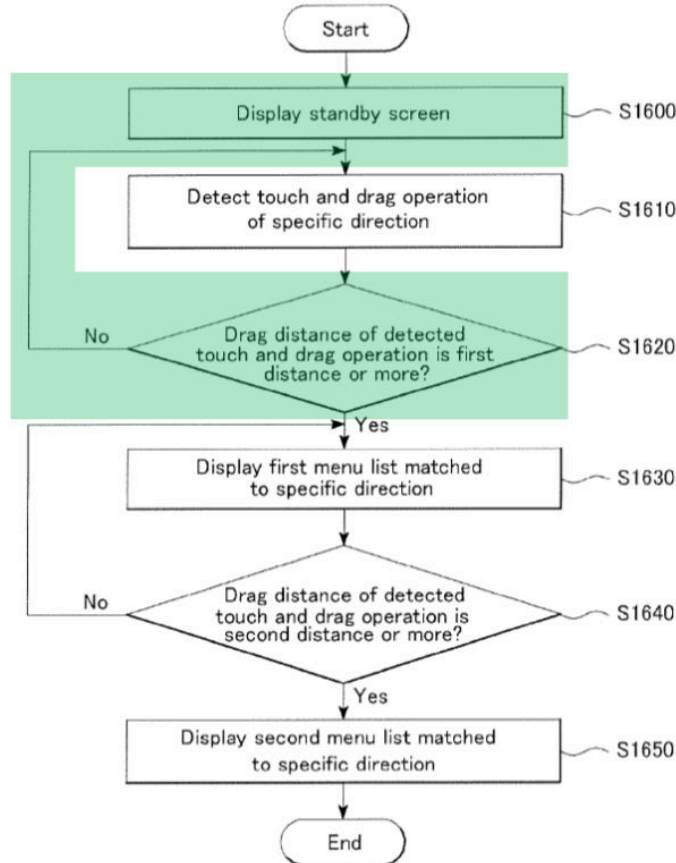
245. The Ahn-Chaudhri combination renders obvious Claim [75].

246. As discussed with respect to Claim [8], *supra*, a POSITA would have at least found it obvious that one or more of the icons displayed as part of indicator area 320 or standby screen 300 could be displayed as organized throughout the standby screen 300 like the menu of icons shown in FIG. 5D of Chaudhri '842.

247. Further, with respect to the embodiment of FIG. 16, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and only “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. In FIG. 16 (reproduced below), when a distance magnitude of the

touch and drag gesture has not yet reached the threshold of the “first distance or more,” the standby screen 300 (e.g., including a menu of icons shown in FIG. 5D of Chaudhri ’842, as discussed above) remains displayed. *See* EX1004, [0107]-[0109].

FIG. 16



EX1004, FIG. 16 (highlighted)

248. Based on these teachings, a POSITA would have at least found it obvious that the device of the Ahn-Chaudhri combination would have been *configured such that, when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to not increase above the*

distance threshold, a home screen for choosing among a plurality of applications is displayed, as recited in Claim 75.

43. Claim 76

[76] The apparatus of claim 27, wherein the apparatus is configured such that, when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to not increase above the distance threshold, a home screen for choosing among a plurality of applications is displayed instead of the menu.

249. Claim [76] is substantially the same as Claim [75]. Thus, the Ahn-Chaudhri combination renders obvious Claim [76] for at least the same reasons described above with respect to Claim [75]. *See* Claims [75], *supra*.

44. Claim 77

[77] The apparatus of claim 27, wherein the apparatus is configured such that, when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to not increase above the distance threshold, a home screen for choosing among a plurality of applications remains displayed instead of displaying the menu.

250. Claim [77] is substantially the same as Claim [75]. Thus, the Ahn-Chaudhri combination renders obvious Claim [77] for at least the same reasons described above with respect to Claim [75]. *See* Claims [75], *supra*.

45. Claim 78

[78.a] The apparatus of claim 27, wherein the apparatus is configured such that the distance magnitude of the gesture is detected to increase above the distance threshold and the menu is displayed in a first use scenario; and

251. Element [78.a] is substantially the same as Claim [27]. Thus, the Ahn-Chaudhri combination renders obvious Element [78.a] for at least the same reasons

described above with respect to Claim [27]. *See* Claims [27], *supra*; *see also* Claim [32], *supra*.

[78.b] the distance magnitude of the gesture is not detected to increase above the distance threshold, the menu is not displayed and a home screen for choosing among a plurality of applications is displayed in a second use scenario.

252. Element [78.b] is substantially the same as Claim [75]. Thus, the Ahn-Chaudhri combination renders obvious Element [78.b] for at least the same reasons described above with respect to Claim [75]. *See* Claims [75], *supra*; *see also* Claim [32], *supra*.

46. Claim 79

[79.a] The apparatus of claim 27, wherein the apparatus is configured such that: the distance magnitude of the gesture is detected to increase above the distance threshold and the menu is displayed for a first gesture in a first use scenario; and

253. Element [79.a] is substantially the same as Claim [27]. Thus, the Ahn-Chaudhri combination renders obvious Element [79.a] for at least the same reasons described above with respect to Claim [27]. *See* Claims [27], *supra*; *see also* Claim [32], *supra*.

[79.b] the distance magnitude of the gesture is not detected to increase above the distance threshold, the menu is not displayed, and a home screen for choosing among a plurality of applications is displayed for a second gesture in a second use scenario.

254. Element [78.b] is substantially the same as Claim [75]. Thus, the Ahn-Chaudhri combination renders obvious Element [79.b] for at least the same reasons

described above with respect to Claim [75]. *See* Claims [75], *supra*; *see also* Claim [32], *supra*.

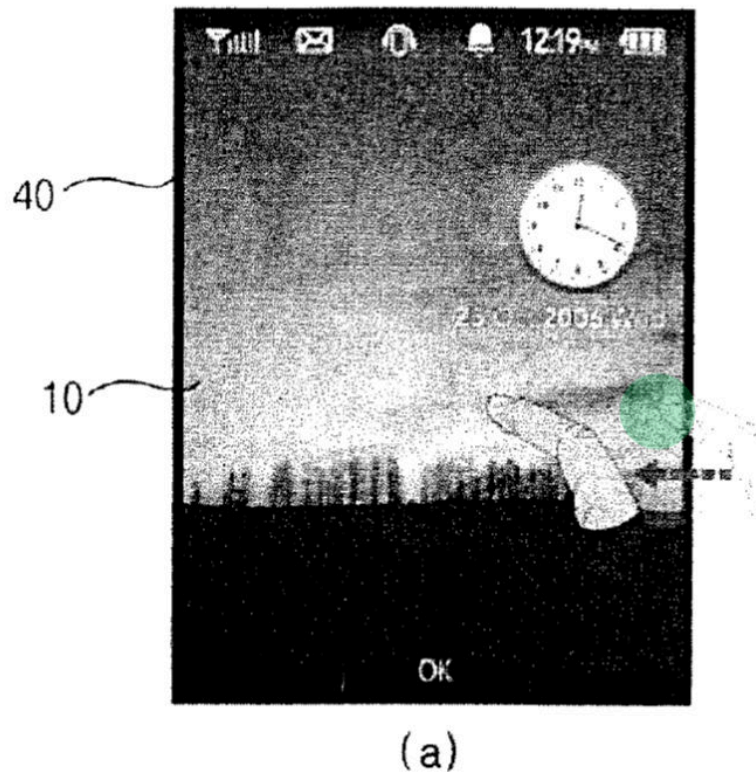
47. Claim 186

[186.a] The apparatus of claim 2, wherein the apparatus is configured such that: the at least part of the gesture is detected on the touch screen on an edge of the touch screen;

255. The Ahn-Chaudhri combination renders obvious Element [186.a]. *See* Claims [28], *supra*.

256. In one example illustrated in FIGS. 13a and 13b, “if the user touches a specific position of the touch screen 10 and drags the touch in a left direction a menu list 1300 matched to a left direction is displayed in the display 40.” EX1004, [0102]. As illustrated in FIG. 13a, the “specific position” at which the user’s finger touches the touch screen 10 is ***at an edge of the touch screen***, as recited in Element [186.a].

FIG. 13



EX1004, FIG. 13 (highlighted)

257. Moreover, with respect to FIG. 18, Ahn describes that the display 40 may utilize “a graphical display for notifying a start position of a touch and drag operation to a user,” and clearly shows “a graphical shadow 1800” displayed at a first edge of the display (e.g., the left edge in this example) that indicates the start position of the touch is *at an edge of the touch screen*. See EX1004, [0118]-[0119]; Ahn explains that “as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800.” EX1004, EX1004, [0118].

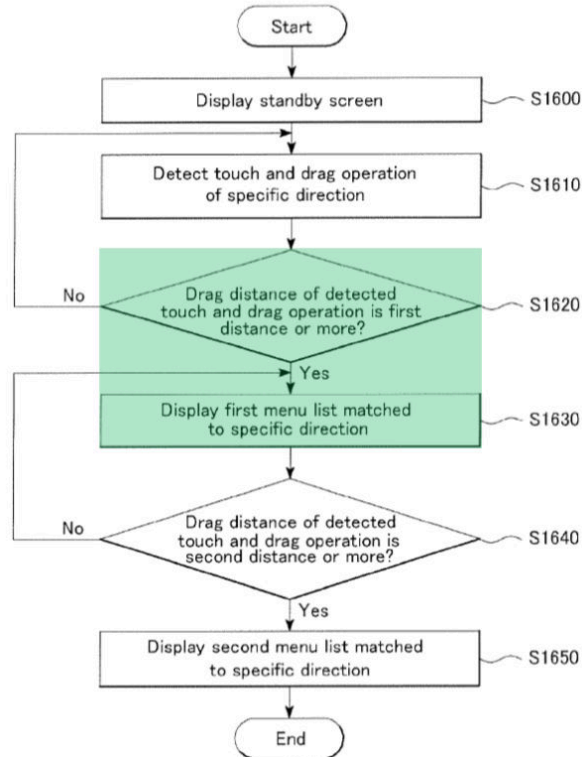
258. A POSITA would have understood and found obvious from these teachings that, in at least implementations like those described with respect to FIG. 18, *the at least part of the gesture is detected on the touch screen on an edge of the touch screen*, as recited in Element [186.a].

[186.b] the magnitude of the gesture includes a distance magnitude; . . . [and] when the magnitude of the gesture detected on the touch screen is detected to increase above a distance threshold, a menu is displayed with at least one option,

259. The Ahn-Chaudhri combination renders obvious Element [186.b]. *See* Claims [27], *supra*.

260. For example, in one embodiment, Ahn describes that “controller 50 controls to sequentially display a plurality of specific menu lists according to a distance of the detected touch and drag operation.” EX1004, [0108].

FIG. 16



EX1004, FIG. 16 (highlighted)

261. Specifically, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. Accordingly, Ahn teaches that the *magnitude of the gesture includes a distance magnitude; . . . [and] when the magnitude of the gesture detected on the touch screen is detected to increase above a distance threshold, a menu is displayed with at least one option*, as recited in Element [186.b].

[186.c] the gesture includes a swipe gesture;

262. The Ahn-Chaudhri combination renders obvious Element [186.c]. *See* Claims [63], *supra*.

263. Ahn describes that the “controller 50 detects a touch and drag operation of a specific direction on the touch screen 10 (S1110)” and “the controller 50 controls to display an item list matched to the specific direction in the display 40 (S1120).” EX1004, [0098]-[0099]. A POSITA would have understood Ahn’s touch and drag gesture ***includes a swipe gesture***, as recited in Element [186.c], because it involves the user moving their finger along the surface of the display. *See* EX1010, 2:48-53 (“The described techniques and apparatuses enable her to select other interfaces through a simple swipe gesture started at an edge of her display. She may swipe from one edge of her display and drag out a user interface enabling her to select her social networking website.”).

[186.d] a magnitude of the blurring is continuously increased as a continuous function of an increase in the magnitude of the gesture being detected on the touch screen;

264. The Ahn-Chaudhri combination renders obvious Element [186.d]. *See* Claims [46], *supra*.

265. As discussed with respect to Element [2.d], *supra*, applying the teachings of Chaudhri ’842 in the context of Ahn’s “touch and drag” gesture and Ahn’s corresponding transition between a user interface state where the standby

screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary, according to the teachings of Chaudhri '842, the optical intensity of the standby screen or at least portions thereof (*e.g.*, the blurring of the clock widget, as shown in FIGS. 4B, 10, and 13b) as a visual indication of a user's progress in completing Ahn's "touch and drag" gesture. *See* EX1005, [0080]-[0089].

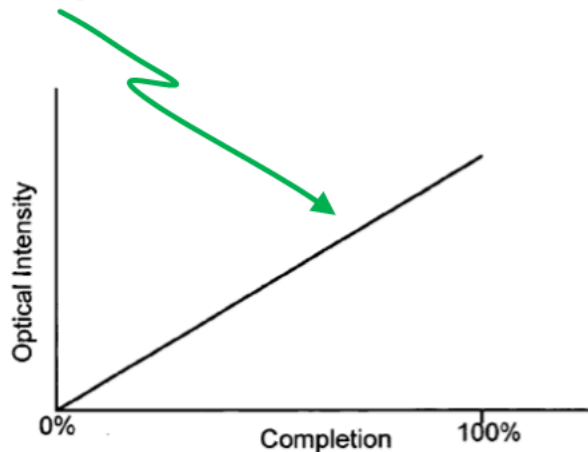
266. With respect to FIGS. 8A-8C, Chaudhri '842 provides "graphs illustrating optical intensity as a function of the completion of the user input condition." EX1005, [0095]. For example, Chaudhri '842 teaches:

In FIG. 8A, the optical intensity is a linear function of the completion of the user input condition. At 0% completion, the optical intensity is at an initial value (in this case, the initial value is 0). As the completion percentage increases, the optical intensity increases linearly with the completion percentage, until it reaches the final value at 100% completion.

EX1004, [0095].

Progressively changing optical intensity as a
continuous function of a change in magnitude
of gesture being detected

Figure 8A



EX1005, FIG. 8A (annotated)

267. Applied in the context of Ahn's transition between a user interface state where the standby screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary the optical intensity (*e.g.*, the blur) of the standby screen 300 or at least the clock widget portion thereof such that *a magnitude of the blurring is continuously increased as a continuous function of an increase in the magnitude of the gesture being detected on the touch screen*, as recited in Element [186.d].

[186.e] a magnitude of the blurring is continuously decreased as a continuous function of another change;

268. The Ahn-Chaudhri combination renders obvious Element [186.e]. *See* Claim [43], *supra*.

269. In the example of FIG. 8C, Ahn describes that, “[i]f the user selects the leftward direction key 38, . . . a basic setting menu list 820 of the mobile communication terminal 100 shown in FIG. 8C is displayed in a left area of the standby screen 300.” EX1004, [0075]-[0076]. From FIG. 8C, “if the user presses the leftward direction key 38 or a termination key, the basic setting menu list 820 disappears, and the screen returns to an initial standby screen state shown in FIG. 8A.” EX1004, FIG., 9A, [0080]. In other words, if a user mirrors the action that opens the basic setting menu list 820, the menu is closed.

270. Ahn does not specify or otherwise limit how menus are closed with respect to the touch screen interface. However, based on the above-noted teachings with respect FIG. 9A, a POSITA would have understood and found obvious that mirroring the touch and drag gesture that opens a menu would close the menu. Indeed, in other known pull-out edge menus, mirroring the dragging gesture that opens an edge menu—either during the original touch and drag operation or in a separate, subsequent touch and drag operation after the menu has been opened—will close the menu. *See, e.g.*, EX1006, [0077] (“The user may close the bezel menu by

sliding it back off of the screen (an on-screen-to-offscreen gesture)”; EX1011, [0053] (“FIGS. 13 and 14 are the flow charts which show the processing procedures for closing the displayed pull-out menu.”), [0054]-[0063] (“after the menu pull-out amount x became smaller than the predetermined definition amount, if it became OFF, it will be regarded as that the user intends to turn off the display of the pull-out menu, and the pull-out menu display will be stopped (S209).”)

271. As part of performing the mirrored touch and drag gesture to close the menu, it further would have been obvious that the blurring would also be reversed in the same manner as it was initially presented. Ahn describes that when a menu is closed, “the screen returns to an initial standby screen state,” which shows that the clock widget is not blurred. *See* EX1004, [0076], FIG. 8A. And Chaudhri ’842 describes that “[c]ontrolling the optical intensity may include increasing or decreasing the optical intensity of a graphical object,” and that “the increase or decrease may follow predefined functions.” EX1005, [0042]. Furthermore a POSITA would have recognized and found obvious that transitioning from an open menu to a closed menu is a transition in user interface state in the same manner that transitioning from a closed menu to an open menu, so Chaudhri ’842’s teachings with respect to varying optical intensity would be equally as applicable for closing the menu as opening the menu. *See* EX1005, [0080]-[0087].

272. Based on at least these teachings, a POSITA would have at least found it obvious, in the Ahn-Chaudhri combination, that *a magnitude of the blurring is continuously decreased as a continuous function of another change* (e.g., a closing gesture), as recited in Element [186.e].

[186.f] the at least one other object is displayed via a first virtual display layer, the menu is displayed in a second virtual display layer that appears above the first virtual display layer,

273. The Ahn-Chaudhri combination renders obvious Element [186.f]. See Claim [33], *supra*.

274. As discussed in Section V.A, *supra*, the '754 Patent describes that “virtual display layer refers to a collection of display elements which have all been assigned the same apparent depth within the 3D layered user interface.” EX1001, 68:39-42. “For example, in one embodiment, a 3D layered user interface may have a virtual foreground display layer and a virtual background display layer.” EX1001, 68:44-47. In some embodiments, “virtual display layers may be given the appearance of depth through the use of 3D depth cues.” EX1001, 68:58-60. However, the '754 Patent does not teach specific software and or hardware implementation details for achieving these “apparent” visual effects, and instead acknowledges that they “may be implemented in any desired environment.” EX1001, 67:66-68:17. In light of these teachings, a POSITA would have understood a “virtual display layer” to be present whenever one or more display elements appear

at “the same apparent depth” of display, regardless of the software and/or hardware mechanisms used to achieve this visual appearance.

275. Ahn describes that the various menus may be “transparently displayed on the standby screen 300,” such that preset standby screen 300 is not completely “hidden” by the menus. EX1004, [0039]; *see also* EX1004, [0070] (“menus displayed on the standby screen 300 can be embodied in a translucent form or an opaque form”). Similarly, Ahn describes that the menus are “displayed in a transparent window form” in various areas “of the standby screen 300.” EX1004, [0064]. In order to display the menus “on” the standby screen 300 using “window forms,” a POSITA would have understood and found obvious that the menu window is and would be displayed in a “virtual display layer,” as that term is broadly used in the ’754 Patent, and that the virtual display layer containing the menu is displayed “on” at least one other virtual display layer that contain(s) the various elements of the standby screen 300. *See* EX1004, FIGS. 3A, 4B, [0064], [0070].

FIG. 3A

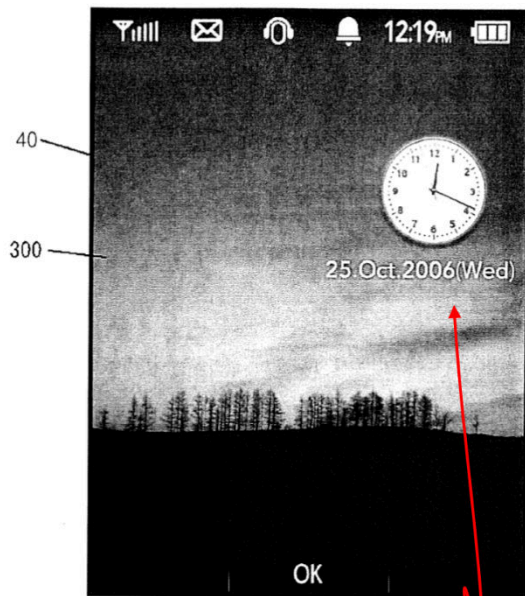
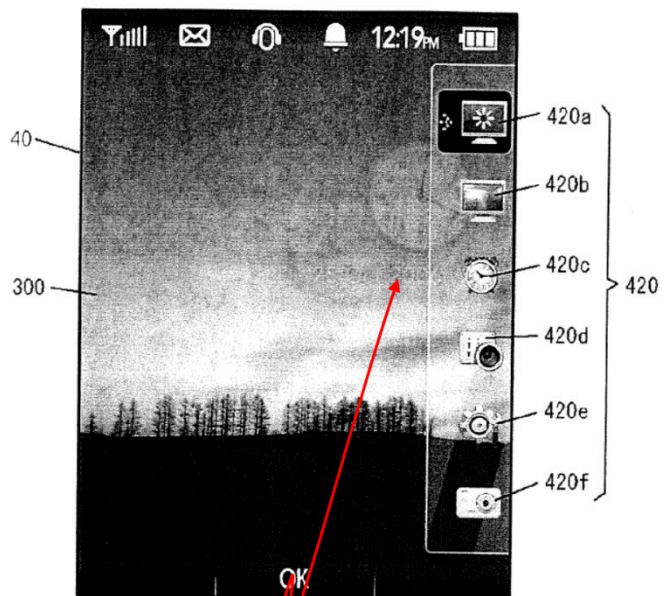


FIG. 4B



**Clock widget is blurred when user
menu 420 is opened**

EX1004, FIGS. 3A and 4B (annotated)

276. Indeed, it was known that, “[w]hen several 2D layers of information are put on top of each other, it is possible to provide the user with an intuitive way of choosing how much and which information to display crisply.” EX1008, 3-4. Indeed, there were user interface systems going back as early as 1991 where “up to 26 layers of information can be displayed at the same time” and where “[e]ach layer has an interest level associated with it that the user can change,” and “[t]he interest level is [visualized as] a combination of blur and transparency.” EX1008, 2, 8.

When a user interface object was displayed in a layer on top of another layer with other user interface objects, the top layer could be made transparent and therefore not necessarily visible beyond its constituent objects, so that components on the lower layer (e.g., a desktop) can still be seen. *See* EX1007, [0082]. Based on these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri combination displayed the various user interface objects as part of virtual layers.

277. Based on at least these teachings, a POSITA would have at least found it obvious, in the Ahn-Chaudhri combination, that *the at least one other object* (e.g., the clock widget of standby screen 300) *is displayed via a first virtual display layer, the menu is displayed in a second virtual display layer that appears above the first virtual display layer*, as recited in Element [186.f].

[186.g] the menu remains displayed after a completion of the gesture.

278. The Ahn-Chaudhri combination renders obvious Element [186.g]. *See* Claim 26, *supra*.

279. With respect to FIG. 11, Ahn describes that, “[a]s the touch and drag operation is detected, the controller 50 controls to display an item list matched to the specific direction in the display 40 (S1120).” EX1004, [0099]. Once the gesture is detected and the menu is displayed, the FIG. 11 process ends without further changes to the display, meaning the menus stays open. *See* EX1004, FIG. 11, [0095]-[0100].

A POSITA would have understood that FIGS. 4B, 10, and 13b show the menu exposed after completion of Ahn's touch and drag gesture. *See* EX1004, FIG. 11 (showing that the process ends with detection of the gesture and display of the item list), [0095]-[0100]. Indeed, it was known in similar systems with edge menus to leave a menu open after the user completed the gesture associated with the menu. *See, e.g.*, EX1006, [0077] (“[A]fter the user gestures to reveal the bezel menu 610, the user can lift their finger, whereupon the bezel menu can remain open for a configurable interval (or indefinitely). The user may then tap on a desired item associated with one of the icons or slots 612, 614, 616, 618, and 620.”); EX1011, [0052].

280. Based on at least these teachings, a POSITA would have understood and found obvious, in the Ahn-Chaudhri combination, that *the menu remains displayed after a completion of the gesture*, as recited in Element [186.g].

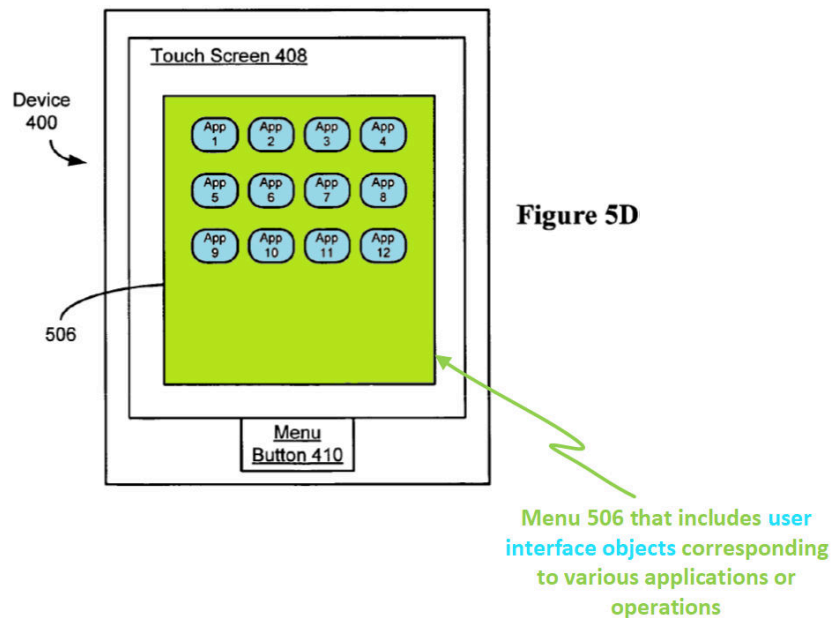
48. Claim 187

[187] The apparatus of claim 186, wherein the apparatus is configured such that the object and the at least one other object are displayed via a home screen for choosing among a plurality of applications when the at least part of the gesture is detected on the touch screen.

281. The Ahn-Chaudhri combination renders obvious Element [187].

282. As discussed with respect to Claim 8, *supra*, a POSITA would have at least found it obvious that one or more of the icons displayed as part of indicator

area 320 or standby screen 300 could be displayed throughout the standby screen 300 like the menu of icons shown in FIG. 5D of Chaudhri '842.



EX1005, FIGS 5D (annotated)

283. Ahn describes that “the preset standby screen 300 is not hidden by the” menus when they are open. EX1004, [0039]. Thus, a POSITA would have at least found it obvious that the home screen is displayed *when the at least part of the gesture is detected on the touch screen*, as recited in Claim [187].

49. Claim 189

[189] The apparatus of claim 186, wherein the apparatus is configured such that the gesture includes a swipe down gesture.

284. The Ahn-Chaudhri combination renders obvious Element [189].

285. Ahn describes that the “controller 50 detects a touch and drag operation of a specific direction on the touch screen 10 (S1110)” and “the controller 50

controls to display an item list matched to the specific direction in the display 40 (S1120).” EX1004, [0098]-[0099]. Ahn describes that menus may be associated with any direction, including down. *See* EX1004, [0058]-[0060], [0072] (“the user can select a direction using any input device that can select a direction, such as . . . a touch screen, etc.”). Based on these teachings a POSITA would understand and find obvious that the mobile device of the Ahn-Chaudhri combination would have been *configured such that the gesture includes a swipe down gesture*, as recited in Claim [189].

50. Claim 191

[191] The apparatus of claim 186, wherein the apparatus is configured such that the another change, includes another change in the magnitude of the gesture being detected on the touch screen.

286. Claim [191] is substantially the same as at least a portion of Claim [43]. Thus, the Ahn-Chaudhri combination renders obvious Element [191] for at least the same reasons described above with respect to Claim [43]. *See* Claims [43], *supra*.

51. Claim 192

[192] The apparatus of claim 186, wherein the apparatus is configured such that the another change, includes a change in a magnitude of another gesture being detected on the touch screen.

287. Claim [192] is substantially the same as at least a portion of Claim [44]. Thus, the Ahn-Chaudhri combination renders obvious Element [192] for at least the same reasons described above with respect to Claim [44]. *See* Claims [44], *supra*.

52. Claim 197

[197] The apparatus of claim 186, wherein the apparatus is configured such that the blur includes decreasing a transparency or a translucency of the second display layer that overlays the at least one other object.

288. Claim [197] is substantially the same as at least a portion of Claim [68].

Thus, the Ahn-Chaudhri combination renders obvious Element [197] for at least the same reasons described above with respect to Claim [68]. *See* Claims [68], *supra*.

53. Claim 199

[199] The apparatus of claim 186, wherein the apparatus is configured such that the magnitude of the blurring is continuously increased, until the at least one other object is completely obscured by the second display layer that overlays the at least one other object.

289. Claim [199] is substantially the same as at least a portion of Claim [69].

Thus, the Ahn-Chaudhri combination renders obvious Element [199] for at least the same reasons described above with respect to Claim [69]. *See* Claims [69], *supra*.

54. Claim 200

[200] The apparatus of claim 165, wherein the apparatus is configured such that the magnitude of the blurring is continuously increased, until the at least one other object is obscured by the second display layer that overlays the at least one other object.

