UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner

v.

Chian Chiu Li
Patent Owner

Case No. IPR2023-00560
U.S. Patent No. 11,016,564

DECLARATION OF BENJAMIN B. BEDERSON

I, Benjamin B. Bederson, hereby declare the following:

I. INTRODUCTION

1. My name is Benjamin B. Bederson, and I am over 21 years of age and otherwise competent to make this Declaration. I make this Declaration based on facts and matters within my own knowledge and on information provided to me by others, and, if called as a witness, I could and would competently testify to the matters set forth herein.

2. I have been retained by counsel for the Petitioner Apple Inc. ("Apple" or "Petitioner") to provide my independent opinions on certain issues requested by Counsel for Petitioner relating to the accompanying Petition for Inter Partes Review of U.S. Patent No. 11,016,564 ("the '564 Patent"). I understand that the Challenged Claims are claims 1-6, 8-12, 14-16 and 18-20. My opinions are limited to those Challenged Claims.

3. My compensation in this matter is not based on the substance of my opinions or the outcome of this matter. I have no financial interest in Petitioner. I am being compensated at an hourly rate of $600 for my analysis and testimony in this case.

A. Background and Qualifications

4. I have summarized in this section my educational background, career history, and other qualifications relevant to this matter. I have also included a current

version of my curriculum vitae attached herein as Appendix A.

5. I received a Bachelor of Science degree in Computer Science with a minor in Electrical Engineering from Rensselaer Polytechnic Institute ("RPI") in 1986. I received a Master of Science degree and a Ph.D. in Computer Science from New York University ("NYU") in 1989 and 1992, respectively.

6. Since 1998, I have been a Professor of Computer Science at the University of Maryland ("UMD"), where I have joint appointments at the Institute for Advanced Computer Studies and the College of Information Studies (Maryland's "iSchool") and am currently Professor Emeritus. I was also Associate Provost of Learning Initiatives and Executive Director of the Teaching and Learning Transformation Center from 2014 to 2018. I am a member and previous director of the Human-Computer Interaction Lab ("HCIL"), the oldest and one of the best known Human-Computer Interaction research groups in the country. I was also co-founder and Chief Scientist of Zumobi, Inc. from 2006 to 2014, a Seattle-based startup that is a publisher of content applications and advertising platforms for smartphones. I am also co-founder and co-director of the International Children's Digital Library ("ICDL"), a web site launched in 2002 that provides the world's largest collection of freely available online children's books from around the world with an interface aimed to make it easy for children and adults to search and read children's books online. I am also co-founder and prior Chief Technology Officer of

Hazel Analytics, a data analytics company whose product sends alerts in warranted circumstances. In addition, I have for more than 15 years consulted for numerous companies in the area of user interfaces, including Logitech, Microsoft, the Palo Alto Research Center, Sony, Lockheed Martin, Hillcrest Labs, and NASA Goddard Space Flight Center.

7. For more than 30 years, I have studied, designed, and worked in the field of computer science and human-computer interaction. My experience includes 30 years of teaching and research, with research interests in human-computer interaction and the software and technology underlying today's interactive computing systems. This includes the design and implementation of software applications on mobile devices, including smart phones and PDAs, such as my work on DateLens, LaunchTile, and StoryKit described below.

8. At UMD, my research is in the area of Human-Computer Interaction ("HCI"), a field that relates to the development and understanding of computing systems to serve users' needs. Researchers in this field are focused on making universally usable, useful, efficient, and appealing systems to support people in their wide range of activities. My approach is to balance the development of innovative technology that serves people's practical needs. Example systems following this approach that I have built include PhotoMesa (software for end users to browse personal photos), DateLens (2002 software for end users to use their mobile devices

to efficiently access their calendar information), LaunchTile (2005 "home screen" software for mobile devices to allow users to navigate apps in a zoomable environment), SpaceTree (2001 software for end users to efficiently browse very large hierarchies), ICDL (as described above), and StoryKit (a 2009 iPhone app for children to create stories).

9. LaunchTile led to my creation of Zumobi in 2006, where I was responsible for investigating new software platforms and developing new user interface designs that provide efficient and engaging interfaces to permit end users to access a wide range of content on mobile platforms (including the iPhone and Android-based devices). For example, I designed and implemented software called "Ziibii," a "river" of news for iPhone, software called "ZoomCanvas," a zoomable user interface for several iPhone apps, and iPhone apps including "Inside Xbox" for Microsoft and Snow Report for REI. At the International Children's Digital Library (ICDL), I have since 2002 been the technical director responsible for the design and implementation of the web site, www.childrenslibrary.org (originally at www.icdlbooks.org). In particular, I have been closely involved in designing the user interfaces as well as the software architecture for the web site since its inception in 2002. I developed a mobile version of the ICDL for iPhone in 2007 that was publicly available in Apple's App Store. I then developed a mobile app called

StoryKit that allowed children to create and tell stories using an iPhone and its touch screen. It was publicly available in Apple's App Store starting in 2009.

10. Beginning in the mid-1990s, I have been responsible for the design and implementation of numerous other web sites in addition to the ICDL. For example, I designed and built my own professional web site when I was an Assistant Professor of Computer Science at the University of New Mexico in 1995 and have continued to design, write the code for, and update both that site (which I moved to the University of Maryland in 1998, currently at http://www.cs.umd.edu/~bederson/) as well as numerous project web sites, such as Pad++, http://www.cs.umd.edu/hcil/pad++/. I received the Janet Fabri Memorial Award for Outstanding Doctoral Dissertation for my Ph.D. work in robotics and computer vision. I have combined my hardware and software skills throughout my career in Human-Computer Interaction research, building various interactive electrical and mechanical systems that couple with software to provide an innovative user experience.

11. One of my projects involved image processing as it related to personal photo management. For example, I wrote a 2003 paper[1] describing the use of image

[1] Bongwon Suh, Haibin Ling, Benjamin B. Bederson, and David W. Jacobs. 2003. Automatic thumbnail cropping and its effectiveness. In Proceedings of the 16th annual ACM symposium on User interface software and technology (UIST '03). Association for Computing Machinery, New York, NY, USA, 95–104. https://doi.org/10.1145/964696.964707

processing to analyze image content and automatically crop away portions of the photo leaving the salient parts which would be easier to see in small thumbnails.

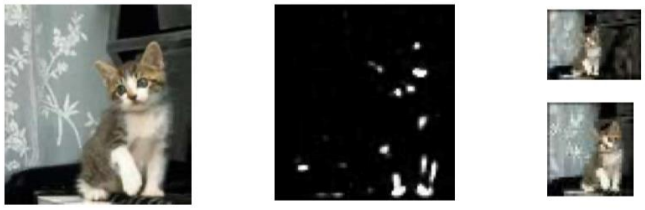


Figure 4 (left): the image cropped based on the saliency map; (middle): the cropping rectangle which contains most of the saliency parts; (right top): a thumbnail subsampled from the original image; (right bottom): a thumbnail subsampled from the cropped image (left part of this figure).

12. In 2007, I wrote a paper[2] that continued that line of work, describing further image processing to organize photos based on identifying the clothes that people were wearing to group them.

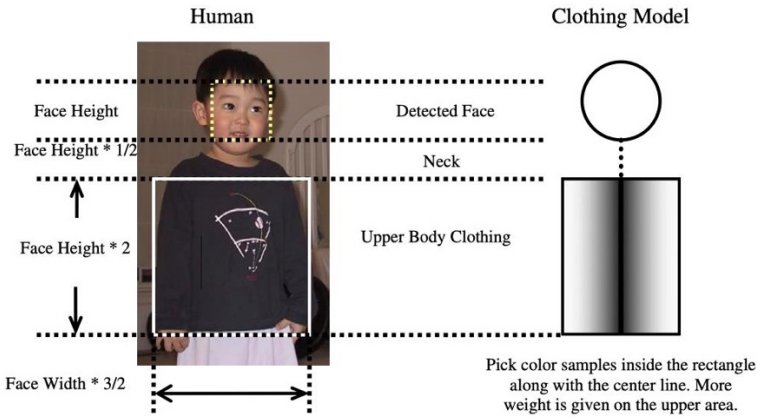


Fig. 6. Locating clothing from detected faces.

13. My work has been published extensively in more than 160 technical

[2] Bongwon Suh and Benjamin B. Bederson. 2007. Semi-automatic photo annotation strategies using event based clustering and clothing based person recognition. Interact. Comput. 19, 4 (July, 2007), 524–544. https://doi.org/10.1016/j.intcom.2007.02.002

publications, and I have given about 100 invited talks, including 9 keynote lectures. I have won a number of awards including the Brian Shackel Award for "outstanding contribution with international impact in the field of HCI" in 2007, and the Social Impact Award in 2010 from Association for Computing Machinery's ("ACM") Special Interest Group on Computer Human Interaction ("SIGCHI"). ACM is the primary international professional community of computer scientists, and SIGCHI is the primary international professional HCI community. I have been honored by both professional organizations. I am an "ACM Distinguished Scientist," which "recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field." I am a member of the "CHI Academy," which is described as follows: "The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry and led the research and/or innovation in human-computer interaction." The criteria for election to the CHI Academy are: cumulative contributions to the field; impact on the field through development of new research directions and/or innovations; and (3) influence on the work of others.

14. I have appeared on radio shows numerous times to discuss issues relating to user interface design and people's use and frustration with common technologies, web sites, and mobile devices. My work has been discussed and I have been quoted by mainstream media around the world over 120 times, including by the New York Times, the Wall Street Journal, the Washington Post, Newsweek, the Seattle Post-Intelligencer, the Independent, Le Monde, NPR's All Things Considered, New Scientist Magazine, and MIT's Technology Review.

15. I have designed, programmed, and publicly deployed dozens of user-facing software products that have cumulatively been used by millions of users. My work is cited in patents by several major companies, including Amazon, Apple, Facebook, Google, and Microsoft. I am the co-inventor of 14 U.S. patents and 20 U.S. patent applications which are generally directed to user interfaces/experience.

16. Based on my experiences described above, and as indicated in my Curriculum Vitae, I am qualified to provide the following opinions with respect to the patents in this case. Additionally, I was at least a person having ordinary skill in the art as of the priority date of the '564 Patent as described in Section 1.A.

17. In writing this declaration, I have considered my own knowledge and experience, including my work experience in the fields of computer science and human-computer interaction; my experience in teaching those subjects; my experience in developing companies and products in those subjects; and my

experience in working with others involved in those fields, my experience in designing and implementing software systems, and user interfaces. In reaching my opinions in this matter, I have focused on the following references and materials:

(a) Petition for *Inter Partes* Review of U.S. Patent No. 11,016,564
(b) U.S. Patent No. 11,016,564 to Li (Ex. 1001)
(c) File History of U.S. Patent No. 11,016,564 (Ex. 1002)
(d) U.S. Patent No. 10,540,013 to Ryu et al. (Ex. 1004)
(e) U.S. Patent Publication No. 2010/0079508 to Hodge et al. (Ex. 1005)
(f) U.S. Patent No. 8,331,992 to Stallings et al. (Ex. 1006)
(g) U.S. Patent Publication No. 2013/0015946 to Lau et al. (Ex. 1007)
(h) File History of U.S. Patent No. 10,540,013 (Ex. 1008)
(i) Appendices A (attached hereto)

II. LEGAL FRAMEWORK

18. I am a technical expert and do not offer any legal opinions. However, counsel has informed me as to certain legal principles regarding patentability and related matters under United States patent law, which I have applied in performing my analysis and arriving at my technical opinions in this matter.

19. I have been informed that the Patent Trial and Appeal Board ("PTAB") now applies the claim construction standard applied by Article III courts (i.e., the *Phillips* standard) regardless of whether a patent has expired. I have been informed that under the *Phillips* standard, claim terms are to be given the meaning they would have to a person having ordinary skill in the art at the time of the invention, taking into consideration the patent, its file history, and, secondarily, any applicable

extrinsic evidence (e.g., dictionary definitions). I understand that, for purposes of this proceeding, Petitioner has proposed the PTAB apply Patent Owner's constructions advanced in the parallel litigation. I have reviewed these constructions in the Petition and apply them to my analyses herein. For any other claim language, I have applied its plain meaning as instructed by *Phillips*.

20. I have also been informed that a person cannot obtain a patent on an invention if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. I have been informed that a conclusion of obviousness may be founded upon more than a single item of prior art. I have been further informed that obviousness is determined by evaluating the following factors: (1) the scope and content of the prior art, (2) the differences between the prior art and the claim at issue, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations of non-obviousness. In addition, the obviousness inquiry should not be done in hindsight. Instead, the obviousness inquiry should be done through the eyes of a person of ordinary skill in the relevant art at the time the patent was filed.

21. In considering whether certain prior art renders a particular patent claim obvious, counsel has informed me that I can consider the scope and content of the prior art, including the fact that one of skill in the art would regularly look to the

disclosures in patents, trade publications, journal articles, industry standards, product literature and documentation, texts describing competitive technologies, requests for comment published by standard setting organizations, and materials from industry conferences, as examples. I have been informed that for a prior art reference to be proper for use in an obviousness analysis, the reference must be "analogous art" to the claimed invention. I have been informed that a reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or (2) the reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention). In order for a reference to be "reasonably pertinent" to the problem, it must logically have commended itself to an inventor's attention in considering his problem. In determining whether a reference is reasonably pertinent, one should consider the problem faced by the inventor, as reflected either explicitly or implicitly, in the specification. I believe that all of the references that my opinions in this IPR are based upon are well within the range of references a person of ordinary skill in the art would consult to address the type of problems described in the Challenged Claims.

22. I have been informed that, in order to establish that a claimed invention was obvious based on a combination of prior art elements, a clear articulation of the reason(s) why a claimed invention would have been obvious must be provided.

Specifically, I am informed that, under the U.S. Supreme Court's *KSR* decision, a combination of multiple items of prior art renders a patent claim obvious when there was an apparent reason for one of ordinary skill in the art, at the time of the invention, to combine the prior art, which can include, but is not limited to, any of the following rationales: (A) combining prior art methods according to known methods to yield predictable results; (B) substituting one known element for another to obtain predictable results; (C) using a known technique to improve a similar device in the same way; (D) applying a known technique to a known device ready for improvement to yield predictable results; (E) trying a finite number of identified, predictable potential solutions, with a reasonable expectation of success; (F) identifying that known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; or (G) identifying an explicit teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine the prior art references to arrive at the claimed invention.

23. I am informed that the existence of an explicit teaching, suggestion, or motivation to combine known elements of the prior art is a sufficient, but not a necessary, condition to a finding of obviousness. This so-called "teaching suggestion-motivation" test is not the exclusive test and is not to be applied rigidly

in an obviousness analysis. In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. Instead, the important consideration is the objective reach of the claim. In other words, if the claim extends to what is obvious, then the claim is invalid. I am further informed that the obviousness analysis often necessitates consideration of the interrelated teachings of multiple patents, the effects of demands known to the technological community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art. All of these issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent.

24. I also am informed that in conducting an obviousness analysis, a precise teaching directed to the specific subject matter of the challenged claim need not be sought out because it is appropriate to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. The prior art considered can be directed to any need or problem known in the field of endeavor at the time of invention and can provide a reason for combining the elements of the prior art in the manner claimed. In other words, the prior art need not be directed towards solving the same specific problem as the problem addressed by the patent. Further, the individual prior art references themselves need not all be directed towards solving the same problem. I am informed that, under the *KSR* obviousness standard, common

sense is important and should be considered. Common sense teaches that familiar items may have obvious uses beyond their primary purposes.

25. I also am informed that the fact that a particular combination of prior art elements was "obvious to try" may indicate that the combination was obvious even if no one attempted the combination. If the combination was obvious to try (regardless of whether it was actually tried) or leads to anticipated success, then it is likely the result of ordinary skill and common sense rather than innovation. I am further informed that in many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature or knowledge, will drive the design of an invention. I am informed that an invention that is a combination of prior art must do more than yield predictable results to be non-obvious.

26. I am informed that for a patent claim to be obvious, the claim must be obvious to a person of ordinary skill in the art at the time of the invention. I am informed that the factors to consider in determining the level of ordinary skill in the art include (1) the educational level and experience of people working in the field at the time the invention was made, (2) the types of problems faced in the art and the solutions found to those problems, and (3) the sophistication of the technology in the field.

27. I am informed that it is improper to combine references where the references teach away from their combination. I am informed that a reference may be said to teach away when a person of ordinary skill in the relevant art, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the patent applicant. In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the patentee. I am informed that a reference teaches away, for example, if (1) the combination would produce a seemingly inoperative device, or (2) the references leave the impression that the product would not have the property sought by the patentee. I also am informed, however, that a reference does not teach away if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.

28. I am informed that even if a *prima facie* case of obviousness is established, the final determination of obviousness must also consider "secondary considerations" if presented. In most instances, the patentee raises these secondary considerations of non-obviousness. In that context, the patentee argues an invention would not have been obvious in view of these considerations, which include: (a) commercial success of a product due to the merits of the claimed invention; (b) a

long-felt, but unsatisfied need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the invention by others skilled in the art; (g) lack of independent simultaneous invention within a comparatively short space of time; (h) teaching away from the invention in the prior art.

29. I am further informed that secondary considerations evidence is only relevant if the offering party establishes a connection, or nexus, between the evidence and the claimed invention. The nexus cannot be based on prior art features. The establishment of a nexus is a question of fact. While I understand that the Patent Owner here has not offered any secondary considerations at this time, I will supplement my opinions in the event that the Patent Owner raises secondary considerations during the course of this proceeding.

III. OPINION

A. Level of a Person of Ordinary Skill in the Art

30. I was asked to provide my opinion as to the level of skill of a person having ordinary skill in the art ("PHOSITA") of the '564 Patent at the time of the claimed invention, which counsel has told me to assume is March 18, 2014. In determining the characteristics of a hypothetical person of ordinary skill in the art of the '564 Patent, I considered several factors, including the type of problems

encountered in the art, the solutions to those problems, the rapidity with which innovations are made in the field, the sophistication of the technology, and the education level of active workers in the field. I also placed myself back in the time frame of the claimed invention and considered the colleagues with whom I had worked at that time.

31. In my opinion, a PHOSITA at the time of the claimed invention of the '564 Patent would have had at least a bachelor's degree in computer science, software engineering, or an equivalent degree with at least one year of experience in the fields of human computer interaction, software engineering or computer engineering in either a research or work capacity. Additionally, this hypothetical person would have experience with user interface design, user interface/mobile device software, and user interaction techniques, or their equivalent. A person with more direct industry experience could accommodate having less formal education, and more formal education in the field, such as a master's degree with relevant specialization can accommodate less direct industry experience. Such a PHOSITA would have been capable of understanding the '564 Patent and the prior art references discussed herein.

32. Based on my education, training, and professional experience in the field of the claimed invention, including teaching the requisite skills necessary for a PHOSITA during the relevant time period, I am familiar with the level and abilities

of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a person having ordinary skill in the art as of the time of the claimed invention of the ’564 Patent.

B. Claimed Invention in the ’564 Patent

33. The ’564 Patent generally describes a method for displaying or presenting content/information to a user of an electronic device while the electronic device is currently operating in a standby or idle mode. The ’564 Patent describes that there was a need to utilize the idle time of an electronic device to present information to a user who also might happen to be idle as well. *’564 Patent* (Ex. 1001) at 1:47-49. The ’564 Patent describes that benefits of displaying information when both the user and the device are idle are that the displaying of said information (e.g., advertisements) would be less intrusive and have a higher chance of not being ignored. *’564 Patent* at 1:50-2:6. Additionally, as the device would not be actively displaying something to a user, the displaying of information/content would not interrupt a user who might be currently viewing something or interacting with a program on the electronic device and such information/content could potentially make use of the entire screen of the device making the displayed information/content more effective especially for devices with smaller screen sizes. *’564 Patent* at 5:29-45. In this way the ’564 Patent describes a way to turn the idle time of both an electronic device and a user into an opportunity to present information to a user.

34. The ’564 Patent describes two methods by which the presenting of information on an idle device could be achieved. The first method would simply require the user to gaze at the idle device, indicating that the user may not be currently engaged in anything and may have some free time to view some information if it were to be presented. *’564 Patent* at 2:33-36. The electronic device would contain a sensor for determining if the user were to gaze at the device. For example, the sensor could track the eyes of a user by taking a picture of the face of the user and utilize algorithms to determine if the user’s gaze is such that their eyesight may fall on the display screen of the device, or the sensor could analyze an image of the user’s eyes to decide which direction the user was looking. *’564 Patent* at 3:65-4:11 (disclosing the “[c]lient 80 may include a sensor 10 which tracks the eye of a user using mature eye-tracking technologies.”), 3:16-19 (disclosing the “[c]lient 80 may represent an electronic device, including but not limited to a desktop computer, a handheld computer, a tablet computer, a wireless gadget (such as mobile phone, smart phone, smart watch, and the like), etc.”). The ’564 Patent illustrates this embodiment for displaying information to a user on an idle device based solely on the user’s gaze in Figures 2 and 3:

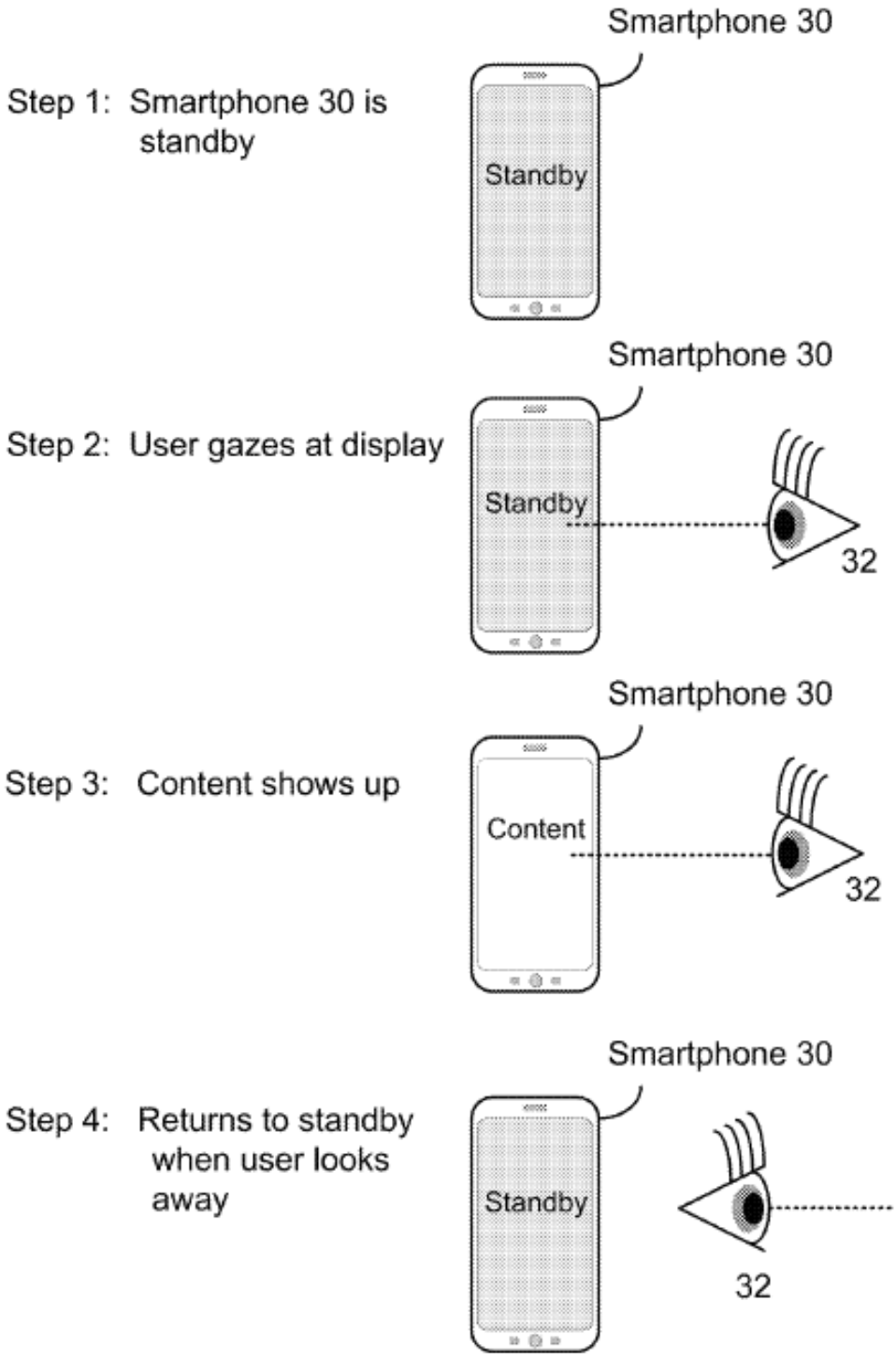


FIG. 2

'564 Patent at Fig. 2.

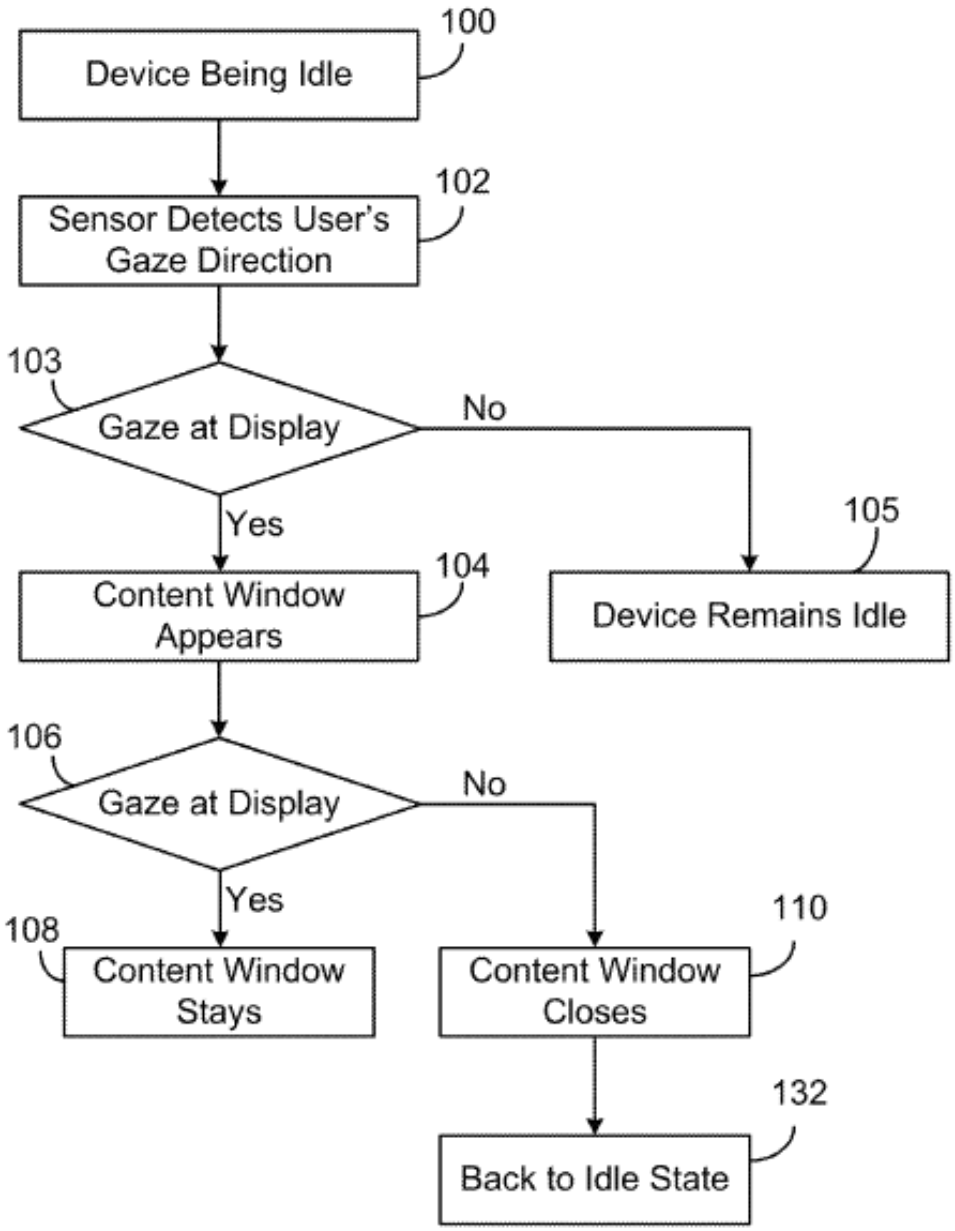


FIG. 3

'564 Patent at Fig. 3, 4:29-5:26 (discussing both Figures 2 and 3).