290. Claim [200] is substantially the same as at least a portion of Claim [70].

Thus, the Ahn-Chaudhri combination renders obvious Element [200] for at least the same reasons described above with respect to Claim [70]. *See* Claims [70], *supra*.

55. Claim 201

[201] The apparatus of claim 186, wherein the apparatus is configured such that the at least one other object is blurred by continuously decreasing a magnitude of a translucency of the second display layer that overlays the at least one other object as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen.

291. Claim [201] is substantially the same as at least a portion of Claim [71].

Thus, the Ahn-Chaudhri combination renders obvious Element [201] for at least the same reasons described above with respect to Claim [71]. *See* Claims [71], *supra*.

56. Claim 202

[202] The apparatus of claim 186, wherein the apparatus is configured such that the at least one other object is blurred, by the second virtual display layer that overlays the at least one other object being displayed to fade-in while the at least one other object is displayed to fade-out.

292. The Ahn-Chaudhri combination renders obvious Claim [202].

293. As discussed with respect to Claim [67], Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state (*e.g.*, a menu that is opened in Ahn) “fade in” while objects associated with the first user interface state (*e.g.*, Ahn’s clock widget) “fade out.” *See* EX1005, [0079], [0087]. Based on these teachings, a POSITA would have at least found it obvious that the

device of the Ahn-Chaudhri combination would have been *configured such that the at least one other object is blurred, by the second virtual display layer that overlays the at least one other object being displayed to fade-in while the at least one other object is displayed to fade-out*, as recited in Claim 202.

57. Claim 203

[203] The apparatus of claim 186, wherein the apparatus is configured such that the at least one other object is blurred by continuously decreasing a magnitude of a transparency of the second display layer that overlays the at least one other object as a continuous function of an increase in the change in the magnitude of the gesture being detected on the touch screen.

294. Claim [203] is substantially the same as at least a portion of Claim [73].

Thus, the Ahn-Chaudhri combination renders obvious Element [203] for at least the same reasons described above with respect to Claim [73]. *See* Claims [73], *supra*.

58. Claim 204

[204] The apparatus of claim 203, wherein the apparatus is configured such that the second virtual display layer moves in response to the change in the magnitude of the gesture being detected on the touch screen, so as to appear as a window shade.

295. Claim [204] is substantially the same as at least a portion of Claim [72].

Thus, the Ahn-Chaudhri combination renders obvious Element [204] for at least the same reasons described above with respect to Claim [72]. *See* Claims [72], *supra*.

59. Claim 223

[223] The apparatus of claim 2, wherein the apparatus is configured such that the blur is accompanied by a fading.

296. Claim [223] is substantially the same as at least a portion of Claim [58]. Thus, the Ahn-Chaudhri combination renders obvious Claim [223] for at least the same reasons described above with respect to Claim [58]. *See* Claims [58], *supra*.

60. Claim 224

[224] The apparatus of claim 2, wherein the apparatus is configured such that the blur is accompanied by a scaling.

297. The Ahn-Chaudhri combination renders obvious Claim [224].

298. Chaudhri '842 describes that “the optical intensity may be perceived by users as a transparency effect (or lack thereof) applied to the user-interface object,” such that the object transitions from “not perceptible to the user” to being “completely materialized visually and [] perceptible to the user.” EX1005, [0085]. In other words, the transition may appear to a user as though objects associated with the second user interface state (*e.g.*, the menu that’s opened in Ahn) “fade in” while objects associated with the first user interface state (*e.g.*, the clock widget in Ahn) “fade out.” *See* EX1005, [0079], [0087].

299. Furthermore, Chaudhri '842 teaches that the transition in optical intensity can be “based on color, hue, color saturation, brightness, contrast, transparency, and any combination thereof,” meaning the transition can include

multiple simultaneous effects. Consistent with the above teachings of Chaudhri '842, it was well known to combine blur with other “focus and context” techniques to help direct a user’s attention to the most relevant information. *See* EX1008, 2 (“The interest level is a combination of blur and transparency, making less interesting layers more blurred and more transparent at the same time”), 4 (blur “can serve as an additional aid to guide the viewer’s attention, together with brighter colors, etc., or as a completely separate dimension of data display”). One set of known “focus and context” techniques were “distortion oriented or spatial methods” in which “geometry of the display is distorted to allow a magnification of interesting information without losing the (less magnified) context.” EX1008, 1. “Distortion-oriented techniques are usually used in an explicit way, by actively bringing the interesting objects into focus, *e.g.* by clicking on objects or dragging them around.” EX1008, 1. Thus, a POSITA would have found it obvious based on their broader knowledge of “focus and context” techniques in the user interface art to combine the blur described in Chaudhri '842 with other techniques such as geometry distortion of the relevant object to help better draw the user’s attention to the most interesting part of the display. *See* EX1008, 1-2.

300. Accordingly, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri combination would have been ***configured such that the blur is accompanied by a scaling***, as recited in Claim [224].

61. Claim 225

[225.a] A method, comprising: at an apparatus including a display, at least one non-transitory memory, a touch screen, and one or more processors in communication with the at least one non-transitory memory and the touch screen:

301. Element [225.a] is substantially the same as Element [2.a], except in the form of a method. The Ahn-Chaudhri combination renders obvious Element [225.a] for at least the same reasons described above with respect to Element [2.a]. *See* Element [2.a], *supra*. Moreover, Ahn teaches that it provides “[a] method of displaying a menu in a mobile communication terminal and a mobile communication terminal,” and that both “[m]ethods and systems are needed to overcome the . . . shortcomings” of the prior art. EX1004, Abstract, [0004], [0006]. Thus, a POSITA would have understood and found obvious that Ahn discloses a method.

[225.b] displaying an object;

302. Element [225.b] is substantially the same as at least of portion of Element [2.b]. The Ahn-Chaudhri combination renders obvious Element [225.b] for at least the same reasons described above with respect to Element [2.b]. *See* Element [2.b], *supra*.

[225.c] detecting at least part of a gesture on the touch screen; and

303. Element [225.c] is substantially the same as Element [2.c]. The Ahn-Chaudhri combination renders obvious Element [225.c] for at least the same reasons described above with respect to Element [2.c]. *See* Element [2.c], *supra*.

[225.d] in response to the detection of the at least part of the gesture without a completion of the gesture being detected, blurring, based on a change in a magnitude of the gesture being detected on the touch screen, at least a portion of at least one other object.

304. Element [225.d] is substantially the same as Element [2.d]. The Ahn-Chaudhri combination renders obvious Element [225.d] for at least the same reasons described above with respect to Element [2.d]. See Element [2.d], *supra*.

62. Claim 230

[230] The method of claim 225, wherein, in response to the magnitude, including a distance magnitude, of the gesture detected on the touch screen being detected to increase above a distance threshold, a menu is displayed with at least one option.

305. Claim [230] is substantially the same as Claim [27]. The Ahn-Chaudhri combination renders obvious Claim [230] for at least the same reasons described above with respect to Claim [27]. See Claim [27], *supra*.

**X. GROUND 1B: AHN, CHAUDHRI '842, AND HINKLEY RENDER
CLAIMS 25, 65, 66, 72, 83, 88, 90, 94, 95, 101, 104, 117, and 122 OBVIOUS**

A. Claim Element Analysis

63. Claim 25

[25.a] The apparatus of claim 2, wherein the apparatus is configured such that the blurring is based on the change in the magnitude of the gesture being detected on the touch screen, by the blurring being conditionally performed based on the change in the magnitude of the gesture, including a duration magnitude, being detected on the touch screen exceeding a threshold duration magnitude, where:

306. The Ahn-Chaudhri-Hinkley combination renders obvious Element [25.a].

307. Ahn describes the “touch and drag” gesture as “indicat[ing] movement of an external object on the touch screen 10.” EX1004, [0098]. And in the context FIG. 16, Ahn describes the “touch and drag” gesture with respect to at least two distance thresholds and varying the operation of the user interface based on these distance thresholds. *See* EX1004, [0105]-[0110]; *see also* Claim [27], *supra*. Ahn does not specify or otherwise limit a duration of the “touch and drag” gesture.

308. For at least the reasons described in Section VII.E, *supra*, a POSITA would have found it obvious to turn to Hinkley for additional implementation details of Ahn’s touch screen user interface. Hinkley describes that, “[b]y virtue of providing a variety of different types of recognizable inputs (e.g., taps, tap combinations, tap/hold combinations, slides, etc), and mapping those recognizable inputs to different types of functionalities, a robust collection of user input mechanisms can be provided.” EX1006, [0066]. Indeed, in some embodiments, Hinkley describes that a bezel menu (which is very similar to the edge menus in Ahn) is displayed based on both a distance threshold and a duration threshold. *See*, EX1006, [0079] (“This feature can be implemented by using a time delay, e.g. 1/3 second, and considering the location of the user’s finger before actually deciding whether to deploy the bezel menu responsive to a bezel gesture.”), [0080] (“When the finger is observed to cross from the screen bezel into a slot of the bezel menu, a timer is started. No other immediate visual feedback occurs. When the timer expires,

if the finger is still in the region occupied by the bezel menu, the bezel menu slides out and tracks with the user's finger.”).

309. Based at least on these teachings, a POSITA would have found it obvious that the touch and drag gesture that opens the edge/bezel menus in the Ahn-Chaudhri-Hinkley combination would have been based on both a distance magnitude and a duration magnitude.

310. As discussed with respect to Element [2.d], *supra*, applying the teachings of Chaudhri '842 in the context of Ahn's "touch and drag" gesture and Ahn's corresponding transition between a user interface state where the standby screen is displayed (*see, e.g.*, EX1004, FIG. 13a) and a user interface state where a menu list 1300 is displayed above or on top of the standby screen (*see, e.g.*, EX1004, FIG. 4B, 10, and 13b), a POSITA would have at least found it obvious to vary, according to the teachings of Chaudhri '842, the optical intensity of the standby screen or at least portions thereof (*e.g.*, the blurring of the clock widget, as shown in FIGS. 4B, 10, and 13b) as a visual indication of a user's progress in completing the "touch and drag" gesture. *See* EX1005, [0080]-[0089].

311. Where, for the reasons discussed above, the touch and drag gesture that opens the edge/bezel menus in the Ahn-Chaudhri-Hinkley combination would have been based on both a distance magnitude and a duration magnitude, a POSITA would have further found it obvious that *the apparatus is configured such that the*

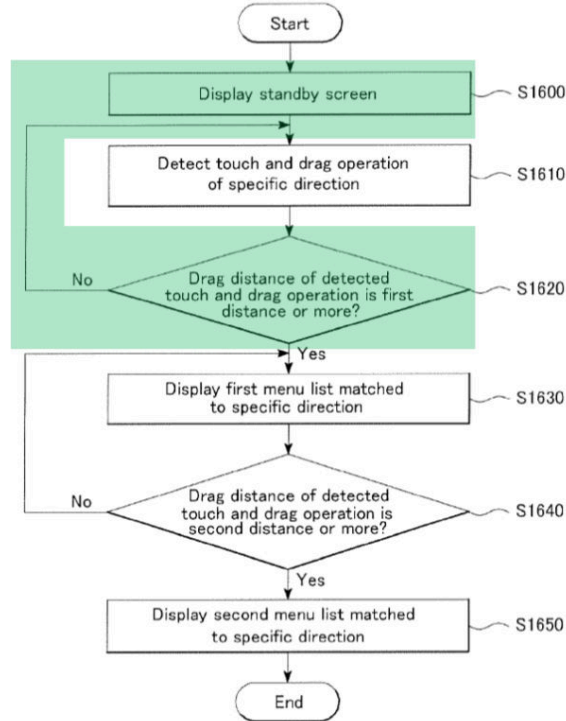
blurring is based on the change in the magnitude of the gesture (e.g., the touch a drag gesture) being detected on the touch screen, by the blurring being conditionally performed based on the change in the magnitude of the gesture, including a duration magnitude, being detected on the touch screen exceeding a threshold duration magnitude, as recited in [25.a].

[25.b] in response to a first change in the duration magnitude of the gesture being detected on the touch screen such that the duration magnitude of the gesture is detected to remain below the threshold duration magnitude, no blurring is performed,

312. The Ahn-Chaudhri-Hinkley combination renders obvious Element [25.b].

313. As discussed with respect to Claim [75], *supra*, in the embodiment of FIG. 16, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and only “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. In FIG. 16 (reproduced below), when a distance magnitude of the touch and drag gesture has not yet reached the threshold of the “first distance or more,” the menu remains closed and only the unaltered standby screen 300 is displayed. *See* EX1004, [0107]-[0109].

FIG. 16



EX1004, FIG. 16 (highlighted)

314. Where the touch and drag gesture is based on both a distance threshold and a duration threshold, as discussed with respect to Element [25.a], *supra*, a POSITA would have additionally found it obvious in light of at least Ahn's FIG. 16 that, when either or both of a distance and duration magnitude of the touch and drag gesture has not yet reached the threshold, the menu remains closed and only the unaltered standby screen 300 is displayed. Where the menu remains closed and only the unaltered standby screen 300 is displayed, a POSITA would have found it obvious that, *in response to a first change in the duration magnitude of the gesture being detected on the touch screen such that the duration magnitude of the gesture*

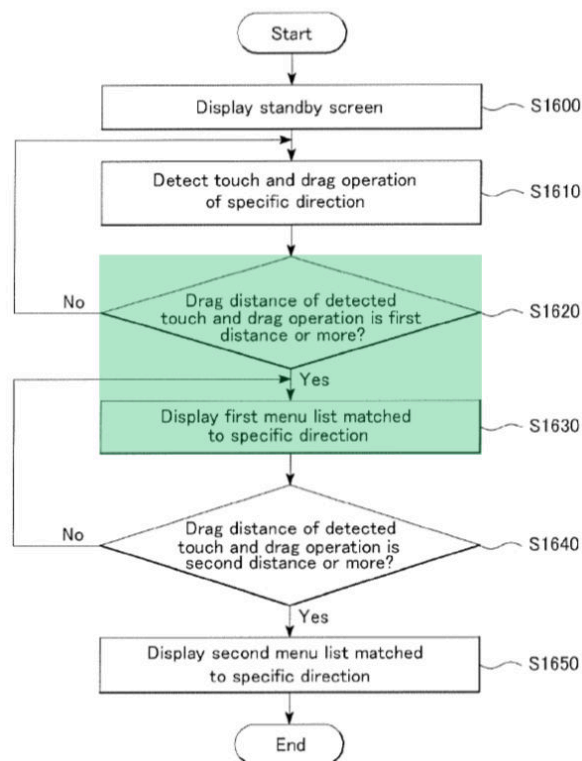
is detected to remain below the threshold duration magnitude, no blurring is performed, as recited in [25.b].

[25.c] in response to a second change in the duration magnitude of the gesture being detected on the touch screen such that the duration magnitude of the gesture is detected to exceed the threshold duration magnitude, the blurring is performed.

315. The Ahn-Chaudhri-Hinkley combination renders obvious Element [25.c].

316. As discussed with respect to Claim [75], *supra*, in the embodiment of FIG. 16, Ahn describes that “controller 50 controls to sequentially display a plurality of specific menu lists according to a distance of the detected touch and drag operation.” EX1004, [0108].

FIG. 16



EX1004, FIG. 16 (highlighted)

317. Specifically, Ahn describes that “controller 50 determines whether a drag distance of the detected touch and drag operation is a first distance or more (S1620),” and “[i]f a drag distance of the detected touch and drag operation is a first distance or more, the controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109].

318. Where the touch and drag gesture is based on both a distance threshold and a duration threshold, as discussed with respect to Element [25.a], *supra*, a POSITA would have additionally found it obvious in light of at least Ahn’s FIG. 16 that, when both of a distance and duration magnitude of the touch and drag gesture has reached respective thresholds, the menu would begin to be displayed. *See* EX1006, [0080] (“When the finger is observed to cross from the screen bezel into a slot of the bezel menu, a timer is started. No other immediate visual feedback occurs. When the timer expires, if the finger is still in the region occupied by the bezel menu, the bezel menu slides out and tracks with the user’s finger.”). And for the reasons discussed with respect to Element [2.d] and Element [25.a], *supra*, as the menu slides out with the touch and drag gesture, the blurring is performed in accordance with the teachings of Chaudhri ’842. Thus, in at least these implementations, a POSITA would have found it obvious that, ***in response to a second change in the duration magnitude of the gesture being detected on the touch screen such that the duration***

magnitude of the gesture is detected to exceed the threshold duration magnitude, the blurring is performed, as recited in [25.c].

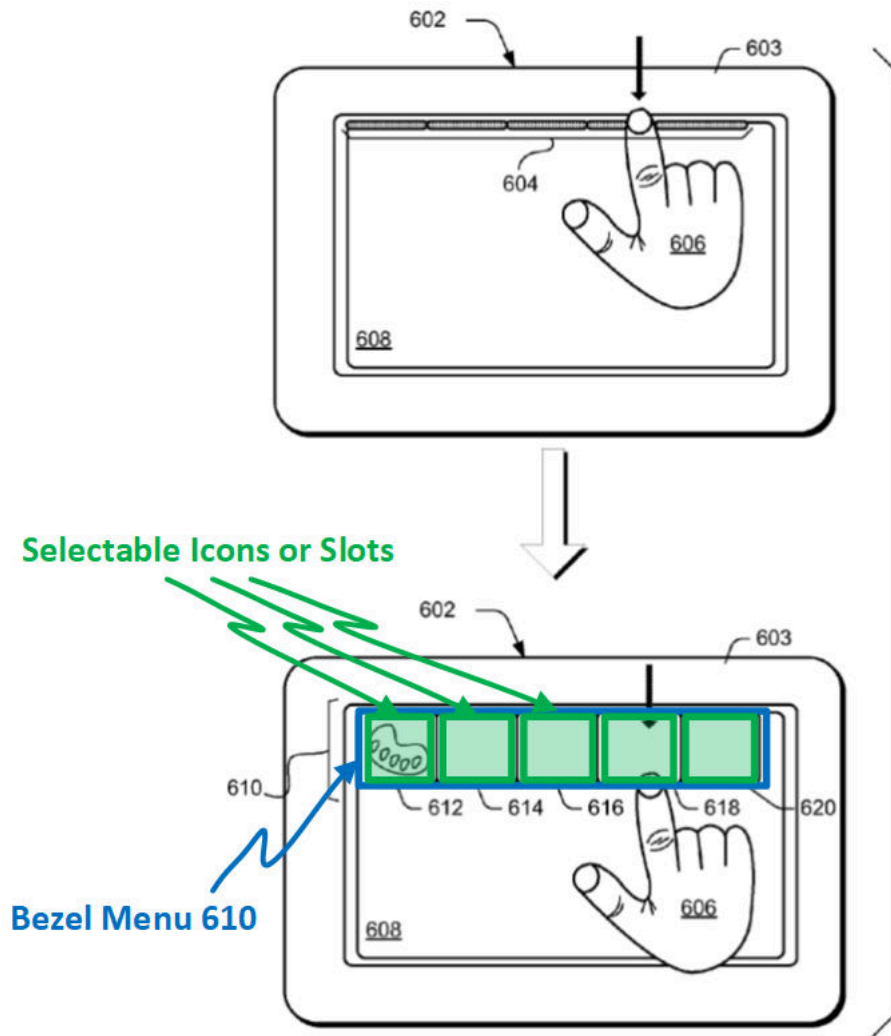
64. Claim 65

[65.a] The apparatus of claim 27, wherein the apparatus is configured such that: when a first duration of touch being applied to the touch screen on the at least one option and a subsequent cessation of the first duration of touch being applied to the touch screen on the at least one option are detected: an action associated with the at least one option k performed; and

319. The Ahn-Chaudhri-Hinkley combination renders obvious Element [65.a].

320. While Ahn describes that the mobile communication terminal 100 may rely on key input device 30 for selection of menus and sub-menus in those implementations where the user provides input through physical keys, Ahn does not explicitly specify or otherwise limit how a POSITA would implement the selection of functions (*i.e.*, those sub-menus that are not themselves associated with further menu lists) in the context of using the touch input device described with respect to FIGS. 11-18. As discussed in Section IV.B.2, *supra*, a POSITA would have found it obvious and been motivated to integrate Hinkley's teachings about bezel gestures and associated user interface elements, including the bezel menus and radial menus, in conjunction with the Ahn-Chaudhri touch screen mobile device. In this regard, Hinkley would provide at least one possible set of implementation details not otherwise specified in Ahn.

321. Hinkley describes that “the bezel menu can be accessed through a bezel gesture in which a finger of user’s hand 606 touches the bezel and then moves across the bezel and onto the display device 608 in the direction of the illustrated arrow.” EX1006, [0073]. The “bezel menu 610 includes multiple selectable icons or slots 612, 614, 616, 618, and 620,” each of which is “associated with a different functionality.” EX1006, [0074].



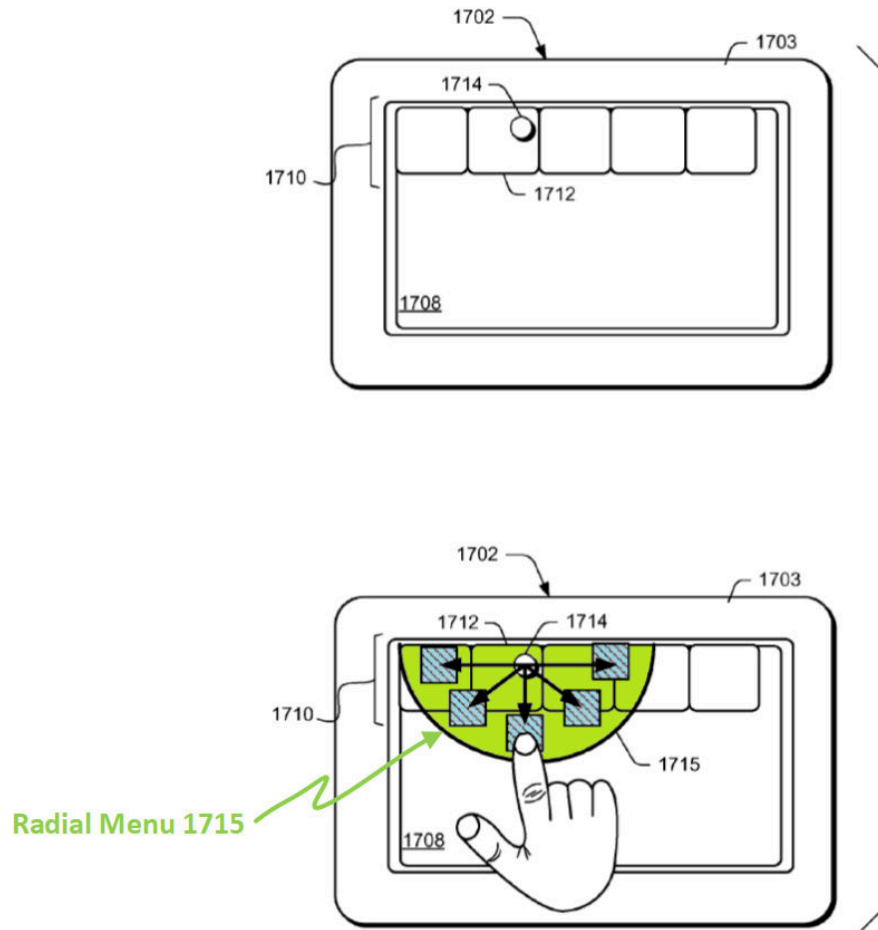
EX1006, FIG. 6 (annotated)

322. “In the novice mode, after the user gestures to reveal the bezel menu 610, the user can lift their finger, whereupon the bezel menu can remain open for a configurable interval (or indefinitely).” EX1006, [0077]. “The user may then tap on a desired item associated with one of the icons or slots 612, 614, 616, 618, and 620,” which causes “the functionality associated with a particular icon or slot can be accessed.” EX1006, [0077]. Based on these teachings, a POSITA would have understood and found obvious that the device of the Ahn-Chaudrhi-Hinkley combination would have been *configured such that: when a first duration of touch being applied to the touch screen on the at least one option and a subsequent cessation of the first duration of touch being applied to the touch screen on the at least one option are detected (e.g., a tap on a desired item associated with one of the icons or slots of the bezel menu): an action associated with the at least one option k performed* (e.g., functionality associated with a particular icon or slot is accessed). *[65.b] when a second duration of touch, that is greater than the first duration and exceeds a duration threshold, being applied to the touch screen on the at least one option is detected: another menu including at least one other option is displayed.*

323. The Ahn-Chaudhri-Hinkley combination renders obvious Element [65.b].

324. “In at least some embodiments, so-called radial menus can be utilized in connection with menus such as bezel menus.” EX1006, [0105]. An example of a bezel menu is shown in FIG. 17. EX1006, [0105], FIG. 17. In this example, “bezel

menu 1710 includes multiple selectable icons or slots,” and “[e]ach of the icons or slots is associated with a different functionality,” just as in the example discussed above with respect to FIG. 6. EX1006, [0106].



EX1006, FIG. 17 (annotated)

325. “[I]con or slot 1712 includes a radial menu icon 1714 that gives a clue to the user that one or more radial menus, for example radial menu 1715, is associated with this particular icon or slot.” EX1006, [0107]. In some implementations, “[t]he radial menus 1715 can be accessed through a tap-and-hold

of the pen or finger on or near the radial menu icon 1714.” EX1006, [0107]. Additionally, selecting “the radial menu icon [1714] triggers a default action which may . . . be different than the action associated with tapping on the bezel menu slot [1712].” EX1006, [0107]. From at least these teachings, a POSITA would have understood and found obvious that, in at least one implementation of Hinkley’s menus and gestures, tapping⁴ the icon 1712 would have triggered one action, while a tap-and-hold gesture on the radial menu icon 1714 portion of icon 1712 would have triggered a different action (*e.g.*, opening the radial menu 1715). *See* EX1006, [0107].

326. Hinkley explains that, “[b]y virtue of providing a variety of different types of recognizable inputs (*e.g.*, taps, tap combinations, tap/hold combinations, slides, etc), and mapping those recognizable inputs to different types of functionalities, a robust collection of user input mechanisms can be provided.” EX1006, [0066]. And Hinkley describes details with respect to gesture module 104

⁴ In the context of Hinkley, where a “tap” is distinguished clearly from a “tap and hold,” a POSITA would have understood that a “tap” is relatively quick engagement and disengagement of the touchscreen, whereas a “tap and hold” is an engagement of the touchscreen that lasts beyond a particular threshold amount of time set by the designer of the user interface.

and bezel gesture module 105 that allow these modules to recognize a “variety of different types of gestures.” *See* EX1006, [0045]-[0051]. Thus, Hinkley provides implementation details for a POSITA to implement these functionalities, and a POSITA would have enjoyed a reasonable expectation of success in doing so.

327. Moreover, Hinkley’s teachings about bezel menus and radial sub-menus are largely consistent with the menus and sub-menus described by Ahn. That is, a POSITA would have recognized the parallel between the first menu list 1700 and second menu list 1710 described by Ahn with respect to its FIG. 17, and the bezel menu 1710 and radial menu 1715 described by Hinkley with respect to its FIG. 17. In fact, both menus include visual affordances (*e.g.*, an arrow icon 860 in the case of Ahn and the radial menu icon 1714 in the case of Hinkley) that identify for the user the presence of a sub-menu. *See* EX1004, [0085]; EX1006, [0107]; To the extent that the techniques for accessing these sub-menus diverge between the teachings of Ahn and Hinkley, a POSITA would have recognized that either Hinkley’s techniques could be utilized as a known alternative to Ahn’s techniques with the benefits noted in Section IV.B.2, *supra*, or both techniques could be implemented together through the use of multiple modes, like the novice and expert modes described by Hinkley. *See* EX1006, [0110] (“In at least some embodiments, radial menus can be implemented to include both a novice mode and an expert mode”).

328. Applying these teachings to the context of Ahn discussed above, a POSITA would have at least found it obvious to implement Ahn's mobile communication terminal 100 such that Ahn's menus would include the multiple selectable icons or slots described by Hinkley and that at least one of the selectable icons or slots would be associated with a radial menu icon, as described by Hinkley. EX1006, [0105]-[0107]. Further, it would have at least been obvious to implement Ahn's mobile communication terminal 100 such that tapping the icon would have triggered one action, while tapping and holding the radial menu icon portion of that same icon would have triggered a different action (*i.e.*, opening the radial menu 1715). *See* EX1006, [0107]. Implemented in this fashion, it would have been at least obvious to the POSITA that the mobile device of the Ahn-Chaudhri-Hinkley combination would have been configured such that, ***when a second duration of touch, that is greater than the first duration and exceeds a duration threshold (e.g., a tap-and-hold gesture with a duration longer than a tap) being applied to the touch screen on the at least one option is detected (e.g., the radial menu icon 1714 portion of icon 1712): another menu including at least one other option is displayed (e.g., a radial menu is displayed)***, as recited in Element [65.b].

65. Claim 66

[66] The apparatus of claim 65, wherein the apparatus is configured such that the distance threshold and the duration threshold are used for providing different contextual menus on the touch screen, which is a hand-held touch screen of a mobile device, to reduce a number of required separate user interactions during use of the hand-held touch screen.

329. Ahn-Chaudhri-Hinkley combination renders obvious Claim [66].

330. Hinkley describes that, “[b]y virtue of providing a variety of different types of recognizable inputs (e.g., taps, tap combinations, tap/hold combinations, slides, etc), and mapping those recognizable inputs to different types of functionalities, a robust collection of user input mechanisms can be provided.” EX1006, [0066]. Indeed, in some embodiments, Hinkley describes that a bezel menu is displayed based on both a distance threshold and a duration threshold, and depending on these thresholds, the user will be provided with different menus. In one, if a user pauses near an edge associated with a bezel menu, and then pulls out after a pause, the bezel menu will follow his or her finger. *See*, EX1006, [0079] (“This feature can be implemented by using a time delay, e.g. 1/3 second, and considering the location of the user’s finger before actually deciding whether to deploy the bezel menu responsive to a bezel gesture.”), [0080] (“When the finger is observed to cross from the screen bezel into a slot of the bezel menu, a timer is started. No other immediate visual feedback occurs. When the timer expires, if the finger is still in the region occupied by the bezel menu, the bezel menu slides out

and tracks with the user's finger.”). On the other hand, “once users are familiar with a particular operation on the bezel menu, they can rapidly drag through it to create and position an object without ever having to be distracted by the opening of the visual menu itself.” EX1006, [0079]. Hinkley contemplates other operations (e.g., with respect to page flipping vs. page pocketing) that rely upon a combination of both duration and distance. *See* EX1006, [0127].

331. Hinkley teaches that the use of both distance and duration for the bezel gestures enables similar gestures to achieve related functionality, while allowing the user to grow faster and more efficient as they become more familiar with the user interface. *See* EX1006, [0077]-[0080]. “The concept succeeds because the novice way of using [the interface] helps to learn and encourage the expert way of working with it.” EX1006, [0079].

332. Because Hinkley describes arrange of gesture options (e.g., based on distance, duration, or a combination of the two) and corresponding functions, a POSITA would have understood and found as an obvious design choice that the apparatus of the Ahn-Chaudhri-Hinkley combination *is configured such that the distance threshold and the duration threshold are used for providing different contextual menus on the touch screen, which is a hand-held touch screen of a mobile device, to reduce a number of required separate user interactions during use of the hand-held touch screen*, as recited in Claim [66].

66. Claim 83

[83] The apparatus of claim 2, wherein the apparatus is configured such that, when a distance magnitude of the gesture detected on the touch screen is detected to increase above a distance threshold, and a duration magnitude of the gesture detected on the touch screen is detected to increase above a duration threshold, a menu is displayed with at least one option.

333. The Ahn-Chaudhri-Hinkley combination renders obvious Claim [83].

334. As discussed with respect to Element [25.a], *supra*, Hinkley describes that a bezel menu (which is very similar to the edge menus in Ahn) is displayed based on both a distance threshold and a duration threshold. *See*, EX1006, [0079] (“This feature can be implemented by using a time delay, e.g. 1/3 second, and considering the location of the user’s finger before actually deciding whether to deploy the bezel menu responsive to a bezel gesture.”), [0080] (“When the finger is observed to cross from the screen bezel into a slot of the bezel menu, a timer is started. No other immediate visual feedback occurs. When the timer expires, if the finger is still in the region occupied by the bezel menu, the bezel menu slides out and tracks with the user’s finger.”). Based at least on these teachings, a POSITA would have found it obvious that the touch and drag gesture that opens the edge/bezel menus in the Ahn-Chaudhri-Hinkley combination would have been based on both a distance magnitude and a duration magnitude.

335. Based on these teachings, a POSITA would have found it obvious that the device of the Ahn-Chaudhri-Hinkley combination would have been ***configured***

such that, when a distance magnitude of the gesture detected on the touch screen is detected to increase above a distance threshold, and a duration magnitude of the gesture detected on the touch screen is detected to increase above a duration threshold, a menu is displayed with at least one option, as recited in Claim 83.

67. Claim 88

[88] The apparatus of claim 83, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen at an edge of the touch screen.

336. Claim [88] is substantially the same as Claim [28]. Thus, the Ahn-Chaudhri-Hinkley combination renders obvious Claim [88] for at least the same reasons described above with respect to Claim [28]. *See* Claims [28], *supra*.

68. Claim 90

[90] The apparatus of claim 83, wherein the apparatus is configured such that the at least part of the gesture is detected on the touch screen on the object.

337. Claim [90] is substantially the same as Claim [30]. Thus, the Ahn-Chaudhri-Hinkley combination renders obvious Claim [90] for at least the same reasons described above with respect to Claim [30]. *See* Claims [30], *supra*.

69. Claim 94

[94] The apparatus of claim 83, wherein the apparatus is configured such that the menu is displayed simultaneously with the blurring of the at least portion of the at least one other object.

338. Claim [94] is substantially the same as Claim [35]. Thus, the Ahn-Chaudhri-Hinkley combination renders obvious Claim [94] for at least the same reasons described above with respect to Claim [35]. See Claims [35], *supra*.

70. Claim 95

[95] The apparatus of claim 83, wherein the apparatus is configured such that, based on the change in the magnitude of the gesture being detected on the touch screen, a location of the object is moved before the menu is displayed.

339. Claim [95] is substantially the same as Claim [36]. Thus, the Ahn-Chaudhri-Hinkley combination renders obvious Claim [95] for at least the same reasons described above with respect to Claim [36]. See Claims [36], *supra*.

71. Claim 101

The apparatus of claim 2, wherein the apparatus is configured such that, when the magnitude, including a duration magnitude, of the gesture detected on the touch screen is detected to increase above a duration threshold, a menu is displayed with at least one option.

340. The Ahn-Chaudhri-Hinkley combination renders obvious Claim [101].

341. As discussed with respect to Claim [83], *supra*, Hinkley describes that a bezel menu (which is very similar to the edge menus in Ahn) is displayed based on both a distance threshold and a duration threshold. See, EX1006, [0079] (“This feature can be implemented by using a time delay, e.g. 1/3 second, and considering

the location of the user's finger before actually deciding whether to deploy the bezel menu responsive to a bezel gesture.”), [0080] (“When the finger is observed to cross from the screen bezel into a slot of the bezel menu, a timer is started. No other immediate visual feedback occurs. When the timer expires, if the finger is still in the region occupied by the bezel menu, the bezel menu slides out and tracks with the user's finger.”).

342. Based at least on these teachings, a POSITA would have found it obvious that the touch and drag gesture that opens the edge/bezel menus in the Ahn-Chaudhri-Hinkley combination would have been based on both a distance magnitude and a duration magnitude, and the device of the Ahn-Chaudhri-Hinkley combination would have been *configured such that, when the magnitude, including a duration magnitude, of the gesture detected on the touch screen is detected to increase above a duration threshold, a menu is displayed with at least one option*, as recited in Claim [101].

72. Claim 117

[117] The apparatus of claim 101, wherein the apparatus is configured such that the menu is accompanied by a view of information associated with the object.

343. The Ahn-Chaudhri-Hinkley combination renders obvious Claim [117].

344. As discussed with respect to Element [2.b], *supra*, the icons displayed as part of standby screen 300 are the displayed objects. With respect to FIG. 3D,

Ahn illustrates that a “pop-up menu window 340 related to the background music setting icon 330c” may be displayed, which includes *a view of information associated with the* icon (*e.g.*, the song that is currently playing). See EX1004, [0045]. Based on these teachings, a POSITA would have at least found obvious that the device Ahn-Chaudhri-Hinkley would have been *configured such that the menu is accompanied by a view of information associated with the object*, as recited in Claim [117].

73. Claim 122

[122] The apparatus of claim 101, wherein the display of the menu is ceased via a window shade movement.

345. The Ahn-Chaudhri-Hinkley combination renders obvious Claim [122].

346. Hinkley describes that a “user may close the bezel menu by sliding it back off of the screen (an on-screen-to-offscreen gesture)” EX1006, [0077]. A POSITA would have understood that the menu sliding back off the screen is a *window shade movement*. Thus, a POSITA would have found obvious that, in the Ahn-Chaudhri-Hinkley combination, *the display of the menu is ceased via a window shade movement*, as recited in Claim [122].

XI. GROUND 1C: AHN, CHAUDHRI '842, AND SHIPLACOFF RENDER CLAIMS 1, 80, 81, 82, 208, 209, 210, 211, 212, 213, 214, 215, and 216 OBVIOUS

A. Claim Element Analysis

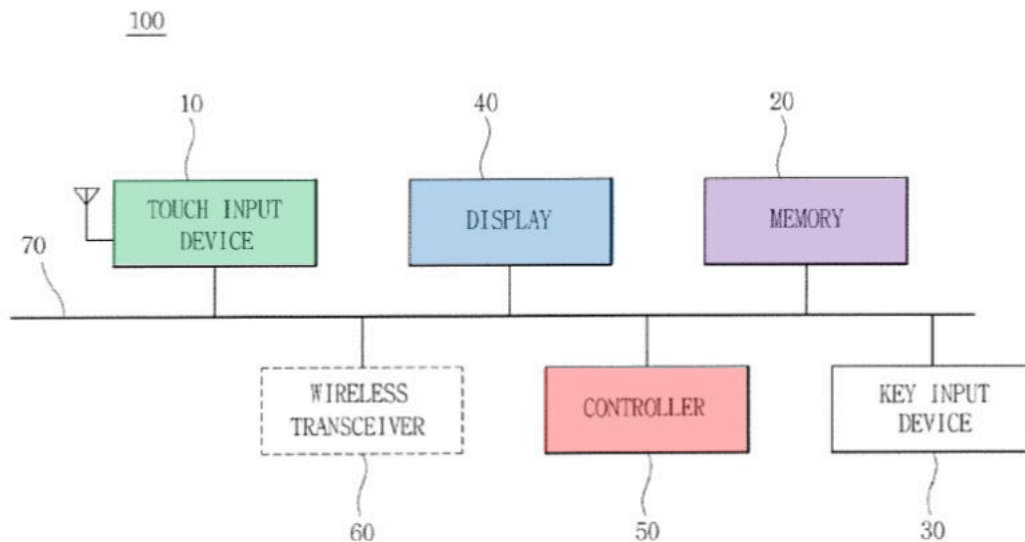
74. Claim 1

[1.a] An electronic device, comprising: a display; one or more processors; memory; and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for:

347. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [1.a].

348. For example, Ahn describes a mobile communication terminal 100 that comprises “a **touch input device 10**, a **memory 20**, a key input device 30, a **display 40**, a **controller 50**, and a wireless transceiver 60.” EX1004, [0027], FIG. 1.

FIG. 1



EX1004, FIG. 1 (highlighted)

349. “The **display 40** may provide outputs various display information and various menu screens 100, and may comprise a Liquid Crystal Display (LCD) or an Organic Light Emitting Diode (OLED).” EX1004, [0031]. A POSITA would have understood or found obvious that Ahn’s **display 40** is a *display*, as recited in [1.a].

350. “The **controller 50** controls a general operation of the mobile communication terminal 100.” EX1004, [0032]. Controller 50 interfaces with memory 20 (*see* EX1004, [0099]-[0100]), controls the display 40 (*see* EX1004, [0099], [0106]. [0108]), and detects a touch and drag operation (*see* EX1004, [0099], [0107], [0109]). A POSITA would have understood and found obvious that Ahn’s description of controller 50 is indicative that at least one known hardware implementation for controller 50 would have been *one or more processors*, as recited in [1.a]. Indeed, Chaudhri ’842 and Shiplacoff address similar user interface problems for similar mobile touchscreen devices, and each of Chaudhri ’842 and Shiplacoff describe that their respective devices comprise *one or more processors*, as recited in [1.a]. *See* EX1005, [0026] (portable electronic device “includes a memory 102, a memory controller 104, one or more processing units (CPUs) 106, a peripherals interface 108, RF circuitry 112, audio circuitry 114, a speaker 116, a microphone 118, an input/output (I/O) sub system 120, a touch screen 126, ...”); EX1013, [0182] (“the computers referred to herein may include a single processor

or may be architectures employing multiple processor designs for increased computing capability”).

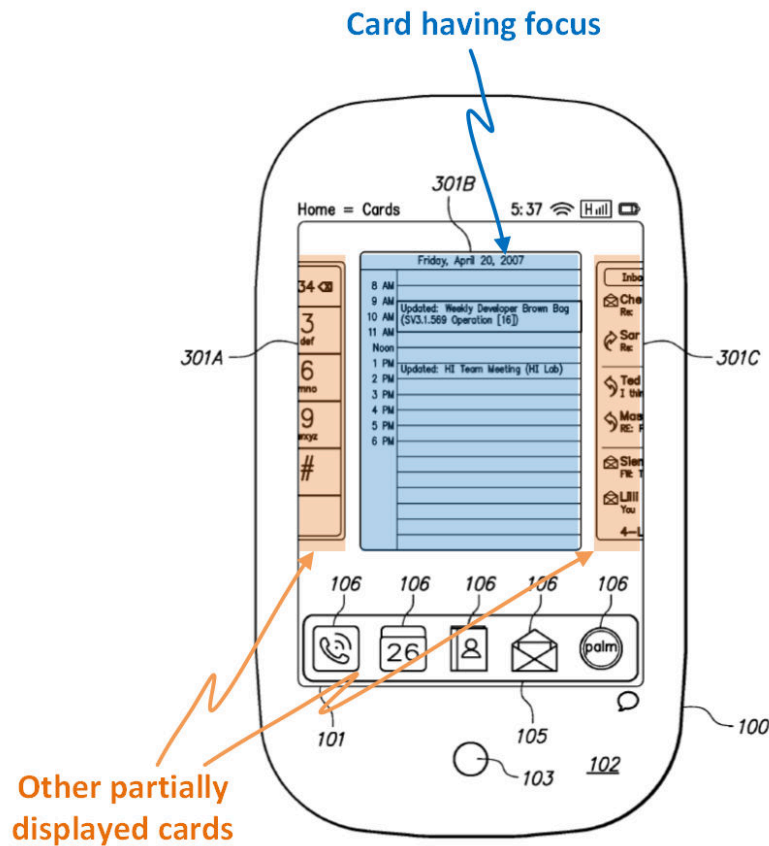
351. “The **memory 20** comprises a program memory and a data memory. Programs for controlling a general operation of the mobile communication terminal 100 are stored in the program memory.” EX1004, [0029]. A POSITA would have understood or found obvious that Ahn’s **memory 20** is a *memory*, as recited in [1.a]. Furthermore, a POSITA would have understood or found obvious that Ahn’s “programs for controlling a general operation of the mobile communication terminal” are *one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors*, as recited in [1.a]. Indeed, each of Chaudhri ’842 and Shiplacoff address similar user interface problems for similar mobile touchscreen devices, and each of Chaudhri ’842 and Hinkley describe that their respective devices comprise *one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors*, as recited in [1.a]. See EX1005, [0028] (“The one or more processors 106 run various software programs and/or sets of instructions stored in the memory 102 to perform various functions for the device 100 and to process data.”); EX1013, [0182] (the apparatus “may comprise a general-purpose computer selectively activated or reconfigured by a computer

program stored in the computer . . . in a computer readable storage medium, such as, but not limited to, read-only memories (ROMs), random access memories (RAMs)”)

[1b] displaying a plurality of user interface elements on the display including a first user interface element and a second user interface element;

352. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [1.b].

353. As discussed in Section VI.C.2, *supra*, a POSITA would have found it obvious and been motivated to integrate Shiplacoff’s teachings about its card metaphor in conjunction with the Ahn-Chaudhri touch screen mobile device. Shiplacoff teaches that “card mode is optimized for easily switching focus from one activity to another and for easily initiating and terminating activities.” EX1013, [0074]. “As can be seen in FIG. 3, in one embodiment in card mode, card 301B having focus is fully visible. Other cards 301A, 301C are only partially visible and do not have focus.” EX1013, [0078]. Shiplacoff describes that “partially displayed cards 301A, 301C provide a positional context for card 301B, and provide a mechanism for navigating to other activities.” EX1013, [0079].



EX1013, FIG. 3 (annotated)

354. A POSITA would have recognized that each of the cards is a user interface element, because they are parts of the overall card mode user interface. *See* EX1013, [0060] (“Users interact with cards to launch, terminate, and reorder activities, as well as to navigate among activities and perform other operations”); Further, Shiplacoff teaches that each of the cards themselves is a collection of user interface elements. EX1013, [0019] (“the user can interact with cards regardless of display mode, so that user interface elements within cards are active regardless of

the display mode”). Based on these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have *display[ed] a plurality of user interface elements on the display including a first user interface element* (e.g., card 301B having focus) *and a second user interface element* (e.g., partially displayed cards 301C), as recited in Element [1.b].

[1.c] detecting a first contact moving across the display; and,

355. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [1.c].

356. Shiplacoff describes “touch-sensitive screen 101 and gesture area 102 can be implemented using any technology that is capable of detecting a location of contact and/or user motion proximate to the surface.” EX1013, [0066]. For example, in the card mode discussed with respect to Element [1.b], *supra*, “the user can [] rearrange cards 301 while in card mode, by tapping and holding a card 301 for a period of time (such as, for example, 500 milliseconds), and then dragging a card 301 from one position to another.” EX1013, [0104].

357. From these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have *detect[ed] a first contact moving across the display* (e.g., the dragging of card 301 from one position to another in card mode), as recited in Element [1.c].

[1.d] while the first contact is detected moving across the display: moving the first user interface element in a first direction on the display at a first speed;

358. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [1.d].

359. As discussed with respect to Element [1.c], *supra*, “the user can [] rearrange cards 301 while in card mode, by tapping and holding a card 301 for a period of time (such as, for example, 500 milliseconds), and then dragging a card 301 from one position to another.” EX1013, [0104]. “Once the movement action has been initiated, the user can continue to drag card 301 in any direction in order to place card 301 at the desired position within the sequence of cards 301.” EX1013, [0106]. The dragging gesture and resulting movement of card 301B causes the other cards in the sequence to “scroll[] left or right in response to the dragging operation; for example, if the user drags card 301 near the right edge of the screen, the sequence scrolls to the left to cause additional cards 301 in the sequence to be shown while others scroll off the screen.” EX1013, [0106].

360. In the example shown in FIGS. 9A-9D, “[t]he user taps and holds his or her finger on card 301B, then drags card 301B upward, causing cards 301C and 301D to move to fill the gap.” EX1013, [0104]. Without lifting his/her finger from the surface and continuing to hold card 301B, the user “moves card 301B into a position between cards 301C and 301D, as shown in FIG. 9C.” EX1013, [0104].

“As the user moves the dragged card 301B between two other cards 301C and 301D, the two cards 301C and 301D separate to allow placement of the dragged card 301B.” EX1013, [0104].

“[U]ser taps and holds his or her finger on card 301B, then drags card 301B upward”

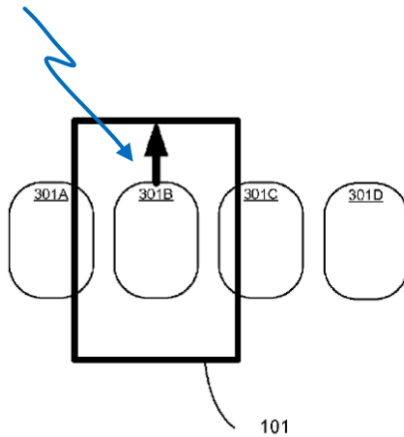


FIG. 9A

Card 301B being dragged upward
“caus[es] cards 301C and 301D to
move to fill the gap”

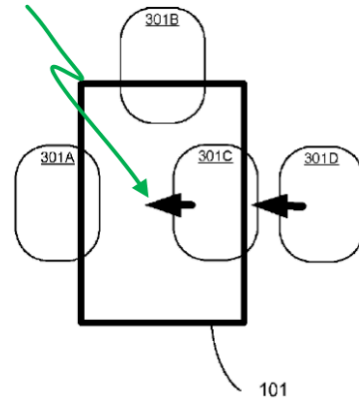


FIG. 9B

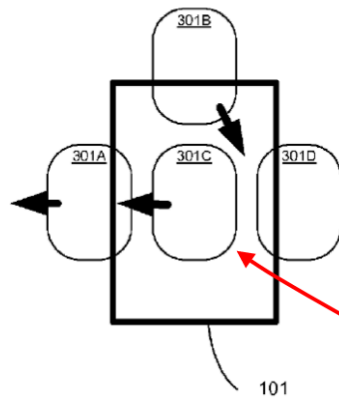


FIG. 9C

While continuing to hold card 301B, “the user moves the dragged card 301B between two other cards 301C and 301D, [and] the two cards 301C and 301D separate to allow placement of the dragged card 301B”

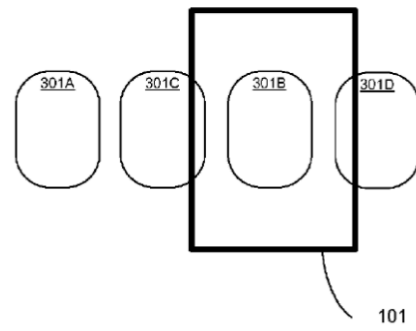


FIG. 9D

EX1013, FIGS. 9A-D (annotated)

361. In the context of Shiplacoff, a POSITA would have understood and found obvious that the term “drag” means that the card remains under or “stuck to” the user’s finger as the user moves his/her finger along the display. *See, e.g.*, EX1006, [0080] (describing a user interface object “following the user’s finger”); EX1010, 7:4-8 (permitting “user experience of dragging out the user interface from the edge as the gesture is performed with the user interface appearing to ‘stick’ to the gesture (e.g., to a mouse point or person’s finger making the gesture).”); EX1011, [0051] (describing updating a display location of a user interface object in accordance with the touch input). Implemented in this fashion, as the touch-sensitive screen 101 detects movement of the user’s finger across the display, the display location of the card 301B would have been updated such that the speed of the card 301B moving across the display would have matched the speed of the user’s finger moving across the touch-sensitive screen. In the example shown in FIGS. 9A-9D, a POSITA would have understood and found obvious that the dragging speed—and thus the speed of the card 301B—would naturally vary throughout the gesture, including coming to or nearly to a stop at the top of the upward drag shown in FIG. 9B to allow cards 301C and 301D to move to fill in the gap. *See* EX1013, [0104]-[0106].

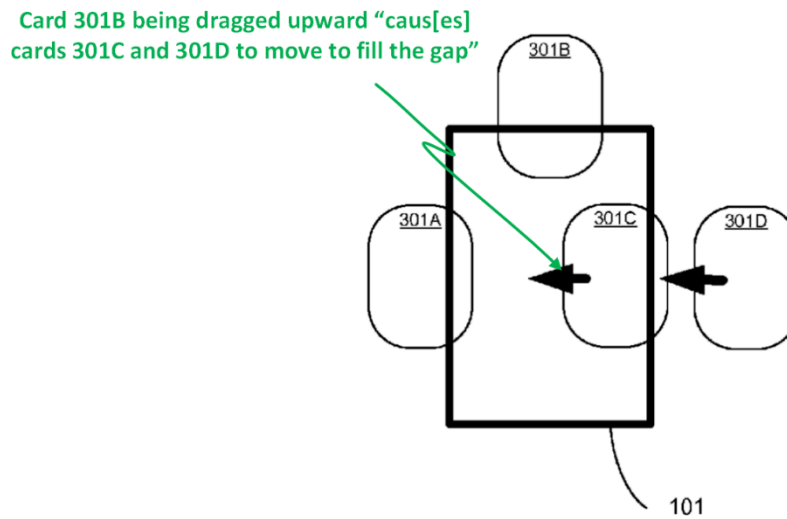
362. Based on these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would

have, *while the first contact is detected moving across the display: mov[ed] the first user interface element* (e.g., the card 301B) *in a first direction on the display at a first speed* (e.g., moving at the same speed as the user's finger as it is dragging across the touchscreen), as recited in Element [1.d], *supra*.

[1.e] moving the second user interface element on the display at a second speed greater than the first speed;

363. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [1.e].

364. In the example shown in FIGS. 9A-9D, Shiplacoff teaches that “[t]he user taps and holds his or her finger on card 301B, then drags card 301B upward, causing cards 301C and 301D to move to fill the gap.” EX1013, [0104]. As discussed with respect to Element [1.e], *supra*, a POSITA would have understood and found obvious that the describing “dragging” would have been implemented by the touch-sensitive screen 101 detecting movement of the user's finger across the display and updating the display location of the card 301B such that the speed of the card 301B moving across the display would have matched the speed of the user's finger moving across the touch-sensitive screen. *See, e.g.*, EX1006, [0080]; EX1010, 7:4-8; EX1011, [0051].



EX1013, FIG. 9B (annotated)

365. As shown in FIG. 9B, Shiplacoff further describes that “cards 301C and 301D [] move to fill the gap” created when card 301B is dragged upward. EX1013, [0104]. Further, Shiplacoff teaches that “the user can continue to drag card 301 in any direction in order to place card 301 at the desired position.” EX1013, [0106]. This continued dragging causes the other cards in the sequence to “scroll[] left or right in response to the dragging operation; for example, if the user drags card 301 near the right edge of the screen, the sequence scrolls to the left to cause additional cards 301 in the sequence to be shown while others scroll off the screen.” EX1013, [0106].

366. A POSITA would have understood and found obvious that, in filling the gap, cards 301C and 301D move with a particular speed in the direction of the arrow shown in FIG. 9B. Shiplacoff does not specify or otherwise limit the speed at

which cards 301C and 301D move when fillings the gap, leaving the speed as a design choice to the POSITA. *See* EX1013, [0104]. Notably, though, Shiplacoff describes that “a transition effect is performed to enhance the smoothness of the transition as cards 301 move and/or snap into place.” *See* EX1014, [0094]. Based on the use of the word “snap,” a POSITA would have at least found obvious that the cards 301C and 301D could move quickly on the display.

367. As discussed with respect to Element [1.e], *supra*, the speed of card 301B is dictated by the speed at which the user’s finger moves across the touchscreen, which would naturally vary throughout the gesture and would, in some instances, slow substantially while the other cards in the sequence shift. In such instances, the speed of card 301B would have been slower than cards 301C and 301D as they “snap” to fill the gap. *See* EX1013, [0094], [0104].

368. Based on these teachings, a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have *mov[ed] the second user interface element (e.g., card 301C) on the display at a second speed greater than the first speed (e.g., snapping card 301C to fill the gap while a user slowly drags card 301 upward)*, as recited in Element [1.e], *supra*.

[1.f] displaying an object and at least one other object;

369. Element [1.f] is substantially the same as Element [2.b]. The Ahn-Chaudhri combination renders obvious Element [1.f] for at least the same reasons

described above with respect to Element [2.b]. *See* Element [2.b], *supra*. Element [1.g] is substantially the same as Element [2.c].

[1.g] detecting at least part of a gesture on the display; and

370. The Ahn-Chaudhri combination renders obvious Element [1.g] for at least the same reasons described above with respect to Element [2.c]. *See* Element [2.c], *supra*

[1.h] during detection of at least a portion of the gesture before a completion thereof is detected, blur, based on a change in a magnitude of the gesture being detected on the display, at least a portion of the at least one other object.

371. Element [1.h] is substantially the same as Element [2.d]. The Ahn-Chaudhri combination renders obvious Element [1.h] for at least the same reasons described above with respect to Element [2.d]. *See* Element [2.d], *supra*.

75. Claim 80

[80] The apparatus of claim 27, wherein the apparatus is configured such that the menu includes a multitasking interface.

372. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [80].

373. As discussed in Section VIII.E, *supra*, a POSITA would have found it obvious and been motivated to integrate Shiplacoff's teachings about its card metaphor in conjunction with the Ahn-Chaudhri touch screen mobile device. Specifically, a POSITA would have found it obvious that at least one way to implement the Ahn-Chaudhri-Shiplacoff combination would have been to associate

one of the directions of Ahn's touch-and-drag gesture with the navigation between the different card navigation "modes," consistent with the teachings of Shiplacoff. *See* EX1013, [0127]-[0128]. For example, in one obvious implementation of the Ahn-Chaudhri-Shiplacoff combination, a POSITA would have found it obvious that activities/applications/functions would have been selected/launched from Ahn's menus (e.g., the "Organizer" activity/application/function illustrated in FIG. 7B) and/or from icons displayed on the standby screen 300, consistent with the teachings of Chaudhri '842 (*see* EX1005, [0047], [0076], FIG. 5D) and Shiplacoff (*see* EX1013, [0063], [0099], FIG. 1). The selected/launched activity would have been displayed in a full screen card, as taught by Shiplacoff. *See* EX1013, [0077]-[0078]. When a user performs a touch-and-drag gesture in the upward direction (akin to the "swipe-up" gesture described by Shilacoff), instead of displaying the service provider additional service menu 620 shown in FIG. 6B, the mobile terminal would "switch[] from full-screen mode to card mode, or from card mode to a launcher screen." *See* EX1013, [0127].