35. The second method by which the '564 Patent describes displaying information on an idle electronic device entails the user of the device to both physically interact with the idle device (e.g., shaking, tapping, or speaking to)

followed by looking at or gazing at said device. The electronic device would then "consider the combination [of both physical interaction and gazing] as a predetermined command to show … information on a screen." *'564 Patent* at 2:36-41. The '564 Patent discloses that when compared to the gaze only method, including the physical interaction of the user with the electronic device along with their gazing would prevent the displaying of information/content that could be caused by a user's unintended gaze. Even more importantly, "[this] scheme saves energy as a gaze sensing system may be off most of the time unless getting activated upon receiving [a] shaking signals." *'564 Patent* at 7:7-12. The '564 Patent discloses that in addition to containing a sensor for detecting a user's gaze, the electronic device would also include "a sensor 24 to detect its own movement by sensing acceleration, deceleration, and rotation." *'564 Patent* at 4:22-28 (also disclosing that the sensor 24 may "employ one or multiple accelerometers, gyroscopes, and/or pressure sensors for performing various measurements tasks which may include detecting device shaking, device vibration, user running, user walking, and so on."). The '564 Patent illustrates this second embodiment for displaying information to a user on an idle device based on both the user's gaze and physical interaction in Figures 6 and 7:

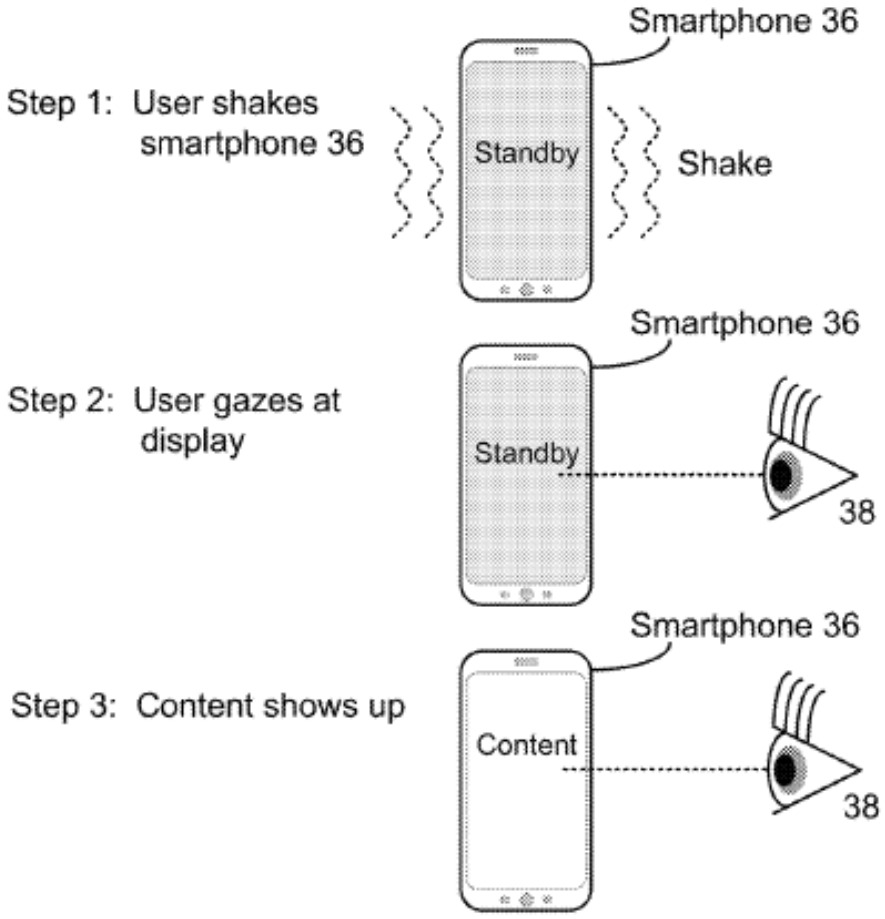


FIG. 6

'564 Patent at Fig. 6.

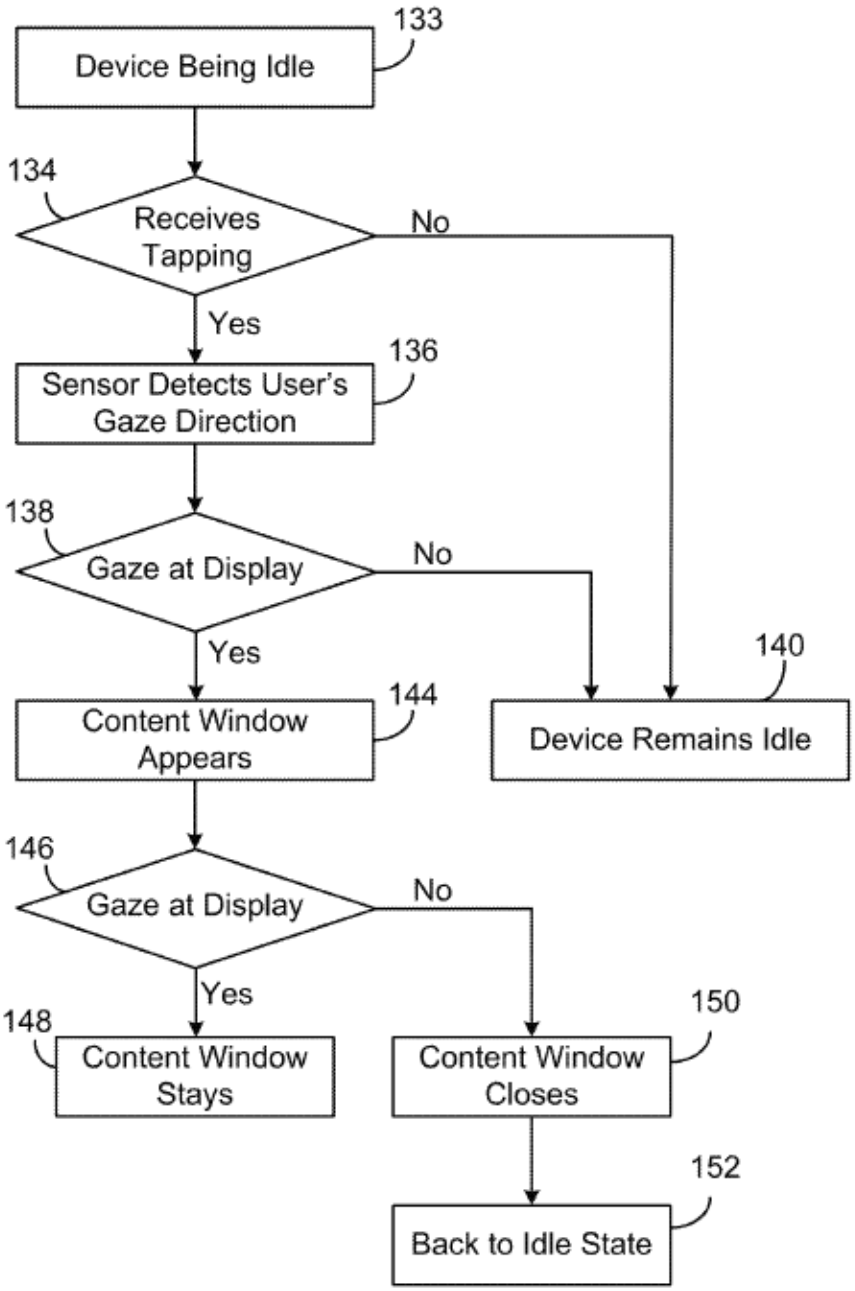


FIG. 7

'564 Patent at Fig. 7, 7:7-48 (discussing both Figures 6 and 7).

36. The '564 Patent additionally discloses that in order to "create and extra layer of protection[,]" the electronic device may also utilize a facial recognition

system to "recognize a device owner, which may protect a user's privacy by not following other people's instructions …" *'564 Patent* at 11:66-12-4, 9:17-20 (disclosing that "[a]n identity recognition system may use a camera to take pictures of a target …[,]" and "[w]hether the target is a user or not may be determined by analyzing the pictures via algorithms and mature techniques."

IV. Ground 1

A. Obvious to Combine Ryu and the Knowledge of a PHOSITA

i. Overview of Ryu

37. U.S. Patent No. 10,540,013 to Ryu et al. ("*Ryu*") was filed on January 29, 2014 and issued on January 21, 2020. *Ryu* (Ex. 1004). *Ryu* was assigned to Samsung Electronics Co., LTD.—a well-known producer of electronic devices such as tablets mobile phones, and smart phones. The *Ryu* patent describes "a method of performing a function of a device based on motion information of the device in a standby mode …" *Ryu* at 1:36-41, Abstract. Like the '564 Patent, *Ryu* teaches that the "movement based input information may be based on a user gesture (for example, a device shaking, a device rotation, a device pickup, etc.) based on a movement of a device." *Id*. at 4:41-44, compare with the *'564 Patent* at 2:36-41 (disclosing that a user may shake, tap, or speak to a device in a standby or idle mode).

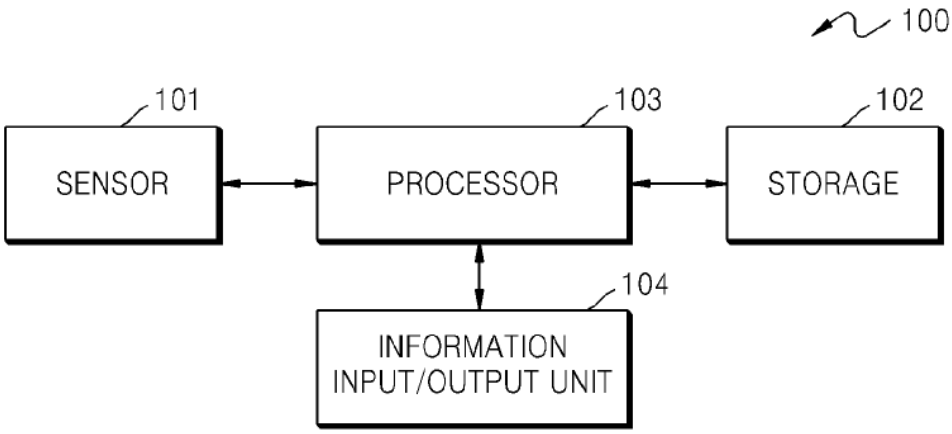
38. Also similar to the '564 patent, *Ryu* teaches that the device (i.e., device 100) which a user interacts with via shaking or rotation "may be, for example, a

smart phone, a smart TV, a personal computer (PC), a desktop PC, a notebook, a smart board, a tablet PC, a mobile device, a handheld device or a handheld PC …" *Ryu* at 6:25-33, compare to the '*564 Patent* at 3:16-19 (disclosing the "[c]lient 80 may represent an electronic device, including but not limited to a desktop computer, a handheld computer, a tablet computer, a wireless gadget (such as mobile phone, smart phone, smart watch, and the like), etc.").

39. Furthermore, the standby mode taught by *Ryu* in which the device starts out prior to a user's interaction is the same as the idle/standby mode disclosed in the '564 Patent. Compare *Ryu* at 5:24-35 teaching that the "standby mode of the device 100 may include at least one of a **black screen state of the device 100** … [,]" wherein "the term 'black screen state' is used throughout the present description to indicate a state of the screen in which no information is displayed **the screen is thus blank and this is typically experienced by the user as a screen that is substantially black or grey in color** …" with the *'564 Patent* at 4:31-33 disclosing "a smartphone 30 is **standby or idling, with a dark screen showing nothing**." (Emphasis added).

40. *Ryu* teaches that the device 100 generally includes a sensor 101, storage 102, a processor 103, and an information input/output unit 104:

FIG. 1



Ryu at Fig. 1, 4:63-67 (describing the same), 5:15-20 (teaching that the sensor 101 "may include a plurality of sensors of various types to sense movement of the device 100[,]" and the input/output unit 104 may include a display that may display a screen (e.g., a touch screen).), 7:34-46 (teaching that the storage 102 contains a program to control the device 100 to perform a function based on the motion information of the device 100 wherein the function corresponds to the motion information.)

41. Figure 2 of Ryu shows a table containing information related to the program stored in storage 102 that exemplifies the mapping or relationship between: the operation mode of the device 100, the motion information of the device 100, and the corresponding function:

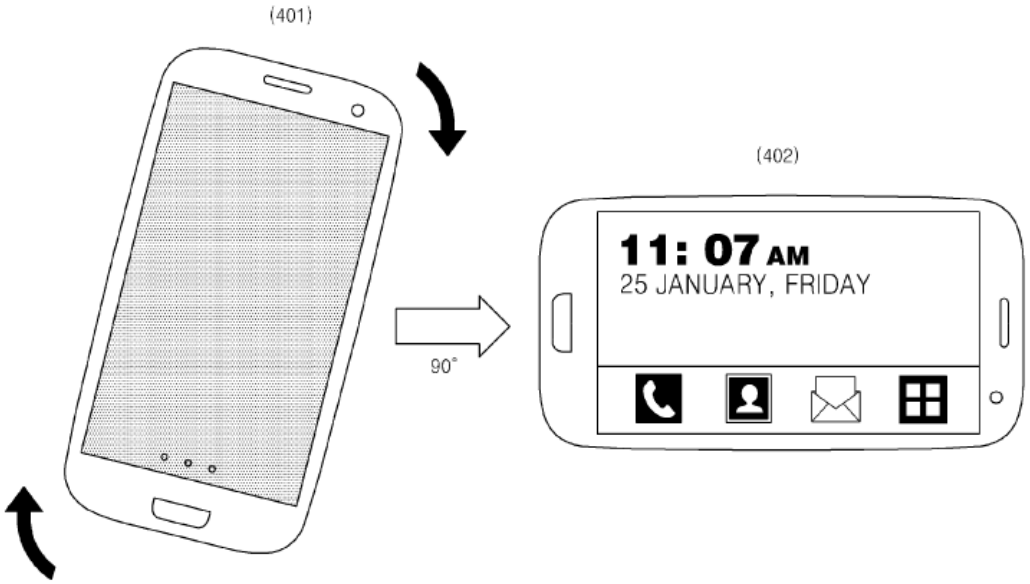
FIG. 2

MOTION INFORMATION / OPERATION MODE OF DEVICE	90° ROTATION IN CLOCKWISE DIRECTION	180° ROTATION IN CLOCKWISE DIRECTION	270° ROTATION IN CLOCKWISE DIRECTION
STANDBY MODE	PERFORM TIME CHECK FUNCTION	PERFORM QUICK NODE FUNCTION	PERFORM BYTE INFORMATION VIEWER FUNCTION
ACTIVE MODE	DURING WEB BROWSING, PERFORM BROWSER SECRET MODE	1. DURING EXEUTION OF APPLICATION PERFORM QUICK SWITCHING 2. DURING LIST DISPLAY, PERFORM SORTING METHOD CHANGE FUNCTION	PERFORM VOICE RECORDER FUNCTION

Id. at Fig. 2, *see also* 7:47-61 (disclosing the same).

42. One example Ryu provides of the device 100 performing a function based on the motion of the device while in a standby mode is taught with respect to Figure 4A:

FIG. 4A

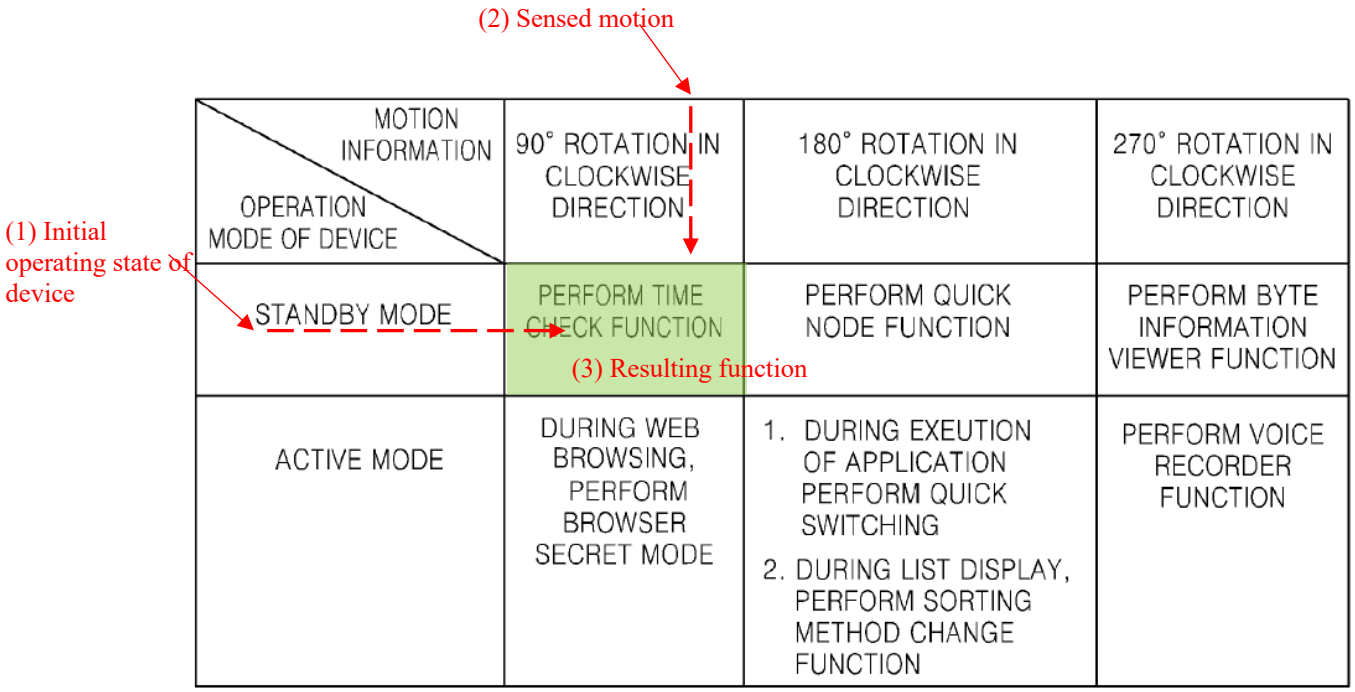


Id. at Fig. 4A, 9:51-60 (teaching that the device 100 is originally in a standby mode and senses via the sensor 101 a physical motion of 90º rotation in a clockwise rotation), 9:61-67 (teaching that the processor 103 of the device 100 then reads from storage 102 the function information related to the detected motion), 10:1-10 (teaching that when the motion information indicates that the device 100 was rotated 90º while in standby the processor 103 controls the function of the device to perform the function of checking the time and changes the black screen 401 of the device 100 to a screen 402 which includes time information). Thus, *Ryu* teaches an electronic device starting out in a standby mode and upon sensing (i.e., detecting) an act made by a user in the form of the user physically moving the electronic device in a 90º rotational movement then performing a function that corresponds with said

movement, and changing the display of the device from a blank screen to an active screen and displaying information to the user.

43. A PHOSITA would have understood that Figure 4A correlates to Figure 2 as shown below in that based on the initial operating mode of the device 100 and the sensed motion a resulting function would be determined and performed:

FIG. 2



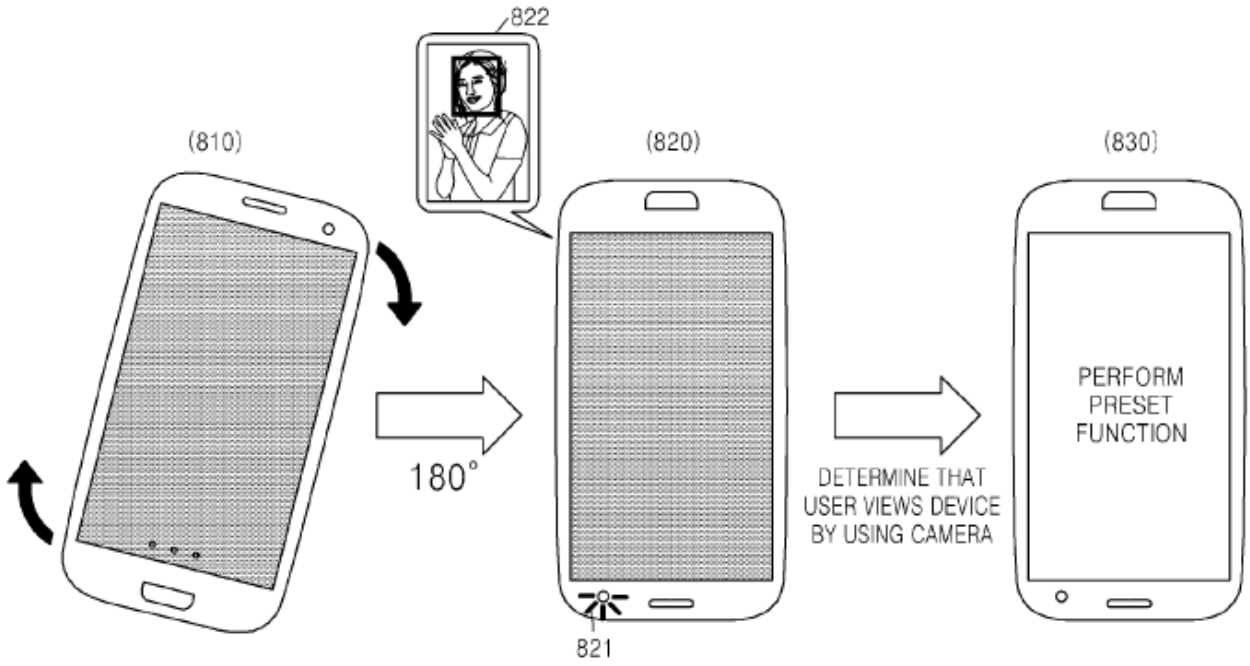
MOTION INFORMATION / OPERATION MODE OF DEVICE	90° ROTATION IN CLOCKWISE DIRECTION	180° ROTATION IN CLOCKWISE DIRECTION	270° ROTATION IN CLOCKWISE DIRECTION
STANDBY MODE	PERFORM TIME CHECK FUNCTION	PERFORM QUICK NODE FUNCTION	PERFORM BYTE INFORMATION VIEWER FUNCTION
ACTIVE MODE	DURING WEB BROWSING, PERFORM BROWSER SECRET MODE	1. DURING EXEUTION OF APPLICATION PERFORM QUICK SWITCHING 2. DURING LIST DISPLAY, PERFORM SORTING METHOD CHANGE FUNCTION	PERFORM VOICE RECORDER FUNCTION

Id. at Fig. 2 (annotated).

44. Not only does *Ryu* teach performing a function based only on the detected motion of a device, *Ryu* further teaches that the device or more particularly the processor of said device would perform the intermittent step of determining if the user of the device is looking at the device after detecting the motion of the device but prior to performing the preset function. *Id*. at 19:4-6 (expressly teaching "the

processor 103 **determines whether the user looks at the device 100 before performing the preset function**."). (Emphasis added). *Ryu* depicts this intervening step of determining if a user is gazing at the device 100 after detecting an act made by the user involving physical movement of the device 100 while in a standby mode but prior to performing a preset function in Figure 8 below:

FIG. 8



Id. at Fig. 8, 19:49-20:3 (teaching a device 100 in a standby mode and displaying a black screen 810 determines that the device 100 has been rotated 180º in a clockwise direction, and the processor 103 then activates a front facing camera 821 and determines if the user is looking at the device 100 by using either face recognition

or eye estimation on an image 822 obtained by the camera 821 prior to performing a preset function.).

45. Thus, *Ryu* and the ’564 Patent both relate to systems and methods for presenting information on a device that: (1) starts out in a standby mode, (2) detects a user’s physical movement, and (3) determines if a user is gazing at the device prior to activating the display and displaying information to the user. *Ryu* at 19:49-20:3, Fig. 8; *’564 Patent* at 6:56-7:12, 7:25-48, Figs 6 and 7. Given these similarities, a PHOSITA would have considered *Ryu* in the same field of endeavor as the ’564 Patent and reasonably pertinent to its claimed invention.

ii. Overview of Hodge

46. U.S. Patent Publication No. 2010/0079508 to Hodge et al, (“*Hodge*”) was filed on September 30, 2008, and published on April 1, 2010. *Hodge* (Ex. 1005). The *Hodge* publication describes a portable electronic device (e.g., a cellular telephone or a handheld computer) that has gaze detection capabilities. Furthermore, *Hodge* teaches the electronic device would be able to adjust its behavior according to whether or not the user’s gaze is detected. *Hodge* at Abstract, ¶ 28 (teaching that “[a]n electronic device may be used to detect a user’s gaze and adjust its behavior according to whether or not the user’s gaze is detected.”), ¶ 29 (teaching that “[e]lectronic devices that have gaze detection capabilities may be portable electronic devices such as laptop computers or small portable computers of the type that are

sometimes referred to as ultraportables.), ¶ 30 (teaching that "[t]he wireless electronic devices may be, for example, handheld wireless devices such as cellular telephones, media players …, handheld computers …, global positioning system (GPS) devices, and handheld gaming devices.").

47. *Hodge* like *Ryu* teaches that the electronic device makes use of a camera for capturing an image of a user and performing gaze detection. *Id*., at ¶ 36 (teaching that the electronic device has a camera that is used for performing gaze detection wherein the camera captures an image of a user's face which is then processed by the device to determine where the user's gaze is detected). *Hodge* also teaches that the electronic device utilizes the gaze detection for implementing power management schemes. *Id*. at ¶ 48, *see also* ¶ 61 (teaching that when "the user has directed their gaze towards device 10)[,]" the device 10 may enter an active mode and turn on its display), ¶ 57 (teaching that "device 10 may turn off display 16 when the device detects that the user is not looking at display 16 …"), ¶ 111 (teaching that the electronic device may activate gaze detection operations to determine if a user is looking at the device in response to detecting motion above that of a threshold level and switching to that of an active mode in which the device's display is turned on if a user's gaze is properly detected).

48. Particularly, *Hodge* teaches that "[t]he **gaze detection capabilities of device 10 may, if desired, include visual user identification capabilities (e.g.,**

face recognition)." This way "device 10 may **distinguish between authorized users and unauthorized users based on image sensor data**." *Id*., at ¶ 116 (emphasis added). Hodge goes on to teach that the electronic device "may recognize an authorized user and may unlock itself whenever the authorized user is detected by the device's gaze detection circuitry (e.g., camera 30)[,]" and "that [when] the authorized user's gaze has been diverted from device 10, device 10 may lock itself to prevent unauthorized users from using device 10." *Id*. Hodge teaches that "[b]y making gaze detection specific to particular users, device 10 will not inadvertently transition from standby mode to active mode if a person in the user's vicinity happens to glance at the user's device." *Id*.

49. Thus, *Hodge* and the '564 Patent both relate to electronic devices that utilize gaze detection for determining if a user is looking at the electronic device and further alter the operation of the electronic device based in whether the user is either gazing at or not gazing at said electronic device. *Hodge* at ¶¶ 36, 48, 61, 57; *'564 Patent* at 6:56-7:12, 7:25-48, Figs 6 and 7. Given these similarities, a PHOSITA would have considered *Hodge* in the same field of endeavor as the '564 Patent and reasonably pertinent to its claimed invention.

50. A PHOSITA would have been motivated to modify the system of *Ryu* to perform *Hodge's* user-specific gaze detection (e.g., face recognition) prior to operating an electronic device based on whether the user is gazing or not gazing at

the electronic device. *Hodge* like *Ryu* teaches multiple modes in which the electronic device can operate (e.g., active, standby, and full standby modes). *Hodge* at ¶ 49. Further, Hodge teaches that the display of the electronic device is operated in a way that is appropriate for each mode. For example, when operating in an active mode the display "may be at an active brightness when device 10 is in the active mode, a standby brightness when device 10 is in the partial standby mode, and may be turned off when device 10 is in the full standby mode." *Id*. Similar to *Ryu*, *Hodge* also teaches that the electronic device utilizes a camera for capturing images of a user's face that are then "processed by device 10 to detect where the user's gaze is directed." *Id.* at ¶ 36. *Hodge* particularly points out that "it is generally desirable for device 10 to be in the active mode whenever a user is actively interacting with device 10[,]" and that "it is desirable for display 16 to be at the active brightness level whenever the user's gaze is directed towards display 16." *Id.* at ¶ 50.

51. Finally, *Hodge* is similar to *Ryu* in that "the electronic device may use readings from sensors such as … motion sensors such as accelerometers to determine whether or not to perform gaze detection operations." *Id.* at ¶ 13, ¶ 111 (teaching that "[t]he motion of device 10 can be indicative of whether device 10 is being used by a user. … For example, when device 10 detects motion above a threshold level with an accelerometer, device 10 may activate gaze detection operations to determine if a user is looking at the device. … With this type of arrangement, device

10 may be in standby mode. ... Device 10 may then activate gaze detection operations and, if the user's gaze is properly detected, may switch to an active mode such as mode 68 in which display 16 is turned on."). Thus, a PHOSITA would have understood that *Hodge* like *Ryu* taught an electronic device that while in a standby mode would detect a user physically interacting with the electronic device, and subsequently perform gaze detection in order to detect if the user's gaze was directed at the electronic device.

52. A PHOSITA would have been motivated and found it obvious to modify *Ryu* to perform the facial recognition of *Hodge* as doing so would have further improved the security and privacy of *Ryu's* device. Providing the system of *Ryu* with the means to perform facial recognition would have improved the functionality of *Ryu's* electronic device in the same way as *Hodge* and ensured that the electronic device would be able to "distinguish between authorized users and unauthorized users …" *Hodge* at ¶ 116. Such an addition would have used *Hodge's* well-known technique of including facial recognition along with gaze detection in an electronic device so that the electronic device would perform both gaze detection and facial recognition prior to transitioning to an active mode from a standby mode, with *Ryu's* electronic device that performs gaze detection. Such a modification would have improved the privacy and security of *Ryu's* electronic device by reducing if not fully preventing an unauthorized user from gaining access to the electronic device.

Likewise, such a modification would have ensured that the electronic device would only present information to an authorized user.

53. A PHOSITA would have expected success in making such a modification, which was nothing more than applying the well-known technique of including facial recognition along with gaze detection within an electronic device. Such a modification would have only required the implementation of simple programming techniques well within a PHOSITA's expertise. As *Ryu* expressly teaches that the memory 102 was capable of storing programs and data for controlling its electronic device, a PHOSITA would have found it obvious to include any necessary programming instructions and data within *Ryu's* memory 102 for implementing facial recognition. Further *Ryu* already teaches capturing images of a user and detecting feature values such as distance between eyes, nose and forehead dimensions, and cheekbone shape which a PHOSITA would have understood as capable of being used for the purpose of recognizing a user. For example, these detected facial values which were commonly known to be used in the identification of a particular individual, would then be compared to facial features of a registered user of *Ryu's* device that had been previously stored in storage 102. This would have allowed for the recognition of the registered user (i.e., determining if the user was recognized via a recognition mechanism) within the device of *Ryu*. Finally, that *Ryu* describes an electronic device that utilizes a camera to capture images of a user and

performs gaze detection using those images similar to the system described by *Hodge* further supports a conclusion that the proposed modification would have been successful.

iii. Claim [1(b)]

a) Ryu teaches the claimed "performing gaze detection only after detecting the act;"

(i) Detecting the act

54. I understand that Apple contends that *Ryu* expressly teaches the limitation "monitoring the electronic device or physical movement of the electronic device to sense an act made by a user when a display of the electronic device has an idle screen or a screen in a standby mode, inactive mode, or screen-saver mode." *'564 Patent*, at 13:26–30. More specifically, as discussed above in the overview of *Ryu* section, I understand that Apple contends that *Ryu* expressly teaches the device 100 includes a sensor 101 which may include a plurality of sensors of various types for the express purpose of sensing the movement of the device 100. *See* ¶ 40. *Ryu* further teaches that "[t]he sensor 101 may include at least one of a gyro sensor for sensing a rotation based movement of the device 100 and an accelerometer sensor for sensing a perpendicular direction based movement of the device 100 and a moving distance of the device 100 …" *Ryu* at 6:62-67. *Ryu* also teaches a user may input information into the device 100 in a number of ways including those of touch and movement based inputs. *Id*. at 4:29-40. Particularly with respect to movement

based inputs, *Ryu* teaches that "**movement based input information may be based on a user gesture (for example, a device shaking, a device rotation, a device pickup, etc**.) based on a movement of a device." *Id*. at 4:29–44 (emphasis added). Based on this disclosure, Apple contends, and I agree, that *Ryu* teaches an electronic device detecting an act made by a user involving physical movement of the electronic device at least because *Ryu* expressly teaches an electronic device (i.e., device 100) that contains a sensor 101 for the express purpose of detecting movement of the device 100 wherein the movement of the device may be a user physically shaking or rotating said device. Therefore, for purposes of my opinions regarding limitation 1[b] of the '564 Patent, I have relied on *Ryu's* express disclosure of sensing when a user shakes or rotates device 100 as the "detecting the act" that must occur before "performing gaze detection," as required by limitation 1[b].

(i) Performing gaze detection only after detecting the act

55. The '564 Patent provides an example of gaze detection following the detection of a user's act (e.g., the shaking of the electronic device) in Figure 6 below:

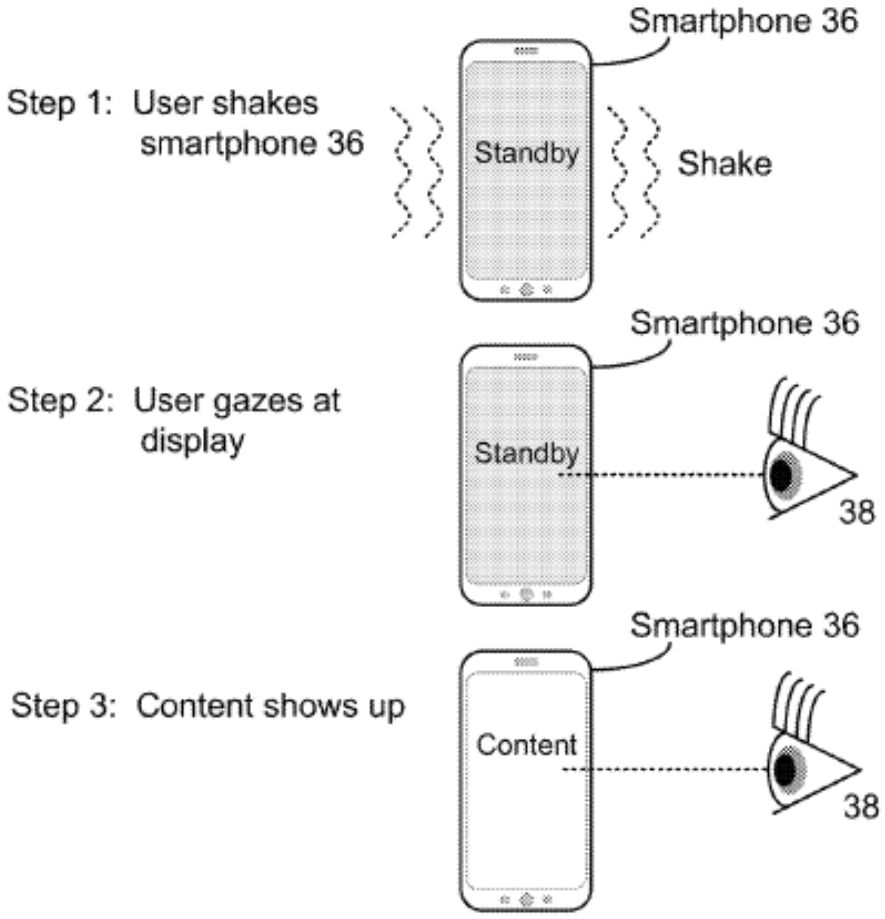


FIG. 6

'564 Patent at Fig. 6. After the shaking act is detected, the '564 Patent discloses that "a sensing process to ascertain whether the user gazes at the phone[]" is then triggered. *Id.* at 6:56-66, 6:66-7:2 (disclosing that "in Step 2, the user may look at the phone screen or an eye 38 may gaze at it as shown in the figure, which is detected …"). While Fig. 6 of the '564 Patent only discloses the user looking at the phone screen, the '564 Patent also discloses that a user "may also look at things located outside a display but close to its edge, instead of looking at the display directly[,]" or "[i]n [the] cases of smartphone and tablet computer, gazing at a device is almost

equivalent to gazing at a display, because for these devices, a display may cover[] the whole area of one side." *Id.* at 12:15–17, 12:27–30.

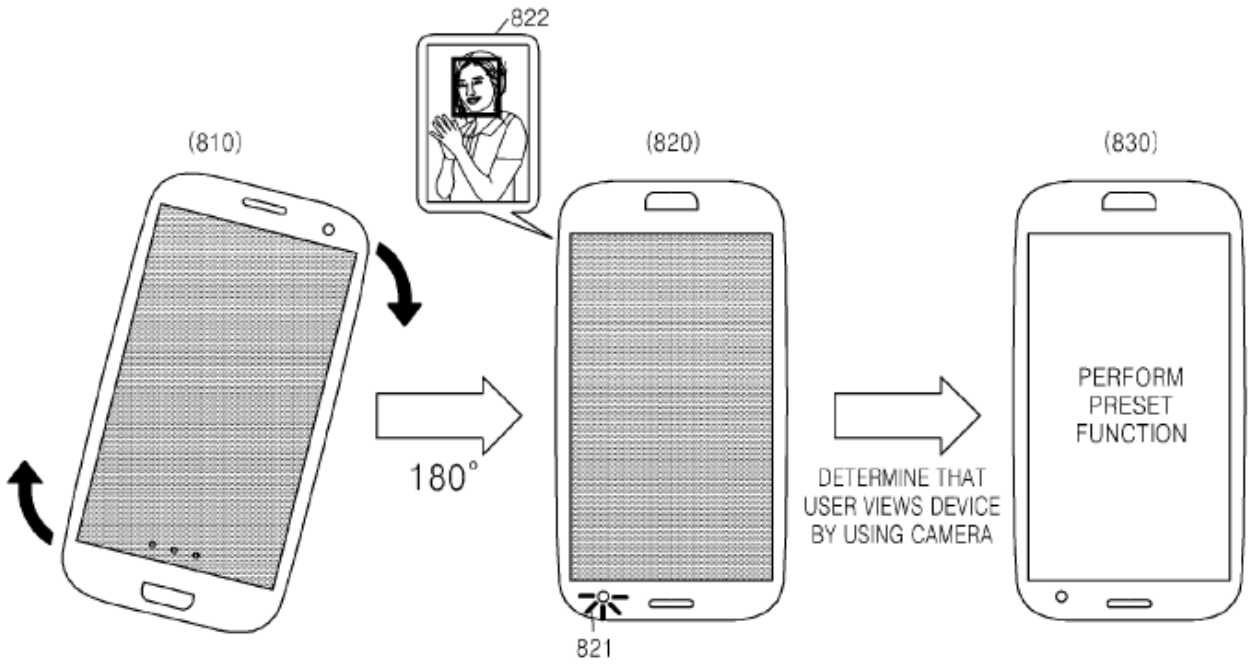
56. The '564 Patent discloses that within the electronic device, the sensor 10 "tracks the eye of a user using mature eye-tracking technologies[,]" and that "[t]he sensor may be arranged very close to the screen of a display and designed to obtain a picture of the facial part of a user." *'564 Patent* at 3:65-4:1. After the sensor 10 has either tracked the eye of the user or obtained a picture of the user, the electronic device will then "recognize whether a user's gaze is in such a direction that the eye sight may fall on the display screen …" *'564 Patent* at 4:1-4, 4:4-8 (further disclosing that the "sensor 10 may be employed to determine whether a user is looking at the screen of a device through proper algorithms[,]" and that "the image of a user's eye may be analyzed to decide which direction the user is looking at.").

57. From this disclosure, a PHOSITA would have understood that the '564 Patent's gaze detection would have at least included the triggering of a process by which a user's eye was tracked or a picture of a user's face was obtained and then subsequently determining if the user gazes at the device's screen, an area just outside of the device's screen, or the device as a whole by using algorithms or imaging technologies and analysis.

58. With respect to Fig. 8, *Ryu* expressly teaches that the device 100 after detecting a user's movement of the device 100 (i.e., after detecting the act) will

change its operating mode to that of an active mode while still maintaining the black screen of the input/output unit 104. *Ryu* then teaches upon changing the operating mode of the device 100 to that of an active mode, the device 100 will execute an application related to the front camera (shown as screen 820 in Fig. 8 below):

FIG. 8



Ryu at Fig. 8, 19:49–59 (teaching the "when the device 100 is in the standby mode and a screen 810 is in a black screen state as shown in FIG. 8, when it is determined that the device 100 has rotated by 180º in a clockwise direction by using a sensing value, the processor 103 activates a function of a front camera 821[] … as shown by a screen 820."). After executing the application related to the front camera 821, *Ryu* teaches that the "processor 103 may **determine whether a user looks at the device**

100 according to [either] face recognition or eyes estimation regarding an image 822 obtained by using the front camera 821." *Id*. at 19:64-67, 19:13-25 (teaching the processor 103 of device 100 may determine whether the user's face is oriented toward the device 100 by using a feature value detection method wherein the feature value detection method detects feature values (e.g., distance between eyes, [nose][3] width, height and shape of cheekbone, forehead proportions) and estimating an orientation direction utilizing the detected feature values), 19:26-29 (teaching that instead of using the face recognition method (i.e., the feature value detection method), the processor 103 may determine whether the user looks at the device 100 by detecting the user's eyes from the obtained image and estimating eye movement). Thus, like the '564 Patent, *Ryu* teaches triggering and executing an application by

[3] I would like to point out that the original spelling in *Ryu* regarding this term is 'noise' which is the same in the as filed specification. See File History of U.S. Patent No. 10,540,013 (Ex. 1008) at p. 49. However, a PHOSITA would have understood that this was a simple misspelling of the word 'nose'. Taken in context, a PHOSITA would have understood that *Ryu* was talking about a detecting a feature value with respect to a 'nose width' from a captured image of a user at least because the rest of the feature values taught by *Ryu* were directly related to a user's facial features (e.g., eye distance, cheekbone shape, shape of the forehead).

which a picture of a user's face was obtained (i.e., performing gaze detection), and then subsequently determining if the user looks (i.e., gazes) at the device as a whole by using imaging technology and analysis.

59. Furthermore, because *Ryu* expressly teaches that it is in response to the device 100 sensing a user's rotation (i.e., detecting the act) that the processor 103 **then** activates a function of the front camera to obtain an image of the user (i.e., performing gaze detection only after detecting the act) and finally determines whether the user is looking at the device 100 (e.g., by performing face recognition or eye estimation on the obtained image), a PHOSITA would have understood *Ryu* expressly teaches that the performing of gaze detection occurs only after the detecting of the act as claimed.

iv. Claim [1(d)]

a) Ryu in view of Hodge teaches the claimed "determining whether the user is recognized via a recognition mechanism; and"

60. The disclosure of the '564 Patent states that the electronic device "may be equipped with a facial recognition system to create an extra layer of protection[,]" by at least "recogniz[ing] a device owner, which may protect a user's privacy …" *'564 Patent* at 11:66–12:4. Additionally, the '564 Patent discloses that identification of the user would be done by performing a comparison "against given facial criteria" and "employ[ing] facial recognition algorithms[.]" *'564 Patent* at 12:4-14.

61. As discussed above, *Ryu* teaches the device 100 as performing a feature value detection method for determining if a user is looking in a direction toward said device. *See* ¶ 58. Particularly, a PHOSITA would have understood the feature values of a user's face (i.e., the **distance between the eyes**, a **[nose] width**, a **height and shape of a cheekbone**, a **proportion of a forehead)** that were detected when performing the feature value detection method as not only capable of being used to determine if the user is looking at the device, but as also capable of being used as a recognition mechanism.

62. Prior to the invention of the '564 Patent, capturing an image of a user and extracting feature values of that user's face for the purpose of recognizing that particular user was a well known method for determining if a user of an electronic device was in fact an authorized user (i.e., a user recognition mechanism). For example, U.S. Patent Publication No. 2013/0015946 to Lau et al. ("*Lau*") filed on July 12, 2011, and published on January 17, 2013. *Lau* (Ex. 1007) teaches using facial recognition techniques as a "**mechanism for recognizing a user** of [a] mobile device as an authorized user and unlocking the mobile device …" *Lau* at ¶ 3 (emphasis added). Similar to the '564 Patent, *Lau* teaches the mobile device capturing an image or images of a user via a camera (e.g., a front facing camera) and performing facial recognition on said image. *Lau* at ¶ 71 and 80. *Lau* teaches that "the facial recognition process involves comparing facial components extracted

from the one or more captured images to facial components extracted from images stored on the mobile device …" *Lau* at ¶ 80, ¶ 98 (teaching the feature descriptors are compared to feature descriptors of authenticated images to determine if the user is authorized.), ¶ 5 (teaching after receiving an indication of a request by a user to unlock a mobile device, capturing an image of the face of the user, extracting facial components, and comparing the extracted facial components with the facial components of an authorized user.). Particularly, the facial components (i.e., face landmark points) taught by *Lau* include facial components such as the eyes, nose, mouth, and other distinctive face landmarks. *Lau* at ¶ 110. Thus, it was well known for an electronic device to utilize extracted facial components/features from a captured image of a user in order to recognize said user (i.e., a recognition mechanism).

63. Furthermore, it was known that performing user recognition particularly with respect to mobile electronic devices such as mobile or smartphones was beneficial due to the fact that utilizing user recognition would allow the electronic device to "determine whether a user [was] authorized to unlock the device from a locked state, thereby granting the user access to one or more applications and/or data stored on the device." Lau at ¶ 67, ¶ 2 (teaching that due to mobile electronic devices containing personal information and generally being used in public environments, it would be beneficial to include a mechanism for authenticating a user prior to

allowing access to data and functions offered by the device to prevent misuse and theft.)

64. As *Ryu* expressly and consistently teaches determining if the **user's** face is detected in the image obtained by the front facing camera by **recognizing a user's face**, a PHOSITA would have understood that *Ryu's* teachings with respect to detecting a face were directed to more than just identifying if a **face was simply present** or **detected** in a captured image. *Ryu*, at 4:51–57 ("[I]nformation obtained by **recognizing a user's face** …"); 19:26–29 ("Instead of the above-described **user's face recognition method** …"); 23:60–63 ("The front camera may operate so as to **recognize a user's face** …"). (All emphasis added) However, while a PHOSITA would have understood that *Ryu's* face detection was directed to more than just identifying if a face was present within a captured image, *Ryu* is not express in that the face detection would **recognize** a user.

65. *Hodge* teaches a method of including facial recognition (i.e., determining whether the user is recognized via a recognition mechanism) within an electronic device. *Hodge* at ¶ 116 (teaching that "[t]he gaze detection capabilities of device 10 may, if desired, **include visual user identification capabilities (e.g., face recognition)**[,]" so that the "device 10 **may distinguish between authorized users and unauthorized users** based on image sensor data."). (Emphasis added).

66. Furthermore, *Hodge* expressly teaches that "[b]y making gaze detection specific to particular users, device 10 will not inadvertently transition from standby mode to active mode if a person in the user's vicinity happens to glance at the user's device." *Hodge* at ¶ 116. Thus, a PHOSITA would have understood that *Hodge* teaches determining if a user is recognized via a recognition mechanism at least because *Hodge* teaches including user identification/face recognition capabilities (i.e., a recognition mechanism) that distinguished between authorized and unauthorized users (i.e., determines if a user is recognized) within the gaze detection capabilities of the electronic device 10.

67. A PHOSITA would have been motivated to combine *Hodge's* identification/face recognition capabilities with the electronic device as taught by *Ryu* for the same reasons as I have discussed above. See ¶¶ 50-53. Such a modification to *Ryu's* electronic device would have improved the device's security and the privacy of the authorized user of said device as Ryu's device would now be able to distinguish between authorized/unauthorized users and prevent unauthorized users from accessing functions and data stored within.

v. Claim [1(e)]

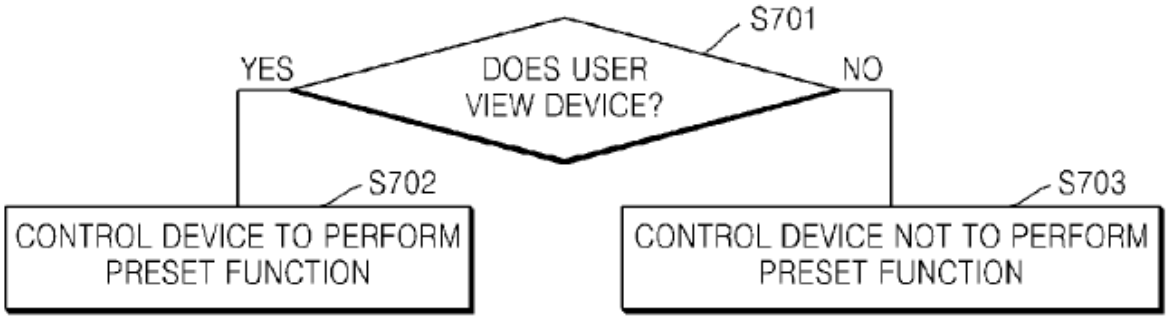
a) Ryu teaches the claimed "presenting a plurality of content items when the user is recognized via the recognition mechanism and it is ascertained that the user looks at a direction toward the electronic device."

68. As I discussed above with respect to Claim Limitation 1(b), *Ryu* teaches determining whether a user looks at the device 100 after the user has physically moved (e.g., shaken or rotated) the electronic device. See ¶¶ 58-59. Likewise, I discussed the device 100 determining whether the user looks at the device 100 by using the feature value detection method as discussed by *Ryu*. See ¶ 58.

69. Also, as I discussed above with respect to Claim Limitation 1(d), a PHOSITA would have been motivated and found it obvious to include *Hodge's* identification/face recognition capabilities within *Ryu's* electronic device 100 so that the electronic device would be capable of determining if a user was both looking at and a **recognized user** (e.g., the owner or authorized user) of device 100. See ¶¶ 64-67.

70. *Ryu* further teaches that determining if a user was looking at the device 100 occurs prior to the device 100 performing a function related to the detected motion of the device. See ¶¶ 40-43 (where I discuss *Ryu* storing within storage 102 a program to control the device 100 to perform a function based on the motion information of the device 100 wherein the function corresponds to the motion information). Particularly *Ryu* teaches the device 100 performing the step of determining if a user looks/views the device 100 in Fig. 7:

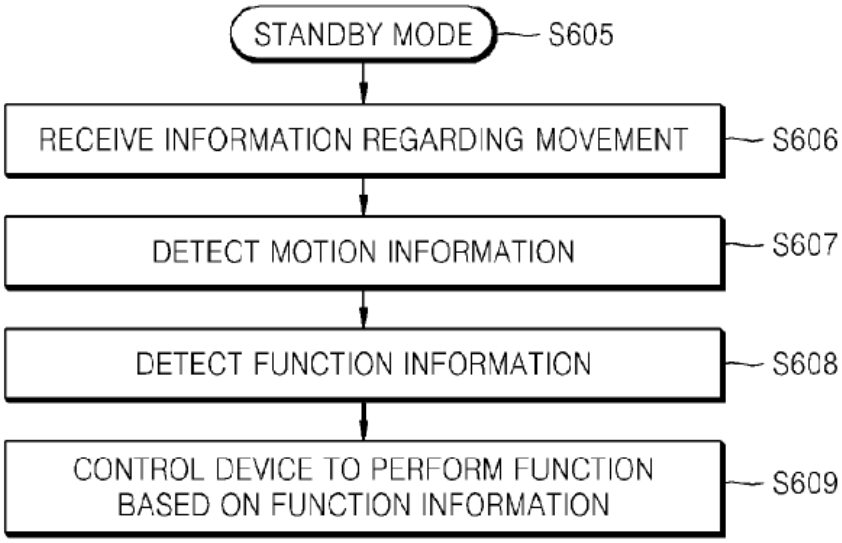
FIG. 7



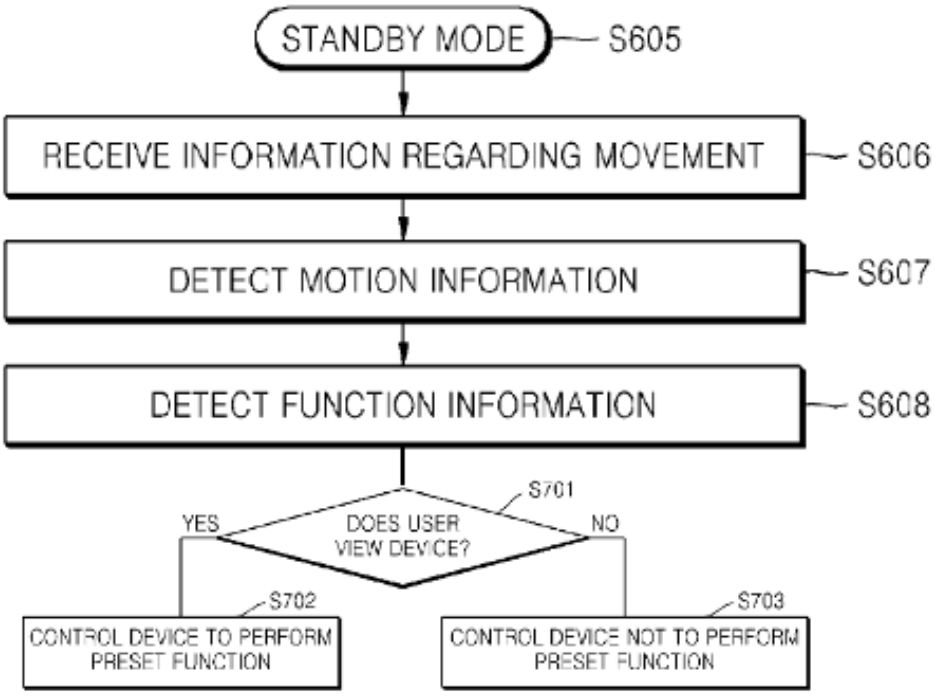
Ryu at Fig. 7, 18:65–19:6 (teaching that the Fig. 7 is a flowchart of a process performed by the processor 103 and that particularly operation S701 is the step where the processor 103 "determines whether the user looks at the device 100 before performing the preset function."), 19:64–67 (teaching the "processor 103 may determine whether a user looks at the device 100 according to the above-described face recognition or eyes estimation regarding an image 822 obtained by using the front camera 821.").

71. *Ryu* goes on to teach that the process steps depicted in Fig. 7 are performed at "… operation [step] S609 of FIG. 6B, according to an exemplary embodiment." *Id*. at 18:65-67.

FIG. 6B



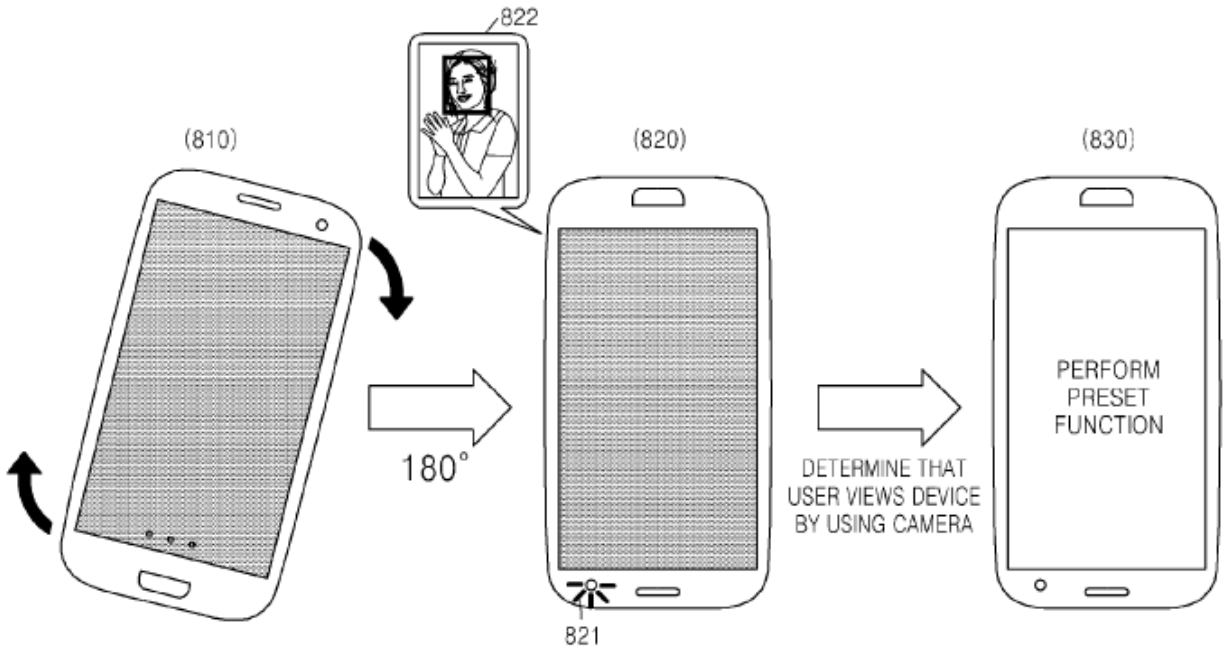
Id. at Fig. 6B. Figure 6B of *Ryu* depicts the method of performing a function on a device when the device starts out in a standby mode. *Id.* at 18:23-26 (teaching "FIG. 6B is a flowchart of a method of performing a function of a device, according to another exemplary embodiment … where the device 100 is in the standby mode."). Thus, a PHOSITA would have understood the processing flow of a device 100 starting out in a standby mode that also performed determining whether the user was looking at said device prior to performing a function would look something like the following:



Id. at Figs. 6B and 7 (modified to show steps S701-S703 from Fig. 7 being performed at step S609 of Fig. 6B).

72. *Ryu's* Fig. 8 depicts the device 100 performing the combined processing steps of Figures 6B and 7 wherein the device 100 starts out in a standby mode, receives input from a user in the form of rotational movement (e.g., 180º rotation), determines the preset function that correlates with said user input, and performs the process of determining if a user is looking towards the device 100.

FIG. 8



Id. at Fig. 8, 19:49–67 (teaching the "when the device 100 is in the standby mode and a screen 810 is in a black screen state as shown in FIG. 8, when it is determined that the device 100 has rotated by 180º in a clockwise direction by using a sensing value, the processor 103 activates a function of a front camera 821[,]" and obtains an image on which the device 100 performs face recognition or eye estimation on in order to determine if a user is looking at said device all while maintaining a black screen), 19:13-25 (teaching the use of a feature value detection method for recognizing if a face is included in the image obtained by the device 100).