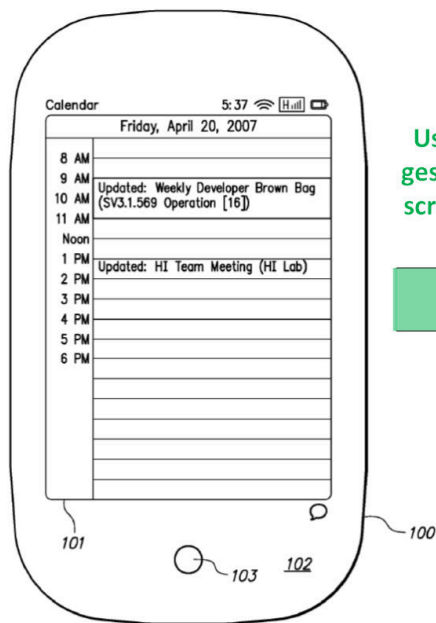


FIG. 2

User performs "swipe-up"
gesture to switch "from full-
screen mode to card mode"

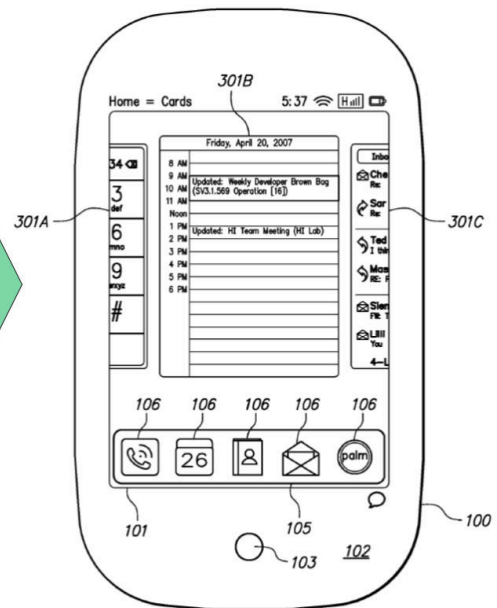


FIG. 3

EX1013, FIGS. 2 and 3 (annotated)

374. As discussed in Section VIII.D, *supra*, a POSITA would have understood and found obvious that Shiplacoff's card mode is a multitasking interface, as it allows a user to navigate between multiple activities. *See* EX1013, [0015] ("In the card mode, the user can cause cards to move on the screen, so as to change focus from one card to another. For example, the card having focus can be moved off the screen, to be replaced by a new card that is then given focus."), [0070], [0074] ("card mode is optimized for easily switching focus from one activity to another and for easily initiating and terminating activities"), [0077]-[0106] (describing operation details of card mode). Further, a POSITA would have understood and found obvious that Shiplacoff's card mode is a type of menu,

because it provides the user with a list of options (e.g., various active applications/activities) from which they may select. See EX1001, 31:46-49, 33:34-37, 35:20-23, 55:57-61 (describing various menus that as lists of options from which a user may select).

76. Claim 81

[81] The apparatus of claim 27, wherein the apparatus is configured such that the menu includes a multitasking interface for choosing among a plurality of only active applications.

375. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [81].

376. As discussed with respect to Claim 80, *supra*, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been ***configured such that the menu includes a multitasking interface*** (e.g., Shiplacoff's card mode interface), as recited in Claim 81. Shiplacoff describes that "cards are initially positioned according to the order in which the corresponding activities (such as applications) were launched." EX1013, [0021]. These launched "cards are active, regardless of the current display mode, so that the information represented in a card is substantially current and is updated substantially in real-time." EX1013, [0019]. "[T]he user can interact with cards regardless of display mode, so that user interface elements within cards are active regardless of the display mode." EX1013, [0019].

377. Based on these teachings, a POSITA would have understood and found obvious that, in the Ahn-Chaudhri-Shiplacoff combination, the multitasking interface is *for choosing among a plurality of only active applications*, as recited in Claim 81.

77. Claim 82

[82] The apparatus of claim 27, wherein the apparatus is configured such that the menu includes a multitasking interface that remains displayed after detection of the completion of the gesture.

378. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [82].

379. As discussed with respect to Claim 80, *supra*, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the menu includes a multitasking interface* (e.g., Shiplacoff's card mode interface), as recited in Claim 82. As discussed in Section VIII.D, *supra*, Shiplacoff describes that "the user can switch among the various modes by performing a gesture," such as a "swipe-up" gesture, that "switches from full-screen mode to card mode, or from card mode to a launcher screen." EX1013, [0127]. In order to navigate through the card mode interface that is displayed as a result of this "swipe-up" gesture, Shiplacoff describes additional independent gestures (e.g., "rearrang[ing] cards 301 while in card mode, by tapping and holding a card 301 for a period of time (such as, for example, 500

milliseconds), and then dragging a card 301 from one position to another”). *See* EX1013, [0104]; *see also id.* [0077]-[0106].

380. Based on these teachings, a POSITA would have understood and found obvious that, in the Ahn-Chaudhri-Shiplacoff combination, the multitasking interface *remains displayed after detection of the completion of the gesture* (e.g., the swipe-up gesture that switches to card mode), as recited in Claim 82.

78. Claim 208

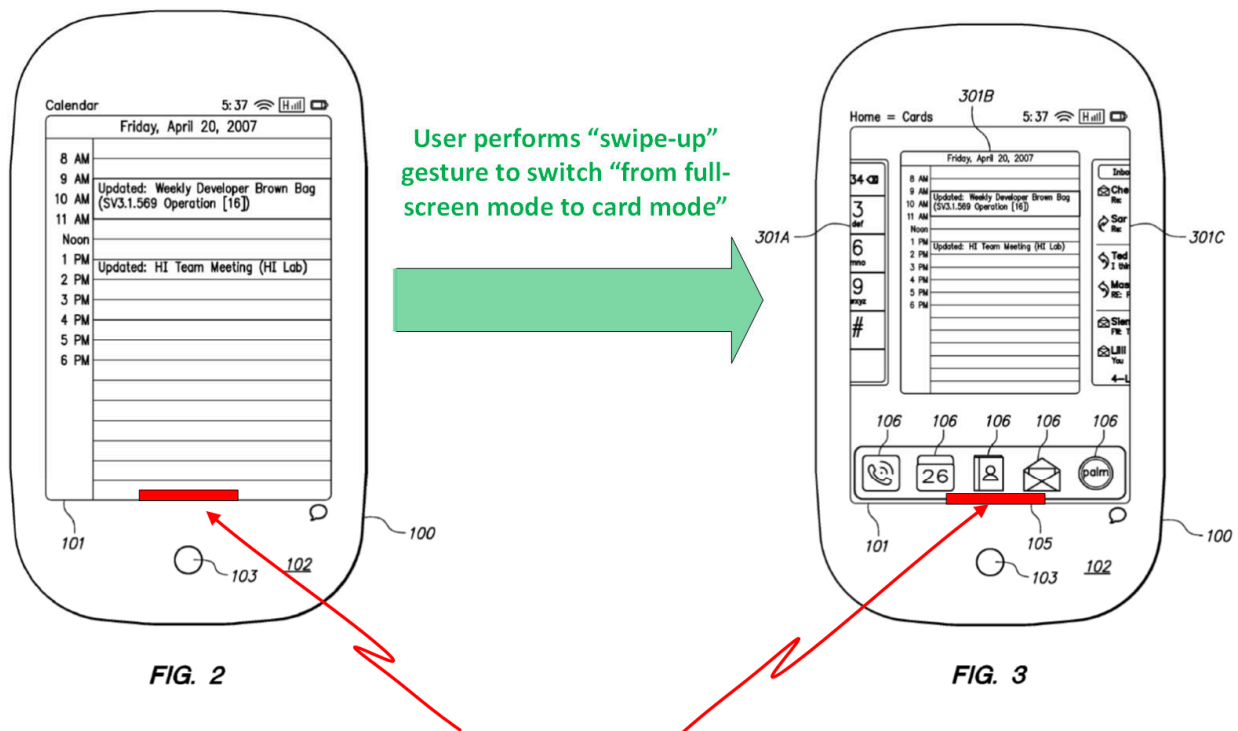
[208.a] The apparatus of claim 2, wherein the apparatus is configured such that: the at least part of the gesture on the touch screen is detected when the object is displayed;

381. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [208.a].

382. As discussed with respect to Claim [30], *supra*, a POSITA would have understood and found obvious that in those implementations that include a graphic shadow 1800, graphic 1800 is *the object*.

383. As discussed with respect to Claim 80, *supra*, a POSITA would have understood and found obvious that Shiplacoff’s card mode is a type of menu, because it provides the user with a list of options (e.g., various active applications/activities) from which they may select. *See* EX1001, 31:46-49, 33:34-37, 35:20-23, 55:57-61 (describing various menus that as lists of options from which a user may select). When integrated into Ahn’s mobile terminal in the manner

discussed in Section VI.C.2, *supra*, a POSITA would have understood and found obvious that “a specific icon for notifying a start position of the touch and drag operation,” such as graphic 1800, would have been useful in guiding the user on how to perform the gesture that switches between Shiplacoff’s modes. *See* EX1004, [0117]-[0119]. In at least one example implementation, a POSITA would have at least found it obvious to include an icon, like graphic 1800, at the bottom edge of the display regardless of which Shiplacoff mode was currently being used, as it would notify the user in each of the modes that a “swipe up” gesture, like the one described in Shilacoff, would have always been available to switch between modes. *See* EX1004, [0117]; EX1013, [0126]-[0128].



An icon like Ahn's graphic 1800 that notifies the user that the "swipe up" gesture is available to "switch[] from full-screen mode to card mode, or from card mode to a launcher screen," as taught by Shiplacoff

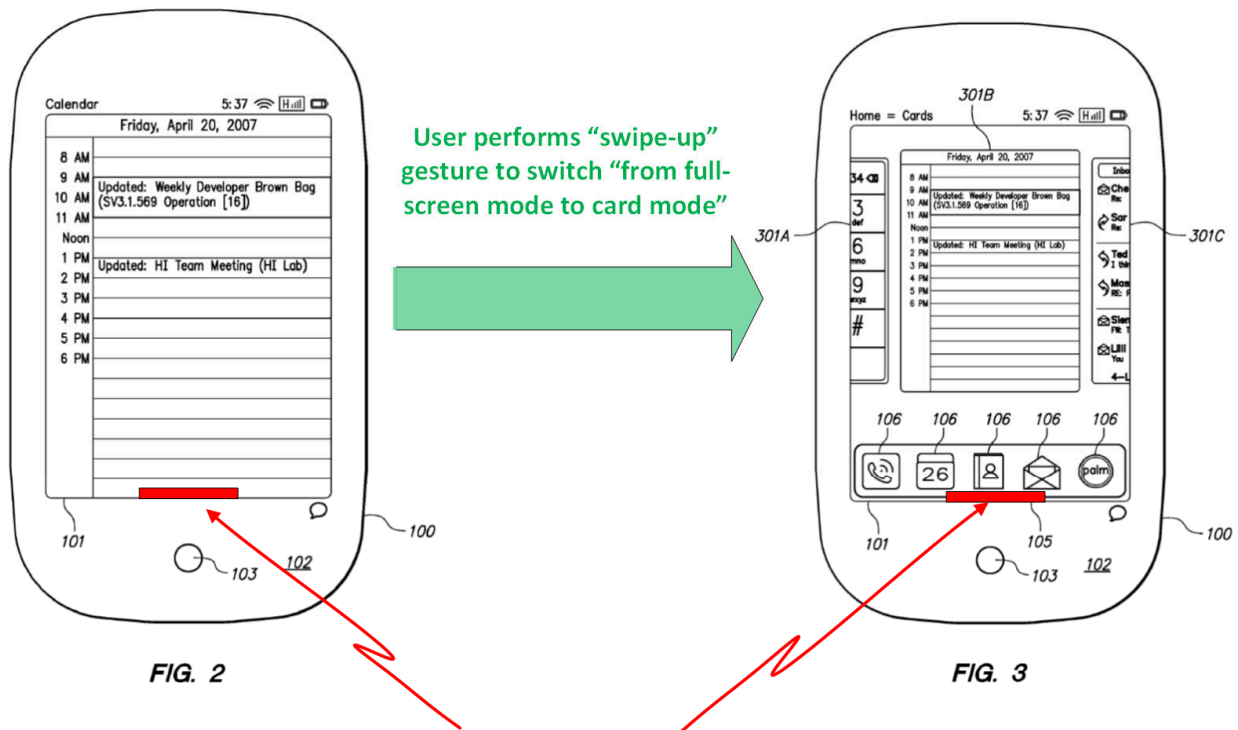
EX1004, FIGS. 2 and 3 (annotated and modified)

384. Accordingly, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the at least part of the gesture on the touch screen is detected when the object is displayed*, as recited in Element [208.a].

[208.b] he at least part of the gesture on the touch screen is detected when a particular application interface of a particular application is displayed;

385. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.b].

386. As discussed with respect to Element [208.a], *supra*, a POSITA would have at least found it obvious to include an icon, like graphic 1800, at the bottom edge of the display regardless of which Shiplacoff mode was currently being used, as it would notify the user in each of the modes that a “swipe up” gesture, like the one described in Shilacoff, would have always been available to switch between modes. *See* EX1004, [0117]; EX1013, [0126]-[0128].



An icon like Ahn's graphic 1800 that notifies the user that the "swipe up" gesture is available to "switch[] from full-screen mode to card mode, or from card mode to a launcher screen," as taught by Shiplacoff

EX1004, FIGS. 2 and 3 (annotated and modified)

387. Shiplacoff explains that the “full-screen mode” is where “user interacts with the active activity (such as the calendar application shown in FIG. 2) by conventional user interface methods, including manipulating on-screen elements, entering text, and the like.” EX1013, [0076]. Accordingly, because Shiplacoff teaches that the gesture “switches from full-screen mode to card mode, or from card mode to a launcher screen” (*see* EX1031, [0127]), a POSITA would have understood and found obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been configured such that ***the at least part of the gesture on the touch screen is detected when a particular application interface of a particular application is displayed***, as recited in Element [186.b].

[208.c] the gesture includes a swipe gesture;

388. Element [208.c] is substantially the same as at least a portion of Claim [63]. Thus, the Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.c] for at least the same reasons described above with respect to Claim [63]. *See* Claims [63], [186.c] *supra*.

[208.d] the at least part of the gesture on the touch screen is detected on the object;

389. Element [208.d] is substantially the same as at least a portion of Claim [30]. Thus, the Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.d] for at least the same reasons described above with respect to Claim [30]. *See* Claims [30], *supra*.

[208.e] the at least part of the gesture on the touch screen is detected at or adjacent to an edge of the touch screen;

390. Element [208.e] is substantially the same as at least a portion of Claim [28]. Thus, the Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.e] for at least the same reasons described above with respect to Claim [28]. *See* Claims [28], [186.a], *supra*.

[208.f] when the magnitude, including a distance magnitude, of the gesture detected on the touch screen is not detected to increase above a distance threshold, a home screen for choosing among a plurality of application is displayed; and

391. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.f].

392. As discussed with respect to Claim [80], *supra*, in one obvious implementation of the Ahn-Chaudhri-Shiplacoff combination, a POSITA would have found it obvious that activities/applications/functions would have been selected/launched from Ahn's menus (*e.g.*, the "Organizer" activity/application/function illustrated in FIG. 7B) and/or from icons displayed on the standby screen 300, consistent with the teachings of Chaudhri '842 (*see* EX1005, [0047], [0076], FIG. 5D) and Shiplacoff (*see* EX1013, [0063], [0099], FIG. 1). The selected/launched activity would have been displayed in a full screen card, as taught by Shiplacoff. *See* EX1013, [0077]-[0078]. When a user performs a touch-and-drag gesture in the upward direction (akin to the "swipe-up" gesture described by

Shilacoff), instead of displaying the service provider additional service menu 620 shown in FIG. 6B, the mobile terminal would “switch[] from full-screen mode to card mode, or from card mode to a launcher screen.” *See* EX1013, [0127].

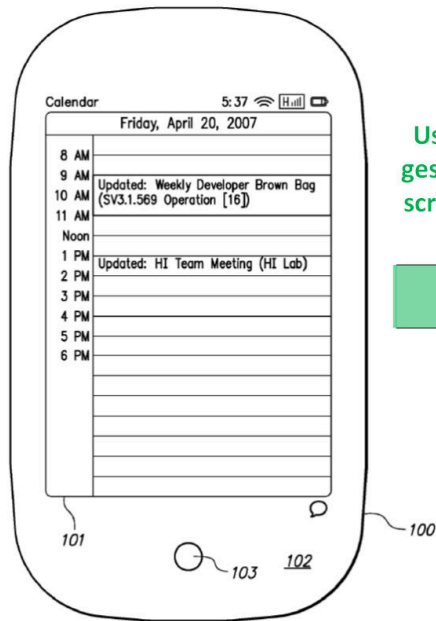


FIG. 2

User performs “swipe-up”
gesture to switch “from full-
screen mode to card mode”

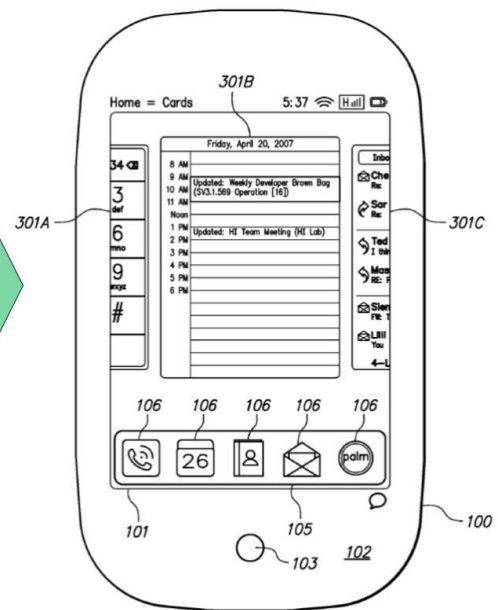


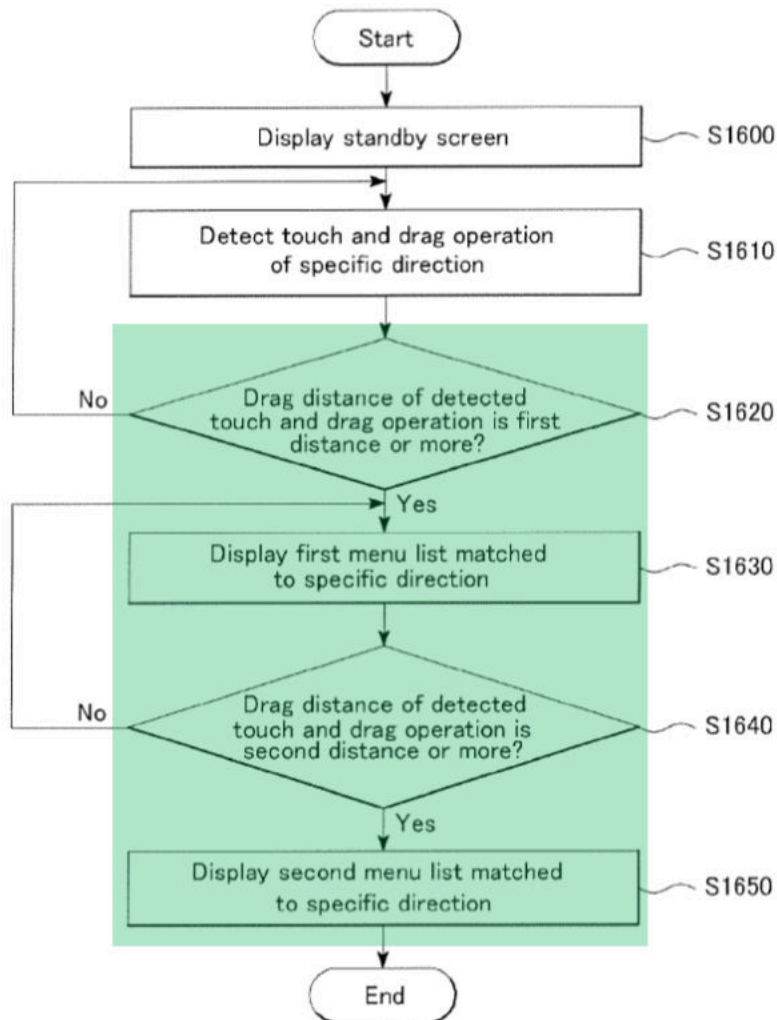
FIG. 3

EX1013, FIGS. 2 and 3 (annotated)

393. As discussed with respect to Claims 27 and 32, *supra*, in one embodiment, Ahn describes that “controller 50 controls to sequentially display a plurality of specific menu lists according to a distance of the detected touch and drag operation.” EX1004, [0108]. Specifically, if “[c]ontroller 50 determines [that] a drag distance of the detected touch and drag operation is a first distance or more (S1620),” then “controller 50 controls to display a first menu list matched to the specific direction (S1630).” EX1004, [0109]. On the other hand, if “controller 50

determines whether a drag distance of the detected touch and drag operation is a second distance or more (S1640),” then “controller 50 controls to display a second menu list matched to the specific direction (S1650).” EX1004, [0110].

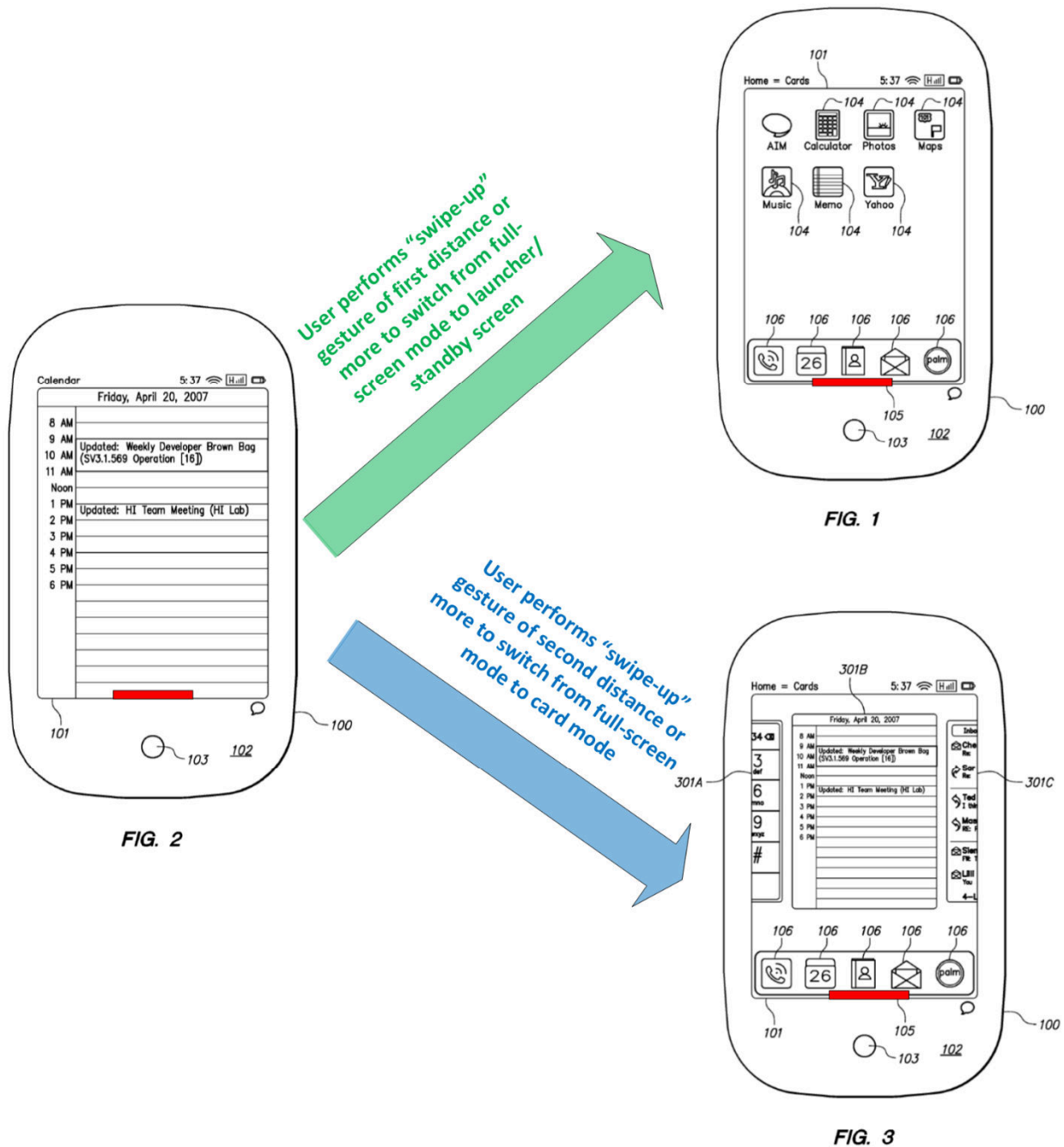
FIG. 16



EX1004, FIG. 16 (highlighted)

394. Applying Ahn’s teachings in the context of the Ahn-Chaudhri-Shiplacoff combination, a POSITA would have found it obvious to utilize Ahn’s teachings with respect to FIG. 16 in order to utilize a distance of the “swipe up”

gesture to determine to which Shiplacoff mode to transition the display. For example, if controller 50 determines that a drag distance of the detected swipe up gesture is a first distance or more, then controller 50 controls to display to transition from a full screen mode to a launcher screen. *See* EX1004, [0109]; EX1013, [0127]; On the other hand, if controller 50 determines that a drag distance of the detected swipe up gesture is a second distance or more, then controller 50 controls to display to transition from a full screen mode to a card mode. *See* EX1004, [0109]; EX1013, [0127].



EX1013, FIGS. 1-3 (annotated and modified)

395. Based on these teachings, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been configured such that, *when the magnitude, including a distance magnitude, of the*

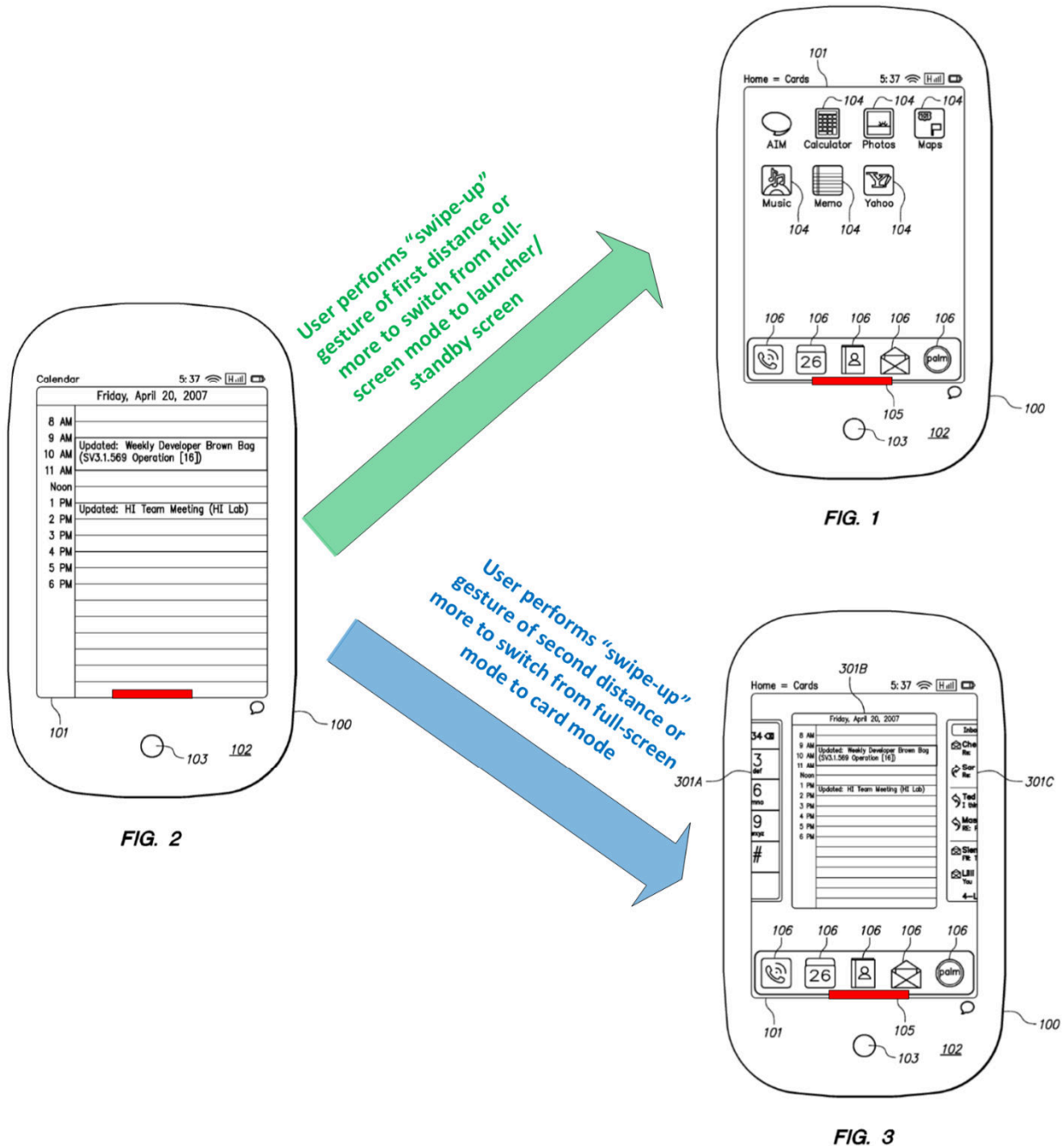
gesture detected on the touch screen (e.g., the swipe up gesture to switch between Shiplacoff's modes) *is not detected to increase above a distance threshold* (e.g., the swipe up is a first distance or more and less than a second distance), *a home screen for choosing among a plurality of application is displayed* (e.g., Ahn's standby screen 300 implemented to include the launcher functionality described by Shiplacoff), as recited in Element [208.f].