73. Thus, *Ryu* expressly teaches that electronic device 100 would determine whether the user is looking towards the electronic device prior to activating the screen and displaying/performing a preset function at least because *Ryu* teaches that

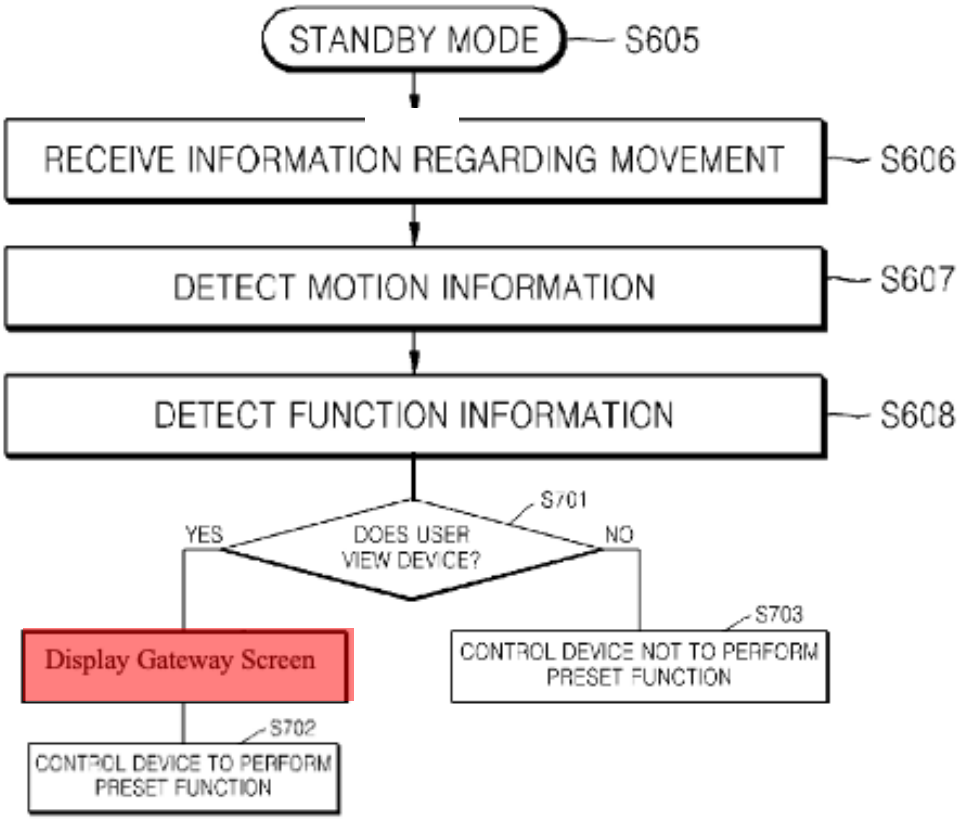
the mobile device 100 would capture an image of a user while maintaining a black screen and use feature value detection, or alternatively estimate the user's eye movements, to determine if the user looks at the device 100.

(i) *Presenting a plurality of content items*

74. The '564 Patent's disclosure with respect to a plurality of content items is that "[c]ontent items presented on an idling device may include **any category of information** such as breaking news, regular news, market updates, newly-arrived shared photos, email alert, text messages, video clips, advertisements, community events, sports, and so on." *'564 Patent*, 4:45–49 (emphasis added), 8:28-30 (further disclosing that "[t]he content items may have video, audio, or **another format** …") (emphasis added), 6:66-7:2 (disclosing with respect to Fig. 6 of the '564 Patent that at "Step 3, content items may show up on the screen."). From this disclosure, a PHOSITA would have understood that the claimed presentation of a plurality of items would have at least included the displaying (i.e., presenting) to a user more than one piece of information on a device's display/screen in a format that was capable of imparting information to a user.

75. With respect to Fig. 6B, *Ryu* expressly teaches that "[i]n operation S609, the processor 103 may **display a gateway screen as shown in FIGS. 17 and 18A through 18F** that will be described later **before the function is performed**." *Ryu*, 18:61–64 (emphasis added). As *Ryu* teaches this intervening step of displaying a

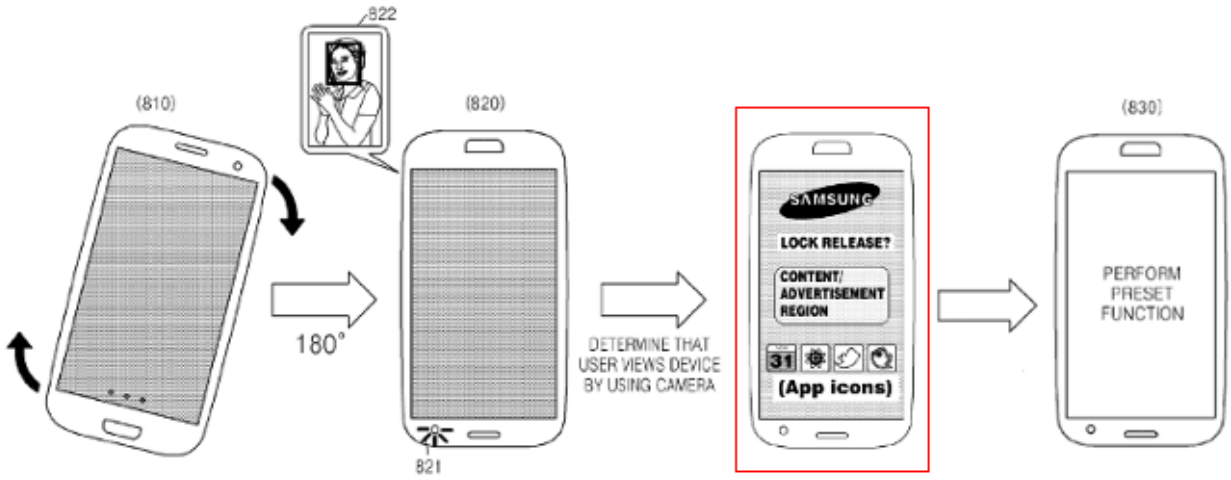
gateway screen occurs at step S609 of Fig. 6, a PHOSITA would have understood that processing steps taken in the case where the device 100 started in a standby mode, determined if the user was looking at the device, and displayed a gateway screen prior to performing a preset function would look something like the following:



Id. at Figs. 6B and 7 (modified so that steps S701-S703 from Fig. 7 were being performed at step S609 of Fig. 6B, and also showing the intervening step of displaying a gateway screen prior to performing the function (highlighted red)). Thus, with respect to Fig. 8 (which exemplifies the device 100 performing the step of determining if the user looks at the device prior to performing the preset function),

a PHOSITA would have understood that the device 100 would also display a gateway screen (i.e., a plurality of content items) prior to performing the preset function. For example, Fig 8 would depict the operations of the electronic device 100 as seen below:

FIG. 8



Id. at Fig. 8 (modified to show the intervening step of displaying the gateway screen 18F prior to the performing of the preset function outlined in red).

76. Looking at gateway screen 18F (i.e., one of the gateway screens explicitly taught by *Ryu* as capable of being displayed prior to performing the function), a PHOSITA would have understood said gateway screen as teaching a plurality of content items. Particularly, *Ryu* teaches that "[t]he gateway screen of FIG. 18F includes **manufacturer identification information** of the device 1400, **a lock release message**, the **information (the content/advertisement region)** that may be selected by the user as to whether to perform a preset function, **and the**

information (icons) used to select at least one executable application." *Id.* at 37:54-60 (emphasis added).

FIG. 18F

Id. at Fig. 18F, 37:33–37 (teaching that the "[i]nformation displayed through the content/advertisement region may be a size-reduced image or a part of an image (for example, a thumbnail image or a key image or a representative image) indicating the preset function that may be performed but is not limited thereto"). Therefore, in light of *Ryu's* teachings, a PHOSITA would have understood that the device 100 would display (i.e., present) a plurality of pieces of information on the device's display/screen in a format that was capable of imparting information to a user (i.e.,

a plurality of content items) when displaying gateway screen 18F at least because gateway screen 18F is taught as containing multiple pieces of displayed information such as a lock release message (i.e., a content item providing information about a locked state of the device), manufacturer identification information (i.e., a content item providing information about the manufacturer of the device), and app icons (i.e., a content item providing information about applications that could be executed). Likewise, as *Ryu* consistently teaches that the displaying of the gateway screen occurs just prior to the preset function being performed, a PHOSITA would have understood that the gateway screen 18F would then be displayed on the electronic device after: (1) the device 100 had determined that the user was looking at said device, and (2) prior to the performing of a preset function.

77. Furthermore, a PHOSITA would have found it obvious and been motivated to cause the electronic device 100 to perform both detecting if a user was looking at the device 100 as well as determining if the user was a recognized user prior to displaying the gateway screen and the performing of a preset function. *Hodge* expressly teaches that **gaze detection should include facial recognition** so that the electronic device can distinguish between authorized and unauthorized users, and not inadvertently transition from standby mode to active mode if someone other than the user happens to glance at the device. *Hodge* at ¶ 116. A PHOSITA would have thus been motivated and found it obvious to include *Hodge's* facial

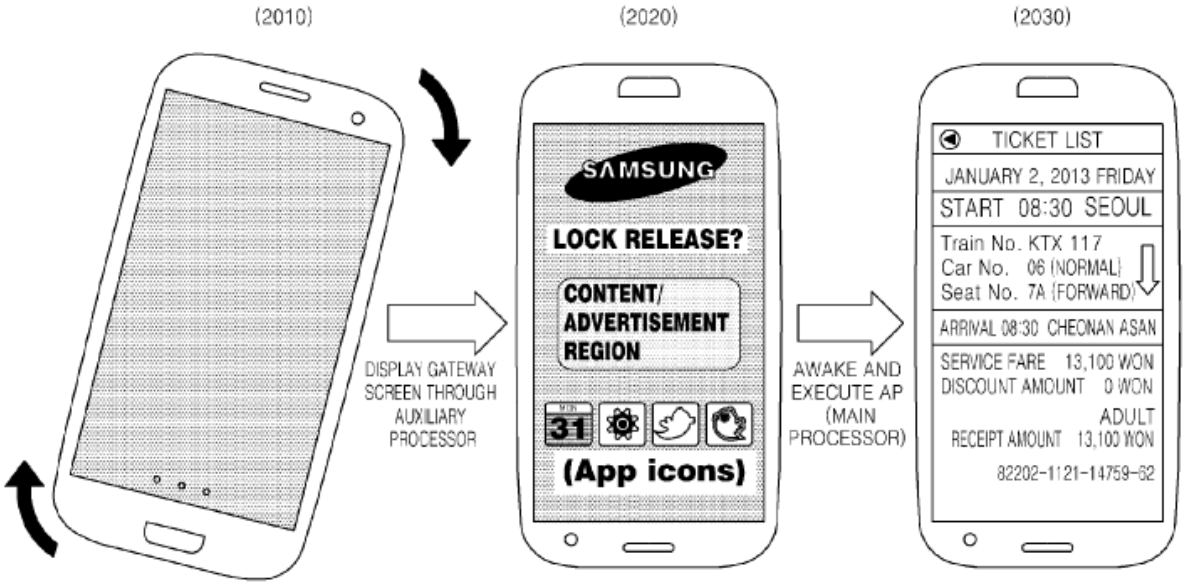
recognition mechanism/step within *Ryu's* gaze detection step (i.e., operating step S701) at least because *Hodge* expressly teaches that the step of gaze detection should also include facial recognition. Furthermore, as Hodge teaches that gaze detection and facial recognition should be performed prior to transitioning to an active mode, a PHOSITA would have similarly wanted the electronic device of *Ryu* to perform these two steps prior to transitioning to an active mode (e.g., displaying of a gateway screen and performing a preset function). Finally, a PHOSITA would have had a reasonable expectation of success in implementing *Hodge's* identification/face recognition within *Ryu's* gaze detection step (i.e., step S701) as this would have only required simple programming techniques well within a PHOSITA's expertise.

vi. Claim 2

a) Ryu in view of Hodge teaches the claimed "wherein the plurality of content items is unrelated to content presented before a state of the idle-screen, the inactive mode, or the screen-saver mode."

78. As I have previously discussed with respect to claim 1(e), *Ryu* teaches performing a preset function after the presenting of a plurality of content items (i.e., the displaying of the gateway screen 18F); *See* ¶¶ 75–76. One of the preset functions taught by *Ryu* as being performed is shown in figure 20 below (particularly see screen 2030):

FIG. 20

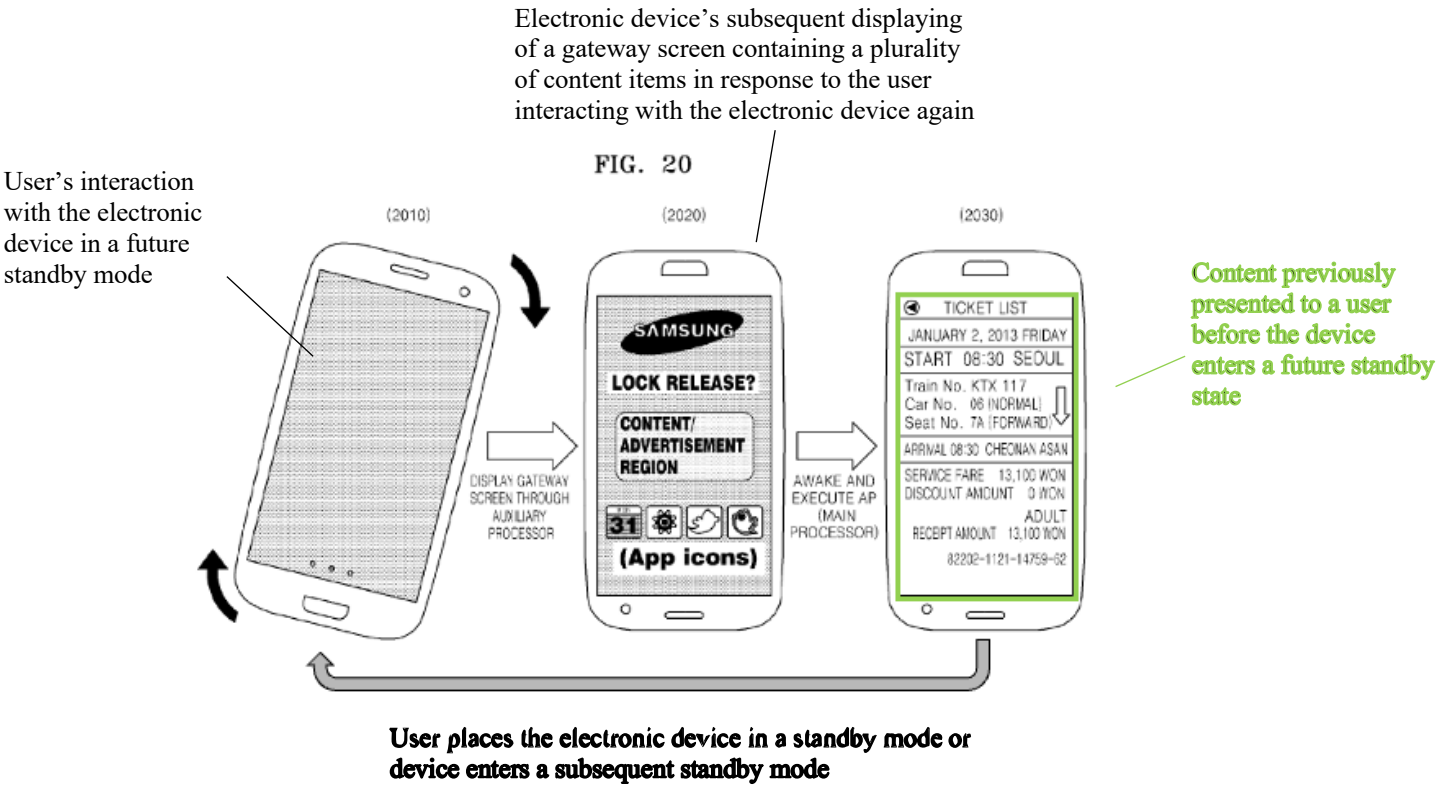


Ryu Fig. 20, 39:12-18 (teaching that Fig. 20 shows screens for requesting preforming of a preset function using gateway screen 2020 which includes icons selectable to execute applications and a content/advertisement region that a user would select to perform a preset function), 39:19–31 (teaching that when motion is detected by a device in standby mode, a gateway screen is displayed, and "[t]he screen 2030 including train ticket information is displayed when the content/advertisement region is selected on the gateway screen 2020."). From this disclosure a PHOSITA would have understood *Ryu* as teaching ultimately displaying train ticket information after previously displaying a gateway screen (i.e., a plurality of content items) wherein the train ticket information would be displayed as a result of the user selecting the corresponding content/advertisement region contained within the gateway screen.

79. As the displaying of the ticket information to a user was taking place while the electronic device was operating in an active mode, a PHOSITA would have understood the train ticket information as being content displayed prior to a subsequent standby or inactive mode of the electronic device. For example, a user having 'woken up' a device in standby mode by physically moving the device in a rotational direction and requesting the displaying of the train ticket information by selecting the content/advertisement region contained within the gateway screen (e.g., advertisement region within screen 2020) would then be able to place the electronic device back into a standby mode after viewing the train ticket information (e.g., by pressing a button related to a standby state like the well-known power button), or allow the electronic device to enter a standby state on its own (e.g., the device may enter standby if a user doesn't interact with the device for a pre-determined period of time).

80. The electronic device entering a future standby mode after having displayed the train ticket information would then be ready for the user to again interact with the device via physical movement. A user's interaction with a device having re-entered a standby mode (e.g., the 180^{o} rotational movement) would then cause the device to again perform the gaze detection, user recognition, and displaying of a gateway screen as previously explained above with respect to the limitations of Claim 1 prior to the performing of a preset function.

81. For example, as I have depicted below with respect to *Ryu's* Fig. 20, a subsequent displaying of the gateway screen on the electronic device that has entered a standby mode would take place after the device had previously displayed train ticket information (i.e., content previously displayed before a user prior to the electronic device entering or being placed in a standby mode):



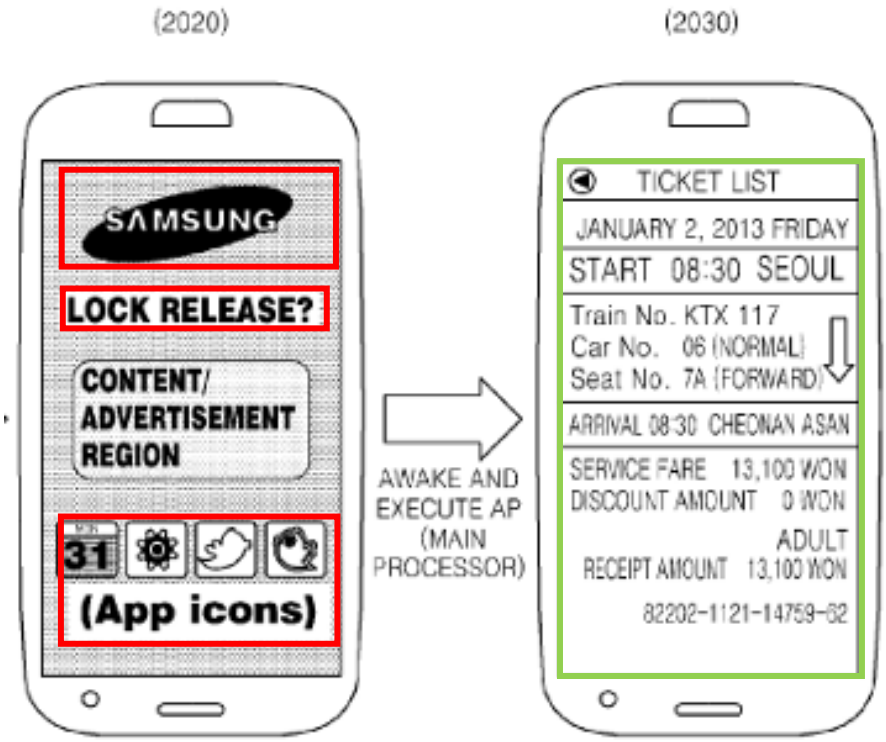
Ryu at Fig. 20 (annotated to depict a future displaying of a gateway screen after the device has previously displayed train ticket information and entered a subsequent standby mode). This subsequent displaying of a gateway screen (e.g., gateway screen 18F containing the plurality of content items) after previously displaying train ticket information (i.e., the content presented before a state of the idle-screen, the

inactive mode, or the screen-saver mode) would be understood as being unrelated to the previously presented content.

82. The ’564 Patent does not contain a description as to what constitutes the plurality of content being “unrelated” to content displayed prior to a standby mode (i.e., idle-screen, inactive mode, or screensaver mode). However, a PHOSITA would have understood the train ticket information displayed by *Ryu* as being “unrelated” to content displayed on the gateway screen. As shown below, the content of the train ticket consists of information related to a unique/specific train ride:

Ryu at Fig. 20 (excerpt of screen 2030 from Fig. 20). As can be seen the content of the train ticket information being displayed to a user was with respect to train number

'KTX 117' that was departing from Seoul at 8:30 on January 2, 2013, with the user's seat being seat no. 7A on car 6. Comparing the above screen 2030 (i.e., the train ticket information) to the plurality of content items presented to a user via the gateway screen (i.e., the manufacturer information of the electronic device, a lock release message, and app icons), a PHOSITA would have understood the plurality of content items as bearing no relation to train ticket information (the content presented to the user prior to the device returning to the standby state (i.e., inactive mode)).



Ryu at Fig. 20 (excerpt showing screens 2020 (the gateway screen with a plurality of content items highlighted red) and screen 2030 (the train ticket information highlighted green)). As the screen 2030 contains no information related to the

manufacturer of the electronic device, whether the device is locked or not, or app icons, a PHOSITA would have understood the gateway screen shown after the electronic device had previously displayed train ticket information and subsequently entered a standby mode as containing a plurality of content items that bore no relation to (i.e., were unrelated) to the content that was previously displayed.

vii. Claim 3

a) Ryu in view of Hodge teaches the claimed "further including stopping presenting the plurality of content items when it is detected that the user looks at a direction other than the one toward the electronic device."

83. Hodge expressly teaches that "it is generally desirable for device 10 to be in the active mode whenever a user is actively interacting with device 10[,]" and that "when the device detects the user is no long[er] looking at the device, **the device may dim or turn off the display**." *Hodge* at ¶¶ 50 and 28 respectively. (Emphasis added). Furthermore, *Hodge* teaches that **"[a]n advantage of turning off the display when the user is not looking at the display is this may help prevent unauthorized users from viewing information on the display, thereby enhancing device security**." *Hodge* at ¶ 28 (emphasis added).

84. A PHOSITA would have thus understood that *Hodge* expressly teaches an electronic device monitoring a user's gaze while in an active mode and upon detecting that a user's gaze is no longer directed at the electronic device transitioning

the electronic device from an active mode to a standby mode wherein the display is turned off (e.g., powered off) and no longer presenting information to a user.

85. *Hodge* further teaches that the electronic device 10 utilizes its gaze detection capabilities to implement power management schemes within the electronic device 10 for the benefit of conserving power. *Id*. at ¶ 9 (teaching the electronic device will transition to a standby mode when "the user's gaze is not directed towards the electronic device" wherein the standby mode minimizes power consumption; ¶ 48 (teaching "[a] device such as device 10 that has gaze detection capabilities may use gaze detector data in implementing a power management scheme."); ¶ 28 (teaching that "[w]ith one suitable arrangement, … the electronic device may accelerate the shutdown of device components when the user's gaze is not detected.").

86. A PHOSITA would have been motivated and found it obvious to modify *Ryu's* electronic device to similarly perform *Hodge's* method of actively monitoring a user's gaze while in an active mode and further powering off its display upon detecting that a user's gaze was no longer directed towards the electronic device. Such a modification uses *Hodge's* well-known technique of powering off a display of an electronic device upon detecting that a user is no longer looking at said device with *Ryu's* electronic device that has gaze detection capabilities and determines if a user is gazing at its electronic device prior to the presenting of a plurality of content

items. Such a modification of *Ryu's* electronic device would have improved the electronic device and accomplished *Hodge's* stated advantages of power conservation and prevention of unauthorized users from viewing information on the display. *Hodge* at ¶¶ 9, 14, and 28.

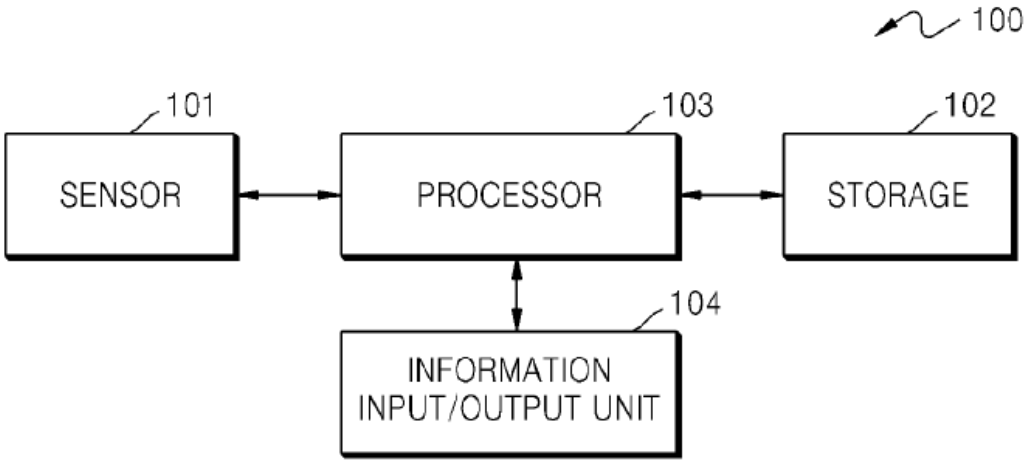
87. Furthermore, a PHOSITA would have had an expectation of success in implementing *Hodge's* teachings of performing gaze detection while in an active mode and further power off a display upon no longer detecting a user's gaze as this modification only requires simple programming techniques well within a PHOSITA's expertise, and *Ryu's* electronic device already had the capability of determining if a user was looking at it.

viii. Claim [8(a)]

a) Ryu teaches the claimed "monitoring the electronic device or physical movement of the electronic device to sense an act made by a user when a display of the electronic device has an idle screen or a screen in standby mode, inactive mode, or screen-saver mode;"

88. As I have discussed above with respect to Claim Element 1(b), Ryu teaches an electronic device that detects a user's act of physically moving the electronic device (e.g., physical rotation). See ¶ 54. Specifically, *Ryu* teaches that the electronic device 100 utilizes a sensor 101 "to sense movement of the device 100." *Ryu*, 4:63–65, 5:15–16. In fact, *Ryu's* Fig. 1 (below) depicts the electronic device 100 as containing the sensor 101:

FIG. 1



Id. at Fig. 1, 6:47–60 (teaching that "[t]he **sensor 101 detects movement of the device 100**[,]" which includes "**rotation based movement** such as an upside-down movement of the device 100, a rotation direction based movement (for example a clockwise direction movement, a counter clockwise direction movement, a +z axial direction movement, and a -z axial direction movement, a perpendicular direction based movement ..."), 6:61–67 (teaching that **the sensor 101 may be a gyro or an accelerometer sensor**). (All emphasis added)

89. Because Ryu explicitly teaches with respect to movement based inputs that "movement based input information may be **based on a user gesture (for example, a device shaking, a device rotation, a device pickup, etc**. …" a PHOSITA would have understood that by detecting a rotational movement of the device (e.g., 180º rotation) that it would have been a user performing the movement

of the device and not some other action (e.g., being dropped, motion imparted during car rides, or vibrations). *Id.* at 4:29–44 (emphasis added). Thus, *Ryu* teaches the device 100 detecting a user's intentional movement of the device (e.g., 180° rotation) and that the device 100 was capable of distinguishing that movement from movements not made by the user.

90. Furthermore, Ryu expressly teaches when the electronic device 100 is in a standby mode, "the device 100 may include **a low power state in which** only **the sensor 101**, the storage 102, and the processor 103 **operate**." *Id.* at 5:52–54 (emphasis added). From this disclosure, a PHOSITA would have understood that *Ryu* is monitoring the movement of the electronic device in order to sense the act of a user physically moving the device even while the device is in a standby mode at least because *Ryu* expressly teaches that the sensor 101 remains operational (e.g., powered on) while the device 100 is in a standby mode. Additionally, as *Ryu* teaches that the standby mode of the device 100 includes " at least one of a black screen state of the device 100" wherein the black screen state is used to "indicate a state of the screen in which no information is displayed[.]" *Id.* at 5:24-31. Thus, a PHOSITA would have understood that device 100 would be monitoring a user's physical movement of the device particularly while the display of the electronic device was in a standby mode as claimed.

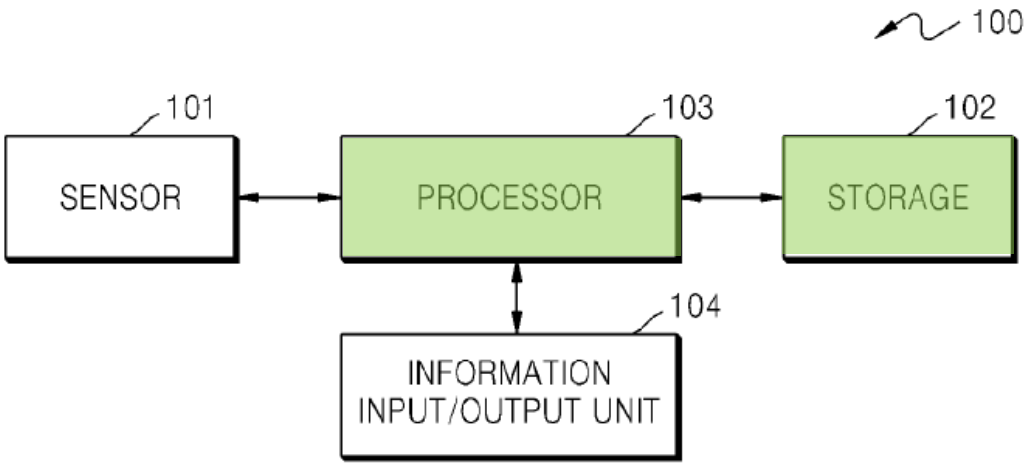
ix. Claim [14(Pre)]

a) Ryu teaches the claimed "An electronic device comprising: a processor, a recognition mechanism, and a memory or memory unit coupled to the processor, the processor operable when executing certain instructions to:"

91. As I have discussed above a PHOSITA would have found it obvious to include a recognition mechanism such as the one taught by *Hodge* within the electronic device along with the necessary programming and storage of a verified user's feature values with which recognition would be performed. *Ryu*. See ¶¶ 61-67. Thus, *Ryu* teaches an electronic device containing "a recognition mechanism" as claimed.

92. *Ryu* expressly teaches that the device 100 includes both a processor and a storage unit (i.e., memory unit) that is coupled to the processor. See Fig. 1 below of the electronic device 100 including both a processor 101 and storage unit 102:

FIG. 1



Ryu at Fig. 1 (annotated to show the processor and memory unit coupled to the processor both in green), 4:63–65 (teaching the device 100 includes storage 102 and a processor 103), 16:34–39 (teaching that the "processor 103 may be one or more processors for controlling a general operation of the device 100[,]" and that "[t]he processor 103 may be a controller, a microprocessor, a digital signal processor, etc."). Thus, *Ryu* teaches the electronic device comprising a processor and memory unit coupled to the processor as claimed.

93. Ryu further teaches that the storage unit 102 (i.e., a memory unit) "stores at least one program and data related to the at least one program[,]" and that "[t]he processor 103 may execute the at least one program stored in the storage 102 …" *Id.* at 7:34–35 and 16:17–21 respectively, *see also* 2:50-54 (teaching that "there is provided a non-transitory computer readable recording medium storing one or more programs including commands for executing the method of performing the function of the device."). Therefore, a PHOSITA would have understood that *Ryu* teaches the electronic device 100 as containing a processor that was coupled to a storage unit (i.e., memory unit) and was further capable of (i.e., operable when) executing programming instructions stored within the storage unit.

x. Claim [14(a)]

a) Ryu teaches the claimed processor operable when executing instructions to "detect an act made by a user involving physical contact with the electronic device or physical movement of the electronic device when a display of the electronic device has an idle screen or a screen in standby mode, inactive mode, or screen-saver mode;"

94. As I previously discussed above with respect to Claim Limitation 8(a), *Ryu* teaches detecting rotation of the device performed by the user, rather than movement to the device by some other action, and that a PHOSITA would have understood that because *Ryu* is detecting an intentional movement of the device (e.g., 180^{o} rotation) such a movement would be indicative of an act made by the user and therefore distinguishable from acts not made by the user. See ¶¶ 54-59.

95. Likewise, as discussed above with respect to Claim Limitation 8(a), *Ryu* teaches that electronic device 100 as including a sensor 101 (e.g., a gyro or accelerometer) for sensing a user's movement of the device while in a standby mode and the device is displaying a black screen. See ¶¶ 88-90.

96. Ryu expressly teaches that "[t]he electrical signals output by the sensor 101 may be referred to as **a sensing value** of the movement of the device 100 **or information regarding the movement of the device 100**." *Ryu*, 7:30–33 (emphasis added). *Ryu* goes on to teach that "[t]he **recognizing of the motion information by the processor 103 according to the sensing value** may be based on **an operation of detecting the motion information from the storage 102 by using the received**

sensing value. **Thus, the recognizing of the motion information by the processor 103 may be referred to as detecting of the motion information** …" *Id.* at 10:52–58 (emphasis added). Because *Ryu* teaches that the processor 103 would receive a sensing value from the sensor 101 (i.e., motion information regarding the user's movement of the device) while the device is in a standby mode and displaying a black screen, and that the processor 103 further recognizes said sensing value, a PHOSITA would have understood Ryu as teaching a processor operable when executing instructions to detect an act made by a user involving physical movement of the electronic device when a display of the electronic device has a screen in standby mode as claimed.

xi. Claim [14(b)]

a) Ryu teaches the claimed processor operable when executing instructions to "perform gaze detection only after detecting the act;"

97. As I discussed above with respect to Claim Limitation 1(b), *Ryu* teaches only performing gaze detection after detecting the user's movement of the device 100 (i.e., the act). See ¶¶ 54 and 58-59.

98. As *Ryu* expressly teaches that "[t]o determine whether the user looks at the device 100 by using … the feature value detection … as described above, **the storage 102 may store at least one related application program and provide the processor 103 with the related application program** …" so that "[t]he **processor**

103 may execute the related application program provided by the storage 102 **and determine whether the user looks at the device** 100 … [,]" a PHOSITA would have understood *Ryu* as teaching the processor operable when executing instructions (i.e., the related application program stored in storage 102) to perform gaze detection only after detecting the act as claimed. *Ryu* at 19:40-48 (emphasis added).

xii. Claim [14(d)]

a) Ryu in view of Hodge teaches the claimed processor operable when executing instructions to "determine whether the user is recognized via the recognition mechanism; and"

99. As I discussed above with respect to Claim Limitation 1(d) above, a PHOSITA would have found it obvious to include *Hodge's* feature value detection method along with including any necessary programming and data within *Ryu's* electronic device. *Ryu*. See ¶¶ 61-67 and 50-53.

100. As a PHOSITA would have found it obvious to include any necessary programming instructions and data within *Ryu's* memory 102 for execution by the processor 103 when implementing *Hodge's* facial recognition, *Ryu* in view of *Hodge* teaches the processor of the electronic device being operable when executing instructions for determining whether the user is recognized as claimed.

xiii. Claim [14(e)]

a) Ryu teaches the claimed processor operable when executing instructions to "present a plurality of content items when it is determined that the user looks at a direction toward the electronic device and the user is recognized via the recognition mechanism."

101. As I have previously discussed with respect to Claim 1(e), *Ryu* teaches that only after the electronic device 100 had determined if the user was: (1) looking at the device 100, and (2) recognized via a recognition mechanism, would the device 100 then change from a standby mode to an active mode and present a gateway screen containing a plurality of content items to a user. *See* ¶¶ 68-77. Furthermore, as I discussed above, *Ryu* expressly teaches that the processor 103 displays the gateway screen during its execution of operation step S609. See ¶ 75 (citing *Ryu* at 18:61–64). Thus, a PHOSITA would have understood that *Ryu* teaches the processor 103 as being operable when executing instructions to present the gateway screen (i.e., the plurality of content items) at least because Ryu teaches that "[i]n operation S609 the processor 103 may **display a gateway screen as shown in FIGS. 17 and 18A through 18F** …" *Ryu*, 18:61–64 (emphasis added).

V. Ground 2

A. Obvious to Combine Ryu in view of Hodge in further view of Stallings

xiv. Overview of Stallings

102. U.S. Patent No. 8,331,992 to Stallings et al, ("*Stallings*") was filed on December 19, 2008, and issued on December 11, 2012. *Stallings* (Ex. 1006). The

Stallings patent describes a mobile communication device (e.g., a cellular telephone or a PDA) that displays a plurality of windows (e.g., RSS feeds) on a display screen after a user wakes up said device. *Stallings* at Abstract, 2:1-16. (teaching that the mobile device will "display, via a device display, the window(s) with the associated portion(s) of the current information …"), 7:17-30 (teaching that if a user provides input to wake up the device 100, the device 100 would wake up and display one or more stock RSS windows). *Stallings* provides an example of the displayed RSS windows in figure 5A:

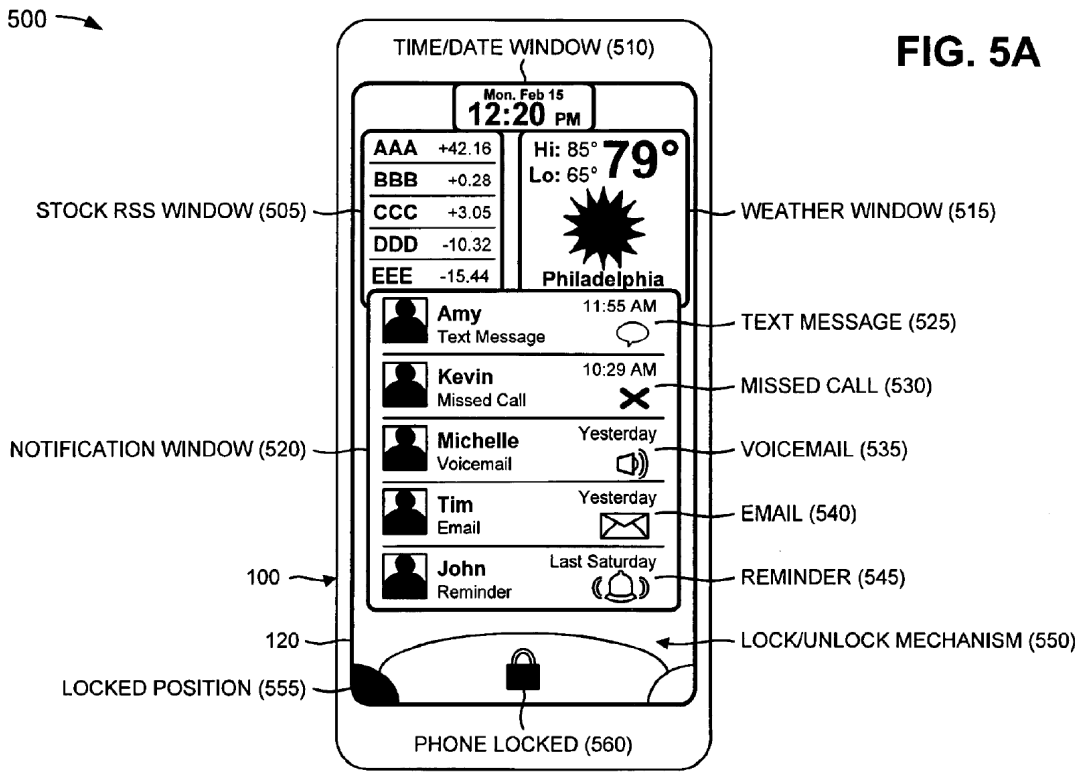


FIG. 5A

Id. Fig. 5A. Particularly, *Stallings* teaches that the windows displayed on display 120 were for "displaying current (or live) information (e.g., current information 400) received by device 100 when device 100 is in the locked state." *Id*. at 6:55-60, *see*

also 5:51-67 (teaching that the current information includes Really Simple Syndication (RSS) feeds that a user subscribes to by entering uniform resource locators (URLs) associated with the RSS feeds into an RSS reader, and that the RSS reader checks the user's subscriptions regularly for new content and downloads the content to the device 100), 7:4-11 (teaching that the device 100 receives information from the RSS feeds while in a sleep/locked state and associates the current information with the one or more RSS windows).

103. Thus, a PHOSITA would have understood *Stallings* as teaching an electronic device that a user interacts with while in a standby mode and upon detecting said input displaying a plurality of content windows each containing content at least because *Stallings* teaches that if a user provides input to wake up the device 100, the device 100 would wake up and display one or more RSS windows that displays updated content (e.g., weather, notifications, emails, text messages, stock information, etc.). Furthermore, as *Stallings* teaches that a user subscribes to RSS content and those subscriptions are regularly checked for updated content, a PHOSITA would have understood the RSS feeds as being a service that provided a plurality of content intended for display on a mobile device.

104. Thus, *Stallings* and the '564 Patent both relate to electronic devices that while in a standby mode receive a user interaction and subsequently display a plurality of content items to a user after said interaction. *Stallings* at 2:1-16, 7:4-11,

7:17-30; *'564 Patent* at 6:54-7:6, 7:25-48, Figs 6 and 7. Given these similarities, a PHOSITA would have considered *Stallings* in the same field of endeavor as the '564 Patent and reasonably pertinent to its claimed invention.

105. A PHOSITA would have been motivated to modify the system of *Ryu* as previously modified by *Hodge* to display a plurality of RSS windows containing updated content as taught by *Stallings* on the gateway screen prior to performing the preset function that corresponded to the user's motion. Such a modification would have further improved the *Ryu/Hodge* electronic device in the same way as *Stallings* by allowing for the presentation of updated content (i.e., a plurality of content items) to a user via the gateway screen. Such an addition would have utilized *Stallings'* well-known technique of displaying one or more RSS windows along with any associated current information in response to a user's interaction with an electronic device, with the *Ryu/Hodge* electronic device. The displaying of the RSS windows with their updated content would thus present a user of the *Ryu/Hodge* electronic device with a plurality of content items that the user had considered to be important and relevant enough to want to be kept up to date with. In fact, Stallings expressly teaches that the displayed RSS windows can be configured by the user to be those that were of interest. *Stallings* at 6:63-7:1 (teaching that the number and type of information provided in the windows may be configured by the user of the device 100). Thus, a PHOSITA would have understood that the RSS windows of *Stallings*

provided to a user a quick and concise overview of up-to-date information thereby allowing the user to remain informed/notified of relevant changes with respect to areas that had been deemed important.

106. A PHOSITA would have expected success in making such a modification, which was nothing more than applying the well-known technique of presenting a plurality of RSS windows containing updated information on a device screen in response to a user's interaction. Such a modification would have only required the implementation of simple programming techniques well within a PHOSITA's expertise. As *Ryu* modified by *Hodge* already teaches the displaying of a gateway screen in response to a user interacting with an electronic device that contains a plurality of pieces of information prior to performing a function, a PHOSITA would have understood that replacing the information displayed on the gateway screen with the RSS windows as taught by *Stallings* would allow the user to remain informed (be presented with information) in a concise easy to understand format before the function occurred. This way, a user would remain updated on any changes that had occurred with respect to the areas of interest selected by the user.

xv. Claim [1(e)]

b) Ryu in view of Hodge in further view of Stallings teaches the claimed "presenting a plurality of content items when the user is recognized via the recognition mechanism and it is ascertained that the user looks at a direction toward the electronic device."

107. As discussed above with respect to Ground I, *Ryu* in view of *Hodge* teaches a method of presenting a gateway screen on an electronic device after having determined that the user was both recognized and looking in a direction towards the electronic device. See ¶¶ 60-67 and 76-77. Also, as discussed above, *Stallings* teaches displaying a plurality of RSS windows containing updated information on an electronic device's display in response to a user having interacted with said device. See ¶¶ 102-103. Further, as discussed above, a PHOSITA would have understood from the disclosure of the '564 Patent that the claimed presentation of a plurality of items would have at least included the displaying (i.e., presenting) to a user more than one piece of information on a device's display/screen in a format that was capable of imparting information to a user. See ¶ 74. Thus, a PHOSITA would have understood that *Stallings'* RSS windows containing updated information displayed to a user via the electronic device's screen as being a plurality of content items at least because the RSS windows displayed information in a format that imparted information to the user (e.g., information regarding updates to weather, notifications, emails, text messages, stock information, etc.).

108. A PHOSITA would have been motivated to modify the *Ryu/Hodge* gateway screen to include and display *Stallings'* RSS windows containing their updated information (i.e., plurality of content) for the same reasons as I have discussed above. See ¶¶ 105-106. Such a modification to the *Ryu/Hodge* electronic

device would have improved the electronic device by presenting to a user a quick and concise overview of up-to-date information covering areas that a user wished to be kept informed about after a user had woken up the device yet prior to performing a function.

xvi. Claim 6

c) Ryu in view of Hodge in further view of Stallings teaches the claimed "method according to claim 1 wherein the plurality of content items is arranged by a service."

109. The '564 Patent's disclosure regarding a "service" is with respect to a "service facility 82" that is connected to the electronic device via a network connection. The '564 Patent depicts this service in Fig. 1:

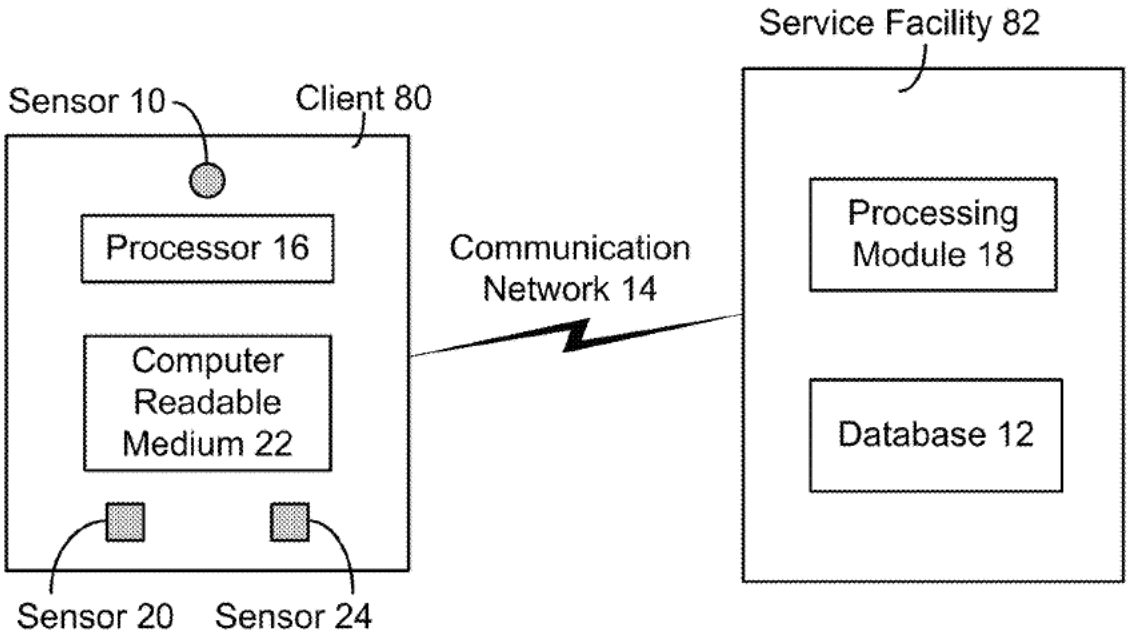


FIG. 1

'564 Patent at Fig. 1, *see also* 3:13-16 (teaching a client 80 is connected via a communication network 14 to a service facility 82). Additionally, the '564 Patent discloses that the service facility 82 includes "one or more servers and storage devices to receive, send, store and process related data or information." *Id*. at 3:38-41. From this disclosure, a PHOSITA would have understood that the claimed 'service' would have included a storage device connected to an electronic device via a network that would store and send data/information to the electronic device.

110. *Stallings* teaches that RSS feeds supply the information to the RSS windows. Particularly, *Stallings* teaches that a user will subscribe to each of the RSS feeds they wish to keep up to date on by "entering uniform resource locators (URLs) associated with RSS feeds 410 into [an] RSS reader." *Stallings* at 5:62-64, 5:64-67 (teaching the RSS reader will then check each of the subscribed RSS feeds regularly for new content and download any updates to the electronic device).

111. A PHOSITA would have understood *Stallings'* RSS windows as displaying content items arranged by a service as claimed at least because the RSS feed pulled information/data from a storage device that was connected to the electronic device via a network. For example, a PHOSITA would have understood that the URLs associated with each RSS feed would have been addresses pointing to a storage location (e.g., a web server) that hosted stored content which would then be sent to an electronic device that was connected to the web server via a network

(e.g., the internet). Thus, the content displayed by the RSS windows would be content from a service because the content would come from a storage location connected to the electronic device via a network (i.e., be downloaded from a corresponding URL that the user had subscribed to).

xvii. Claim [8(e)]

d) Ryu in view of Hodge in further view of Stallings teaches the claimed "presenting a plurality of content items when the user is recognized via the recognition mechanism and it is detected that the user looks at a direction toward the electronic device"

112. As discussed above with respect to Ground II, *Ryu* in view of *Hodge* in further view of *Stallings* teaches presenting a plurality of content items on a gateway screen on an electronic device after having determined that the user was both recognized and looking in a direction towards the electronic device. See ¶¶ 107-108.

xviii. Claim 10

e) Ryu in view of Hodge in further view of Stallings teaches the claimed "The method according to claim 8 wherein the plurality of content items is arranged by a service."

113. As discussed above with respect to Ground II, Ryu in view of Hodge in further view of Stallings teaches the plurality of content items arranged by a service. See ¶¶ 109-110.

xix. Claim [14(e)]

f) Ryu in view of Hodge in further view of Stallings teaches the claimed "present a plurality of content items when it is determined that the user looks at a direction toward the electronic device and the user is recognized via the recognition mechanism."

114. As discussed above with respect to Ground II, Ryu in view of Hodge in further view of Stallings teaches presenting a plurality of content items on a gateway screen on an electronic device after having determined that the user was both recognized and looking in a direction towards the electronic device. See ¶¶ 107-108.

xx. Claim 19

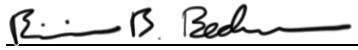
g) Ryu in view of Hodge in further view of Stallings teaches the claimed "The electronic device according to claim 14 wherein the user relies on a service to arrange the plurality of content items."

115. As discussed above with respect to Ground II, Ryu in view of Hodge in further view of Stallings teaches the plurality of content items as being arranged by a service. See ¶¶ 109-111.

VI. CONCLUSION

116. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were 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.

Date: February 6, 2023

By: 
Dr. Benjamin B. Bederson

APPENDIX A

Dr. Benjamin B. Bederson
University of Maryland, College Park
Professor Emeritus, Computer Science

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I have read the following and certify that it is a current and accurate statement of my professional record as of January 27, 2023.

1. PERSONAL INFORMATION

EDUCATION

9/89 – 6/92	**Ph.D., New York University, Computer Science Dept.**	**New York, NY**
9/87 – 8/89	**M.S., New York University, Computer Science Dept.**	**New York, NY**
9/82 – 6/86	**B.S., Rensselaer Polytechnic Institute, Computer Science Dept.** **Minor, Electrical Engineering**	**Troy, NY**

EMPLOYMENT

1/19 – Present	**Bederson Expert Services, Inc.** Technical consulting	**Windsor, MA**
1/98 – Present	**University of Maryland, Computer Science Dept./UMIACS** 7/19 – Present: Professor Emeritus, Computer Science Department. 4/14 – 6/18: Associate Provost of Learning Initiatives, and Executive Director of Teaching and Learning Transformation Center 4/13 – 4/14: Special Advisor to the Provost on Technology and Educational Transformation 8/11 – 6/19: Professor 9/04 – 7/11: Associate Professor 6/00 – 9/06: Director of the Human-Computer Interaction Lab (HCIL) 1/98 – 8/04: Assistant Professor	**College Park, MD**
1/06 – Present	**International Children's Digital Library Foundation** Co-founder and Technical Director for this library of exemplary free online children's books from around the world. 7/17 – present: President, secretary and treasurer	**Windsor, MA**
10/14 – Present	**Hazel Analytics, Inc.** Co-founder & Board member: regulatory data analytics 10/14 – 12/19: Chief Technology Officer	**Seattle, WA**
9/06 – 10/14	**Zumobi, Inc.** Co-founder of VC-funded startup for mobile apps and advertising. 9/06–1/08: VP Client Technologies 1/08–10/14: Chief Scientist	**Seattle, WA**
6/03 – 11/08	**Windsor Interfaces, Inc.** Founder: Small company to commercialize HCIL products.	**Chevy Chase, MD**
1/95 – 8/97	**University of New Mexico, Computer Science Department** Assistant Professor in the Computer Science Department.	**Albuquerque, NM**
9/92 – 8/94	**Bell Communications Research (Bellcore)** Research Scientist in Computer Graphics and Interactive Media group.	**Morristown, NJ**
6/93 – 7/94	**New York University, Media Research Laboratory** Visiting Research Scientist.	**New York, NY**

9/90 – 8/92	**Vision Applications, Inc.** Research Scientist.	**New York, NY**
9/88 – 6/90	**New York University, Computer Science Department** Teaching Assistant.	**New York, NY**
1/87 – 5/87	**North Slope Borough/North Slope Higher Education Center** Instructor. Taught Computers & Society to rural Eskimo population.	**Barrow, AK**

2. RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

Note about publications:

- In all references, my name is in bold.
- Authors are displayed as published. Authors are usually listed in order of decreasing contribution – except that sometimes the last author is the lead advising faculty member. I put an asterisk next to my name when I served that role.
- Students that I supervised are underlined.

A. BOOKS

i. Authored Books

1. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., **Bederson, B. B.**, Conrad, F.G., Traugott, M., (2008) "Voting Technology and the Not-So-Simple Act of Casting a Ballot," *Brookings Institute Press*.

ii. Edited Collections

1. Teevan, J., Jones, W., **Bederson, B. B.** (Eds.) (2006) *Communications of the ACM (CACM)*, Editors of special issue on "Personal Information Management", 49 (1), ACM Press.
2. **Bederson, B. B.**, Shneiderman, B. (Eds.) (2003). *The Craft of Information Visualization: Readings and Reflections*. San Francisco: Morgan Kaufmann.

iii. Book Chapters

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2. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., **Bederson, B. B.**, Conrad, F.G., Traugott, M.W. (2008) The Current State of Electronic Voting in the United States. Chen, H., Brandt, L., Dawes, S., Gregg, V., Hovy, E., Macintosh, A., Traunmüller, R., Larson, C. (Eds.) *Digital Government: Advanced Research and Case Studies,* Springer, 157-180.
3. Karlson, A., **Bederson, B. B.**, & Contreras-Vidal, Jose L. (2007) Understanding One Handed Use of Mobile Devices. Lumsden, Jo (Ed.), *Handbook of Research on User Interface Design and Evaluation for Mobile Technology,* Idea Group Reference, 86-101.
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7. **Bederson, B. B.**, Hollan, J. D., Stewart, J., Rogers, D., Druin, A., Vick, D., Ring, L., Grose, E., & Forsythe, C. (1997). A Zooming Web Browser. C. Forsythe, J. Ratner, & E. Grose (eds.), *Human Factors and Web Development* (Chap. 19, 255-266). New Jersey: Lawrence Erlbaum.

8. **Bederson, B. B.**, & Druin, A. (1995). Computer Augmented Environments: Physical Spaces to Enrich Our Lives. Jakob Nielsen (eds.), *Advances in Human-Computer Interaction* (Vol. 5, Chap. 2, 37-66). New Jersey: Ablex Press.
9. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1993). A Miniaturized Space-Variant Active Vision System: Cortex-I. Richard Mammone (eds.), *Artificial Neural Networks for Speech and Vision*. Chapman-Hall Publishers.
10. Wallace, R. S., Ong, P.-W., **Bederson, B. B.**, & Schwartz, E. L. (1993). Connective Graphs in Space-Variant Active Vision. George A. Bekey & Ken Goldberg (eds.), *Neural Networks in Robotics*. Kluwer Academic Publishers.

B. REFEREED ARTICLES
i. Journals

1. **Bederson, B. B.**, Jin, G. Z., Leslie, P., Quinn, A. J., Zou, B. (2017) "Incomplete Disclosure: Evidence of Signaling and Countersignaling", in *American Economic Journal: Microeconomics*, (in press).
2. Anderson, L. B., Gardner, E. E., Wolvin, A., Kirby-Straker, R., Yalcin, A., & **Bederson, B. B.*** (2016), "Incorporating Learning Analytics into Basic Course Administration: How to Embrace the Opportunity to Identify Inconsistencies and Inform Responses", in *Journal of the Association for Communication Administration*, 35 (1), Winter-Spring 2016, pp 2-14.
3. Lee, T. Y., **Bederson, B. B.*** (2016) "Give the people what they want: studying end-user needs for enhancing the web", *PeerJ Computer Science,* Nov, 2016, 2:e91 https://doi.org/10.7717/peerj-cs.91
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7. Bonsignore, E., Quinn, A. J., Druin, A. & **Bederson, B. B.*** (2013) "Sharing Stories 'In The Wild': A Mobile Storytelling Case Study using StoryKit", in *Transactions on Computer-Human Interaction (TOCHI)*, ACM, 20 (3), July 2013, Article 18.
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12. Hanmer, M.J., Park, W-H., Traugott, M.W., Niemi, R.G., Herrnson, P.S., **Bederson, B. B.**, and Conrad, F.C. (2008) "Losing Fewer Votes: The Impact of Changing Voting Systems on Residual Votes", *in Political Research Quarterly,* Sage Publications, September, 2008. doi:10.1177/1065912908324201.
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27. Parr, C. S., Lee, B., & **Bederson, B. B.*** (2004). Visualizations for Taxonomic and Phylogenetic Trees. *Bioinformatics*, Oxford University Press, 20 (17), 2997-3004.