[208.g] when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to increase above the distance threshold, a multitasking interface for choosing among a plurality of active applications is displayed, such that:

396. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.g].

397. As discussed with respect to Element [208.f], *supra*, a POSITA would have found it obvious to utilize Ahn's teachings with respect to FIG. 16 in order to utilize a distance of the "swipe up" gesture to determine to which Shiplacoff mode to transition the display. For example, if controller 50 determines that a drag distance of the detected swipe up gesture is a first distance or more, then controller 50 controls to display to transition from a full screen mode to a launcher screen. *See* EX1004, [0109]; EX1013, [0127]. On the other hand, if controller 50 determines that a drag distance of the detected swipe up gesture is a second distance or more,

then controller 50 controls to display to transition from a full screen mode to a card mode. *See* EX1004, [0109]; EX1013, [0127].



EX1013, FIGS. 1-3 (annotated and modified)

398. Based on these teachings, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been configured such that, *when the magnitude, including the distance magnitude, of the gesture detected on the touch screen* (e.g., the swipe up gesture to switch between Shiplacoff's modes) *is detected to increase above the distance threshold* (e.g., the swipe up is a second distance or more), *a multitasking interface for choosing among a plurality of active applications is displayed* (e.g., Shiplacoff's card mode), as recited in Element [208.g].

[208.h] the multitasking interface is displayed in at least one first virtual display layer that appears above a second virtual display layer including the at least portion of the at least one other object that is blurred, and

399. The Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.h].

400. As discussed with respect to Claim [80], *supra*, a POSITA would have understood and found obvious that Shiplacoff's card mode is a type of menu, because it provides the user with a list of options (e.g., various active applications/activities) from which they may select. See EX1001, 31:46-49, 33:34-37, 35:20-23, 55:57-61 (describing various menus that as lists of options from which a user may select).

401. Ahn describes that the menus that are opened through a touch and drag gesture are displayed as a window "on" the standby screen 300. See EX1004,

[0039], [0070]. [Further, Ahn describes that the “menus displayed on the standby screen 300 can be embodied in a translucent form or an opaque form, depending on implementation.” EX1004, [0070]. As discussed with respect to Element [2.d], *supra*, a POSITA would have known and found it obvious that, when differentiated from “transparent” and “opaque” in the manner they are used by Ahn, the word “translucent” means “allowing light, but not detailed images, to pass through; semitransparent.” EX1009, 6. A POSITA would have understood not transmitting detail as a type of blurring, because the word “blur” means to “make or become unclear or less distinct.” EX1009, 3.

402. Implemented in the manner of Ahn’s translucent menus, described above, a POSITA would have at least found it obvious that Shiplacoff’s card mode would be displayed “on” the standby screen 300 in a translucent form, such that the area between the displayed cards would show a blurred standby screen 300.

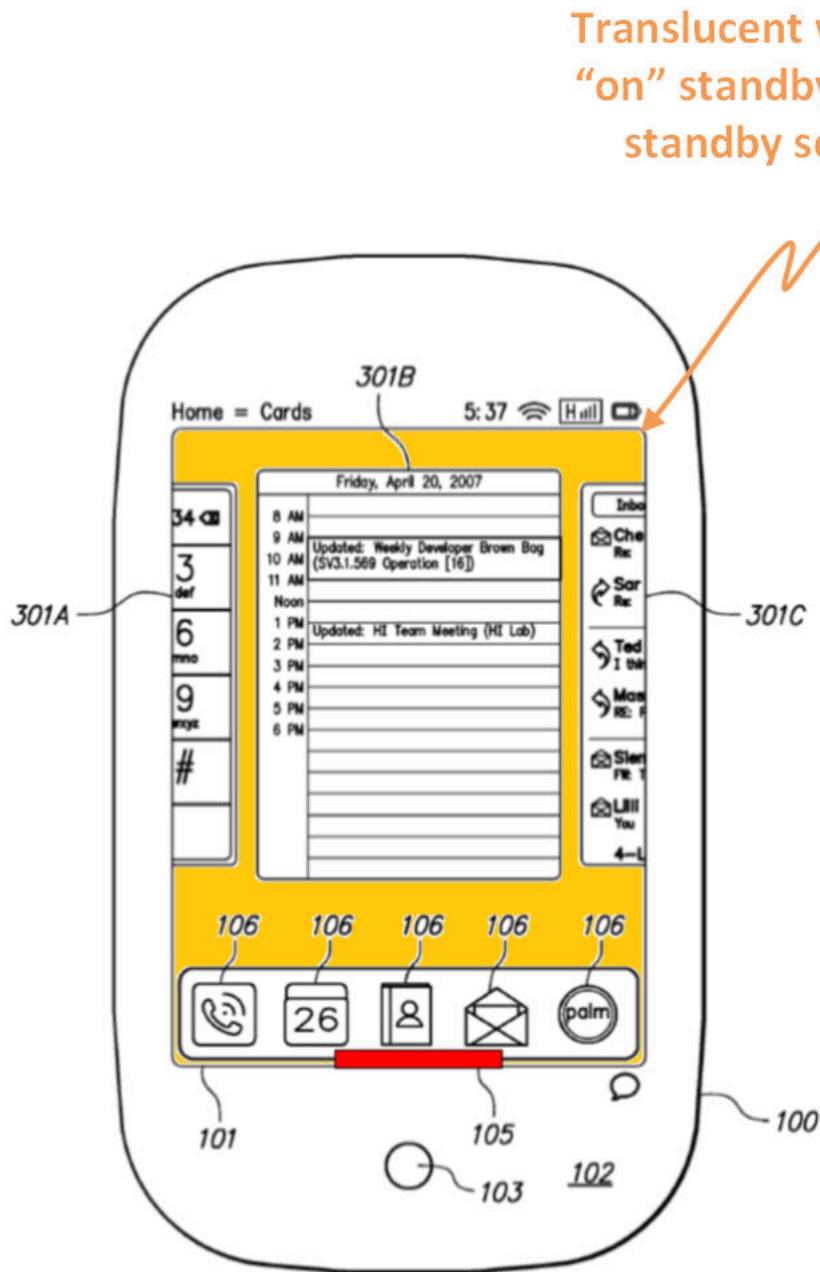


FIG. 3

EX1013, FIG. 1 (annotated and modified)

403. As discussed with respect to Claims 24 and 30, *supra*, a POSITA would have understood a “virtual display layer,” in the context of the ’754 Patent, to be

present whenever one or more display elements appear at “the same apparent depth” of display, regardless of the software and/or hardware mechanisms used to achieve this visual appearance. “For example, in one embodiment, a 3D layered user interface may have a virtual foreground display layer and a virtual background display layer.” EX1001, 68:44-47.

404. As further discussed with respect to Claims 24 and 30, *supra*, in order to display the menus “on” the standby screen 300 using “window forms,” a POSITA would have understood and found obvious that the menu window (*e.g.*, Shiplacoff’s card mode) would be displayed in a “virtual display layer,” as that term is broadly used in the ’754 Patent, and that the virtual display layer containing the menu is displayed “on” one or more other virtual display layers that contain elements of the standby screen 300 (including, *e.g.*, the background thumbnail and the clock widget). *See* EX1004, FIGS. 3A, 4B, [0064], [0070].

405. Based at least on the above teachings of Ahn and Shiplacoff, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been configured such that ***the multitasking interface is displayed in at least one first virtual display layer (e.g., a virtual display layer containing the card mode interface) that appears above a second virtual display layer including the at least portion of the at least one other object that is***

blurred (e.g., a virtual display layer containing one or more elements of standby screen 300), as recited in Element [208.h].

[208.i] the multitasking interface remains displayed after the completion of the gesture.

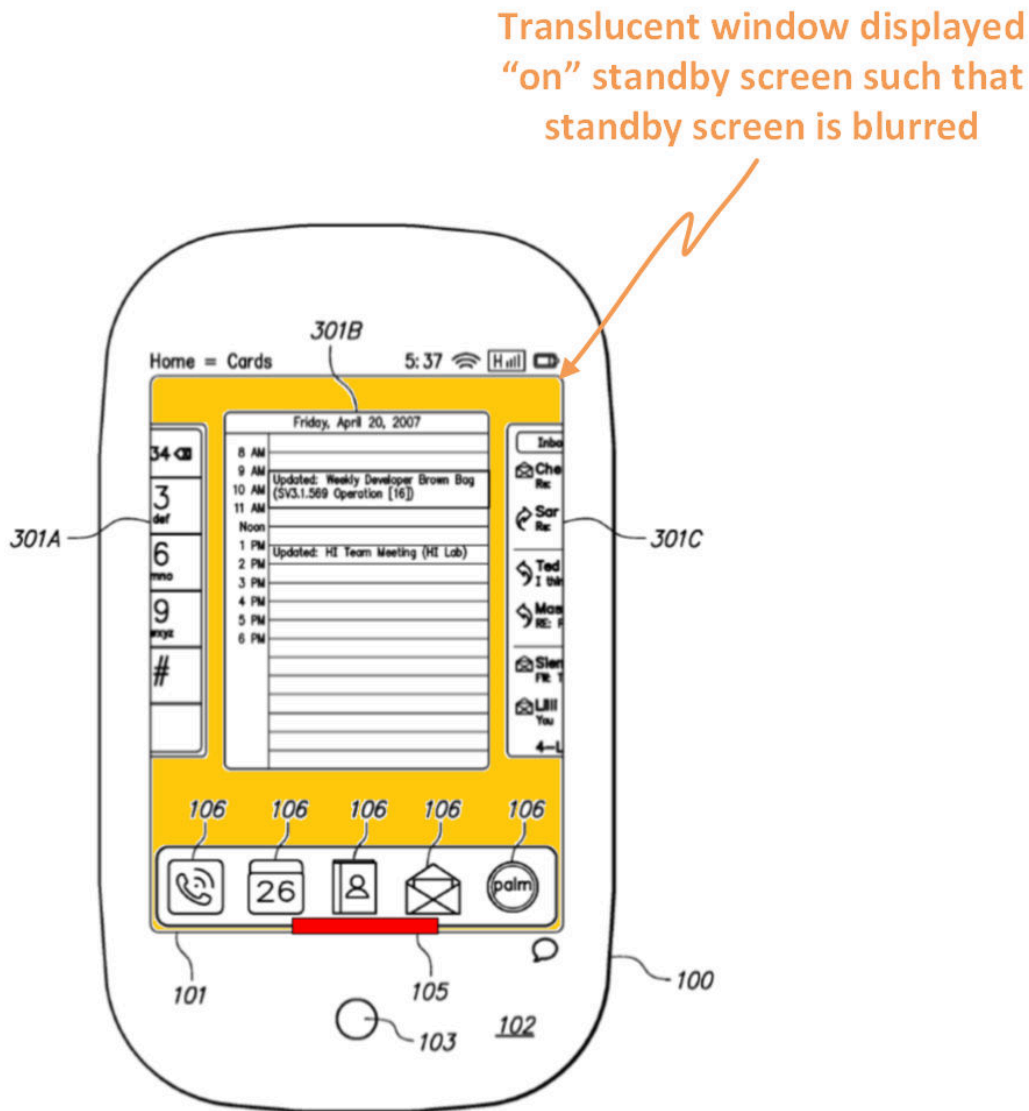
406. Element [208.i] is substantially the same as at least a portion of Claim [82]. Thus, the Ahn-Chaudhri-Shiplacoff combination renders obvious Element [208.i] for at least the same reasons described above with respect to Claim [82]. *See* Claims [82], *supra*.

79. Claim 209

[209] The apparatus of claim 208, wherein the apparatus is configured such that the second virtual display layer includes the home screen for choosing among the plurality of applications.

407. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [209].

408. As discussed with respect to Element [208.h], *supra*, a POSITA would have at least found it obvious that Shiplacoff's card mode would be displayed "on" the standby screen 300 in a translucent form, such that the area between the displayed cards would show a blurred standby screen 300.



EX1013, FIG. 1 (annotated and modified)

409. As further discussed with respect to Element [208.h], *supra*, in order to display the menus “on” the standby screen 300 using “window forms,” a POSITA would have understood and found obvious that the menu window (e.g., Shiplacoff’s card mode) would be displayed in a “virtual display layer,” as that term is broadly

used in the '754 Patent, and that the virtual display layer containing the menu is displayed “on” one or more other virtual display layers that contain elements of the standby screen 300 (including, *e.g.*, icons for launching activities, as taught with respect to Shiplacoff’s launcher screen). *See* EX1004, FIGS. 3A, 4B, [0064], [0070].

410. Based at least on the above teachings of Ahn and Shiplacoff, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the second virtual display layer includes the home screen for choosing among the plurality of applications* (*e.g.*, one or more portions of standby screen 300 including the icons for launching activities, as taught with respect to Shiplacoff’s launcher screen), as recited in Claim [209].

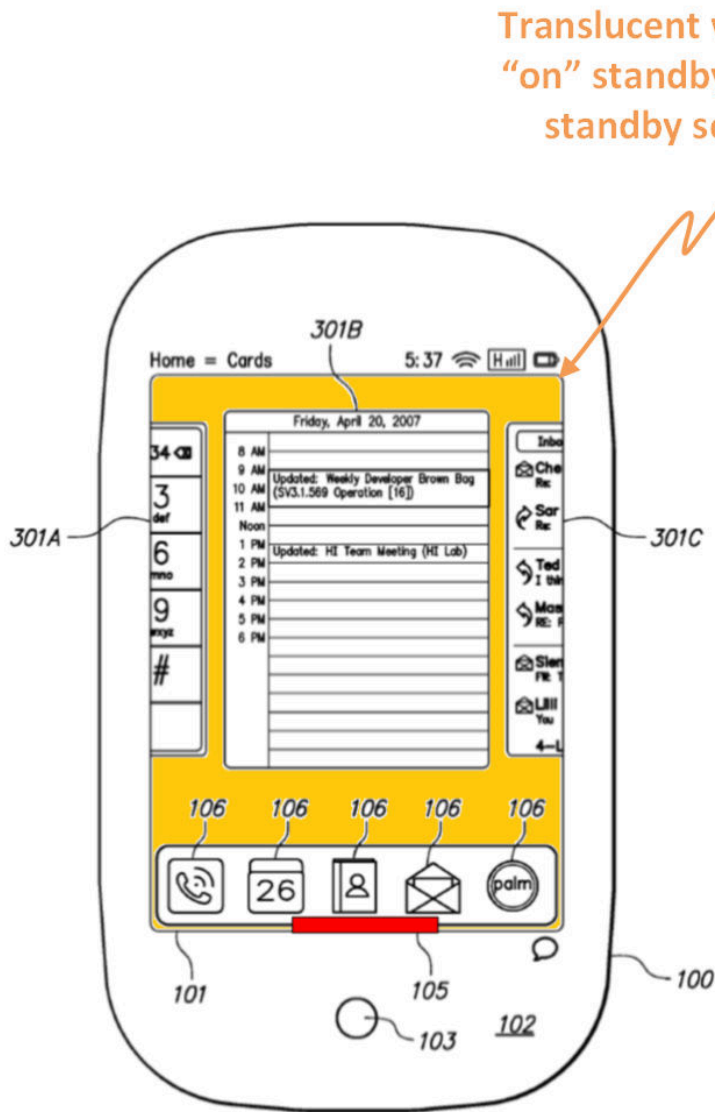
80. Claim 210

[210] The apparatus of claim 209, wherein the apparatus is configured such that a third virtual display layer is displayed between the first virtual display layer and the second virtual display layer.

411. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [210].

412. As discussed with respect to Element [208.h], *supra*, a POSITA would have at least found it obvious that Shiplacoff’s card mode would be displayed “on”

the standby screen 300 in a translucent form, such that the area between the displayed cards would show a blurred standby screen 300.



EX1013, FIG. 1 (annotated and modified)

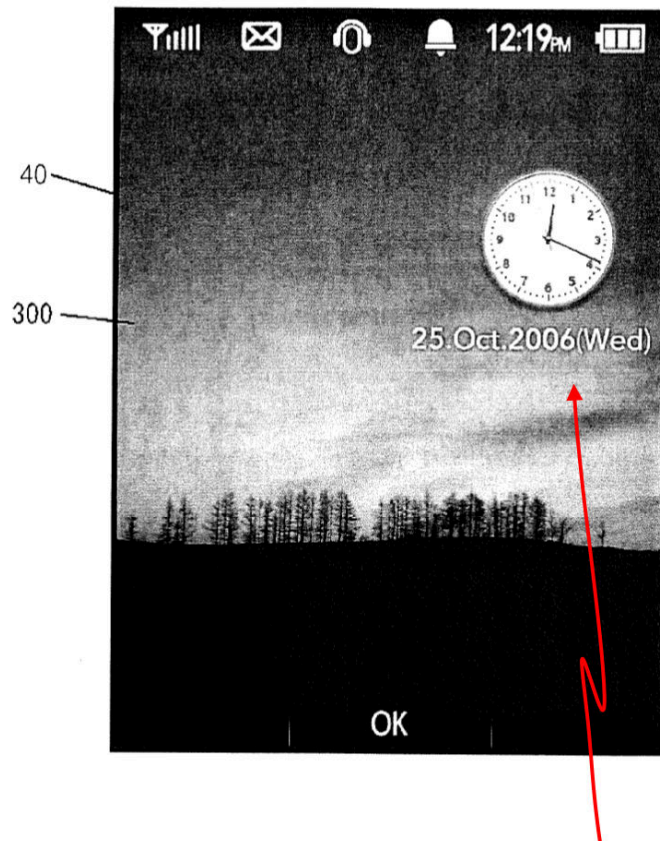
413. As discussed with respect to Claims 24 and 30, *supra*, a POSITA would have understood a “virtual display layer,” in the context of the ’754 Patent, to be

present whenever one or more display elements appear at “the same apparent depth” of display, regardless of the software and/or hardware mechanisms used to achieve this visual appearance. In some embodiments, “virtual display layers may be given the appearance of depth through the use of 3D depth cues.” EX1001, 68:58-60. Thus, in the context of the ’754 Patent, the existence and assignment of virtual display layers is based on appearance and a user’s perception.

414. As further discussed with respect to Element [208.h], *supra*, in order to display the menus “on” the standby screen 300 using “window forms,” a POSITA would have understood and found obvious that the menu window (*e.g.*, Shiplacoff’s card mode) would be displayed in a “virtual display layer,” as that term is broadly used in the ’754 Patent, and that the virtual display layer containing the menu is displayed “on” one or more other virtual display layers that contain elements of the standby screen 300 (including, *e.g.*, the clock widget shown in Ahn and icons for launching activities, as taught with respect to Shiplacoff’s launcher screen). *See* EX1004, FIGS. 3A, 4B, [0064], [0070].

415. As shown in FIG. 3A, Ahn illustrates that the clock widget portion of standby screen 300 appears to be displayed over a background thumbnail image selected by the user. *See* EX1004, [0036], [0054]-[0055], FIG. 3A.

FIG. 3A



**Clock widget appearing to be
displayed "on" thumbnail image
selected by user in standby screen
setting window 520**

EX1004, FIG. 3A (annotated)

416. Based on the display shown in FIG. 3A, a POSITA would have at least found it obvious that the standby screen 300 could be implemented such that a one "virtual display layer" (as that term is used broadly in the '754 Patent) contains the background thumbnail image and another virtual display layer on top of it contains the clock widget.

417. Taking the above teachings of Ahn and Shiplacoff together, a POSITA would have at least found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that a third virtual display layer* (e.g., a virtual display layer containing the clock widget) *is displayed between the first virtual display layer* (e.g., a virtual display layer containing the card mode interface) *and the second virtual display layer* (e.g., a virtual display layer containing one or more elements of standby screen 300, such as the thumbnail image displayed under the clock widget), as recited in Claim [210].

81. Claim 211

[211] The apparatus of claim 209, wherein the apparatus is configured such that the home screen, including the at least portion of the at least one other object, is blurred, when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to increase above the distance threshold.

418. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [211].

419. As discussed with respect to Element [208.g], *supra*, a POSITA would have found it obvious to utilize Ahn's teachings with respect to FIG. 16 in order to utilize a distance of the "swipe up" gesture to determine to which Shiplacoff mode to transition the display. For example, if controller 50 determines that a drag distance of the detected swipe up gesture is a first distance or more, then controller 50 controls to display to transition from a full screen mode to a launcher screen. *See*

EX1004, [0109]; EX1013, [0127]. On the other hand, if controller 50 determines that a drag distance of the detected swipe up gesture is a second distance or more, then controller 50 controls to display to transition from a full screen mode to a card mode. See EX1004, [0109]; EX1013, [0127]. Thus, *when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to increase above the distance threshold*, as recited in Claim 211, a POSITA would have at least found it obvious to display the card mode.



EX1013, FIGS. 1-3 (annotated and modified)

420. As discussed with respect to Element [208.h], *supra*, implemented in the manner of Ahn's translucent menus, a POSITA would have at least found it obvious that Shiplacoff's card mode would be displayed "on" the standby screen

300 in a translucent form, such that the area between the displayed cards would show a blurred standby screen 300.

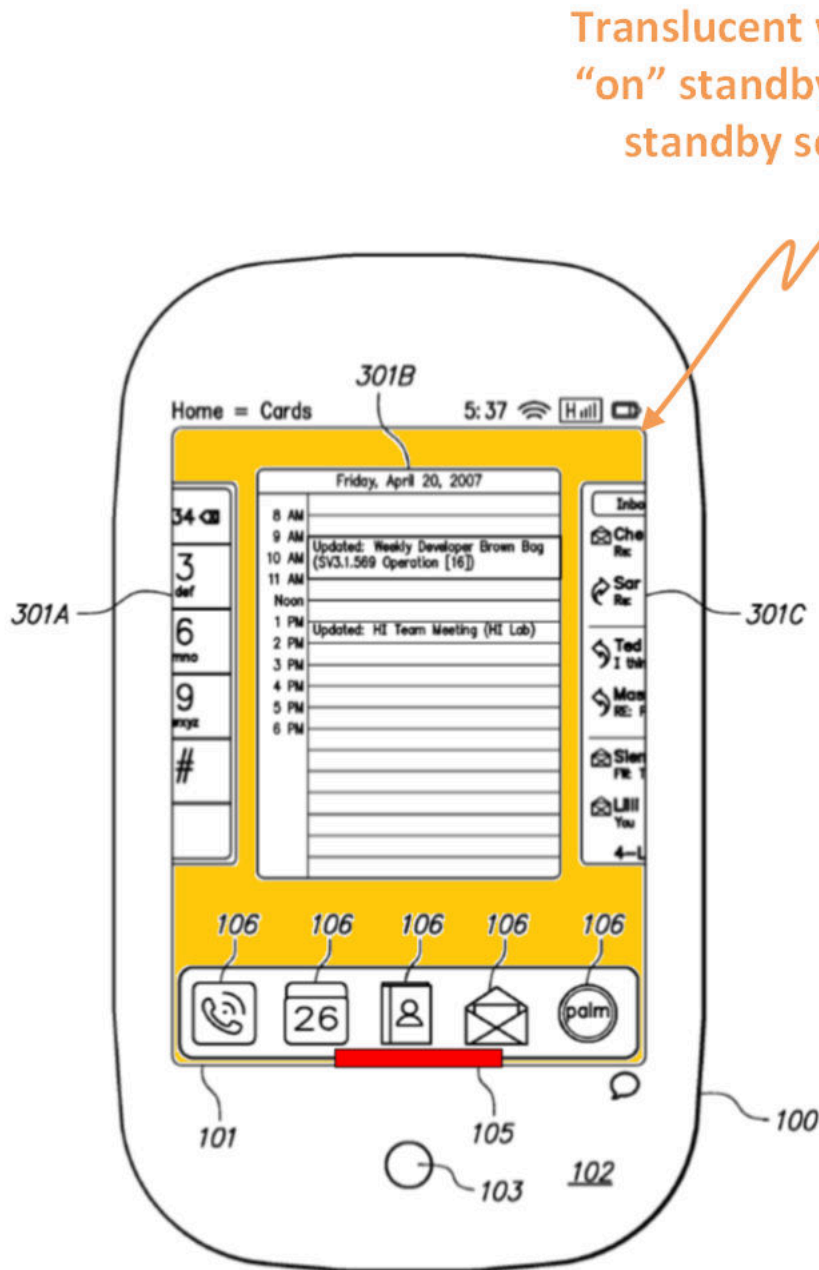


FIG. 3

EX1013, FIG. 1 (annotated and modified)

421. Based on these teachings, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the home screen (e.g., Ahn's standby screen 300), including the at least portion of the at least one other object (e.g., the clock widget portion of standby screen 300), is blurred, when the magnitude, including the distance magnitude, of the gesture detected on the touch screen is detected to increase above the distance threshold*, as recited in Claim [211].

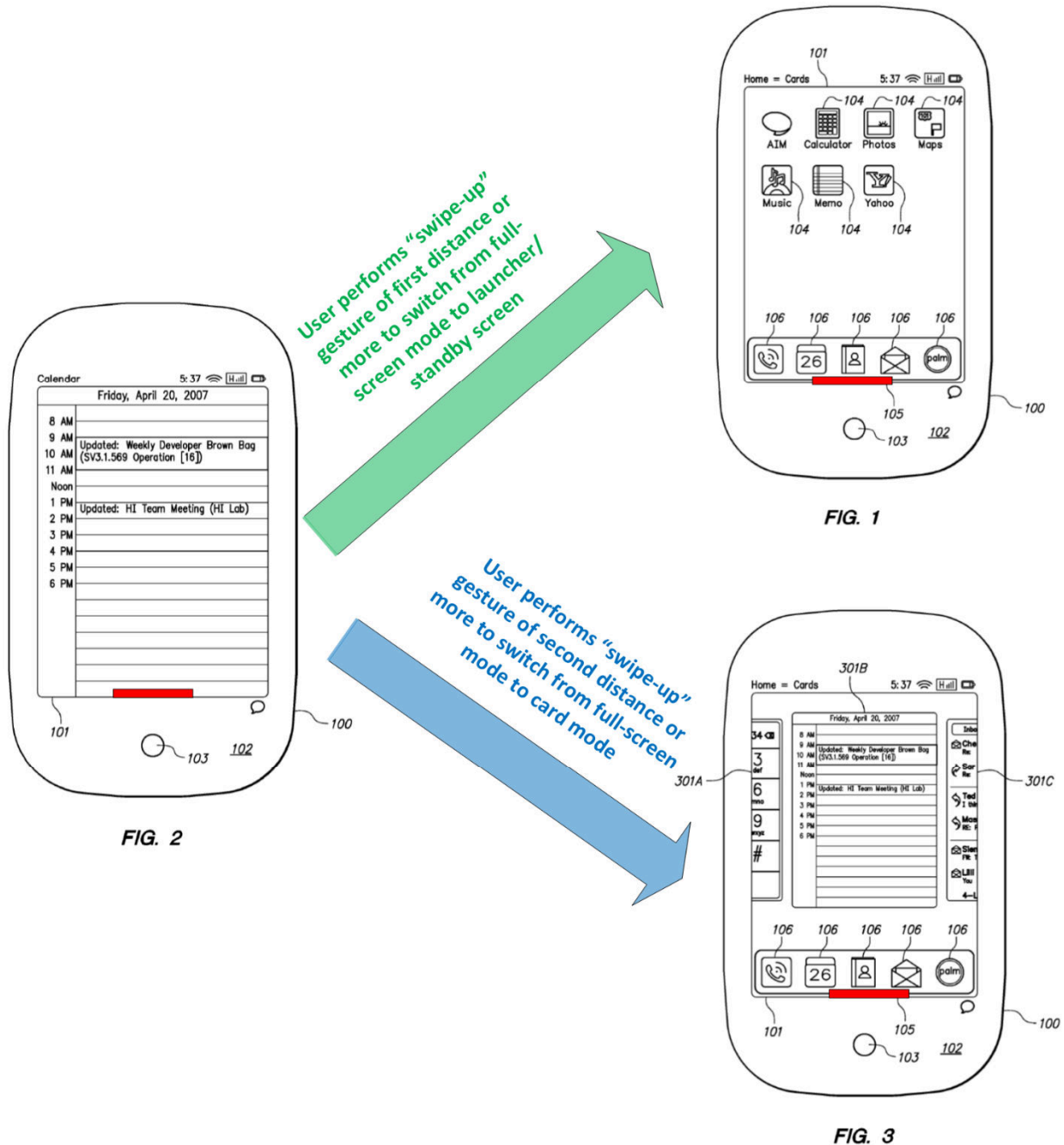
82. Claim 212

[212] The apparatus of claim 208, wherein the apparatus is configured such that the home screen for choosing among the plurality of applications is displayed, by replacing the particular application interface with the home screen.

422. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [212].

423. As discussed with respect to Element [208.f], *supra*, a POSITA would have found it obvious to utilize Ahn's teachings with respect to FIG. 16 in order to utilize a distance of the "swipe up" gesture to determine to which Shiplacoff mode to transition the display. For example, if controller 50 determines that a drag distance of the detected swipe up gesture is a first distance or more, then controller 50 controls to display to transition from a full screen mode to a launcher screen. *See* EX1004, [0109]; EX1013, [0127]. On the other hand, if controller 50 determines that a drag distance of the detected swipe up gesture is a second distance or more,

then controller 50 controls to display to transition from a full screen mode to a card mode. *See* EX1004, [0109]; EX1013, [0127].



EX1013, FIGS. 1-3 (annotated and modified)

424. Based on these teachings, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the home screen for choosing among the plurality of applications* (e.g., Ahn’s standby screen 300 implemented to include the launcher functionality described by Shiplacoff) *is displayed, by replacing the particular application interface* (e.g., Shiplacoff’s full screen mode, where a user interacts with the active activity, such as the calendar application shown in FIG. 2) *with the home screen.*

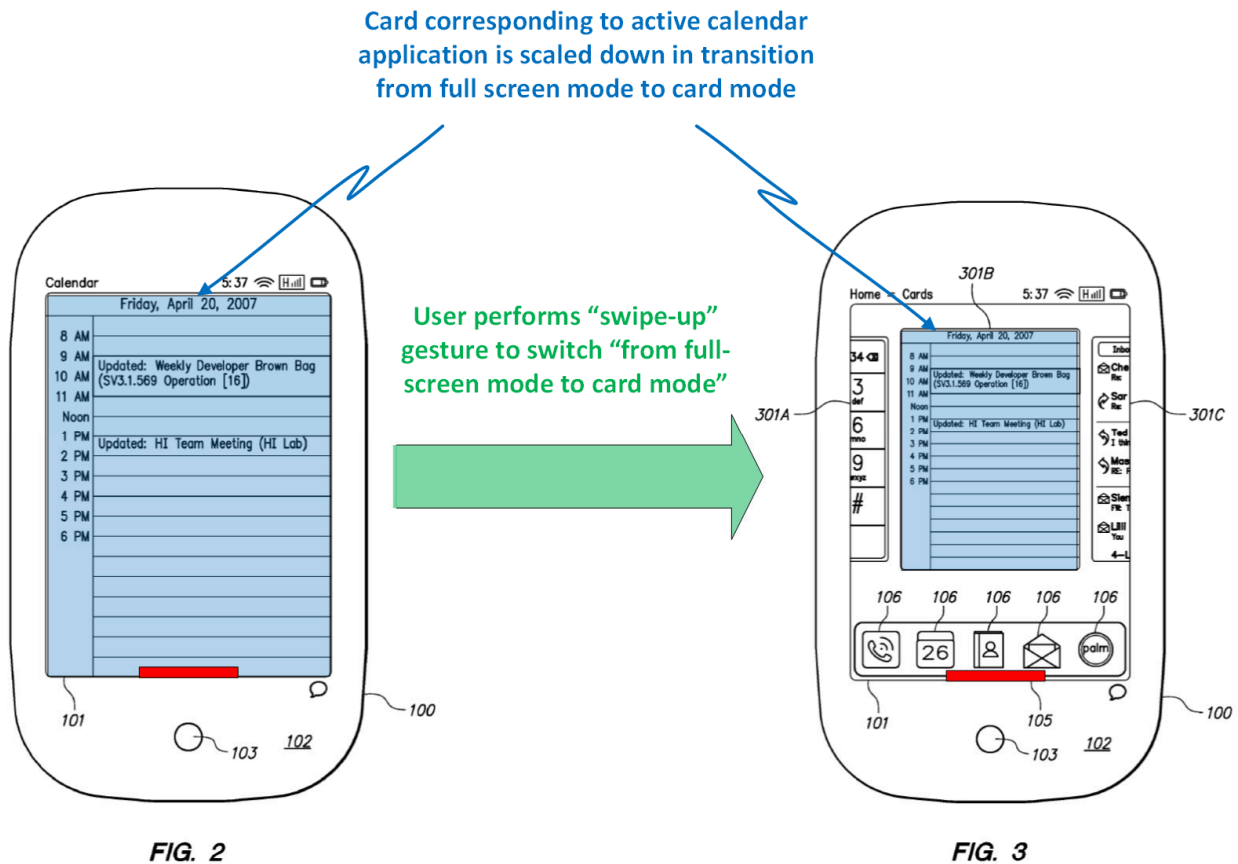
83. Claim 213

[213] The apparatus of claim 208, wherein the apparatus is configured such that at least a portion of the multitasking interface includes a scaled version of the particular application interface.

425. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [213].

426. As discussed with respect to Element [208.g], the *multitasking interface* is Shiplacoff’s card mode. Shiplacoff teaches that, “[i]n card mode, one activity is visible within a card, and a portion of at least one other card is also visible.” EX1013, [0015]. As shown in FIG. 3, “[u]sually, card 301B having focus represents the same activity that was displayed in full-screen mode immediately before the switch to card mode.” EX1013, [0078]. By comparing FIGS 2 and 3, it

is clear that card 301B in card mode is a scaled version of the card as it was displayed in full screen mode.



EX1013, FIGS 2 and 3 (annotated and modified)

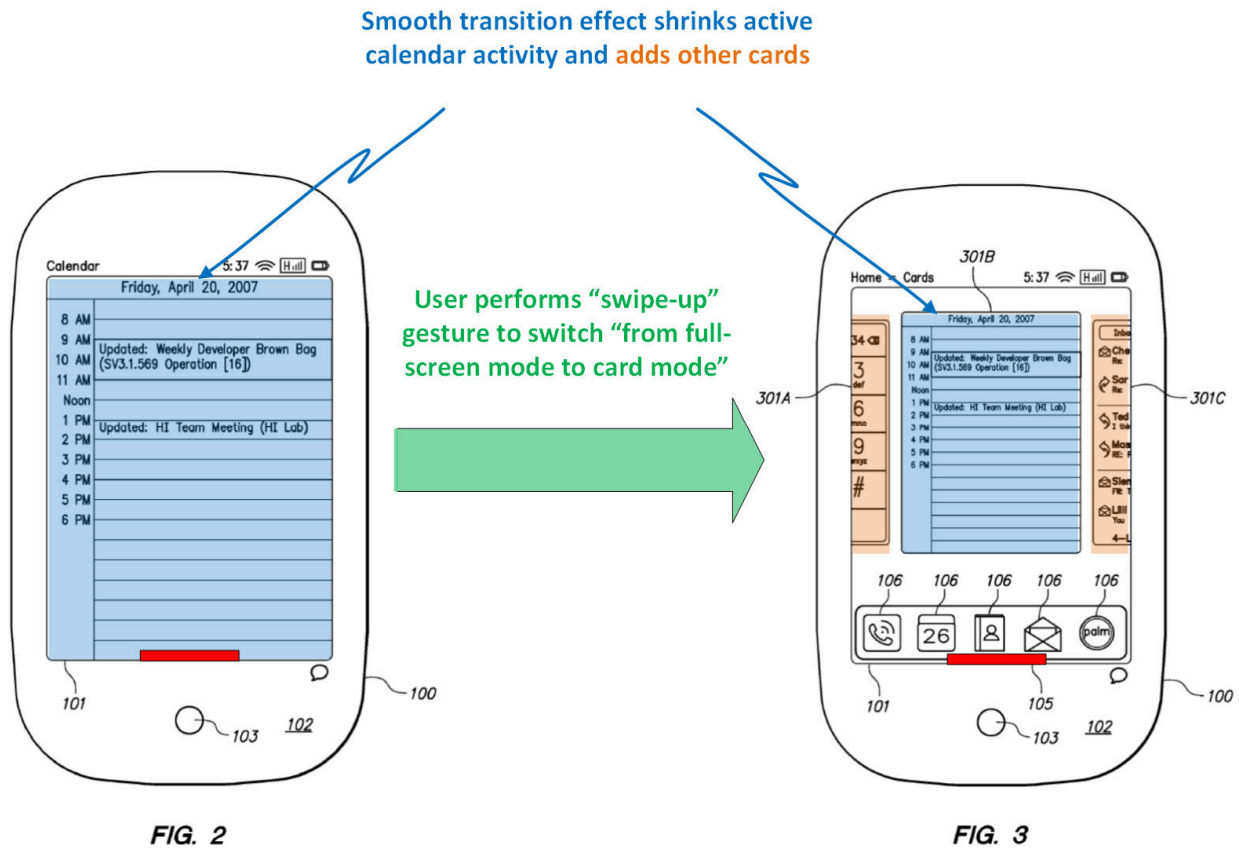
427. Accordingly, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been ***configured such that at least a portion of the multitasking interface includes a scaled version of the particular application interface***, as recited in Claim 213.

84. Claim 214

[214] The apparatus of claim 208, wherein the apparatus is configured such that the at least one other object is displayed when the at least part of the gesture is detected on the touch screen.

428. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [214].

429. Shiplacoff teaches that “a transition effect is performed when switching from one mode to another.” EX1013, [0124]. One possible transition effect “enhance[s] the smoothness of the transition as cards 301 move and/or snap into place.” EX1013, [0094]. Based on these teachings, a POSITA would have understood and found obvious that in transitioning from full screen mode to card mode, the active card (*e.g.*, the calendar activity shown in FIG. 2) is smoothly shrunk in size while the other cards shown in card mode (*e.g.*, cards 301A and 301C in FIG. 3) are smoothly added to the screen. In order to provide visual feedback to the user consistent with the teachings of Chaudhri ’842, a POSITA would have at least found it obvious that these smooth transitions would be performed simultaneous with a user’s gestures in order to show the user the effects of their gesture and progress toward completion of the gesture. *See* EX1005, [0080]-[0084].



EX1013, FIGS. 2 and 3 (annotated and modified)

430. As discussed with respect to Element [208.h], *supra*, a POSITA would have at least found it obvious that Shiplacoff's card mode would be displayed "on" the standby screen 300 in a translucent form, such that the area between the displayed cards would show a blurred standby screen 300. A POSITA would have further understood and found obvious that the menu window (e.g., Shiplacoff's card mode) would be displayed in a "virtual display layer," as that term is broadly used in the '754 Patent, and that the virtual display layer containing the menu is displayed "on" one or more other virtual display layers that contain elements of the standby screen

300 (including, *e.g.*, the background thumbnail and the clock widget). *See* EX1004, FIGS. 3A, 4B, [0064], [0070].

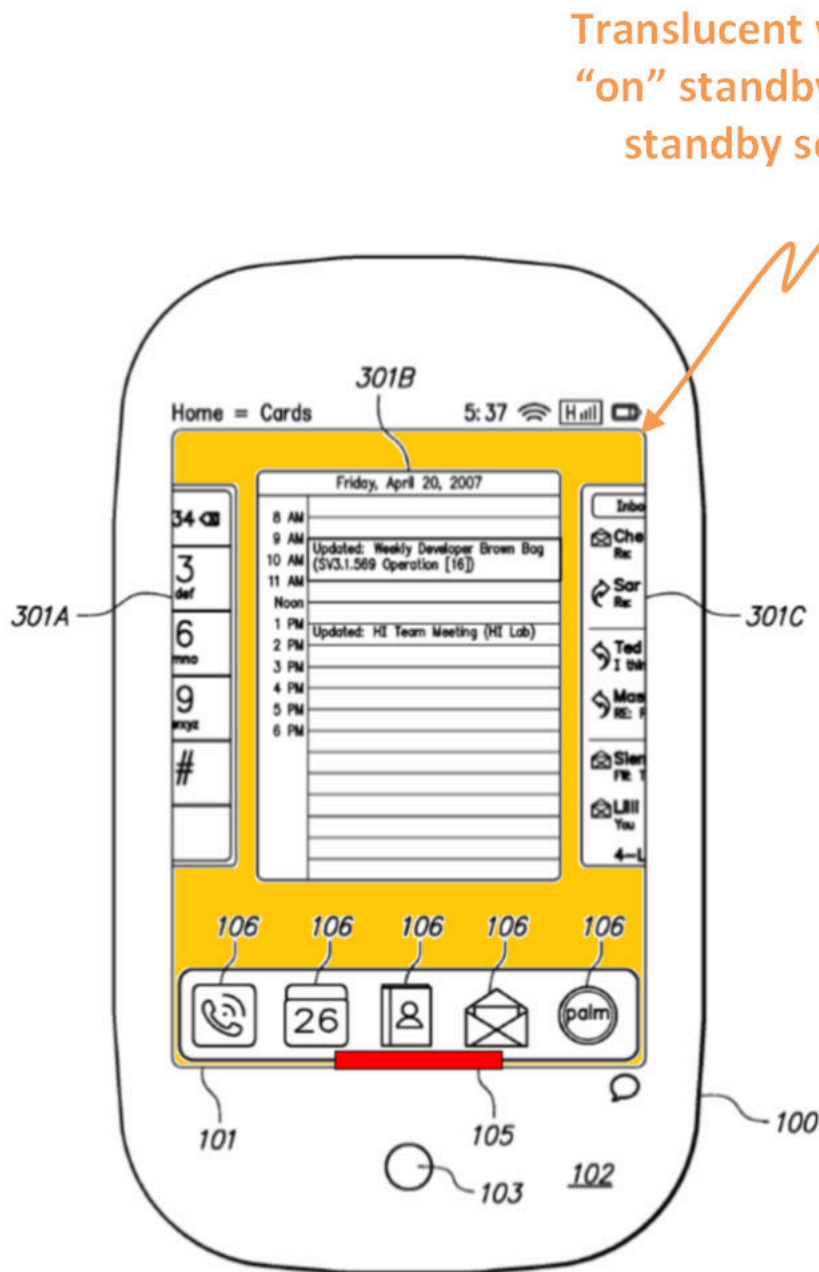


FIG. 3

EX1013, FIG. 1 (annotated and modified)

431. Because the smooth transition would occur simultaneous with the user's swipe up gesture, as discussed above, one or more other virtual display layers that contain elements of the standby screen 300 (including, *e.g.*, the background thumbnail and the clock widget) would have begun to be displayed through the translucent card mode window while the user is still providing the swipe-up gesture. Accordingly, in at least the above-discussed implementation, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the at least one other object is displayed when the at least part of the gesture is detected on the touch screen*, as recited in Claim [214].

85. Claim 215

[215] The apparatus of claim 208, wherein the apparatus is configured such that the at least one other object is not displayed when the at least part of the gesture is detected on the touch screen.

432. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [215].

433. Shiplacoff describes that the transition effect discussed with respect to Claim 214, *supra*, is just one potential embodiment. *See* EX1013, [0124]. In other embodiments, a POSITA would have understood and found obvious that switching between Shiplacoff's modes is performed after the controller 50 detects completion of the swipe up gesture. *See* EX1013, [0124], [0127]. In these alternative

implementations, a POSITA would have at least found it obvious to provide visual feedback to the user consistent with the teachings of Chaudhri '842 through other mechanisms, such as through movement and/or fading of the graphic 1800, as disclosed in Ahn. *See* EX1004, [0117]-[0119]; EX1005, [0080]-[0084].

434. Because in the above-discussed implementations the card mode would not be shown until after completion of the swipe up gesture, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the at least one other object is not displayed when the at least part of the gesture is detected on the touch screen*, as recited in Claim [215].

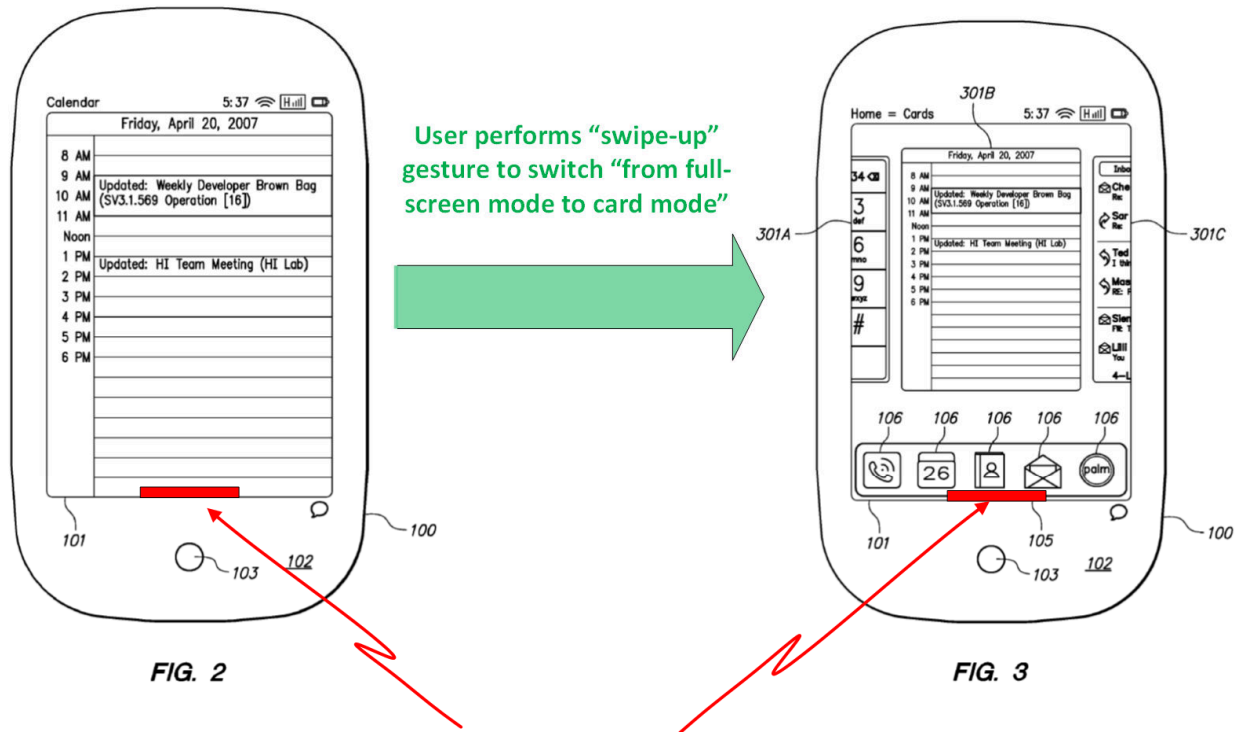
86. Claim 216

[216] The apparatus of claim 208, wherein the apparatus is configured such that the object is moved during the at least part of the gesture.

435. The Ahn-Chaudhri-Shiplacoff combination renders obvious Claim [216].

436. As discussed with respect to Element [208.a], *supra*, a POSITA would have at least found it obvious to include an icon, like graphic 1800, at the bottom edge of the display regardless of which Shiplacoff mode was currently being used, as it would notify the user in each of the modes that a “swipe up” gesture, like the

one described in Shilacoff, would have always been available to switch between modes. *See* EX1004, [0117]; EX1013, [0126]-[0128].



An icon like Ahn's graphic 1800 that notifies the user that the "swipe up" gesture is available to "switch[] from full-screen mode to card mode, or from card mode to a launcher screen," as taught by Shiplacoff

EX1004, FIGS. 2 and 3 (annotated and modified)

437. As discussed with respect to Claim 26, *supra*, Ahn describes that "as the user drags the graphic shadow 1800, the menu list 1500 can be displayed along the dragged graphic 1800." EX1004, [0118]. In other words, Ahn describes that the graphic 1800 moves (*i.e.*, is "dragged") in response to and along with a user's touch and drag gesture on the touch screen. *See* EX1004, [0118]. A POSITA would have

understood and found obvious that movement of the graphic 1800 would have provided a visual cue and feedback to the user that the touch and drag gesture is being detected by the controller 50 and will lead to the display of a menu. *See* EX1004, [0118]; *see also* EX1005, Abstract, [0054], [0062], [0073] (describing benefits of visual cues and feedback).

438. Based on these teachings, a POSITA would have found it obvious that the mobile device of the Ahn-Chaudhri-Shiplacoff combination would have been *configured such that the object is moved during the at least part of the gesture*, as recited in Claim [216].

XII. GROUND 1D: AHN, CHAUDHRI '842, HINKLEY, AND SHIPLACOFF RENDER CLAIMS 97-100 OBVIOUS

A. Claim Element Analysis

87. Claim 97

[97] The apparatus of claim 83, wherein the apparatus is configured such that the menu includes a multitasking interface for choosing among a plurality of active applications.

439. Claim [97] depends from Claim [83], which is obvious over Ahn-Chaudhri-Hinkley combination. Moreover, Claim [97] is substantially the same as Claim [81], which is obvious over the Ahn-Chaudhri-Shiplacoff combination. Thus, the Ahn-Chaudhri-Hinkley-Shiplacoff combination renders obvious Claim [97] for at least the same reasons described above with respect to Claims [81] and [83]. *See* Claim [81], *supra*.

88. Claim 98

[98] The apparatus of claim 83, wherein the apparatus is configured such that the menu includes a multitasking interface.

440. Claim [98] depends from Claim [83], which is obvious over Ahn-Chaudhri-Hinkley combination. Moreover, Claim [98] is substantially the same as Claim [80], which is obvious over the Ahn-Chaudhri-Shiplacoff combination. Thus, the Ahn-Chaudhri-Hinkley-Shiplacoff combination renders obvious Claim [98] for at least the same reasons described above with respect to Claims [80] and [83]. *See* Claim [80], *supra*.

89. Claim 99

[99] The apparatus of claim 83, wherein the apparatus is configured such that the menu includes a multitasking interface for choosing among a plurality of only active applications.

441. Claim [97] depends from Claim [83], which is obvious over Ahn-Chaudhri-Hinkley combination. Moreover, Claim [99] is substantially the same as Claim [81], which is obvious over the Ahn-Chaudhri-Shiplacoff combination. Thus, the Ahn-Chaudhri-Hinkley-Shiplacoff combination renders obvious Claim [99] for at least the same reasons described above with respect to Claims [81] and [83]. *See* Claim [81], *supra*.

90. Claim 100

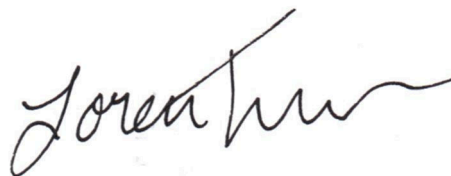
[100] The apparatus of claim 83, wherein the apparatus is configured such that the menu includes a multitasking interface that remains displayed after detection of the completion of the gesture.

442. Claim [97] depends from Claim [83], which is obvious over Ahn-Chaudhri-Hinkley combination. Moreover, Claim [100] is substantially the same as Claim [82], which is obvious over the Ahn-Chaudhri-Shiplacoff combination. Thus, the Ahn-Chaudhri-Hinkley combination renders obvious Claim [100] for at least the same reasons described above with respect to Claim [82]. *See* Claims [82] and [83], *supra*.

XIII. CONCLUSION

443. I declare that all statements made in this Declaration of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both (under Section 1001 of Title 18 of the United States Code).

Executed this 28th day of June, 2024.

A handwritten signature in black ink, appearing to read "Loren Terveen", with a stylized, flowing script.

Loren Terveen, PhD

APPENDIX A

Loren G. Terveen

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Address	Department of Computer Science and Engineering University of Minnesota Minneapolis, MN 55455		
Education	Ph.D. in Computer Sciences	University of Texas	1991
	M.S. in Computer Sciences	University of Texas	1988
	B.A. in Computer Science, Mathematics, History	University of South Dakota	1984
Affiliations	Member of ACM, ACM/SIGCHI		
Research Interests	Human-Computer Interaction, Social Computing		
Professional Experience	Professor	University of Minnesota	2002 --
	Distinguished McKnight University Professor		2017 --
	Principal Member of Technical Staff	AT&T Labs - Research	1996-2002
	Member of Technical Staff	AT&T Bell Labs	1991-1996
	Graduate Research Intern	Microelectronics and Computer Corporation	1986-19991
	Teaching Assistant	University of Texas at Austin	1985

AWARDS AND MAJOR ROLES

ACM Distinguished Scientist (awarded 2009)

ACM SIGCHI Academy (2019)

ACM SIGCHI Lifetime Service Award (2023)

ACM SIGCHI President (2015-2018)

ACM Council, SIG Governing Board Representative (2016 – 2018)

RESEARCH

External Funding

NSF:CISE: Community-Engaged Design and Implementation of a Framework for Ethical Online Communities Research (**Co-PI**, with Svetlana Yarosh PI, Stevie Chancellor Co-PI, Joseph Konstan Co-PI, Kangjie Lu Co-PI), \$400,000 for 01/01/2023 to 12/31/2025.

Cisco: Detecting and Reducing Bias in Collaborative Virtual Meetings (**Co-PI**, with Stevie Chancellor PI). **\$177,915** for 9/1/2021 to 12/31/2022.

NSF:CHS:Small: Incorporating and Balancing Stakeholder Values in Algorithm Design (UMN **PI**), Award Total \$500,000, UMN Share \$243,941 for 8/1/2019 to 7/31/2022.

NSF: EAGER: AI-DCL: Capture, Explain and Negotiate the Inherent Trade-offs in Machine Learning Algorithms (UMN **co-PI**), Award Total \$295,713, UMN Share \$103,267 for 10/1/2019 to 9/30/2022.

NSF:CHS: Small: Collaborative Research: Structured Data Peer Production: Addressing Challenges and Leveraging Opportunities (**PI**), \$249,738 for 9/1/2018 - 8/31/2021.

National Cancer Institute (NCI): Restore: Improving sexual outcomes of gay and bisexual prostate cancer survivors (R. Simon Rosser **PI**; my role: **Co-PI**); \$2,039,220 (directs) \$3,039,541 (total), 2017-2022.

NSF: “PFI:BIC: Smart Human-Centered Collision Warning System: sensors, intelligent algorithms and human-computer interfaces for safe and minimally intrusive car-bicycle interactions” (Co-PI, with Rajesh Rajamani (PI), Max Donath, and Nichole Morris), \$999,773 for September 1, 2016 to August 31, 2019.

NSF: “Computer-Supported Cooperative Work Doctoral Colloquium” (**PI**), \$25,000 for 03/01/2016 to 02/28/2017.

National Institute on Drug Abuse: “A Technology-Delivered Peer-to-Peer Support ARB Adherence Intervention for HIV+ Adults”, (Co-PI, with Keith Horvath (PI) and Darin Erickson), \$3,302,62 for 07/01-2015 to 05/31/2020.

NSF: “HCC: Tools and Mechanisms to Support Social Participation Efforts”, (**PI**), \$499,399 for 10/01/2012 to 09/30/2015.

NSF: “SoCS: Collaborative Research: Novel Algorithms and Interaction Mechanisms to Enhance Social Production”, (**PI**), \$527,140, for 7/01/2012 to 06/30/2015.

NSF: “Collaborative Research: Supporting Newcomer Socialization in Online Production Communities”, (**PI**), \$301,135.00 for 08/2011 to 08/31/2015.

Minnesota Department of Transportation: “Statewide Cycloplan: A Bicycle Planning Tool with Participatory GIS”, **(PI)**, \$130,000, for 10/01/2011 to 06/30/2013.

Metropolitan Council: “Cycloplan II”, **(PI)**, \$71,350, for 08/15/2011 to 05/31/2012.