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39. **Bederson, B. B.**, & Meyer, J. (1998). Implementing a Zooming User Interface: Experience Building Pad++. *Software: Practice and Experience*, 28(10), 1101-1135.

40. **Bederson, B. B.**, Hollan, J. D., Perlin, K., Meyer, J., Bacon, D., & Furnas, G. W. (1996). Pad++: A Zoomable Graphical Sketchpad for Exploring Alternate Interface Physics. *Journal of Visual Languages and Computing*, 7, 3-31.

41. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1995). A Miniaturized Space-Variant Active Vision System: Cortex-I. *Machine Vision and Applications*, 8 (2), 101-109.

42. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1994). A Miniature Pan-Tilt Actuator: the Spherical Pointing Motor. *IEEE Transactions on Robotics and Automation*, 10(3), 298-308.

43. Wallace, R. S., Ong, P.-W., **Bederson, B. B.**, & Schwartz, E. L. (1994). Space-Variant Image Processing. *International Journal of Computer Vision*, 13(1), 71-90.

ii. Peer-Reviewed Published Full-Length Conference Papers

1. Yalçın, M. A., Elmqvist, N., & **Bederson, B. B.*** (2017) Raising the Bars: Evaluating Treemaps vs. Wrapped Bars for Dense Visualization of Sorted Numeric Data, *Proceedings of Graphics Interface (GI 2017)*, 41-49. DOI: https://doi.org/10.20380/GI2017.06

2. Quinn, A., & **Bederson, B. B.*** (2014) AskSheet: Efficient Use of Web Workers to Support Decision Making, *Proceedings of ACM CSCW (CSCW 2014)*, ACM Press, pp. 1456–1466.

3. Yeh, T., Chang, T-H., Xie, B., Walsh, G., Watkins, I., Wongsuphasawat, K., Davis, L.S., & **Bederson, B. B.*** (2011) Creating Contextual Help for GUIs Using Screenshots, *Proceedings of ACM UIST (UIST 2011)*, ACM Press, 145-154.

4. Quinn, A., & **Bederson, B. B.*** (2011) Human Computation: A Survey and Taxonomy of a Growing Field, *Proceedings of ACM CHI (CHI 2011)*, ACM Press, 1403-1412.

5. Resnik, P., Buzek, O., Hu, C., Kronrod, Y., Quinn, A.J., & **Bederson, B. B.*** (2010) Improving Translation via Targeted Paraphrasing, *Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP 2010)*, 127-137.

6. Hu, C., **Bederson, B. B.,** & Resnik, P. (2010) Translation by Interactive Collaboration between Monolingual Users, *Proceedings of Graphics Interface (GI 2010),* 39-46.

7. Dearman, D., Karlson, A., Meyers, B., & **Bederson, B. B.** (2010) Multi-Modal Text Entry and Selection on Mobile Devices, *Proceedings of Graphics Interface (GI 2010),* 19-26.

8. Quinn, A., Hu, C., Arisaka, T., & **Bederson, B. B.*** (2008) Readability of Scanned Books in Digital Libraries, *Proceedings of ACM CHI (CHI 2008)*, ACM Press, 705-714. [22% acceptance rate]

9. Karlson, A., & **Bederson, B. B.*** (2008) One-Handed Touchscreen Input for Legacy Applications, *Proceedings of ACM CHI (CHI 2008)*, ACM Press 1399-1408. [22% acceptance rate]

10. **Bederson, B. B.**, Clamage, A., Plaisant, C., (2008) Enhancing In-Car Navigation Systems with Personal Experience, *in Proc. of the Transportation Research Board 87th annual meeting*, The National Academies, Washington, DC (2008) 1-11.

11. Karlson, A., & **Bederson, B. B.*** (2007) ThumbSpace: Generalized One-Handed Input for Touchscreen-Based Mobile Devices, *Proceedings of INTERACT 2007*, 324-338 – **Winner of Brian Shackel Award for making an "outstanding contribution with international impact in the field of HCI".**

12. Druin, A., Weeks, A., Massey, S., & **Bederson, B. B.** (2007) Children's Interests and Concerns When Using the International Children's Digital Library: A four country case study, *Proceedings of the Joint Conference on Digital Libraries (JCDL 2007)*, 167-176. – **Nominated for Best Paper Award, came in #2.** [36% acceptance rate].

13. Parhi, P., Karlson, A., & **Bederson, B. B.*** (2006). "Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices", *Proceedings of MobileHCI 2006*, ACM Press, 203-210. – **Winner of Best Historical Paper Award, September 2016.**

14. Hutchinson, H. B., **Bederson, B. B.**, & Druin, A. (2006). "The Evolution of the International Children's Digital Library Searching and Browsing Interface", *Proceedings of 5th International Conference for Interaction Design and Children (IDC 2006)*, ACM Press, 105-112. [38% acceptance rate]

15. Hutchinson, H., Druin, A., **Bederson, B. B.**, Reuter, K., Rose, A., Weeks, A. (2005) How do I Find Blue Books About Dogs? The Errors and Frustrations of Young Digital Library Users, *Proceedings of HCII 2005*, Las Vegas, NV (CD-ROM).

16. Shneiderman, B. & **Bederson, B. B.** (2005). "Maintaining Concentration to Achieve Task Completion", *Proceedings of Designing User Experience (DUX 2005)*.

17. Karlson, A., **Bederson, B. B.**, & SanGiovanni, J. (2005). AppLens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices, CHI Letters, 7(1), 201-210. [25% acceptance rate] – **Nominated for Best Paper Award.**

18. Khella, A., **Bederson, B. B.*** (2004). Pocket PhotoMesa: A Zoomable Image Browser for PDAs. *In Proceedings of Mobile and Ubiquitous Multimedia (MUM 2004)* ACM Press, 19-24.

19. Lee, B., Parr, C. S., Campbell, D., & **Bederson, B. B.*** (2004). How Users Interact With Biodiversity Information Using TaxonTree. *In Proceedings of Advanced Visual Interfaces (AVI 2004)* ACM Press, 320-327. [25% acceptance rate]

20. Suh, B., Ling, H., **Bederson, B. B.**, & Jacobs, J. W. (2003). Automatic Thumbnail Cropping and Its Effectiveness. UIST 2003, ACM Symposium on User Interface Software and Technology, CHI Letters, 5(2), 95-104. [22% acceptance rate] – **Winner of Best Student Paper Award**.

21. **Bederson, B. B.**, Lee, B., Sherman, R., Herrnson, P. S., Niemi, R. G. (2003). Electronic Voting System Usability Issues. CHI 2003, ACM Conference on Human Factors in Computing Systems, CHI Letters, 5(1), 145-152. [16% acceptance rate]

22. Hutchinson, H., Mackay, W., Westerlund, B., **Bederson, B. B.**, Druin, A., Plaisant, C., Evans, H., Hansen, H., Conversy, S., Beaudouin-Lafon, M., Roussel, N., Lacomme, L., Eiderbäck, B., Lindquist, S., Sundblad, Y. (2003). Technology Probes: Inspiring Design for and with Families. CHI 2003, ACM Conference on Human Factors in Computing Systems, CHI Letters, 5(1), 17-24. [16% acceptance rate]

23. Knudtzon, K., Druin, A., Kaplan, N., Summers, K., Chisik, Y., Kulkarni, R., Moulthrop, S., Weeks, H., & **Bederson, B.** Starting an Intergenerational Technology Design Team: A Case Study. *In Proceedings of* Interaction Design and Chidlren (*IDC 2003*) ACM Press, 51-58.

24. Baudisch, P., Cutrell, P., Robbins, D., Czerwinski, M., Tandler, P., **Bederson, B. B.**, & Zierlinger, A. (2003) Drag-and-Pop and Drag-and-Pick: Techniques for Accessing Remote Screen Content on Touch- and Pen-Operated Systems. *Proceedings of Interact 2003*, Austria: International Federation for Information Processing, 57-64. [33% acceptance rate]

25. Plaisant, C., Grosjean, J., & **Bederson, B. B.*** (2002) SpaceTree: Design Evolution of a Node Link Tree Browser. *Proceedings of Information Visualization Symposium (InfoVis 2002)* New York: IEEE, 57-64. [27% acceptance rate] – **Won 2022 IEEE Vis Test of Time Award in InfoVis, https://ieeevis.org/year/2022/info/awards/test-of-time-awards.**

26. Suh, B., & **Bederson, B. B.*** (2002) OZONE: A Zoomable Interface for Navigating Ontology Information. *Proceedings of International Conference on Advanced Visual Interfaces (AVI 2002)*, ACM Press, Trento, Italy, 139-143. [30% acceptance rate]

27. Boltman, A., Druin, A., **Bederson, B.**, Hourcade, J.P., Stanton, D., O'Malley, C., Cobb, S., Benford, S., Fast, C., Kjellin, M., & Sundblad, Y. (2002). The nature of children's storytelling with and without technology. *Proceedings of American Educational Research Association (AERA) Conference*, New Orleans.

28. **Bederson, B. B.** (2001). PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps. UIST 2001, ACM Symposium on User Interface Software and Technology, CHI Letters, 3(2), 71-80. [19% acceptance rate]

29. Druin, A., **Bederson, B. B.**, Hourcade, J.P., Sherman, L., Revelle, G., Platner, M., Weng, S. (2001) Designing a Digital Library for Young Children. *In Proceedings of Joint Conference on Digital Libraries (JCDL 2001)* ACM Press, 398-405. [30% acceptance rate]

30. Benford, S., **Bederson, B. B.**, Åkesson, K., Bayon, V., Druin, A., Hansson, P., Hourcade, J. P., Ingram, R., Neale, H., O'Malley, C., Simsarian, K., Stanton, D., Sundblad, Y., & Taxén, G. (2000). Designing Storytelling Technologies to Encourage Collaboration Between Young Children. CHI 2000, ACM Conference on Human Factors in Computing Systems, CHI Letters, 2(1), 556-563. [19% acceptance rate]

31. **Bederson, B. B.**, Meyer, J., & Good, L. (2000). Jazz: An Extensible Zoomable User Interface Graphics Toolkit in Java. UIST 2000, ACM Symposium on User Interface Software and Technology, CHI Letters, 2(2), 171-180. [26% acceptance rate]

32. **Bederson, B. B.** (2000). Fisheye Menus. UIST 2000, ACM Symposium on User Interface Software and Technology, CHI Letters, 2(2), 217-225. [26% acceptance rate]

33. Gandhi, R., Kumar, G., **Bederson, B. B.**, & Shneiderman, B. (2000). Domain Name Based Visualization of Web Histories in a Zoomable User Interface. *In Proceedings of Eleventh International Workshop on Database and Expert Systems Applications – Second International Workshop on Web-Based Information Visualization (WebVis 2000)*, IEEE Computer Society, Los Alamitos, CA (2000), 591-598.

34. **Bederson, B. B.**, & Boltman, A. (1999). Does Animation Help Users Build Mental Maps of Spatial Information? *In Proceedings of Information Visualization Symposium (InfoVis 99)* New York: IEEE, 28-35. [23% acceptance rate]

35. Combs, T. T. A., & **Bederson, B. B.*** (1999). Does Zooming Improve Image Browsing? *In Proceedings of Digital Library (DL 99)* New York: ACM, 130-137. [21% acceptance rate]

36. Stewart, J., **Bederson, B. B.**, & Druin, A. (1999). Single Display Groupware: A Model for Co-Present Collaboration. *In Proceedings of Human Factors in Computing Systems (CHI 99)* ACM Press, 286-293. [25% acceptance rate]

37. Hightower, R. R., Ring, L., Helfman, J., **Bederson, B. B.**, & Hollan, J. D. (1998). Graphical Multiscale Web Histories: A Study of PadPrints. *In Proceedings of ACM Conference on Hypertext (Hypertext 98)* ACM Press, 58-65.

38. Druin, A., Stewart, J., Proft, D., **Bederson, B. B.**, & Hollan, J. D. (1997). KidPad: A Design Collaboration Between Children, Technologists, and Educators. *In Proceedings of Human Factors in Computing Systems (CHI 97)* ACM Press, 463-470. [22% acceptance rate]

39. **Bederson, B. B.**, Hollan, J. D., Stewart, J., Rogers, D., Druin, A., & Vick, D. (1996). A Zooming Web Browser. *In Proceedings of SPIE Multimedia Computing and Networking* New York: IEEE, 260-271. https://www.spiedigitallibrary.org/conference-proceedings-of-spie/2667/0000/Zooming-Web-browser/10.1117/12.235898.short

40. **Bederson, B. B.**, & Hollan, J. D. (1995). Advances in the Pad++ Zoomable Graphics Widget. *In Proceedings of USENIX Tcl/Tk '95 Workshop (Tcl/Tk 95)* New York: USENIX, 3.

41. Furnas, G. W., & **Bederson, B. B.** (1995). Space-Scale Diagrams: Understanding Multiscale Interfaces. *In Proc. of Human Factors in Computing Systems (CHI 95)* ACM Press, 234-241. [29% acceptance rate]

42. **Bederson, B. B.**, & Hollan, J. D. (1994). Pad++: A Zooming Graphical Interface for Exploring Alternate Interface Physics. *In Proc. of User Interface and Software Technology (UIST 94)* ACM Press, 17-26.

43. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1993). Control & Design of the Spherical Pointing Motor. *In Proceedings of IEEE International Conference on Robotics and Automation (ICRA 93)* New York: IEEE, 2, 630-636.

44. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1992). A Miniaturized Active Vision System. *In Proceedings of Eleventh International Conference on Pattern Recognition,* IEEE Press, 58-61.

45. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1992). Two Miniature Pan-Tilt Devices. *In Proceedings of IEEE International Conference on Robotics and Automation,* New York: IEEE Press, (1), 658-663.

46. Wallace, R. S., **Bederson, B. B.**, & Schwartz, E. L. (1992). Voice-Bandwidth Visual Communication Through Logmaps: the Telecortex. *In Proceedings of IEEE Workshop on Applications of Computer Vision* New York: IEEE Press, 4-10.

iii. Other Publications

1. Yalcin, M. A., Elmqvist, N., & **Bederson, B. B.*** (2017). Piled Bars: Dense Visualization of Numeric Data. Poster presented at Graphics Interfaces, 2017.

2. **Bederson, B. B.**, Barker, K., Owens, L., Kim, Y. J. & Palmer, K. (2017) Designing Organizations to Support Tech on Campus. Panel at SXSW Edu, Austin, TX, March 6, 2017.

3. Yalcin, M. A., Elmqvist, N., & **Bederson, B. B.*** (2016). Keshif: Out-of-the-Box Visual and Interactive Data Exploration Environment. In *Proceedings of IEEE VIS 2016 Workshop on Visualization in Practice: Open Source Visualization and Visual Analytics Software*.

4. Yalcin, M. A., Elmqvist, N., & **Bederson, B. B.*** (2016). Cognitive Stages in Visual Data Exploration. In *Proceedings of Beyond Time and Errors: Novel Evaluation Methods for Visualization* (BELIV 2016) at IEEE VIS 2016.

5. Roberts, S., Swan, L., & **Bederson, B. B.** (2016). "Fishing for Faculty: The Bait and Hooks", Workshop in 2016 Professional and Organizational Development (POD) Conference, Louisville, KY, November, 2016.

6. Anderson, L. B., Gardner, E. E., Wolvin, A., Kirby-Straker, R., Yalcin, A., & **Bederson, B. B.*** (2015), "Incorporating Learning Analytics into Basic Course Administration: How to Embrace the Opportunity to Identify Inconsistencies and Inform Responses". *In NCA 2015 - 101th Annual meeting of the National Communication Association*. **Top Paper in Basic Course Division.**

7. Anderson, L. B., Gardner, E. E., Wolvin, A., Kirby-Straker, R., Yalcin, A., & **Bederson, B. B.*** (2015), "Utilizing learning analytics to improve the basic course: A qualitative analysis of the instructor feedback captured in Revealer". *Paper presented at the annual meeting of the Eastern Communication Association, Philadelphia, PA, June 2015*.

8. Hara, K, Hajiaghayi, M., & **Bederson, B. B.** (2015). FluTCHA: Using Fluency to Distinguish Humans from Computers, short paper and poster, WWW2015, Florence, Italy, May 18-22, 2015.

9. Teasley, S., & **Bederson, B. B.** (2015). Learning Analytics and iSchools: What, Why & Worries, *at iConference*, Session for Interaction and Engagement, March 24-27, 2015, Newport Beach, CA.

10. Xu, Z., Goldwasser, D., **Bederson, B. B.**, Lin, J. (2014) Visual Analytics of MOOCs at Maryland, *Poster at Learning @ Scale Conference (L@S '14)*.

11. **Bederson, B. B.**, Jin, G., Leslie, P., Quinn, A.J., & Zhou, B. (alphabetical order), (2014) "Incomplete Disclosure: Insights from Maricopa", International Industrial Organization Conference, April 11-13, 2014, Chicago.

12. Lee, T.Y., Mauriello, M.L., Ingraham, J., Sopan, A., Ahn, J., & **Bederson, B. B.*** (2012) "CTArcade: Learning Computational Thinking while Training Virtual Characters Through Game Play", WiP at CHI 2012, ACM Press, 2309-2314.

13. Cranor, L., **Bederson, B. B.**, & Quesenberry, W. (2012) "Occupy CHI! Engaging U.S. Policymakers", Panel in CHI 2012, ACM Press, 1139-1142.

14. **Bederson, B. B.**, Quinn, A. J., & Rose, A. (2012) SearchParty: Learning to Search in a Web-based Classroom, Workshop paper at CHI 2012.

15. Hu, C., Resnik, P., Kronrod, Y., & **Bederson, B. B.*** (2012) Deploying MonoTrans Widgets in the Wild. Note at CHI 2012, ACM Press, 2935-2938.

16. Hu, C., Resnik, P., Kronrod, Y., Eidelman, V., Buzek, O., & **Bederson, B. B.*** (2011) The Value of Monolingual Crowdsourcing in a Real-World Translation Scenario: Simulation using Haitian Creole Emergency SMS Messages. *In Proceedings of EMNLP 2011 Sixth Workshop on Statistical Machine Translation, 399-404.*

17. Kronrad, Y., Hu, C., Buzek, O., & Quinn, A.J. (2011) Using Monolingual Crowd to Improve Translation. Student poster at AAAS 2011. **Winner of poster in Math, Technology and Engineering category.**

18. **Bederson, B. B.**, & Quinn, A.J. (2011) Web Workers Unite! Addressing Challenges of Online Laborers. Alt.CHI paper at CHI 2011, ACM Press, 97-106.

19. Hu, C., **Bederson, B. B.**, & Resnik, P. (2011) MonoTrans2: A New Human Computation System to Support Monolingual Translation. Short paper at CHI 2011, ACM Press, 1133-1136.

20. Kronrod, Y., Buzek, O., Hu, C., Quinn, A., Resnik, P., & **Bederson, B. B.*** (2010) Using Crowdsourcing to Translate Without Bilinguals. Poster at CrowdConf 2010.

21. Hu, C., **Bederson, B. B.**, and Resnik, P. (2010) Translation by Iterative Collaboration Between Monolingual Users. Abstract and demo at the Human Computation Workshop (HCOMP 2010), 54-55.

22. Buzek, O., Resnik, P., & **Bederson, B. B.*** (2010) Error Driven Paraphrase Annotation using Mechanical Turk, In Creating Speech and Language Data With Amazon's Mechanical Turk, NAACL 2010 Workshop, 2010.

23. Chen, R., Rose, A., & **Bederson, B. B.*** (2009) How People Read Books Online: Mining and Visualizing Web Logs for Use Information. In Proceedings of European Conference on Digital Libraries (ECDL 2009), Short Paper, 364-369.

24. **Bederson, B. B.**, Rutledge, P., Quinn, A. (2009) Generalizing the International Children's Digital Library. In Proceedings of the Digital Humanities Conference (DH 09), Poster.

25. **Bederson, B. B.**, Quinn, A., Druin, A. (2009) Designing the Reading Experience for Scanned Multi-lingual Picture Books on Mobile Phones. In Proceedings of the Joint Conference on Digital Libraries (JCDL 2009), Short Paper, ACM Press, New York, NY, 305-308.

26. Hu, C., Rose, A., **Bederson, B. B.*** (2009) Locating Text in Scanned Books. In Proceedings of the Joint Conference on Digital Libraries (JCDL 2009), Poster.

27. Druin, A., Cavallo, D., Fabian, C., **Bederson, B. B.**, Revelle, G., Rogers, Y. (2009) Mobile Technologies for the World's Children. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2009), ACM Press, Panel.

28. **Bederson, B. B.** (2008) "Experiencing the International Children's Digital Library", Interactions Magazine, ACM Press, 15 (6), 50-54.

29. Lazar, J., Hochheiser, H., Johnson, J., Karat, C-M., **Bederson, B. B.** (2008) "CHI Policy Issues Around the World", Panel in CHI 2008, ACM Press, 2277-2280.

30. Teevan, J., Jones, W., **Bederson, B. B.**, (2006) "Introduction: Personal Information Management," Communications of the ACM, 49 (1), 40-43. Ranked #3 "Year Rank" in annual downloads among ACM Magazines and Computing Surveys articles (CACM, 50 (12), 92-93).
31. Lee, B., Parr, C.S., Plaisant, C., **Bederson, B. B.**, (2006) "TreePlus: Visualizing Graphs as Trees," Video in InfoVis 2006.
32. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., **Bederson, B. B.**, Conrad, F.G., Traugott, M., (2006) "The Importance of Usability Testing of Voting Systems," in Usenix/Accurate Electronic Voting Workshop.
33. Herrnson, P., Niemi, R., Hanmer, M., **Bederson, B. B.**, Conrad, F., Traugott, M., (2006) "Voter Errors in Electronic voting: Voting Systems, Ballot Type, and Voter Traits," In Midwest Political Science Association annual conference.
34. Herrnson, P., Niemi, R., Hanmer, M., **Bederson, B. B.**, Conrad, F., Traugott, M., (2006) "Voters' Abilities to Cast Write-In Votes Using Electronic Voting Systems," In Midwest Political Science Association annual conference.
35. Conrad, F., Peytcheva, E., Traugott, M., Lewis, B., Herrnson, P., **Bederson, B. B.** (2006) "Usability of Electronic Voting Systems: Field and Laboratory Experiments," In Midwest Political Science Association annual conference.
36. Lee, B., Parr, C. S., Plaisant, C., & **Bederson, B. B.*** (2005) "Visualizing Graphs as Trees: Plant a Seed and Watch it Grow", Proceedings of Graph Drawing 2005, 516-518.
37. Klein, C. &, **Bederson, B. B.*** (2005). "Benefits of Animated Scrolling", Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2005) ACM Press, Short Paper, 1965-1968.
38. Lee, B., Czerwinski, M., Robertson, G. G. &, **Bederson, B. B.** (2005). "Understanding Research Trends in Conferences using PaperLens", Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2005) ACM Press, Short Paper, 1969-1972.
39. Traugott, M.W., Hanmer, M.J., Park, W.H., Herrnson, P.S., Niemi, R.G., **Bederson, B. B.**, Conrad, F.G.,(2005) "The Impact of Voting Systems on Residual Votes, Incomplete Ballots, and Other Measures of Voting Behavior," In American Political Science Association meeting (APSA 2005).
40. Lee, B., Czerwinski, M., Robertson, G. G. &, **Bederson, B. B.** (2004). "Understanding Eight Years of InfoVis Conferences using PaperLens", InfoVis 2004 Symposium Compendium. **Winner of InfoVis Contest**.
41. **Bederson, B. B.** (2004) Interfaces for Staying in the Flow. In Ubiquity, ACM Press, (5) 27.
42. Hourcade, J. P., **Bederson, B. B.**, Druin, A. (2004) Preschool Children's Use of Mouse Buttons. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2004) ACM Press, Short Paper, 1411-1412.
43. Selker, T., Fischer, E. A., **Bederson, B. B.**, McCormack, C., Nass, C. (2003) Voting: User Experience, Technology and Practice. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2003) ACM Press, Panel, 700-701.
44. **Bederson, B. B.**, Clamage, A., Czerwinski, M. P., Robertson, G. G. (2003) A Fisheye Calendar Interface for PDAs: Providing Overviews in Small Displays. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2003) ACM Press, Demonstration, 618-619.
45. Hourcade, J.P., **Bederson, B. B.**, Druin, A., Rose, A., Farber, A., Takayama, Y. (2002). The International Children's Digital Library: Viewing Digital Books Online. Interaction Design and Children International Workshop, August 28-29, 2002, Eindhoven, The Netherlands 15 (3), 151-167.
46. Herrnson, P., **Bederson, B. B.** (2002) Debugging Maryland Balloting, Washington Post, Outlook Section, p. B08, Sunday May 12th, 2002.
47. Good, L., **Bederson, B. B.**, Stefik, M., Baudisch, P. (2002) Automatic Text Reduction For Changing Size Constraints. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Short Paper, 798-799.

48. Hourcade, J.P., **Bederson, B. B.**, Druin, A., Taxén, G. (2002) KidPad: A Collaborative Storytelling Tool for Children. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Referred Demo, 500-501.

49. Hourcade, J.P., **Bederson, B. B.**, Druin, A. (2002) SearchKids: A Digital Library Interface for Young Children. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Referred Demo, 512-513.

50. **Bederson, B. B.** (2001). PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps. UIST 2001, ACM Symposium on User Interface Software and Technology. Refereed demo.

51. Browne, H., **Bederson, B. B.**, Druin, A., Sherman, L., & Westerman, W. (September 2000) Designing a Collaborative Finger Painting Application for Children, HCIL-2000-17, CS-TR-4184, UMIACS-TR-2000-66

52. Hourcade, J., **Bederson, B. B.** (May 1999) Architecture and Implementation of a Java Package for Multiple Input Devices (MID) HCIL-99-08, CS-TR-4018, UMIACS-TR-99-26

53. Hightower, R.R., Ring, L.T., Helfman, J.I., **Bederson, B. B.**, Hollan, J.D. (1998) PadPrints: Graphical Multiscale Web Histories. UIST 1998, ACM Symposium on User Interface Software and Technology. Tech Note, 121-122.

54. Stewart, J., Raybourn, E., **Bederson, B. B.**, & Druin, A. (1998). When Two Hands Are Better Than One: Enhancing Collaboration Using Single Display Groupware. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 98) ACM Press, Short Paper, 287-288.

55. **Bederson, B. B.**, Hollan, J. D., Druin, A., Stewart, J., Rogers, D., & Proft, D. (1996). Local Tools: An Alternative to Tool Palettes. In Proceedings of User Interface and Software Technology (UIST 96) ACM Press, Short Paper, 169-170.

56. **Bederson, B. B.**, Hollan, J. D. (1995) Pad++: A Zoomable Graphical Interface System. In Proceedings of Conference on Human Factors in Computing Systems Conference Companion (CHI 95) ACM Press, Short Paper, 23-24.

57. **Bederson, B. B.**, & Davenport, G., & Druin, A., & Maes, P. (1994). Immersive Environments: A Physical Approach to the Multimedia Experience, In Proceedings of IEEE International Conference on Multimedia Computing and Systems, Boston, Massachusetts, May 17-19, 1994, (Panel).

58. **Bederson, B. B.** (1995). Audio Augmented Reality: A Prototype Automated Tour Guide. In Proceedings of Human Factors in Computing Systems (CHI 95) New York: ACM Press, (Short Paper), 210-211.

59. Stone, L. M., Erickson, T., **Bederson, B. B.**, Rothman, P., Muzzy, R. (1994) Visualizing Data: Is Virtual Reality the Key? IEEE Visualization, IEEE Press, Short Paper, 410-413.

60. **Bederson, B. B.**, Stead, L., & Hollan, J. D. (1994). Pad++: Advances in Multiscale Interfaces. In Proceedings of Human Factors in Computing Systems (CHI 94) New York: ACM Press, Short Paper, 315-316.

61. **Bederson, B. B.** (1992). A Miniature Space-Variant Active Vision System: Cortex-I. Doctoral dissertation, New York University, New York, NY.