NSF: “Wikisym Doctoral Consortium”, **(PI)**, \$13,163, for 05/01/2011 to 04/30/2012.

IBM: “Mobile Crowdsensing”, **(PI)**, \$100,000 awarded 04/01/2011

NSF: “Social-Computational Systems (SoCS) Community Meeting” **(PI)**, \$48,801 for 09/01/2010 to 08/31/2011

NSF: “SoCS: Collaborative Research: Information Framing: Intelligent Interfaces for an Online Production Community”, **(PI)**, \$375,000 for 09/15/2010 to 08/31/2015.

NSF: “Collaborative Research: Guiding Folksonomy Development to Enable Novel Tagging Applications” **(PI)**, with J. Riedl and S. Sen (Macalester College)). \$949, 788 for 04/1/2010 to 03/31/2014 (UMN Share).

Minnesota Department of Transportation: Bike, Bus, and Beyond: Extending Cyclopath to Enable MultiModal Routing **(PI)**, \$60,627, for 07/08/2010 to 01/31/2012

NIH: An Interactive Website to Promote Communication about Sexual Health and Dating Relationships between Parents and Teens **(Co-PI)**, with Sonya Brady (PI), Simon Rosser, and Renee Sieving), \$679,500 for 09/30/2009 to 08/31/2011.

Metropolitan Council: “Cycloplan” **(PI)**, \$185,000, October 2009 – March 2011.

NSF “Collaborative Research: Understanding Online Volunteer Communities: Toward Theory-Based Design” **(co-PI)**, with J. Riedl, J. Konstan, M. Snyder, & Y. Ren; R. Kraut (CMU) \$2,400,000 for 08/01/2008 to 07/31/2013.

NSF: “Recommender Systems Doctoral Consortium” **(PI)** \$15,415, 2007-2008.

NSF: “Mining Spatiotemporal Data: From Personal Use to Community Knowledge” **(PI)** \$449,570 for 12/1/2005 to 11/30/2009.

NSF: “Collaborative Research: Mark This! - Operationalizing the notion of "place" for interactive community systems” **(PI)**, with Q. Jones (NJIT) and S. Whittaker (Univ. of Sheffield)). \$173,411 for 6/1/2003 to 5/31/2007 (UMN share).

NSF: “Being There: Mobile Devices for Community and Commerce” **(PI)**, with J. Konstan, J. Riedl, and S. Shekhar). \$120,000 for 9/1/2002 to 8/31/2005.

NSF: “ITR: Collaborative Research: Designing On-Line Communities to Enhance Participation” (co-PI, with J. Konstan & J. Riedl, R. Kraut & S. Kiesler (CMU), P. Resnick and Y. Chen (Univ. of Michigan)). \$1,246,017 for 9/1/2003 to 8/31/2009 (UMN share).

AT&T: “VURI: Collaborative Filtering and Intelligent Interface Design for Enhanced TV Applications” (PI). \$35,000 for November 1, 2008 to October 31, 2009.

AT&T: “VURI: Collaborative Filtering and Intelligent Interface Design for Enhanced TV Applications” (PI). \$35,000 for June 1, 2007 to May 31, 2008.

Internal Funding

Minnesota/China Collaborative Research Grant: "Expertise Oriented Mining for Web Community". \$10,000 for July 1, 2007 to June 30, 2008 (PI, with Jie Tang, Tsinghua University, Beijing China).

University of Minnesota TEL grant: “The Next Generation Online Learning Environment: Designing for Community and Collaboration”. \$10,000 for September 2006 to May 2007. (co-PI, with Joan Hughes, David Ernst, and Ann Ooms, College of Education and Human Development).

University of Minnesota Digital Technology Center: “Indoor Navigation Aids for Visually Impaired People”. \$25,670 for June 2005 to December 2006. (co-PI, with S. Shekhar and G. Legge).

University of Minnesota Digital Technology Center: “Eye-Tracking Research on Community Websites: Photo Directories and Building Social Networks”. \$19,300 for June 2004 to June 2005. (co-PI, with J. Konstan).

University of Minnesota Grant-In-Aid: “Facilitating Participation in Online Communities”. \$20,397 for 1/1/2003 to 6/30/2004.

Books

1. Bickhard, M.H. and Terveen, L.G. Foundational Issues in Artificial Intelligence and Cognitive Science: Impasse and Solution, (1995), Elsevier Science.

Refereed Journal Papers

2. Mo Houtti, Moyan Zhou, Loren Terveen, and Stevie Chancellor. “All of the White People Went First”: How Video Conferencing Consolidates Control and Exacerbates Workplace Bias. *PACM Human-Computer Interaction* (2023).
3. Mo Houtti, Isaac Johnson, Joel Cepeda, Soumya Khandelwal, Aviral Bhatnagar, and Loren Terveen. 2022. “We Need a Woman in Music”: Exploring Wikipedia’s Values on Article Priority. *PACM Human-Computer Interaction* 7, (2022).
4. Charles Chunkai Zhang*, Mo Houtti*, C, Estelle Smith, Ruoyan Kong, and Loren Terveen. Working for Invisible Machines or Pumping Information into an Empty Void? An Exploration of Wikidata Contributors’ Motivations. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 6 (2022). (* co-first authors)
5. C. Estelle Smith, William Lane, Hannah Miller Hillberg, Daniel Kluver, Loren Terveen, and Svetlana Yarosh. Effective Strategies for Crowd-Powered Cognitive Reappraisal Systems: A

- Field Deployment of the Flip*Doubt Web Application for Mental Health. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5 (2021). **Best Paper Honorable Mention.**
6. C. Estelle Smith, Avleen Kaur, Katie Z. Gach, Loren Terveen, Mary Jo Kreitzer, and Susan O’Conner-Von. What is Spiritual Support and How Might It Impact the Design of Online Health Communities? In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5 (2021).
 7. Levonian, Z., Dow, M., Erickson, D.R., Ghosh, S., Miller Hillberg, H., Narayanan, S., Terveen, L. and Yarosh, L. Patterns of Patient and Caregiver Mutual Support Connections in an Online Health Community. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 4 (2020).
 8. Zhu, H., Yu, B., Halfaker, A., and Terveen, L. Value-Sensitive Algorithm Design: Method, Case Study, and Lessons. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, No. 2 (2018).
 9. Miller Hillberg, H., Levonian, Z., Terveen, L., and Hecht, B. What I See is What You Don’t Get: Effects of Seeing Emoji Rendering Differences Across Platforms. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, No. 2 (2018).
 10. Hall, A., Terveen, L., and Halfaker, A. Bot Detection in Wikidata Using Behavioral Cues. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 2, No. 2 (2018).
 11. Sheppard, S.A., Turner, J., Thebault-Spieker, J., Zhu, H., and Terveen, L. Never Too Old, Cold or Dry to Watch the Sky: A Survival Analysis of Citizen Science Volunteerism. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 1, No. 2 (2017).
 12. Thebault-Spieker, J., Kluver, D., Klein, M., Halfaker, A., Hecht, B., Terveen, L., and Konstan, J. Simulation Experiments On (The Absence of) Ratings Bias in Reputation Systems. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 1, No. 2 (2017).
 13. Yu, B., Wang, X., Lin, A.Y., Ren, Y., Terveen, L., and Zhu, H. Out With The Old, In With The New? Unpacking Member Turnover in Online Production Groups. In *Proceedings of the ACM on Human-Computer Interaction*, Vol. 1, No. 2 (2017).
 14. Nguyen, T.T., Harper, F.M., Terveen, L., and Konstan, J. User Personality and User Satisfaction with Recommender Systems. In *Information Systems Frontiers* (2017).
 15. Filson Moses, J., Dwyer, P.C., Fugelstad, P.T., Kim, J.S., Maki, A., Synder, M., and Terveen, L. Encouraging Online Engagement: The Role of Interdependent Self-Construal and Social Motives in Fostering Online Participation. In *Personality and Individual Differences* (2017).
 16. Thebault-Spieker, J., Terveen, L., and Hecht, B. Towards a Geographic Understanding of the Sharing economy: Systemic Biases in UberX and TaskRabbit. In *ACM Transactions on Computer-Human Interaction* (2017).
 17. Brady, S.S., Sieving, R.E., Terveen, L.G., Rosser, R. S., Kodet, A.J., and Rothberg, V.D. An Interactive Website to Reduce Sexual Risk Behavior: Process Evaluation of TeensTalkHealth, JMIR Research Protocols (2015).
 18. Ren, Y., Harper, F.M., Drenner, S., Terveen, L., Kiesler, S., Riedl, J., and Kraut, R.E. (2012). Building Member Attachment in Online Communities: Applying Theories of Group Identity and Interpersonal Bonds. *Management Information Systems Quarterly*.
 19. Jones, Q., Grandhi, S., Karam, S., Whittaker, S., Zhou, C., and Terveen, L. Geographic ‘Place’ and Community Information Preferences, in *Computer-Supported Cooperative Work*.
 20. Zhou, C., Frankowski, D., Ludford, P., Shekhar, S., Terveen, L., Discovering Personally Meaningful Places from Location Data: An Interactive Clustering Approach. *ACM Transactions on Information System*, 25, 3 (July 2007).

21. Ling, K., Beenen, G., Ludford, P.J., Wang, X., Chang, K., Li, X., Cosley, D., Frankowski, D., Terveen, L., Rashid, A.M., Resnick, P., and Kraut, R.E. Using Psychology to Motivate Contributions to Online Communities. *Journal of Computer-Mediated Communication*, 10, 4 (June 2005).
22. Terveen, L. and McDonald, D. Social Matching: A Framework and Research Agenda. *ACM Transactions on Computer-Human Interaction*, 12, 3 (2005), 401-434.
23. Whittaker, S., Jones, Q., Nardi, B., Creech, M., Terveen, L., Isaacs, E., and Hainsworth, J. ContactMap: organizing communication in a social desktop, in *ACM Transactions on Computer-Human Interaction*, 11, 4 (December 2004), 445-471.
24. Jones, Q., Grandhi, S., Terveen, L., and Whittaker, S. People-To-People-to-Geographical-Places: The P3 Framework for Location-Based Community Systems. in *Computer-Supported Cooperative Work*, 13, 3-4 (August 2004), 249-282.
25. Herlocker, J.L., Konstan, J.A., Terveen, L.G., and Riedl, J.T. Evaluating Collaborative Filtering Recommender Systems, *ACM Transactions on Information Systems* (2004).
26. Amento, B., Terveen, L., Hill, W., Hix, D., and Schulman, R. Experiments in Social Data Mining: The TopicShop System, in *ACM Transactions on Computer-Human Interaction*, 10, 1 (March 2003), 54-85.
27. Whittaker, S., Terveen, L.G., and Nardi, B.A. Let's stop pushing the envelope and start addressing it, in *Human-Computer Interaction*, 15, 2-3 (Sep 2000), 75-106.
28. Terveen, L.G., Hill, W.C., and Amento, B. Constructing, Organizing, and Visualizing Collections of Topically Related Web Resources, in *ACM Transactions on Computer-Human Interaction*, 6, 1 (Mar. 1999), 67-94.
29. Selfridge, P.G. and Terveen, L.G. Knowledge Management Tools for Business Process Support and Reengineering, in *Journal of Intelligent Systems in Accounting, Finance, and Management* (Jan. 1996).
30. Terveen, L.G. An Overview of Human-Computer Collaboration, in *Knowledge-Based Systems*, 8, 2-3 (1995), 67-81.
31. Terveen, L.G., Selfridge, P.G., and Long, M.D. Living Design Memory: Framework, System, and Lessons Learned, in *Human-Computer Interaction*, 10, 1 (1995), 1-37.
32. Terveen, L.G. Intelligent Systems as Cooperative Systems, in *International Journal of Intelligent Systems*, 3, 2-4 (1993), 217-250.
33. Brachman, R.J., Selfridge, P.G., Terveen, L.G., Altman, B., Borgida, A., Halper, F., Kirk, T., Lazar, A., McGuinness, D.L., and Resnick, L.A. Integrated Support for Data Archaeology, in *International Journal of Intelligent and Cooperative Information Systems*, 2, 2 (1993), 159-185.

Refereed Conference Papers

34. Zhang, C and Terveen, L. Quantifying the Gap: A Case Study of Wikidata Gender Disparities. In *Proceedings of OpenSym 2021*, the 17th International Symposium on Open Collaboration
35. Yu, B., Ye, Y., Terveen, L., Wu, Z.S., Forlizzi, J., and Zhu, H. Keeping Designers in the Loop: Communicating Inherent Algorithmic Trade-offs Across Multiple Objectives. In *Proceedings of DIS 2020*, the ACM Conference on Designing Interactive Systems.
36. Smith, C.E., Yu, B., Srivastava, A., Halfaker, A., Terveen, L., and Zhu, H. Keeping Community in the Loop: Understanding Wikipedia Stakeholder Values for Machine

Learning-Based Systems. In *Proceedings of CHI 2020, the ACM Conference on Human Factors in Computing Systems*. **Best Paper Honorable Mention.**

37. Levonian, Z., Erikson, D., Luo, W., Narayanan, S., Rubya, S., Vachher, P., Terveen, L. and Yarosh, S. Bridging Qualitative and Quantitative Methods for User Modeling: Tracing Cancer Patient Behavior in an Online Health Community. In *Proceedings of ICWSM 2020, AAAI Conference on the Web and Social Media*.
38. Cheng, H.F., Yu, B., Fu, S., Zhao, J., Hecht, B., Konstan, J., Terveen, L., Yarosh, S., and Zhu, H. Teaching UI Design at Global Scales: A Case Study of Designing Collaborative Capstone Projects for MOOC Students, in *Proceedings of ACM Learning at Scale 2019*.
39. Hall, A., Thebault-Spieker, J., Sen, S., Hecht, B., and Terveen, L. Exploring the Relationship Between “Informal Standards” and Contributor Practice in OpenStreetMap. In *Proceedings of OpenSym 2018*.
40. Thebault-Spieker, J., Halfaker, A., Terveen, L., and Hecht, B. Distance and Attraction: Gravity Models for Geographic Content Production. In *Proceedings of CHI 2018, the ACM Conference on Human Factors in Computing Systems*.
41. Thebault-Spieker, J., Hecht, B., and Terveen, L. Geographic Biases are ‘Born, not Made’: Exploring Contributors’ Spatiotemporal Behavior in OpenStreetMap. In *Proceedings of ACM Group 2018*.
42. Kang, J., Condiff, K., Chang, S., Terveen, L., Konstan, J., and Harper, F.M. Understanding How People Use Natural Language to Ask for Recommendations, in *RecSys 2017*.
43. Miller, H., Kluver, D., Thebault-Spieker, J., Terveen, L., and Hecht, B. Understanding Emoji Ambiguity in Context: The Role of Text in Emoji-Related Miscommunication. In *Proceedings of ICWSM 2017, AAAI Conference on the Web and Social Media*.
44. Hall, A., McRoberts, S., Thebault-Spieker, J., Lin, A.Y., Sen, S., Hecht, B., and Terveen, L. Freedom versus Standardization: Structured Data Generation in a Peer Production Community. In *Proceedings of CHI 2017, the ACM Conference on Human Factors in Computing Systems (CHI 2017)*.
45. Yu, B., Ren, Y., Terveen, L., and Zhu, H. Predicting Member Productivity and Withdrawal from Pre-Joining Attachments in Online Production Groups. In *Proceedings of CSCW 2017, The ACM Conference on Computer-Supported Cooperative Work and Social Computing*.
46. Chang, S., Harper, M., and Terveen, L. Crowd-Based Personalized Natural Language Explanations for Recommendations In *Proceedings of RecSys 2016, The ACM Conference on Recommender Systems*.
47. Chang, S., Harper, M., He, L., and Terveen, L. CrowdLens: Experimenting with Crowd-Powered Recommendation and Explanation. In *Proceedings of ICWSM 2016, AAAI Conference on the Web and Social Media*.
48. Miller, H., Thebault-Spieker, J., Chang, S., Johnson, I., Terveen, L., and Hecht, B. “Blissfully happy” or “ready to fight”: Varying Interpretations of Emoji. In *Proceedings of ICWSM 2016, AAAI Conference Web and Social Media*.
49. Zhao, Q., Huang, Z., Harper, F.M., Terveen, L., and Konstan, J. “Precision Crowdsourcing: Closing the Loop to Turn Information Consumers into Information Producers”. In *Proceedings of CSCW 2016, The ACM Conference on Computer Supported Cooperative Work and Social Computing*.

50. Harper, F.M., Xu, F., Kaur, H., Condiff, K., Chang, S., and Terveen, L. Putting Users in Control of their Recommendations. In *Proceedings of RecSys2015, The ACM Conference on Recommender Systems*.
51. Kapoor, K., Kumar, V., Terveen, L., Konstan, J.A., and Schrater, P. "I like to explore sometimes" – Adapting to Dynamic User Novelty Preferences. In *Proceedings of RecSys2015, The ACM Conference on Recommender Systems*.
52. Warncke-Wang, M., Ranjan, V., Terveen, L., and Hecht, B. Misalignment Between Supply and Demand of Quality Content in Peer Production Communities. In *Proceedings of the International Conference on Weblogs and Social Media (ICWSM'15)*.
53. Chang, S., Harper, F.M., and Terveen, L. Using Groups of Items to Bootstrap New Users in Recommender Systems. In *Proceedings of the 18th ACM conference on Computer supported cooperative work & social computing (CSCW '15)*. ACM, New York, NY, USA.
54. Miller, H., Chang, S., and Terveen, L. "I LOVE THIS SITE!" vs. "It's a little girly": Perceptions of and Initial User Experience with Pinterest. In *Proceedings of the 18th ACM conference on Computer supported cooperative work & social computing (CSCW '15)*. ACM, New York, NY, USA.
55. Thebault-Spieker, J., Terveen, L., and Hecht, B. 2015. Avoiding the South Side and the Suburbs: The Geography of Mobile Crowdsourcing Markets. In *Proceedings of the 18th ACM conference on Computer supported cooperative work & social computing (CSCW '15)*. ACM, New York, NY, USA.
56. Warncke-Wang, M., Hecht, B., and Terveen, L. The Success and Failure of Quality Improvement Projects in Peer Production Communities. In *Proceedings of the 18th ACM conference on Computer supported cooperative work & social computing (CSCW '15)*. ACM, New York, NY, USA.
57. Panciera, K., Masli, M., and Terveen, L. Crème de la Crème: Elite contributors in an online community, in *Proceedings of the 10th International Symposium on Open Collaboration (OpenSym 2014)*.
58. Kumar, V., Kluver, D., Terveen, L., and Riedl, J. More Efficient Tagging Systems with Tag Seeding, in *Proceedings of IEEE SocialCom 2014*.
59. Nguyen, T., Hui, P., Harper, F.M., Terveen, L., and Konstan, J. Exploring the Filter Bubble: The Effect of Using Recommender Systems on Content Diversity, in *Proceedings of WWW 2014*.
60. Halfaker, A., Geiger, S., and Terveen, L. Snuggle: Designing for Efficient Socialization and Ideological Critique, in *Proceedings of CHI 2014*.
61. Chang, S., Kumar, V., Gilbert, E., and Terveen, L. Specialization, Homophily, and Gender in a Social Curation Site Findings from Pinterest, in *Proceedings of CSCW 2014*.
62. Grevet, C., Terveen, L., and Gilbert, E. Managing Political Differences in Social Media, in *Proceedings of CSCW 2014*.
63. Masli, M., and Terveen, L. Leveraging the Contributory Potential of User Feedback, in *Proceedings of CSCW 2014*.
64. Sheppard, S.A., Wiggins, A., and Terveen, L. Capturing Quality: Retaining Provenance for Curated Volunteer Monitoring Data, in *Proceedings of CSCW 2014*.
65. DeLong, C., Terveen, L., and Srivastava, J. (2013). TeamSkill and the NBA: Applying Lessons from the Virtual World to the Real World, in *Proceedings of ASONAM 2013*.

66. Torre, F., Liu, Y., Liu, Z., and Terveen, L. (2013). Local Knowledge Matters for Crowdsourcing Systems: Experience from Transferring an American Site to China, in Proceedings of ICWSM 2013.
67. Gilbert, E., Bakshi, S., Chang, S., and Terveen, L. (2013). "I Need to Try This!": A Statistical Overview of Pinterest, in Proceedings of CHI 2013.
68. Torre, F., Pitchford, D., Brown, P., and Terveen, L. (2012). Matching GPS Traces to (Possibly) Incomplete Map Data: Bridging Map Building and Map Matching, in ACM SIGSPATIAL GIS 2012.
69. Dunne, L., Zhang, J., and Terveen, L. (2012). An Investigation of Contents and Use of the Home Wardrobe, in UbiComp 2012.
70. Dong, Z., Shi, C., Sen, S., Terveen, L., and Riedl, J. (2012). War Versus Inspirational in Forrest Gump: Cultural Effects in Tagging Communities, in ICWSM 2012.
71. Masli, M. and Terveen, L. (2012) Evaluating Compliance-Without-Pressure Techniques for Increasing Participation in Online Communities, in CHI 2012.
72. Fuglestad P.T., Dwyer, P.C., Filson Moses, J., Kim, J.S., Mannino, C.A., Terveen, L., and Snyder, M. (2012) What Makes Users Rate (Share, Tag, Edit...)? Predicting Patterns of Participation in Online Communities, in CSCW 2012.
73. Nathan, M., Topkara, M., Lai, J., Pan, S., Wood, S., Boston, J., and Terveen, L. (2012) In Case You Missed It: Benefits of Attendee-Shared Annotations for Non-attendees of Remote Meetings, in CSCW 2012.
74. Priedhorsky, R., Pitchford, D., Sen, S., and Terveen, L. (2012), Recommending Routes in the Context of Bicycling: Algorithms, Evaluation, and the Value of Personalization, in CSCW 2012.
75. Lam, S.K., Uduwage, A., Dong, Z., Sen, S., Musicant, D.R., Terveen, L., and Riedl, J. (2011). WP:Clubhouse? An Exploration of Wikipedia's Gender Imbalance, in Wikisym 2011. **Best Paper Winner.**
76. Panciera, K., Masli, M., and Terveen, L.G. (2011). "How Should I Go from __ to __ without Getting Killed? Motivations and Benefits in Open Collaboration", in Wikisym 2011.
77. Priedhorsky, R., and Terveen, L.G. (2011). Wiki Grows Up: Arbitrary Data Models, Access Control, and Beyond, in Wikisym 2011.
78. Sheppard, S.A. and Terveen, L.G. (2011). Quality is a Verb: The Operationalization of Data Quality in a Citizen Science Community, in Wikisym 2011.
79. Masli, M., Priedhorsky, R., and Terveen, L. (2011). Task Specialization in Social Production Communities: The Case of Geographic Volunteer Work, in the Proceedings the 4th International AAAI Conference on Weblogs and Social Media (ICWSM 2011).
80. Torre, F., Sheppard, S.A., Priedhorsky, R., and Terveen, L. (2010) bumpy, caution with merging: An Exploration of Tagging in a Geowiki, in GROUP 2010.
81. Panciera, K., Priedhorsky, R., Erickson, T., and Terveen, L. (2010). Lurking? Cyclopaths? A Quantitative Analysis of User Behavior in a Geowiki, in CHI 2010. **Best of CHI Nominee.**
82. Priedhorsky, R., Masli, M., and Terveen, L. (2010). Eliciting and Focusing Geographic Volunteer Work, in CSCW 2010.
83. Panciera, K., Halfaker, A., and Terveen, L. (2009). Wikipedians are Born, Not Made: A Study of Power Editors on Wikipedia, in GROUP 2009. *36% Acceptance Rate.*
84. Reily, K., Ludford Finnerty, P., and Terveen, L. Two Peers are Better than One: Aggregating Peer Reviews for Computing Assignments is Surprisingly Accurate, in GROUP 2009. *36% Acceptance Rate.*

85. Ludwig, M., Priedhorsky, R., and Terveen, L. (2009). Path Selection: A Novel Interaction Technique for Mapping Applications, in CHI 2009. *24% acceptance rate.*
86. Priedhorsky, R., and Terveen, L. (2008). The Computational Geowiki: What, Why, and How, in CSCW 2008. *23% acceptance rate. Best of CSCW Nominee.*
87. Drenner, S., Sen, S., and Terveen, L. (2008). Crafting the Initial User Experience to Achieve Community Goals, in RecSys 2008. *30% acceptance rate.*
88. Reily, K., Ludford, P., and Terveen, L. (2008). Sharescape: An Interface for Place Annotation, in NordiCHI 2008. *30% acceptance rate.*
89. Nathan, M., Harrison, C., Yarosh, S., Terveen, L., Stead, L., and Amento, B. (2008), CollaboraTV: Making Television Viewing Social Again, in uxTV 2008.
90. Priedhorsky, R., Jordan, B., and Terveen, L. (2007), How a Personalized Geowiki Can Help Bicyclists Share Information More Effectively, in WikiSym 2007. *50% acceptance rate.*
91. Priedhorsky, R., Chen, J., Lam, A., Panciera, K., Terveen, L., and Riedl, J. (2007), Creating, Destroying, and Restoring Value in Wikipedia, in ACM Group 2007.
92. Rouben, A. and Terveen, L. (2007), Speech and Non-Speech Audio: Navigational Information and Cognitive Load, in International Conference on Auditory Displays (ICAD).
93. Ludford, P., Priedhorsky, R., Reily, K., and Terveen, L. (2007), Capturing, Sharing, and Using Local Place Information, in CHI 2007. *25% acceptance rate.*
94. Cosley, D., Frankowski, D., Terveen, L., and Riedl, J. (2007), SuggestBot: Using Intelligent Task Routing to Help People Find Work in Wikipedia, in IUI 2007. *22% acceptance rate.*
95. Harper, F.M., Frankowski, D., Drenner, S., Ren, Y., Kiesler, S., Terveen, L., Kraut, R., and Riedl, J. (2007), Talk Amongst Yourselves: Inviting Users To Participate In Online Conversations, in IUI 2007. *22% acceptance rate.*
96. Frankowski, D., Cosley, D., Sen, S., Terveen, L., and Riedl, J. You Are What You Say: Privacy Risks of Public Mentions, in SIGIR 2006. *19% acceptance rate.*
97. Ludford, P.J., Frankowski, D., Reily, K., Wilms, K., and Terveen, L., Because I Carry My Cell Phone Anyway: Functional Location-Based Reminder Applications, in *Proceedings of CHI 2006*. *23% acceptance rate.*
98. Cosley, D., Frankowski, D., Terveen, L., and Riedl, J., Using Intelligent Task Routing and Contribution Review to Help Communities Build Artifacts of Lasting Value, in *Proceedings of CHI 2006*. *23% acceptance rate.*
99. Drenner, S., Harper, M., Frankowski, D., Riedl, J., and Terveen, L. Insert Movie Reference Here: A System to Bridge Conversation and Item Oriented Web Sites, in *Proceedings of CHI 2006* (Tech Note).
100. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. How Do People's Concepts of Place Relate to Physical Locations? In *Proceedings of INTERACT 2005*. *27% acceptance rate.*
101. D. Cosley, D. Frankowski, S. Kiesler, L. Terveen, J. Riedl. How Oversight Improves Member-Maintained Communities. In *Proceedings of CHI 2005*, Portland, OR, 2005. *25% acceptance rate.*
102. Jones, Q., Grandhi, S., Whittaker, S., Chivakula, K., and Terveen, L. Putting Systems into Place: A Qualitative Study of Design Requirements for Location Aware Community Systems, in *Proceedings of CSCW 2004*. *30% acceptance rate.*
103. Zhou, C., Ludford, P., Shekhar, S., and Terveen, L. Discovering Personal Gazetteers: An Interactive Clustering Approach, in ACM GIS 2004 (12th International Symposium on Geographic Information Systems). *33% acceptance rate.*

104. Ludford, P., Cosley, D., Frankowski, D., and Terveen, L.G. Think Different: Increasing Online Community Participation Using Uniqueness and Group Dissimilarity, in *Proceedings of CHI 2004*. 16% acceptance rate.
105. Cosley, D., Ludford, P. and Terveen, L.G. Studying the Effect of Similarity in Online Task-Focused Interactions, *Proceedings of GROUP 2003*. 35% acceptance rate.
106. Ludford, P. and Terveen, L.G. Does an Individual's Myers-Briggs Type Indicator Preference Influence Task-Oriented Technology Use?, *Proceedings of Interact 2003*. 34% acceptance rate.
107. Whittaker, S., Jones, Q., and Terveen, L.G. Contact Management: Identifying Contacts to Support Long-Term Communication, *Proceedings of CSCW 2002*, 216-225. 20% acceptance rate.
108. Terveen, L.G., McMackin, J., Amento, B., and Hill, W. Specifying Preferences Based On User History, *Proceedings of CHI 2002*, 315-322. 15% acceptance rate.
109. Whittaker, S., Jones, Q., and Terveen, L.G. Managing Long Term Conversations: Conversation and Contact Management, *Proceedings of HICSS 2002*. 50% acceptance rate.
110. Amento, B., Terveen, L., Hill, W., and Hix, D. TopicShop: Enhanced Support for Evaluating and Organizing Collections of Web Sites, *Proceedings of UIST 2000*. 26% acceptance rate.
111. Amento, B., Terveen, L., and Hill, W. Does 'Authority' Mean Quality? Predicting Expert Quality Ratings of Web Documents, *Proceedings of SIGIR 2000*. 27% acceptance rate.
112. Amento, B., Hill, W., Terveen, L., Hix, D., and Ju, P. An Empirical Evaluation of User Interfaces for Topic Management of Web Sites, *Proceedings of CHI 1999*, 552-559. 25% acceptance rate.
113. Terveen, L.G and Hill, W.C. Evaluating Emergent Collaboration on the Web, *Proceedings of CSCW 1998*, 355-362. 19% acceptance rate.
114. Whittaker, S., Terveen, L.G, Hill, W.C., and Cherny, L. The Dynamics of Mass Interaction, *Proceedings of CSCW 1998*, 257-264. 19% acceptance rate.
115. Terveen, L.G and Hill, W.C. Finding and Visualizing Inter-site Clan Graphs, *Proceedings of CHI 1998*, 448-455. 23% acceptance rate.
116. Terveen, L.G and Hill, W.C. Involving Users in Continuous Design of Web Content, in *Proceedings of DIS 1997*, ACM Press, 137-145. 41% acceptance rate
117. Terveen, L.G., Hill, W.C., Amento, B., McDonald, D., and Creter, J. Building Task-Specific Interfaces to High Volume Conversational Data, *Proceedings of CHI 1997*, 226-233. 23% acceptance rate.
118. Hill, W.C. and Terveen, L.G Using Frequency-of-Mention in Public Conversations for Social Filtering, *Proceedings of CSCW 1996*, 106-112.
119. Terveen, L.G. and Murray, L. Helping Users Program Their Personal Agents, *Proceedings of CHI 1996*, 355-361. 23% acceptance rate.
120. Terveen, L.G. and Tuomenoksa, M.L. DynaDesigner: A Tool for Rapid Creation of Device-Independent, *Proceedings of INTERACT 1995*, 386-389.
121. Terveen, L.G. and Selfridge, P.G. Intelligent Assistance for Software Construction: A Case Study, *Proceedings of Knowledge-Based Software Engineering 1994*, 14-21.
122. Terveen, L.G., Selfridge, P.G., and Long, M.D. From 'Folklore' to 'Living Design Memory', in *Proceedings of INTERCHI 1993*, 15-22. 19% Acceptance Rate.