E. TALKS, ABSTRACTS, AND OTHER PROFESSIONAL PAPERS PRESENTED
i. Keynote Talks

1. April 2017 **CHIuXiD - The International Conference in Human-Computer Interaction & User Experience**, Jakarta, Indonesia
   "From Human-Computer Interaction to Strategic Leadership for Change"

2. March 2017 **Maryland College Learning Center Association**, Shady Grove, MD
   "Fishing for Faculty: Teaching & Learning Engagement at UMD"

3. April 2014 **Innovations in Teaching and Learning Conference**, College Park, MD
   "An Introduction to the Teaching and Learning Transformation Center"

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4. October, 2012 **South African Institute for Computer Scientists and Information Technologists** Johannesburg, South Africa
   "Social Participation: How Collective Activity Can Make Change"
5. September, 2010 **Visual Information Communication International Symposium**, Beijing, China
   "The Promise of Zoomable User Interfaces"
6. May, 2010 **Human-Computer Interaction Lab's 27th Annual Symposium**, College Park, MD
   "The Promise of Zoomable User Interfaces"
7. November, 2009 Raja Roy Singh Keynote Lecture at the **UNESCO Asia-Pacific Programme of Educational Innovation for Development**, Hangzhou. China
   "Educational Technology for Creativity, Collaboration and Community"
8. February, 2009 **Microsoft Internal "UX Canvas Camp"**, Redmond, WA
   "A Short History of Zoomable User Interfaces"
9. September, 2002 **IEEE Symposium on Human Centric Computing Languages and Environments (HCC 02)**, Arlington, VA
   "Interfaces for Staying in the Flow"

ii. Invited Talks (doesn't include Keynote talks, which are listed above)

1. October 3, 2018, **Rutgers University**, Newark, NJ
   "Transforming Teaching at the University of Maryland"
2. September 28, 2018, **EPAM Executive Roundtable**, Minsk, Belarus
   "Workforce of the Future"
   on Panel with Eugene Roman (Canada Tire), Sjoerd Gehring (Johnson & Johnson) & Sandra Loughlin (UMD)
3. September 27, 2018, **EPAM Software Engineering Conference (SEC 2018)**, Minsk, Belarus
   "Open Company, Open Community, Open World"
   on Panel with Elaina Shekhter (EPAM), Sjoerd Gehring (Johnson & Johnson), Scott Nissenbaum (Ben Franklin Technology Partners) & Sandra Loughlin (UMD)
4. December 4, 2017, **Cornell Tech**, New York, NY
   "Academic Technologies in Higher Ed"
5. November 10, 2017, **Online Programs and MOOCs – Opportunities and Challenges**, in The 7th Annual MIS Academic Leadership Conference, RHSmith School of Business, University of Maryland
6. Sept 2, 2017, **Google**, New York, NY
   "Academic Technologies in Higher Ed"
7. June 11, 2015 **Designing a Learning Environment**, in "Open Textbooks: Challenges for Policy" workshop, University of Haifa, Haifa, Israel
8. May 13, 2015 **Strategic Integration of MOOCs into Graduate and Professional STEM Programs**, Champaign, Illinois
   Raineri, D., Breslow, L., **Bederson, B. B.**
   "Future of MOOCs in Research Universities"
9. April 13, 2015 **#EduAnalyticsDC Workshop**, Washington, DC
   "Understanding Consistency in a Large Multi-Section Course with Many Instructors"
10. March 3, 2015 **Coursera Partners Conference**, Newport Beach, CA
    Verstelle, M., Bennett, A., **Bederson, B. B.**, & Jeffries, Pam
    "Designing a MOOC Portfolio: Content Strategy for Online Education"
11. March 1, 2015 **Coursera Partners Conference**, Newport Beach, CA
    Buitendijk, S., **Bederson, B. B.**, Kerrison, M., & Price, V.
    "Value to Partners: Case Studies From Partner Institutions"

12. January 29, 2015 **University of Wisconsin, Madison**, Madison, WI
"Reflections on 20 Years Doing HCI Systems Research"
Department of Computer Science, Distinguished Lecture Series

13. Sheil, M., Rock, E., O'Brien, L., **Bederson, B. B.**, & Xiaoming, L. (2014) "Future Trajectories of MOOCS in Higher Ed", Panel at Coursera Partners' Conference.

14. February 12, 2014 **Patuxent Partnership**, Lexington Park, MD
"UMD MOOCs and What the Future Holds For Them"

15. January 29, 2014 **Carnegie Mellon University**, Pittsburgh, PA
"Power to the People: Approaches to Crowdsourcing"

16. January 14, 2014 **Microsoft**, Friendship Heights, MD
"Cracking the Code: Improving Computer Science Education Outcomes in the State of Maryland"
Panel participant on Microsoft public series "Conversations on Education"

17. November 20, 2013 **University of Maryland**, College Park, MD
"Mobile, Online, Flipped, Active: New Uses of Educational Technologies"
College of Education

18. October 11, 2013 **Huawei**, Hong Kong, China
"When Crowds Come Together"

19. October 8, 2013 **National Institute of Information and Communications Tecnology**, Osaka, Japan
"Crowdsourced Monolingual Translation"
in 2nd Workshop on Future Directions in Translation Research

20. February 1, 2013 **Google**, Mountain View, CA
"Social + MOOCs + Hcomp = SMOOCH: Computing Comes to Education"

21. January 29, 2013 **Google**, Mountain View, CA
"The Promise of Zoomable User Interfaces: Reflections on Design of Simple UX"

22. December 6, 2012 **Sunlight Foundation**, Washington, DC
"Digital Disclosure of a Nationally Standardized Database of Restaurant Food Safety Inspections" (with Ginger Jin)

23. November 19, 2012 **University of Maryland**, College Park, MD
"Innovation, Iteration & Creation: A Discussion about the Development of New Ideas in the Modern World"

24. November 6, 2012 **World Usability Day**, Minsk, Belarus
"The Promise of Zoomable User Interfaces"

25. November 2, 2012 **Central & Eastern European Software Engineering Conference in Russia** Moscow, Russia
"Learning to Code in an Online World"

26. November 2, 2012 **Central & Eastern European Software Engineering Conference in Russia** Moscow, Russia
Panelist in "Peopleware: what skills and qualifications we need to build a dream team of software engineers"

27. October 4, 2012 **UNISA – University of South Africa**, Johannesburg, South Africa
"Innovation, Iteration & Creation: A Discussion about the Development of New Ideas in the Modern World"

28. June 20, 2012 **University of Haifa**, Haifa, Israel
"Books that are Blue: What Children Can Teach Us About Creating New Technologies" (with Allison Druin)

29. June 19, 2012 **Interdisciplinary Center**, Herzilya, Israel
"Books that are Blue: What Children Can Teach Us About Creating New Technologies" (with Allison Druin)

30. Nov 17, 2011 **Future of Information Alliance**, College Park, MD
"Anonymity and Privacy While Learning"

31. Sept 21, 2011 **U.S. Senate and Congress Briefings**, Washington, DC
Panel participant in "Deconstructing the iPad: How Federally Supported Research Leads to Game-Changing Innovation" run by the Task Force on American Innovation and the CRA

32. Aug 24, 2011 **Summer Social Webshop** College Park, MD
"Translation by Collaboration Among Monolingual Users"

33. May, 2011 **National Science Foundation**, Arlington, VA
Distinguished Lecture Series
"Translation by Collaboration among Monolingual Users" (with Philip Resnik)

34. September, 2010 **Microsoft Research Asia**, Beijing, China
"Collaborative Monolingual Translation"

35. September, 2010 **Tsinghua University**, Beijing, China
"Collaborative Monolingual Translation"

36. April, 2010 **CHI 2010**, Atlanta, GA
Social Impact Award talk

37. October, 2009 **Google**, Mountain View, CA
Panel participant in "Breakthrough Learning in a Digital Age" invitation only conference

38. September, 2009 **Google Tech Talk**, Mountain View, CA
"Translation by Iterative Collaboration between Monolingual Users"

39. April, 2009 **University of Illinois (CS Dept.)**, Champaign-Urbana, IL
"Zoomable User Interfaces from Sun Sparcstations to iPhones"

40. April, 2009 **University of Illinois (iSchool)**, Champaign-Urbana, IL
"From Ulann Baatar to iPhone: A Digital Library for the World's Children"

41. February, 2009 **Tufts University**, Medford, MA
"From iPhone to Ulaan Baatar: A Digital Library for the World's Children"

42. February, 2009 **Microsoft Internal "UX Canvas Camp"**, Redmond, WA
"A Short History of Zoomable User Interfaces"

43. September, 2008, **Carnegie Mellon University**, Pittsburgh, PA
"Black Ears to Blonde Cats: Paths for Designing Change"

44. May, 2008, **Manchester Public Library** Manchester by the Sea, MA
"No Road, Drive: The ICDL Travels to Mongolia"

45. April, 2008 **Web 2.0 Expo**, San Francisco, CA
"Next Generation Mobile UI" (with John SanGiovanni)

46. February, 2008 **USACM Executive Council**, Washington, DC
"Voting Technology: The Not-So-Simple Act of Casting a Ballot"

47. October, 2007 **Widget Summit**, San Francisco, CA
"Mobile Widget Design"

48. September, 2007 **Knight Center for Specialized Journalism**, College Park, MD
"Mobile Technology Trends"

49. June, 2007 **Mobile Marketing Association**, New York, NY
"Designing for Usability"

50. May, 2007 **MIT Enterprise Forum**, Arlington, VA
"Co-present Mobile Collaboration"

51. December, 2006 **Human Factors and Ergonomics Society Potomac Chapter**, Bethesda, MD
"A Library for the World's Children"

52. June, 2006 **Open Society Forum**, Ulaan Baatar, Mongolia
"A Library for the World's Children"

53. February, 2006 **Dingman Center for Entrepreneurship, R.H. Smith School of Business**, UMD
"Web 2.0 UI"

54. December, 2005 **World Bank**, Washington, DC
"The International Children's Digital Library"

55. December, 2005 **IBM T.J. Watson Research Center**, Hawthorne, NY
"Making Visualization Work"

56. November, 2005 **NSA**, Laurel, MD
"Making Visualization Work"

57. October, 2005 **IBM Research**, Cambridge, MA
"Making Visualization Work"

58. October, 2005 **Johns Hopkins University – Computer Science Dept.**, Baltimore, MD
"Making Visualization Work"

59. September, 2005 **InfoToday Conference on 'Innovations in Search'**, New York, NY
"Zooming Into Visual Search"

60. March, 2005 **NFAIS**, Philadelphia, PA
"Making Sense of Search Results"

61. February, 2005 **American Association for the Advancement of Science (AAAS)** Washington, DC
Panel in annual conference,
"Designing Interfaces for Voting Machines"

62. February, 2005 **National Association of State Election Directors (NASED)** Washington, DC
Invited talk at annual conference.
"Designing Interfaces for Voting Machines"

63. January, 2005 **Microsoft**, Seattle, WA
"Interfaces for Staying in the Flow"

64. January, 2005 **Google**, Mountain View, CA
"The International Children's Digital Library"

65. December, 2004 **National Library of New Zealand,** Wellington, New Zealand
"The International Children's Digital Library"

66. December, 2004 **University of Waikato**, Hamilton, New Zealand
"Interfaces for Staying in the Flow"

67. December, 2004 **Victoria University Wellington**, Wellington, New Zealand
"Interfaces for Staying in the Flow"

68. December, 2004 **University of Canterbury**, Christchurch, New Zealand
"Interfaces for Staying in the Flow"

69. November, 2004 **National Archives and Records Administration (NARA)**, College Park, MD
in Conference "Partnerships in Innovation: Serving a Networked Nation"
"International Children's Digital Library"

70. April, 2004 **Johns Hopkins University Applied Physics Lab**, Laurel, MD
"Interfaces for Staying in the Flow"

71. October, 2003 **University of Maryland, Robert H. Smith School of Business**, College Park, MD
on InForum 2003 panel on "Does IT Matter?"

72. September, 2003 **University of Maryland**, College Park, MD
"Making Visualization Work"

73. September, 2003 **University of Victoria**, Victoria, Canada
"Interfaces for Staying in the Flow"

74. March, 2003 **National Archives and Records Administration**, College Park, MD
”Visualizations for Archivists”

75. March, 2003 **Microsoft Research**, Redmond, WA
”DateLens: A Scalable Fisheye Calendar Interface”

76. January, 2003 **Sun Microsystems**, Menlo Park, CA
”Zoomable User Interfaces for Searching and Browsing”

77. September, 2002 **Microsoft Research Limited**, Cambridge, England
”Information Visualization for Mobile Devices”

78. July, 2002 **Microsoft Research**, Redmond ,WA
Demo of DateLens with Bill Gates at Microsoft Faculty Summit

79. July, 2002 **Microsoft Research**, Redmond, WA
”Scalable Interfaces for Mobile Devices”

80. June, 2002, **WebShop**, Dept. of Sociology, UMD, College Park, MD
”Access and Usability: The Importance of Internet Applications”

81. January, 2002 **Workshop on Election Standards and Technology**, Washington, DC
”Visualization Techniques for Electronic Voting”

82. October, 2001 **Microsoft Research**, Redmond, WA
“Zoomable User Interfaces for Searching and Browsing: SearchKids & PhotoMesa”

83. October, 2001 **Xerox PARC**, Palo Alto, CA
“Zoomable User Interfaces for Searching and Browsing: SearchKids & PhotoMesa”

84. November, 2000 **Census Bureau, Dept. of Commerce**, Suitland, MD
”Zoomable User Interfaces”

85. May, 2000 **Bowie State University**, Bowie, MD
“Zoomable User Interfaces and Single Display Groupware”

86. April, 2000 **University of Delaware**, DE
“Zoomable User Interfaces and Single Display Groupware”

87. August, 1999 **Xerox PARC**, Palo Alto, CA
“Zoomable User Interfaces and Single Display Groupware”

88. August, 1999 **University of California, Berkeley**, Berkeley, CA
“Zoomable User Interfaces and Single Display Groupware”

89. August, 1999 **Sun Microsystems, Inc. (Java Group)**, Palo Alto, CA
“Zoomable User Interfaces and Single Display Groupware”

90. July, 1999 **Nokia**, Linköping Sweden
"Zoomable Information Retrieval Systems and Single Display Groupware"

91. June, 1998 **IBM**, Yorktown, NY
"Zoomable User Interfaces"

92. May, 1998 **Washington DC Linux User's Group**, Alexandria, VA
"Zoomable User Interfaces"

93. April, 1998 **National Institute of Standards and Technology (NIST)**, Gaitherberg, MD
"Zoomable User Interfaces"

94. March, 1998 **Microsoft Research**, Redmond, WA
"Zoomable User Interfaces"

95. October, 1997 **Netherlands Design Institute**, Amsterdam, Holland
"Pad++: Zoomable User Interfaces"

96. October, 1997 **Philips Labs**, Eindhoven, Holland
"Pad++: Zoomable User Interfaces"

97. October, 1997 **CID, Royal Institute of Technology (KTY),** Stockholm, Sweden
"Pad++: Zoomable User Interfaces"

98. September, 1997 **Swedish Institute of Computer Science (SICS)**, Stockholm, Sweden
"Pad++: Zoomable User Interfaces"

99. October, 1996 **ART3000, A French society for the development of Art & Technology**, Paris, France
"Pad++: A Zoomable Graphical Interface"

100. October, 1996 **University of Michigan, Department of Information Sciences**, Ann Arbor, MI
"Pad++: A Zoomable Graphical Interface"

101. July, 1996 **AT&T Bell Labs**, NJ
"Pad++: A Zoomable Graphical Interface"

102. January, 1996 **Stanford University, Cognitive Psychology Group**, CA
"Pad++: A Zoomable Graphical Interface"

103. October, 1995 **Cornell University, Computer Science Department**, Ithaca, NY
"Pad++: A Zoomable Graphical Interface"

104. June, 1995 **Sandia National Labs**, Los Alamos, NM
"Pad++: A Zoomable Graphical Interface"

105. April, 1995 **Los Alamos National Labs**, Los Alamos, NM
"Pad++: A Zoomable Graphical Interface"

106. November, 1993 **Digital Equipment Corporation, Stanford Research Center**, CA
"Pad++: A Multiscale Hierarchical Sketchpad"

107. October, 1993 **Brown University, Computer Science Department**, Providence, RI
"Pad++: A Multiscale Hierarchical Sketchpad"

108. April, 1993 **University of Chicago, Computer Science Department**, |
"PA3D: A Multiscale Hierarchical Sketchpad"

109. October, 1992 **Rensselaer Polytechnic Institute, Computer Science Department**, Troy, NY
"Cortex-I: A Miniature Active Vision System"

H. ORIGINAL DESIGNS, PLANS, INVENTIONS, AND PATENTS
i. Patents

1. SanGiovanni, J., & **Bederson, B. B.** (Inventors). (2022) *Systems, methods, and computer program products displaying interactive elements on a canvas.* US Patent #11,243,673
2. **Bederson, B. B.,** & SanGiovanni, J. (Inventors). (2021) *Techniques to modify content and view content on a mobile device*. US Patent #11,061,524.
3. SanGiovanni, J., & **Bederson, B. B.**, and Painter, B. (Inventors). (2018) *Systems and methods for adaptive third party content*. US Patent #10,019,963.
4. SanGiovanni, J., & **Bederson, B. B.** (Inventors). (2018) *Systems, methods, and computer program products displaying interactive elements on a canvas*. US Patent #9,959,020.
5. **Bederson, B. B.,** & SanGiovanni, J. (Inventors). (2017) *Techniques to modify content and view content on mobile devices*. US Patent #9,778,810.
6. SanGiovanni, J., & **Bederson, B. B.** (Inventors). (2016) *Systems, Methods, and Computer Program Products Providing an Integrated User Interface for Reading Content*. US Patent #9,361,130.
7. SanGiovanni, J., & **Bederson, B. B.** (Inventors). (2014) *Systems, Methods, and Computer Program Products Displaying Interactive Elements on a Canvas.* US Patent #8,819,570.
8. Pahud, M., Murillo, O. E., Karlson, A. K., & **Bederson, B. B.** (Inventors). (2012). *Monitoring Pointer Trajectory and Modifying Display Interface*. US Patent #8,261,211.

9. Good, L.E., **Bederson, B. B.**, & Stefik, M.J. (Inventors). (2010). *Methods and Systems for Supporting Presentation Tools Using Zoomable User Interfaces*. US Patent #7,707,503.
10. **Bederson, B. B.**, Good, L. E., & Stefik, M.J. (Inventors). (2009). *Methods and Systems for Incrementally Changing Text Representation*. US Patent #7,650,562 B2.
11. **Bederson, B. B.**, Good, L. E., & Stefik, M. J. (Inventors). (2009). *Methods and Systems for Incrementally Changing Text Representation*. US Patent #7,549,114 B2.
12. Wallace, R. S., **Bederson, B. B.**, & Schwartz, E. L. (Inventors). (1997). *TV Picture Compression and Expansion*. US Patent #5,642,167.
13. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (Inventors). (1993). *Two-Dimensional Pointing Motor*. US Patent #5,204,573.
14. Wallace, R. S., **Bederson, B. B.**, & Schwartz, E. L. (Inventors). (1992). *Telephone Line Picture Transmission*. US Patent #5,175,617.

ii. University Disclosures

1. **Bederson, B. B.** & Lin, J. (Inventors) (2009), CrowdFlow: A Computer-Human Hybrid Cloud Computing Model.
2. **Bederson, B. B.** (Inventor) (2002), Fisheye Calendar: A Calendar interface for small to large devices, IS-2002-015.
3. **Bederson, B. B.** (Inventor) (2001), PhotoMesa: A Zoomable Image Browser, IS-2001-053
4. **Bederson, B. B.**, & Chipman, L. G. (Inventors) (2000), *Physical Linear Slider Device to Control Computer Interface*, IS-2000-018.
5. **Bederson, B. B.** (Inventor) *Fisheye Menus For Selecting an Item From a Long List*, IS-2000-025.
6. **Bederson, B. B.**, Druin, A., & Pablo, J. P. (Inventors) (2000), *KidPad: A Collaborative Storytelling Environment for Children*, IS-2000-019.

I. CONTRACTS AND GRANTS

Total Funding: $18,036,144
UMD Portion: $10,329,299

1. **Ithaka SR, July 2016, co-PI**
   Elementary Statistics with an adaptive learning system
   $113,500
2. **Maryland Innovation Initiative, March 2014, PI**
   A Nationwide Database of Food Safety Inspections for Retail Establishments
   $100,000
3. **Huawei, July 2013, PI**
   XParty: Synchronous Online Language Learning
   $54,000
4. **Google, March 2013, PI**
   XParty: Synchronous Peer Learning in MOOCs (extension)
   $48,872
5. **Google, December 2011, PI**
   Search Party: Learning to Search in a Web-Based Classroom
   $60,000
6. **Alfred P. Sloan Foundation, November 2011, co-PI**
   Digital Disclosure of a Nationally Standardized Database of Restaurant Food Safety Inspections
   $465,272

7. **Google, June 2011, PI**
   Search Party: Web-Based Classroom Learning to Search
   $15,000

8. **Google, June 2011, co-PI**
   Translate the World: A Unified Framework for Crowdsourcing Translation
   $150,000

9. **Nokia Research, July 2010, PI**
   Mobile Learning
   $36,000

10. **NSF, CDI Type I: Translation as a Collaborative Process, Sep 2009, PI**
    $630,000

11. **Google, July 2009, PI**
    Translation as a Collaborative Process
    $70,000

12. **Sesame Workshop, January 2009, co-PI**
    Literacy 360 Alliance
    $22,500

13. **Eliassen Foundation, Nov 2008, co-PI**
    ICDL Elias Project
    $50,000

14. **Intel, Nov 2008, co-PI**
    ICDL ClassmatePC Project
    $50,000

15. **NSF, Designing and Understanding Intergenerational Mobile Learning Communities, Sep 2008, co-PI**
    $100,000

16. **Government of Mongolia Ministry of Education, Culture and Science – Nov2008, PI**
    International Children's Digital Library Phase 2
    $230,000
    $190,000 (for UMD)

17. **NSF, Usability Study of Independent Voter Verification Systems – July 2006, co-PI**
    PI – Paul Herrnson (Gov't & Politics)
    $68,000

18. **Government of Mongolia Ministry of Education, Culture and Science – May 2006, PI**
    Creating Digital Libraries in Mongolia
    $75,000

19. **IBM Faculty Award – December 2005, PI**
    Award to support my research on the open source Piccolo graphics toolkit.
    $30,000

20. **Maryland State Board of Elections, September 2005 – January 2006, co-PI**
    PI – Paul Herrnson (Gov't & Politics)
    $70,000

21. **(Agency not disclosed), April 2005 – March 2006, co-PI**
    Joint Institute for Knowledge Discovery
    $224,000 (my part of larger $2,000,000 effort led by VS Subrahmanian)

22. **Booz Allen (subcontract from ARDA), March 2005 – April 2006**
    Human-Information Interaction Research
    $325,000

23. **Toshiba, July 2004 – December 2006, PI**
Automatic Thumbnail Cropping
$20,000

24. **Microsoft, January 2004 – December 2006, PI**
Interaction Design and Visualization
$1,000,000

25. **DARPA, February, 2003 – January 2006, PI**
Zoomable User Interfaces for the Semantic Web
$230,000

26. **NSF, September, 2003 – August 2006, co-PI**
PI – Paul Herrnson (Gov't & Politics), co-PI, Richard Niemi (Univ. of Rochester), Michael Traugott (Univ. of Michigan)
An Assessment of Voting Technology and Ballot Design
$900,000 – approx $540K for UMD research

27. **Chevron, Oct 2002 – Oct 2003, co-PI**
PI – Catherine Plaisant (UMIACS)
Information Visualization for the Oilfield of the Future
$75,000

28. **IBM, September, 2002, PI**
T221 high-resolution display
$9,000 in kind

29. **IMLS, September, 2002 – August, 2005, co-PI**
PI – Allison Druin (CLIS)
The Children's International Digital Library
$397,162

30. **NSF, September, 2002 – August 2005, PI**
Search Interfaces for Biodiversity Informatics
$380,000

31. **NSF, September 2002 – August 2007, co-PI**
PI – Allison Druin (CLIS), co-PI, Anne Weeks
Developing a Children's International Digital Library
$3,000,000 ($2,125,000 to UMD)

32. **NSF, September 2002 – August 2005, co-PI**
co-PI – Allison Druin (CLIS), PI - Nancy Kaplan (Univ. of Baltimore), Stuart Malthrop (U. of Balt.)
An HCI Partnership Serving Under represented Groups
$420,000 ($133,000 to UMD)

33. **Microsoft Research, May 2002 – April 2001, PI**
Mobile Interfaces and .NET
$100,000

34. **Microsoft Research, September 2001 – August 2002, PI**
Mobile Interfaces
$50,000

35. **DARPA, May 2001 – August 2003, PI**
Zoomable User Interfaces for the Semantic Web
$320,000

36. **European Union – Esprit, The Disappearing Computer, Jan 2001 – December 2003, co-PI**
co-PI – Allison Druin (CLIS), Several PIs in Europe
With Royal Institute of Technology (KTH – Sweden), Univ. of Paris Sud, France.
InterLiving: Designing Interactive, Intergenerational Interfaces for Living Together
~$1,500,000 - approx $400K for UMD research

37. **Chevron, Nov 2000 – May, 2002, PI**
co-PI – Catherine Plaisant (UMIACS)
Information Visualization
$141,000

38. **DARPA, May 1998 – June 2002, PI**
Zoomable User Interfaces for InImEx and Command Post of the Future (CPOF)
$1,000,000

39. **Lockheed Martin Corp. sub-contract from DARPA, June 1999 - June 2000, PI**
Unified Zoomable Environment (UZE) for Command Post of the Future
$40,000

40. **European Union – Esprit, Intelligent Information Interfaces, Sept. 1998 – August 2001, co-PI**
co-PI – Allison Druin (CLIS), Several PIs in Europe
With Swedish Institute of Computer Science, Royal Institute of Technology (KTH – Sweden)
University of Nottingham, England.
KidStory
~$1,500,000 - approx $300K for UMD research

41. **Sun Microsystems, May 1999, PI**
Zoomable User Interfaces
$30,000 in equipment

42. **UNM sub-contract from DARPA, February 1998 – March 1999, PI**
Pad++: Zoomable User Interfaces
$200,000

43. **Microsoft, April, 1998, PI**
Productivity and development software
$5,000 in software and tech support

44. **Trivista, PI January 1998 - January 1999, PI**
Graphical User Interfaces based on Zooming
$50,000

UNIVERSITY OF NEW MEXICO

45. **Sony Research Corporation, PI**
co-PI – Jim Hollan (Univ. of New Mexico), co-PI – Ken Perlin (New York University)
Licensing of Pad++ software from UNM and NYU
$500,000 plus royalties

46. **Intel Donation, January, 1997, co-PI**
PI – Jim Hollan (Univ. of New Mexico)
200 MHz PC Computer
$4,000 in-kind

47. **DARPA, July'94 - June'97, Worked on grant with Jim Hollan**
Beyond Imitation: A Strategy For Building A New Generation of HCI Design Environments
$3,000,000 over 3 years with subcontracts to New York University and the Univ. of Michigan

48. **Sandia LDRD (Sandia internal research project) Oct'95 - Oct'96, PI**
Data Zooming - A New Physics for Information Navigation
$64,000

49. **Sandia SURP (Sandia University Research Program) Oct'95 - Oct'96, PI**
Pad++: A Zoomable Interface to the World-Wide Web
$40,000

50. **Sony Research Corporation, Jan'96, PI**
co-PI – Allison Druin (University of New Mexico)
Help plan Sony's efforts to develop a Zooming User Interface system
$3,674

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51. **Sandia LDRD (Sandia internal research project) Oct'94 - Oct'95, Worked on grant with Jim Hollan**
$40,000

52. **Bellcore Donation, July'93, PI**
SGI Indigo Workstation computer
$30,000 in-kind

J. FELLOWSHIPS, PRIZES, AWARDS

1. **2022 – IEEE VIS Test of Time Award.** Joint with Catherine Plaisant and Jesse Grosjean – for my 2002 paper: SpaceTree: Supporting Exploration in Large Node Link Tree, Design Evolution and Empirical Evaluation. *IEEE Symposium on Information Visualization, 2002. INFOVIS 2002.*, 2002, pp. 57-64, doi: 10.1109/INFVIS.2002.1173148. https://ieeevis.org/year/2022/info/awards/test-of-time-awards

2. **2021 – IEEE VIS Test of Time Award.** Joint with Ben Shneiderman and Martin Wattenberg – for my 2001 and 2002 papers: Ordered and Quantum Treemaps: Making effective use of 2D space to display hierarchies. Benjamin B. Bederson, Ben Shneiderman, Martin Wattenberg. ACM TOG 21(4):833-854 200 DOI: 10.1145/571647.571649. https://ieeevis.org/year/2021/info/awards/test-of-time-awards

3. **2016 – Winner of Best Historical Paper Award.** Joint with Pekka Parhi and Amy K. Karlson MobileHCI 2016 – 18th International Conference on Human-Computer Interaction With Mobile Devices and Services for "Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices", MobileHCI 2006.

4. **2012 – Elected to the CHI Academy**
http://www.sigchi.org/about/awards/

   The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry, and led the research and/or innovation in human-computer interaction. The criteria for election to the CHI Academy are:
   - Cumulative contributions to the field.
   - Impact on the field through development of new research directions and/or innovations.
   - Influence on the work of others.

5. **2011 – Recognized as an ACM Distinguished Scientist**
http://awards.acm.org/distinguished_member/year.cfm

   The Distinguished Member Grade recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field.