123. Terveen, L.G. Interface Support for Data Archaeology, *ISMM International Conference on Information and Knowledge Management (CIKM'93)*. (acceptance rate for 1992 unknown; average is 24%).
124. Brachman, R. J., Selfridge, P.G., Terveen, L.G., Altman, B., Borgida, A., Helper, F., Kirk, T., Lazar, A., McGuinness, D.L., and Resnick, L. A., Knowledge Representation Support for Data Archaeology, *ISMM International Conference on Information and Knowledge Management (CIKM'92)*. (acceptance rate for 1992 unknown; average is 24%).
125. Selfridge, P.G., Terveen, L.G., and Long, M.D. Managing Design Knowledge to Provide Assistance to Large-Scale Software Development, *Proceedings of Knowledge-Based Software Engineering 1992*, 154-162.
126. Terveen, L.G. and Wroblewski, D.A. A Tool for Achieving Consensus in Knowledge Editing, *Proceedings of AAAI 1991*, 74-79. 24% acceptance rate.
127. Terveen, L.G., Wroblewski, D.A., and Tighe, S.N. Intelligent Assistance Through Collaborative Manipulation, *Proceedings of IJCAI 1991*, 9-14. (acceptance rate for 1991 unknown; typically in low 20s).
128. Terveen, L.G. and Wroblewski, D.A. A Collaborative Interface for Browsing and Editing Large Knowledge Bases, *Proceedings of AAAI 1990*, 491-496. 18% acceptance rate.

Book Chapters

129. Terveen, L., Riedl, J., Konstan, J., and Lampe, C. (2014) "Study, Build, Repeat: Using Online Communities as a Research Platform", in *Human Computer Interaction Ways of Knowing*, edited by Judith S. Olson and Wendy Kellogg, New York: Springer.
130. Amento, B., Harrison, C., Nathan, M., and Terveen, L. (2009), Asynchronous Communication – Fostering Social Interaction with CollaboraTV, in Cesar, P., Geerts, D., and Chorianopoulos, K. (ed.), *Social Interactive Television: Immersive Shared Experiences and Perspectives* (2009), Information Science Reference.
131. Amento, B., Terveen, L.G and Hill, W. From PHOAKS to TopicShop: Experiments in Social Data Mining, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), Springer.
132. Whittaker, S., Terveen, L.G, Hill, W.C., and Cherny, L. The Dynamics of Mass Interaction, in Lueg, C. and Fisher, D. (ed.), *From Usenet to CoWebs: Interacting with Social Information Spaces* (2002), (this chapter is a reprint of Whittaker et al 1998), Springer.
133. Terveen, L.G and Hill, W. Beyond Recommender Systems: Helping People Help Each Other, in Carroll, J. (ed.), *HCI in the New Millennium* (2001), Addison Wesley.
134. Terveen, L.G. Computer-Mediated Collaboration, in *More than Screen Deep: Toward Every-Citizen Interfaces to the Nation's Information Infrastructure* (1997), National Academy Press.

Other Publications

135. Konstan, J.A., and Terveen, L.G. Human-centered recommender systems: Origins, advances, challenges, and opportunities. *AI Magazine*, 2021.
136. Terveen, L. "Autonomous" agents? What should we worry about? What should we do? *Human-Computer Interaction*.
137. Kaur, A., Smith, C. E., and Terveen, L. Sway Together, Stay Together: Visualizing Spiritual Support Networks Through the SoulGarden Prototype. In *Extended Abstracts of CSCW 2021*.

138. Kaur, H., Johnson, I., Miller, H., Terveen, L., Lampe, C., Hecht, b., and Lasecki, W. Oh The Places You'll Share: An Affordances-Based Model of Social Media Posting Behaviors. In *Extended Abstracts of CHI 2017* (ACM Conference on Human Factors in Computing Systems). 40% acceptance rate.
139. Masli, M. and Terveen, L. Geographical Social Production: Lessons from Cyclopath, in CHI 2013 GeoHCI Workshop.
140. Masli, M., Bouman, L., Owen, A., and Terveen, L. Geowiki + route analysis = improved transportation planning, CSCW 2013 Interactive Poster.
141. Brady, S. S., Sieving, R. E., Terveen, L. G., Rosser, B. R. S., Kodet, A. J., & Rothberg, V. D. (2012, October). *TeensTalkHealth: An interactive website to promote healthy relationships and prevent STIs*. Paper presented at the annual meeting of the American Public Health Association, San Francisco, CA.
142. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "The role of community orientation in promoting online participation" (with J. S. Kim, P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, C. A. Mannino, R Davies, & M. Snyder)
143. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Applying a functional approach to participation in online groups" (with P. T. Fuglestad, P. C. Dwyer, J. Filson Moses, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
144. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Past volunteerism predicts amount of content contributed in an online community" (with P. C. Dwyer, J. Filson Moses, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
145. Society for Personality and Social Psychology, San Antonio, TX. January, 2011. "Social motives and personality as predictors of online participation" (with J. Filson Moses, P. C. Dwyer, P. T. Fuglestad, J. S. Kim, C. A. Mannino, R Davies, & M. Snyder)
146. Kapoor, N., Frankowski, D., Konstan, J., and Terveen, L. Lessons Learned in Implementing the CHIplace Online Community, in *Proceedings of Human-Computer Interaction International 2005*.
147. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Exploring How People Describe Places, Short Paper in *Proceedings of Pervasive 2005*.
148. Zhou, C., Ludford, P., Frankowski, D., and Terveen, L. An Experiment in Discovering Personally Meaningful Places from Location Data, Short Paper in *Proceedings of CHI 2005*.
149. Kapoor, N., Konstan, J., and Terveen, L. How Peer Photos Influence Member Participation in Online Communities, Short Paper in *Proceedings of CHI 2005*.
150. Amento, B., Hill, W., and Terveen, L. The Sound of One Hand: A Wrist-mounted Bio-acoustic Fingertip Gesture Interface, Short Paper in *Proceedings of CHI 2002*, 724-725. 33% acceptance rate.
151. Terveen, L., Hill, W., and Amento, B. Collaborative Filtering to Locate, Comprehend, and Organize Collections of Websites, in SIGART Bulletin, 9, 3&4 (1998), 10-17.
152. Terveen, L., Hill, W., Amento, B., McDonald, D., and Creter, J. 1997. PHOAKS: a system for sharing recommendations. *Commun. ACM* 40, 3 (Mar. 1997), 59-62.
153. Terveen, L.G., Stolze, M., and Hill, W. From 'Model World' to 'Magic World', in *SIGCHI Bulletin*, 27, 4 (1995), 31-34.
154. Terveen, L.G., Papavero, E., and Tuomenoksa, M. DynaDesigner: A Tool for Rapid Design and Deployment of Device-Independent Interactive Services, Refereed Formal Demonstration in *Adjunct Proceedings of CHI'95*, 29-30.

155. Terveen, L.G. Person-Computer Cooperation through Collaborative Manipulation. Ph.D. Thesis, University of Texas Department of Computer Sciences, 1991.

Invited Presentations

Carnegie Mellon University

Northwestern University

The University of California Irvine

Carleton College

Twin Cities MetroGIS Policy Board

Hennepin County Bicycle Advisory Committee

University of Minnesota Digital Humanities Collaborative

University of Minnesota Advanced Transportation Technologies Seminar Series

Georgia Tech

University of Minnesota Urban Ecosystems Symposium

University of Minnesota New Media

IBM T.J. Watson Research

University of Illinois

University of Maryland

University of Washington

Carnegie-Mellon University

Swedish Institute of Computer Science / Royal Institute of Technology

Uppsala University, Sweden

New Jersey Institute of Technology

Microsoft Research

Vassar University

Rensselaer Polytechnic Institute

University of Colorado

Virginia Tech

University of Nebraska

Conference Presentations

- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2014.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2012.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 2002.
- ACM Conference on Computer-Supported Cooperative Work (CSCW), 1998.
- ACM Conference on Human Factors in Computing Systems (CHI), 1998.
- ACM Conference on Design of Interactive Systems, 1997.

- ACM Conference on Human Factors in Computing Systems (CHI), 1997.
- ACM Conference on Human Factors in Computing Systems (CHI), 1996.
- IFIP TC13 International Conference on Human-Computer Interaction (INTERACT), 1995.
- IEEE Conference on Knowledge-Based Software Engineering, 1994.
- ACM Conference on Human Factors in Computing Systems (CHI), 1993.
- Conference on Information and Knowledge Management, 1993.
- Conference on Information and Knowledge Management, 1992.
- National Conference on Artificial Intelligence (AAAI), 1991.
- International Joint Conference on Artificial Intelligence (IJCAI), 1991.
- National Conference on Artificial Intelligence (AAAI), 1990.

Workshop Presentations

- CHI 2013 GeoHCI Workshop
 - “Geographical Social Production: Lessons from Cyclopath”
- CSCW 2002 Workshop on “The Role of Place in Shaping Virtual Communities”:
 - “Place-Based Community Information Systems”.
- CHI 99 Workshop on “Interacting with Recommender Systems”:
 - “Visualization Interfaces for Recommender Systems”.
- 1999 Human-Computer Interaction Consortium Workshop:
 - “A Reference Task Agenda for Human-Computer Interaction”.
- 1998 AAI Workshop on “Recommender Systems”:
 - “The PHOAKS Recommender System”.
- 1997 Human-Computer Interaction Consortium Workshop:
 - “The PHOAKS Recommender System”.
- 1995 Lifelike Computer Characters Workshop:
 - “Hidden Hands, not Talking Heads: The Magic World Interaction Paradigm”.
- 1995 Lifelike Computer Characters Workshop:
 - “Moving Agent-User Voice Dialogue towards Natural Conversation”.
- CHI 95 Workshop on “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”:
 - “The ‘Magic World’ Approach to Human-Computer Collaboration”.
- 1993 AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”:
 - “A Framework for Human-Computer Collaboration”
- 1993 AI-ED Workshop on “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”:

- “Collaborative Problem Solving in Interactive Systems”.
- 1992 CAIA Workshop on “Applying AI To Software Problems: Assessing Promises and Pitfalls”:
 - “Representing and Disseminating Software Design Knowledge”.
- 1992 AAAI Spring Symposium on “Cognitive Aspects of Knowledge Acquisition”:
 - “In The Footprints of The Masters: Embedding Knowledge Acquisition in Organizational Activity”.
- AAAI 90 Workshop on “Complex Systems, Ethnomethodology, and Interaction Analysis”:
 - “Resources for Person-Computer Collaboration”.
- 1990 AAAI Spring Symposium on “Knowledge-Based Human-Computer Communication”:
 - “Tools for Human-Computer Collaboration”.

Patents

U.S. Patent # 5,388,188. Apparatus and methods for providing design advice. (with P. Selfridge). Issued February 7, 1995.

U.S. Patent #5,659,724. Interactive data analysis apparatus employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued August 19, 1997.

U.S. Patent #5,680,530. Graphical environment for interactively specifying a target system (with P. Selfridge). Issued October 21, 1997.

U.S. Patent #5,806,060. Interactive data analysis employing a knowledge base. (with A. Borgida, R.J. Brachman, T. Kirk, and P. Selfridge). Issued September 8, 1998.

U.S. Patent # 5,809,492. Apparatus and method for defining rules for personal agents. (with L. Murray). Issued September 15, 1998.

U.S. Patent # 5,953,393. Personal Telephone Agent. (With P. Culbreth, P. Danielsen, R.J. Hall, E. Papavero, and M. Tuomenoksa). Issued September 14, 1999.

U.S. Patent #6,029,192. System and method for locating resources on a network using resource evaluations derived from electronic messages. (with W.C. Hill). Issued February 22, 2000.

U.S. Patent #6,244,873. Wireless myoelectric control apparatus and methods. (with W.C. Hill, F.C. Pereira, and Y. Singer). Issued June 12, 2001.

U.S. Patent #6,256,648. System and method for selecting and displaying hyperlinked information resources. (with W.C. Hill). Issued July 3, 2001.

U.S. Patent #9,430,043. Bioacoustic Control System, Method, and Apparatus. (with B. Amento and W.C. Hill). Issued August 30, 2016.

CONSULTING

This is my consulting record for the years 2019-2023. I have received compensation for the patent litigation cases listed below in these years. I provide details for the cases where my role unless the client requested I do not do so; in the latter case I provide general descriptions.

- (2023) Retained on behalf a consumer and information technology company. General technology area: graphical and touch-based user interfaces. Writing declaration in support of inter partes review petitions.
- (2023) Retained on behalf of a computer software, hardware, and consumer electronics company. General technology areas: graphical user interfaces for web information access. Writing declaration in support of inter partes review petitions.
- (2022) Retained on behalf of a computer software company. General technology areas: map-based user interfaces, mobile computing, messaging. Writing declarations in inter partes review proceedings involving patents owned by the company.
- (2022) Retained as expert witness on behalf of a computer software and hardware company. General technology area: group collaboration systems. Writing declaration in support of inter partes review petitions.
- (2022) Retained as expert witness on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2022) Retained as expert witness on behalf of a computer software company. General technology areas: Web-based and mobile user interfaces.
- (2021) Retained to write declaration in support of inter partes review petitions. General technology area: information discovery.
- (2021) Retained on behalf of a computer software and hardware company. General technology area: graphical user interfaces. Writing declaration in support of inter partes review petitions.

- **Deposed: September 2022**

- (2021) Retained on behalf of a computer software and hardware company. General technology areas: web information access, voice interaction, home automation. Writing declaration in support of inter partes review petitions.
- (2021) Retained on behalf of a computer software company. General technology area: multimedia messaging. Analyzing potential infringement of company's patents.
- (2021) Retained on behalf of a computer software company. General technology areas: map-based user interfaces, mobile computing, messaging. Writing declarations in support of patent holder's position in *ex parte* reexaminations.

- (2020) Retained on behalf of a computer software and hardware company. General technology area: information processing, hypertext, inference. Writing expert reports.
- (2020) Retained on behalf of a computer software and hardware company. General technology area: graphical user interfaces. Analyzed potential invalidity of patents.
- (2020) Retained by on behalf of a consumer electronics company. General technology area: graphical user interfaces. Analyzed possible infringements of the company's patents.
- (2020) Retained by Erise IP on behalf of Apple
 - Worked on *Inter Partes* review declaration
 - **Deposed: December 2020**
- (2019) Retained on behalf of Comcast. General technology area: interactive program guide systems. Writing expert reports.
 - **Deposed July 2021**
 - **Testified July 2022**
 - **Testified at jury trial April 2022:** Judge William Jung of the U.S. District Court for the Middle District of Florida granted judgment as a matter of law of no infringement for Comcast.
- (2019) Retained on behalf of a computer and internet software company. General technology area: information search. Did not write expert reports.

SERVICE

University of Minnesota Committees

- College of Science & Engineering Consultative Committee: 2015-2018
- College of Science & Engineering Honors & Awards Committee, 2017-2020

External Professional Activities

ACM Special Interest Group on Computer Human Interaction

- President: 2015-2018
- Executive Committee: Adjunct Chair for Awards, 2012 – 2015.
- Executive Committee: Vice President for Membership and Communication, 2009 – 2012.

Conference Chair

- CHI 2002: ACM Conference on Human Factors in Computing Systems
- IUI 1998: ACM Conference on Intelligent User Interfaces.

Program Committee Chair

- CSCW 2004: ACM Conference on Computer-Supported Cooperative Work.
- CSCW 2013: ACM Conference on Computer-Supported Cooperative Work.

Computer Supported Cooperative Work (CSCW) Steering Committee

- Chair, 2012-2014 (First elected Chair of the committee that oversees the CSCW Conference and the general CSCW and Social Computing research community.)

Awards Committee Chair

- CSCW 2008: ACM Conference on Computer-Supported Cooperative Work.

Journals Edited

- Special Issue of *Knowledge-Based Systems* on Human-Computer Collaboration, Vol. 8, No. 2-3, 1995.

Proceedings Edited

- Proceedings of the 2002 ACM Conference on Human Factors in Computing Systems (CHI 2002).
- Proceedings of the 1998 ACM Conference on Intelligent User Interfaces (IUI 1998).

Editorial Boards

- Communications of the ACM, 2009-present.
- ACM Transactions on CHI, 2000-2006.
- Knowledge-Based Systems, 1993-2009.
- ACM *intelligence*, 1998-2001.

Program Committees

- ACM Conference on Human Factors in Computing Systems (CHI): 1999-2004, 2006, 2016.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 2000, 2006, 2008, 2010, 2011, 2012, 2015.
- ACM Conference on Intelligent User Interfaces (IUI): 1997-2000, 2004.
- ACM Recommender Systems Conference: 2007, 2008, 2009, 2010, 2013.
- ACM GROUP Conference: 2007, 2009, 2010.
- ACM SIGIR Conference: 2008.
- AAAI Conference on the Web and Social Media: 2011, 2012, 2016.
- User Modeling, Adaptation, and Personalization: 2011, 2016.
- NordiCHI 2008, 2010.
- Communities and Technology: 2009.

- Computer-Supported Cooperative Learning 2002.
- User Modeling: 2001.
- International Conference on Knowledge Capture 2001.
- Knowledge-Based Software Engineering (KBSE): 1994-1999.
- Intelligent Data Analysis: 1997.
- National Conference on Artificial Intelligence (AAAI): 1996-1997.
- IEEE Conference on Artificial Intelligence for Applications (CAIA): 1994.
- International Workshop on Privacy-Aware Location-based Mobile Services: 2007.
- SIGIR Workshop on Future Challenges in Expertise Retrieval: 2008.

Other conference leadership positions

- ACM Conference on Computer-Supported Cooperative Work Doctoral Consortium Co-Chair, 2016 and 2011.
- The 2nd AAAI Conference on Human Computation and Crowdsourcing (HCOMP 2014) Doctoral Consortium Co-Chair.
- International Symposium on Wikis and Open Collaboration Doctoral Symposium Chair, 2011.
- ACM Conference on Recommender Systems Doctoral Consortium, Co-Chair, 2007.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, Co-Chair, 1996.

Reviewer

Journals

- ACM Computing Surveys.
- IEEE Transactions on Data and Knowledge Engineering.
- IEEE Expert.
- Information Systems.
- International Journal of Human-Computer Studies.
- Journal of Computer-Supported Cooperative Work.

Conferences

- Ninth IFIP International Conference on Human-Computer Interaction (INTERACT): 2003.
- ACM Conference on Human Factors in Computing Systems (CHI): 1995-1998.
- ACM Conference on Computer-Supported Cooperative Work (CSCW): 1998.
- ACM Symposium on User Interface Software and Technology (UIST): 1996.

- ISSM Conference on Information and Knowledge Management: 1993.

National Science Foundations Panels

Served on panels in 1996, 1998, 2001, 2003, 2005, 2010, 2012, 2013.

Workshops Organized

- ACM Wikis and Open Collaboration Doctoral Symposium, 2011.
- Social Computational Systems Community Workshop, 2011.
- ACM Computer Supported Cooperative Work Doctoral Consortium, 2011.
- International Conference on Ubiquitous Computing (UbiComp): “Multi-device Interfaces for Ubiquitous Peripheral Interaction”, 2003.
- ACM Conference on Human Factors in Computer Systems (CHI): “Interacting with Recommender Systems”, 1999.
- International Joint Conference for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1997.
- American Association for Artificial Intelligence Doctoral Consortium, 1996.
- ACM Conference on Human Factors in Computer Systems (CHI): “‘Model World’ to ‘Magic World’: Making Visual Objects the Medium for Intelligent Design Assistance”, 1995.
- ACM Conference on Human Factors in Computer Systems (CHI): “New Uses and Abuses of Interaction History”, 1994.
- AAAI Fall Symposium: “Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice”, 1993.
- World Conference on Artificial Intelligence and Education: “Collaborative Problem Solving: Theoretical Frameworks and Innovative Systems”, 1993.
- Conference on AI for Applications: “Applying AI To Software Problems: Assessing Promises and Pitfalls”, 1992.

Other Professional Service

- Member of SIGCHI Publications Board and Conference Management Committee, 2002-2004.
- ACM Special Interest Group on Artificial Intelligence Conference Chair (1995-1999); originated and co-organized Doctoral Consortia held in conjunction with AAAI and IJCAI.

Internal Service

- Associate Department Head, 2019-
- Chair, Department Head Search Committee, 2015.
- Chair, Strategic Planning Committee, 2013-2014.
- Chair, Social Computing Faculty Search Committee, 2013-2014.
- Curriculum Committee, 2012-2013.

- Chair, Strategic Planning Committee / Faculty Recruiting Committee, 2011-2012.
- Director of Graduate Studies: 2007-2010.
- Communications Committee: 2007
- Newsletter/Brochure Committee (chair): 2006-2007
- Research Opportunities Committee: 2005-2007
- Curriculum Committee: 2003-2005.
- Hosted Robert Kraut, Cray Colloquium speaker: October 2003.
- Participated in recruiting and admission activities.
- Information, Technology, and Everyday Life Initiative: Committee Member.

TEACHING AND ADVISING

Ph.D. Students Advised

- Dan Cosley (co-advised with John Riedl): completed PhD July 2006, currently an Associate Professor at Cornell University; on leave as Program Director at NSF.
- Pamela Ludford: completed PhD September 2007, currently an independent consultant.
- Reid Priedhorksy: completed PhD August 2010, currently employed at Los Alamos National Laboratories.
- Colin Delong: completed PhD October 2013 (co-advised with Jaideep Srivastava)
- Mikhil Masli: completed PhD July 2013, currently employed at IBM.
- Aaron Halfaker (co-advised with John Riedl): completed PhD September 2013, currently employed at Microsoft.
- Katie Panciera: completed PhD August 2014; currently Assistant Professor at Milwaukee School of Engineering.
- Fernando Torre: completed PhD September 2014; founder of a startup.
- Shuo (Steven) Chang: completed PhD August 2016; currently employed at Facebook.
- Tien Nguyen (co-advised with Joe Konstan): completed PhD August 2016; currently employed at Facebook.
- Morten Warncke-Wang (co-advised with Brent Hecht): completed PhD December 2016, currently employed at the Wikimedia Foundation.
- Andrew Sheppard: completed PhD December 2017, currently employed at Houston Engineering.
- Jacob Thebault-Spieker (co-advised with Brent Hecht): completed PhD December 2017; currently Assistant Professor at The University of Wisconsin.
- Hannah Miller (co-advised with Brent Hecht): completed PhD August 2018; currently Assistant Professor at University of Wisconsin Oshkosh.
- Vikas Kumar (co-advised with Joe Konstan), completed PhD August 2018, currently employed at KenSci.

- Andrew Hall: completed PhD August 2019; currently employed at 3M.
- Bowen Yu (co-advised with Haiyi Zhu), completed PhD December 2018, currently employed at Facebook.
- C. Estelle Smith: completed PhD December 2020; currently Assistant Professor at the Colorado School of Mines.
- Zach Levonian (co-advised with Lana Yarosh): completed PhD July 2022.
- Charles Chuankai Zhang (entered program Fall 2019).
- Mohammed (Mo) Houtti (entered program Fall 2019)
- Moyan Zhou (entered program Fall 2021)
- Ava Bartolome (entered program Fall 2022; co-advised with Stevie Chancellor)

M.S. Students Advised

- Tyler Danielsen – received degree in 2016
- Jie Kang – received degree in 2016
- Zahra Eslami – received degree in 2015
- Yanjie Liu – received degree in 2013
- Renji Yu – received degree in 2012
- Carol Drysdale – received degree in 2011
- Jingwen Zhang – received degree in 2011
- Jisu Oh – received degree in 2010
- Sara Drenner – received degree in 2008
- Anna Rouben – received degree in 2006
- Arjun Sundararajan – received degree in 2006
- Pamela Ludford – received degree in 2005
- Rahul Akolkar – graduated May 2004

Undergraduate Honors / Senior Thesis Students Advised

- Moyan Zhou 2021
- Avleen Kaur 2020
- Harmanpreet Kaur, 2016
- Arlo Siemsen, 2014
- Johnathan Frenz, 2013
- David Pitchford - 2012
- Michael Ludwig - 2010
- Jordan Focht – 2010

- Kurt Wilms - 2005
- John Murphy – 2004

Other Committees

- Hanlin Li, PhD: Member of final examination committee (Northwestern University).
- Matheus Araújo, PhD: Member of preliminary and final examination committees
- Hao-Fei Cheng, PhD: Member of preliminary and final examination committees
- Catherine Grevet, PhD: member of preliminary and final examination committees (Georgia Tech).
- Loxley Wang, PhD: member of preliminary and final examination committees.
- Abigail Bakke, PhD: member of preliminary and final examination committees
- Tahir Sousa, MS: member of final examination committee
- Tony Lam, PhD: member of preliminary examination committee.
- Michael Janseen, PhD: member of preliminary examination committee.
- Haleh Hagh Shenass, PhD: member of preliminary & final examination committees.
- Julie Beilfuss, MS: member of final examination committee.
- Liv Knatterud, MS: member of final examination committee.
- Sean McNee, MS: member of final examination committee.
- Shankar Subrahmanian, MS: member of final examination committee.
- Vamsee Venuturumilli, MS: member of final examination committee.
- Eric Gilbert, Ph.D. Preliminary and Final Examination Committees (UIUC, 2009/2010): member of thesis committee.
- Yi (Jenny) Zhang, Ph.D. (New Jersey Institute of Technology, 2004): member of thesis committee.
- Brian Amento, Ph.D. (Virginia Tech, 2001): member of thesis committee.
- David McDonald, Ph.D. (UC Irvine, 2000): member of thesis committee.

Courses taught

A list of all the classes I have taught, in most cases multiple times.

- CSCI 8115: Human-Computer Interaction and UI Technology
- CSCI 5125: Collaborative and Social Computing
- CSCI 5116: GUI Toolkits and Their Implementation
- CSCI 5115: User Interface Design, Implementation, and Evaluation
- HSEM 2519H: Honors Seminar on Crowdsourcing
- CSCI 1902: Structure of Computer Programming II

- CSCI 1901H: Introduction to Computer Science (Honors)

Tutorials

“Intelligent User Interfaces: Issues, Approaches, Evaluation”, offered at 1993 Conference on Artificial Intelligence for Applications.