6. **2010 – ICDL received the American Library Association President's Award for International Library Innovation**. Joint with Allison Druin and Ann Weeks.

7. **2010 – Winner of SIGCHI Social Impact Award**
http://www.sigchi.org/about/awards/2010-sigchi-awards

8. **2009 – Winner of Digital Education Achievement Award from the Center for Digital Education and Converge magazine**
For joint work on the International Children's Digital Library with Allison Druin and Ann Weeks.

9. **2007 – Winner of Brian Shackel Award for "outstanding contribution with international impact in the field of HCI"**
Karlson, A., & Bederson, B. B. (2007) ThumbSpace: Generalized One-Handed Input for Touchscreen-Based Mobile Devices, *Proceedings of INTERACT 2007*, 324-338.

10. **2005 – IBM Faculty Award**
$30,000 gift to support my work on open source Piccolo graphics toolkit

11. **2005 – The International Children's Digital Library (www.icdlbooks.org)** website was selected for inclusion by the National Endowment for the Humanities on their EDSITEment website (http://edsitement.neh.gov) as one of the best online resources for education in the humanities.

12. **2004 – Winner of InfoVis Contest**
Lee, B., Czerwinski, M., Robertson, G. G. &, Bederson, B. B. (2004). "Understanding Eight Years of InfoVis Conferences using PaperLens", InfoVis 2004, IEEE, 216-217.

13. **2003 – Winner of Best Student Paper Award**
Suh, B., Ling, H., Bederson, B. B., & Jacobs, J. W. (2003). "Automatic Thumbnail Cropping and Its Effectiveness". UIST 2003, ACM Symposium on User Interface Software and Technology, CHI Letters, 5(2), 95-104.

14. **1992 – Janet Fabri Memorial Award for Outstanding Doctoral Dissertation**,
Department of Computer Science, Courant Institute, New York University

K. REVIEWING ACTIVITIES

ACM Conference on Graphics (SIGGRAPH)
ACM Conference on Human Factors in Computing Systems (CHI)
ACM Conference on Information Retrieval (IR)
ACM Conference on User Interfaces and Software Technology (UIST)
ACM Transactions on Computer-Human Interaction (TOCHI)
Communications of the ACM (CACM)
Computer Graphics and Applications
Graphics Interface Conference, Canada (GI)
International Conference on Information Visualization
International Journal of Human-Computer Interaction
IEEE Symposium on Information Visualization (InfoVis)
IEEE Symposium on Visual Analytics Science and Technology (VAST)
IEEE Transactions on Software Engineering (TSE)
IEEE Transactions on Visualization and Computer Graphics (TVCG)
Journal of Experimental Algorithmics
Journal of Information Visualization
Journal of Software Practice and Engineering (SPE)
NSERC (Canadian scientific funding agency)
National Science Foundation

L. OTHER
i. Software

StoryKit	iPhone app for children and their elders to create new books. Put in iPhone App Store August, 2009. Typical usage of 100,000 hours of story writing per month.
ICDL for iPhone	iPhone app for reading books from the International Children's Digital Library. Put in iPhone App Store November, 2008.
International Children's Digital Library	A library of children's books. Put on the Web Nov, 2002. http://www.childrensbooks.org • Unique accessors total: > 7,000,000 • Unique accessors monthly: ~130,000
DateLens	A calendar program for PDAs. Put on the Web July, 2002
SpaceTree	A general purpose tree browser. Put on the Web Dec, 2002. http://www.cs.umd.edu/hcil/spacetree
PhotoMesa	An end-user zoomable photo browser. Put on the Web May, 2001. http://www.cs.umd.edu/hcil/photomesa
CounterPoint	A zoomable presentation tool that works as a plug-in for Microsoft PowerPoint. Put on the Web in late 2001. http://www.cs.umd.edu/hcil/counterpoint
Piccolo	A library to support structured 2D graphics, the successor to jazz. Put on the Web in July 2002. http://www.cs.umd.edu/hcil/piccolo
Jazz	A general-purpose Java toolkit for building Zoomable User Interfaces. Put on the Web as Open Source software July 1999. http://www.cs.umd.edu/hcil/jazz
KidPad	An application that teaches young children communication skills through collaborative storytelling. Built using MID and KidPad. Put on the Web for non-commercial use March 2000. Access through March 2001 follow. http://www.cs.umd.edu/hcil/kidpad
Fisheye Menus	A new user interface widget for selecting one item for a long list using graphical distortion. Put on the Web for non-commercial use June 2000. Access through March 2001 follow. http://www.cs.umd.edu/hcil/fisheyemenu
MID	A general-purpose Java toolkit for supporting multiple input devices. It currently supports multiple USB mice on Windows 98. Put on the Web as Open Source software July 1999. It is used by the small but growing community of researchers investigating Single Display Groupware http://www.cs.umd.edu/hcil/mid
Pad++	Pad++ is described in detail in the papers referenced above. http://www.cs.umd.edu/hcil/pad++
Togl	An extension to Tcl/Tk that allows the creation of OpenGL graphics written in C to appear in a window managed by Tk. In addition, Tcl event bindings can be attached to the window which can then communicate with the C code that did the OpenGL rendering. Put on the net for public access. http://togl.sourceforge.net/

ii. Media

1. February 2, 2017 **The Diamondback** by Carly Taylor
"McKeldin Mall's Newest Academic Building Will Be Completed in March After Nearly 3 Years"
http://www.dbknews.com/2017/02/02/edward-st-john-construction-umd/

2. August 29, 2016 **The Diamondback** by Andrew Dunn
"University System of Maryland to offer an online course for free"
http://www.dbknews.com/2016/08/30/mooc-umb-umuc-online-usm/

3. February 15, 2016 **The Diamondback** by Samantha Reilly
"SGA passes resolution to revive 2012 syllabus bill"
http://www.dbknews.com/2016/02/16/umd-sga-passes-syllabus-resolution-to-revive-university-senate-bill/

4. September 24, 2015 **The Diamondback** by Taylor Swaak
"Active-Learning Courses Gain Traction at the University of Maryland"
http://www.diamondbackonline.com/news/active-learning-courses-gain-traction-at-the-university-of-maryland/article_435098ca-6247-11e5-a8e2-df59d97181a5.html

5. September 14, 2015 **Washington Post Express** by Beth Luberecki
"Massive open online courses (MOOCs) can help you achieve the next step in your career"
https://www.washingtonpost.com/express/wp/2015/09/14/massive-open-online-courses-moocs-can-help-you-achieve-the-next-step-in-your-career/

6. April 30, 2015 **The Diamondback** by Talia Richman
"USM Center for Academic Innovation to be renamed to honor Brit Kirwan"
http://www.diamondbackonline.com/news/article_51cbc02c-eeb7-11e4-a838-6b9857ba8e37.html

7. April 13, 2015 **The Diamondback** by Rokia Hassanein
"UMD Team Creates Nation's Largest Food Safety Inspection Database"
http://www.diamondbackonline.com/news/article_553da506-e181-11e4-b6c9-0f23d720b7cc.html#.VS1VV_HbNqc.twitter

8. April 6, 2015 **Quality Assurance & Food Safety Magazine**
"Database of Food Safety Inspection Information Created"
http://www.qualityassurancemag.com/food-safety-inspection-information.aspx

9. February 23, 2015 **Diamondback, UMD Student Newspaper** by Taylor Swaak
"New UMD website offers alternative ways to save money on textbooks"
http://www.diamondbackonline.com/news/article_0d910a34-baf5-11e4-826a-dfbcb9e8b5f8.html

10. January 13, 2015 **WAMU Kojo Nnamdi Show**
"The Rise of Mobile Apps"
http://thekojonnamdishow.org/shows/2015-01-13/tt_the_rise_of_mobile_apps

11. October 1, 2014 **The Chronicle of Higher Education**
"Optimism About MOOCs Fades in Campus IT Offices"
http://chronicle.com/blogs/wiredcampus/optimism-about-moocs-fades-in-campus-it-offices-survey-finds/54705

12. September 8, 2014 **WAMU Kojo Nnamdi Show**
"Beefing Up Photo, Cloud and Online Security"
http://thekojonnamdishow.org/shows/2014-09-09/beefing-photo-cloud-and-online-security

13. April 29, 2014 **Diamondback, UMD Student Newspaper** by James Levin
"Learning to ask for help"
http://www.diamondbackonline.com/news/article_632cbbb8-cf5b-11e3-b8b4-0017a43b2370.html

14. April 18, 2014 **CNN.com** by Emanuella Grinberg
"Removing 'barriers' to education through free college textbooks"
http://www.cnn.com/2014/04/18/living/open-textbooks-online-education-resources/

15. January 27, 2014 **DiamondBack, UMD Student Newspaper** by Ellie Silverman
"University expanding online class sequences through Vanderbilt partnership"
http://www.diamondbackonline.com/news/campus/article_dff739f4-86ed-11e3-9a18-001a4bcf6878.html

16. September 27, 2013 **Baltimore Business Journal** by Sarah Gantz
"Maryland Schools use Online Model to Tout Brand, Attract Students"
http://www.bizjournals.com/baltimore/print-edition/2013/09/27/maryland-schools-use-online-model-to.html?page=all

17. July 16, 2013 **HuffingtonPost.com**
"Blended Learning: College Classrooms of the Future"
http://www.huffingtonpost.com/uloop/blended-learning-college-_b_3598718.html

18. December 5, 2012 **Diamondback, UMD Student Newspaper** by Allison Gray
"University members hoping to see 'massive open online courses' integrated"
http://www.diamondbackonline.com/news/article_4873330c-3ef1-11e2-9a16-0019bb30f31a.html

19. September 21, 2012 **SmartMoney.com** by Quentin Fottrell
In Apple's Maps War vs. Google, Consumers Lose
http://blogs.smartmoney.com/advice/2012/09/21/in-apples-maps-war-vs-google-consumers-lose/?link=SM_hp_ls4e

20. September 18, 2012 **WAMU Kojo Nnamdi Show**
"Creativity and the Patent Wars" (guest on one-hour show)
http://thekojonnamdishow.org/shows/2012-09-18/creativity-and-patent-wars

21. September 7, 2012 **New York Magazine** by Matthew Shaer
"The Digital Elite: Smartphones are getting huge. Can the average-size thumb keep up?" (discusses my study on thumb size and mobile touch screens.

22. Aug 13, 2012 **Fact Witness in Apple v. Samsung trial covered broadly**
http://blogs.wsj.com/digits/2012/08/13/samsungs-first-witnesses-push-prior-art-after-minor-victory/

http://news.cnet.com/8301-13579_3-57492486-37/samsung-goes-on-offense-aims-to-bust-apple-patents/

http://arstechnica.com/tech-policy/2012/08/apple-rests-patent-case-as-judge-tosses-three-samsung-phones-from-trial/

http://www.forbes.com/sites/connieguglielmo/2012/08/13/apple-says-it-complained-about-samsung-copying-in-2010-live-blog/

http://allthingsd.com/20120813/judge-refuses-to-toss-most-of-apples-suit-against-samsung/

http://www.theverge.com/2012/8/13/3240686/samsung-apple-patents-launchtile-diamondtouch-table

http://www.eweek.com/c/a/Mobile-and-Wireless/Samsung-Begins-Presenting-Case-in-Apple-Patent-Infringement-Trial-162894/

23. May 7, 2012 **WAMU Kojo Nnamdi Show**
"Free Online Courses - Higher Ed of the Future?" (guest on hour show)
http://thekojonnamdishow.org/shows/2012-05-07/free-online-courses-higher-ed-future

24. January 24, 2012 **Washington Post** by Bonnie Berkowitz and Alberto Cuadra
"Touchscreens: How they work", I am the primary source
http://www.washingtonpost.com/national/health-science/touchscreens-how-they-work/2012/01/23/gIQAZHlAMQ_graphic.html

25. June 28, 2011 **New Scientist** by Jim Giles
"The man-machine: Harnessing humans in a hive mind", discussed MonoTrans.
http://www.newscientist.com/article/mg21028181.900-the-manmachine-harnessing-humans-in-a-hive-mind.html

26. June 14, 2011 **WAMU Kojo Nnamdi Show**
"A Shift in Cloud Computing" (guest on hour show)
http://thekojonnamdishow.org/shows/2011-06-14/shift-cloud-computing

27. May 13, 2011 **Discovery News** by Alyssa Danigelis
"Tech Turns Air into a Multi-touch screen", quoted.
http://news.discovery.com/tech/touch-screen-technology-zerotouch-110513.html

28. April 28, 2011 **Converge Magazine** by Tanya Roscorla
"Music Apps Take Top Prizes in U of Maryland Contest", discusses mobile app from the University of Maryland mobile app contest that I ran.

29. April 26, 2011 **Voice of America** by Do Noghte Sefr (in Persian)
"Mobility Initiative ابتکار تحرک"
http://www.youtube.com/donoghtesefr

30. April 24, 2011 **Washington Post**
"Business Rx: A jukebox democracy in search of voters", discusses mobile app from the University of Maryland mobile app contest that I ran.

31. February 25, 2011 **New Scientist** by Jim Giles and Jacob Aron
"Crowdsourced translations get the word out from Libya", discusses my MonoTrans project
http://www.newscientist.com/article/dn20174-crowdsourced-translations-get-the-word-out-from-libya.html

32. February 9, 2011 **DiamondBack, UMD Student Newspaper**
"Creativity at her fingertips" by Erin Egan
http://www.diamondbackonline.com/news/article_f7143841-131c-5695-a310-42596336345d.html

33. February 8, 2011 **WAMU Kojo Nnamdi Show**
"A Revolution in Tech Jobs? The Murky World of Online Labor" (hour show with me as only guest)
http://thekojonnamdishow.org/shows/2011-02-08/revolution-tech-jobs-murky-world-online-labor

34. November 23, 2010 **WAMU Kojo Nnamdi Show**
"The End of Email and other Tech Prognostications"
(hour show with me and one other guest)
http://thekojonnamdishow.org/shows/2010-11-23/end-email-and-other-tech-prognostications

35. November 9, 2010 **MIT Technology Review** by Erica Naone
"Gesturing at Your TV Isn't Ready for Prime Time" quotes me discussing Microsoft Kinect
http://www.technologyreview.com/computing/26691/

36. October 27, 2010 **MIT News** by Larry Hardesty
"Programming crowds" quotes me in analyzing Rob Miller's work
http://web.mit.edu/newsoffice/2010/programming-crowds-1027.html

37. October 2, 2010 **News 8 TV Austin**
"App Wrap: eReading for Kids" discussing StoryKit app for iPhone
http://www.news8austin.com/content/headlines/274426/app-wrap--ereading-for-kids

38. August 24, 2010 **WAMU Kojo Nnamdi Show**
"Automating Language Translation: The Future of a Unified Internet?" discussing my research and the general topic of crowdsourcing and translation.
http://thekojonnamdishow.org/shows/2010-08-24/automating-language-translation-future-unified-internet

39. May 4, 2010 **Technology Review**
"Redesigning the Web for Touch Screens"
http://www.technologyreview.com/printer_friendly_article.aspx?id=25236&channel=computing&section=

40. April 2010 **FutureGov Magazine** by Kelly Ng, Singapore
Description of ICDL for iPad application

41. April 17, 2010 **ABC 7 News, WLS-TV Chicago**
"Chicago Students Face Off in Battle of Books"
http://abclocal.go.com/wls/story?section=news/local&id=7392055

42. April 8, 2010 **Publisher's Weekly**
"The iPad Meets the Children's Book"
http://www.publishersweekly.com/article/455914-The_iPad_Meets_the_Children_s_Book.php?nid=2788&source=link&rid=16811925

43. April 3, 2010 **The Independent**, London
"Chlidren's book iPad apps offer multilingual tales, long-distance bedtime stories"
http://www.independent.co.uk/arts-entertainment/books/childrens-book-ipad-apps-offer-multilingual-tales-longdistance-bedtime-stories-1934847.html

44. January 28, 2010 **Baltimore Sun**, Baltimore, MD
"Apple unveils tablet computer" by Gus G. Sentementes
http://www.baltimoresun.com/business/technology/bal-bz.ipad28jan28,0,5120135.story

45. December 2009 **FutureGov Magazine** by Kelly Ng, Singapore
"Inside the Teacher's Lounge" covered Ben's keynote UNESCO talk in Hangzhou, China

46. November 20, 2009 **World Bank Blog**
http://blogs.worldbank.org/edutech/icdl-1

47. November 2, 2009 **Technology Review.com**
"First Test for Election Cryptography"
http://www.technologyreview.com/web/23836/

48. December 23, 2008 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy"

49. September 18, 2008 **America.gov**
"Kids Help Design International Children's Digital Library" by Jeffrey Thomas
http://www.america.gov/st/educ-english/2008/September/200809181459141CJsamohT0.2946283.html
Also published in **gulf-times.com** in Qatar
http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=245520&version=1&template_id=46&parent_id=26

50. April 25, 2008 **C|Net News.com**
"The Six Secrets of Mobile Computing Success" by Tom Krazit

51. February 8, 2008 **WYPR Maryland Morning**, Baltimore, MD
10 minute radio interview about usability of voting systems

52. January 30, 2008 **KCSN News** by Jessica Caldera
Short radio interview about usability of voting systems

53. January 29, 2008 **Technology Review.com** by Erica Naone
"Voting with (Little) Confidence"
http://www.technologyreview.com/Infotech/20122/

54. January 28, 2008 **ScienceDaily.com**
"Touch Screen Voting A Hit; Critics Miss Mark on Security, Study Says"
http://www.sciencedaily.com/releases/2008/01/080123170954.htm

55. January 26, 2008 **Newsweek** by Barrett Sheridan
"Like a Super Hero: Humans weren't made for scrolling and searching. We were made for zooming."
http://www.newsweek.com/id/105532/output/print

56. January 25, 2008 **Government Executive.com** by Gautham Nagesh
"Voters confused by e-voting machines, study finds"
http://www.govexec.com/dailyfed/0108/012508n1.htm

57. January 22, 2008 **WAMU Kojo Nnamdi Show**, Washington, DC
Thirty minute segment on "Technology User Frustrations – Spotlight on Cellphones"
http://wamu.org/programs/kn/08/01/22.php#19083

58. January 16, 2008 **KUOW, The Conversation**, Seattle, WA
The guest on an hour-long call-in talk show on the future of cellphones.
http://www.kuow.org/defaultProgram.asp?ID=14159

59. October 30, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", talking about software reliability

60. August 7, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", current tech events, iPhone, Tivo, and listeners email and calls
http://wamu.org/programs/kn/07/08/07.php

61. June 13, 2007 **New York Times** by John Markoff
"That iPhone has a keyboard, but it's not mechanical"
http://www.nytimes.com/2007/06/13/technology/13phone.ready.html

62. June 5, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", Microsoft Surface, cell phone problems, and listeners email and calls
http://wamu.org/programs/kn/computerguys/07/cg070605.php

63. April 3, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", Physical and virtual convergence, and listeners email and calls
http://wamu.org/programs/kn/computerguys/07/cg070403.php

64. March 17, 2007 **Science News** weekly magazine, by Ivars Peterson
"Games Theory", several quotes by me on article about von Ahn's games.
http://www.sciencenews.org/articles/20070317/bob9.asp

65. January 18, 2007 **Wall Street Journal**, by Jeremy Wagstaff
"The March of Time", covering DateLens

66. December 31, 2006 **Associated Press**, by Brian Bergstein
"Low-Cost Laptop Could Transform Learning"
http://www.washingtonpost.com/wp-dyn/content/article/2006/12/31/AR2006123100380.html
AP story picked up in 175 locations, including:

    - Washington Post
    - BusinessWeek
    - Chicago Tribune
    - Boston Globe
    - ABC News
    - CNN
    - FOX News
    - Eyewitness News
    - Forbes
    - BBC News, UK
    - Sydney Morning Herald, Australia
    - The Age, Australia
    - Economic Times, India

67. December 5, 2006 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", Vista, holiday tech gifts, and listeners email and calls
http://www.wamu.org/programs/kn/06/12/05.php#12452

68. September 22, 2006 **Salon.com** by Katharine Mieszkowski
"Written out of the story", discussing write-in votes using the Hart eSlate system
http://www.salon.com/news/feature/2006/09/22/delay_write_in/index_np.html

69. May 2, 2006 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy – life in the fast lane", discussing broadband at home
http://www.wamu.org/programs/kn/06/05/02.php#10686

70. April 23, 2006 **Pittsburgh Post-Gazette** by Mark Roth
"Experts see computers getting bigger and smaller at the same time"
http://www.post-gazette.com/pg/06113/684425-96.stm

71. March 9, 2006 **Baltimore Sun** by Mike Himowitz
"PhotoMesa a nifty way to organize photographs"
http://www.baltimoresun.com/technology/bal-bz.himowitz09mar09,0,3518441.column

72. February 21, 2006 **WAMU Kojo Nnamdi Show**, Washington, DC
"Wiki Sites"
http://www.wamu.org/programs/kn/06/02/21.php#10383

73. February 3, 2006 **Baltimore Sun** by Frank D. Roylance
"Spreading the e-word" (quoted about Sony's new ebook reader e-paper)
http://www.baltimoresun.com/news/health/bal-hs.eink03feb03,1,3010066.story

74. January 13, 2006 **Washington Business Journal** by Jennifer Nycz-Conner
"What was I doing, again?"
http://www.bizjournals.com/washington/stories/2006/01/16/focus1.html

75. November 18, 2005 **c|net News.com** by Stefanie Olsen
"The 'millenials' usher in a new era" (about ICDL)
http://news.com.com/The+millennials+usher+in+a+new+era/2009-1025_3-5944666.html?tag=nefd.lede

76. September, 2005 **Chicago Parent** by Jane Huth
"Screen time=reading time"
http://www.chicagoparent.com/main.asp?SectionID=10&SubSectionID=32&ArticleID=529&TM=67415.63

77. September 22, 2005 **Delphos Herald**
"Site Seeing"
http://www.delphosherald.com/page2.php?story=8655&archive=

78. April, 2005 **Chicago Parent** by Judy Belanger
"Explore the world by turning pages"
http://www.chicagoparent.com/main.asp?SectionID=10&SubSectionID=33&ArticleID=306&TM=67012.6

79. April 5, 2005 **EE Times** by Nicolas Mokhoff
" Microsoft touts 'thumb-as-stylus' interface progress"
http://www.eetimes.com/showArticle.jhtml;jsessionid=NHVZOY3L1AQWUQSNDBGCKH0CJUMEKJVN?articleID=160500234
Also picked up by **Information Week**

80. March 10, 2005 **folha equilibrio (Brazil)** by Sérgio Rizzo
"Cibertentações" (article about computer-based distraction, describing some of my work.)

81. March, 2005 **Radio City (Ecuador) / BBC Affiliate**
5 minute radio interview (performed in English, translated into Spanish)

82. March 1, 2005 **The Statesman (India)** by Stanley Theodore
"Webcrawler: All About E-Attention Deficit Disorder"
http://www.thestatesman.net/page.news.php?clid=24&theme=&usrsess=1&id=70119

83. February 28, 2005 **Washington Times** by Ann Geracimos
"New Chapter in Online Books"
http://washingtontimes.com/metro/20050227-101610-1015r.htm

84. February 18, 2005 **North Carolina State Technician** by Danny Frye
"Research targets computer distraction such as AIM"
http://technicianonline.com/story.php?id=011167

85. February 13, 2005 **Bloomberg Radio, "Simply Put"** by Michael Goldman & Tom Moroney
9 minute interview discussing attention and interruptions on the computer

86. February 10, 2005 **New York Times** by Katie Hafner
"You There, at the Computer: Pay Attention"
http://www.nytimes.com/2005/02/10/technology/circuits/10info.html
Also picked up by
    a. **International Herald Tribune (France)**
    b. **ABS CBN News (Philippines)**
    c. **CNET News.com**
    d. **Spartanburg Herald (SC)**
    e. **Wilmington Morning Star (NC)**
    f. **Minneapolis Star Tribune (MN)**

87. Nov 11, 2004 **Maryland Public Television** by Frank Batavick
"Message in a Bottle", Bob the vid-tech guy 30 minute special including 5 minute segment of Allison Druin and me explaining email and instant messaging to children.

88. May 7, 2004 **Baltimore Sun** by Elizabeth Schuman
"Research Lab Crosses Cultures"

89. October 20, 2003 **The Feature** by Jeff Goldman
"A View Into Your Phone"
http://www.thefeature.com/article?articleid=100146

90. October 10, 2003 **The Independent** by Charles Arthur
"Treemap Offers a New Way of Visualizing Complex Data. Nothing Beats it for Simplicity and the "wow!" effect when you first use it."
http://news.independent.co.uk/digital/features/story.jsp?story=451099

91. July, 2003 **Higher Learning – Technology Serving Education**
"Web Sites: The International Children's Digital Library"

92. July 7, 2003 **Pittsburgh Post-Gazette** by Karen MacPherson
"Web Site Invites Children to Read Online: International Children's Digital Library Caters to Young Around the Globe"

93. June 15, 2003 **San Antonio News 9** by Michael Garfield
"Website a Fun Way to Encourage Kids to Read"

94. April 11, 2003 **San Jose Mercury News** by Dan Gillmor
"Designing New Handhelds to Improve Interactions Between Humans, Computers"
Also picked up by **New Jersey Star Ledger (NJ)**

95. February 12, 2003 **Tech TV Live** by Peter Barnes
Also on **abcnews.com**
"Easy Online Reader: An International Online Nook for Children's Books"

96. January 17, 2003 **Voice of America TV** by Larry Clamage
4.5 minute video of children's design team focusing on ICDL

97. December, 2002 **Sun's Java Website**
ICDL Linked to from http://java.sun.com/industry/

98. December 17, 2002 **Associated Press**
Picture of Ben Bederson w/ Bill Gates at Microsoft about DateLens project
    a. **Seattle Post Intelligencer (WA)**
    b. **Times Daily (AL)**
    c. **Sarasota Herald-Tribute (FL)**
    d. **Naples Daily (FL)**

99. December 16, 2002 **Baltimore Sun** by Alex MacGillis
"Two Study Intricacies of Voting Machines"
Also picked up by AP, excerpts in:
    a. **USA Today**
    b. **WMAR (MD)**
    c. **WBAL-TV (MD)**
    d. **News Channel 8.net**

100. December 12, 2002 **Philadelphia Inquirer** by Joyce Kasman Valenza
"tech.life @ school | New virtual library offers children much"

101. December 10, 2002 **Le Monde (France)** by Chantal Dussuel
"Livres en ligne pour internautes on herbe"

102. December 10, 2002 **Christian Science Monitor**
News in Brief – ICDL

103. December 5, 2002 **New York Times** by Lisa Guernsey
"Online Library Project Plans a Digital and Cultural Trove for Children"

104. December 1, 2002 **Die Burger (South Africa)**
"Paragrawe"

105. November 30, 2002 **The Vancouver Sun (Canada)**
"Book Endz: Free Kid's Books"

106. November 30, 2002 **La Vanguardia (Spain)**
"Nuevos Proyectos: TalentMatch.com, International Children's Digital Library SoapCity"

107. November 27, 2002 **USA Today** by Karen Thomas
"World Books, Children Click"

108. November 27, 2002 **The Ohama World-Herald**
"TechBytes: Digital Library Links Kids to Other Cultures"

109. November 27, 2002 **Education Week**
"Internet Library for Children Invites the World to Read"

110. November 26, 2002 **The Gold Coast Bulletin (Australia)**
"The Net: News Bytes"

111. November 25, 2002 **intern.de (Germany)**
"Kinderbibliothek"

112. November 25, 2002 **Seattle Post-Intelligencer**
"Kids Books Now Online"

113. November 21, 2002 **AP Wire** by Sam Hannel
"Web Site to Give Free Access to Children's Books"
    a. **ABCNews.com**
    b. **The Age (Australia)**
    c. **Ananova.com (UK)**
    d. **Asia Pacific Media Network**
    e. **The Baltimore Sun**
    f. **Globetechnology.com (Canada)**
    g. **KTVU 2 News (Bay Area)**
    h. **Indiana Gazette**
    i. **MSNBC.com**
    j. **Newsday.com**
    k. **Rapid City Journal**
    l. **San Jose Mercury News**
    m. **Sarasota Herald-Tribune (Florida)**
    n. **Santa Fe New Mexican**
    o. **Seattle Post-Intelligencer**
    p. **Sydney Morning Herald (Australia)**
    q. **Waterloo/Cedar Falls**
    r. **WFTV (Florida)**

114. November 21, 2002 **24ur.com (Slovenia)**
"Knjige brezplacno na internetu"

115. November 21, 2002 **Courier Mail (Australia)**

116. November 21, 2002 **United Press International (UPI)**
"New Online Library for Kids Launched"

117. November 21, 2002 **Washington Post (.COM Column)** by Leslie Walker
"A Library for Young Browsers"
    a. **International Herald Tribute**
    b. **SFGate.com (San Francisco)**

118. November 21, 2002 **Internet Magazine**
"Site Offers Free Access to Kids Books"

119. November 20, 2002 **Magasinet (Norway)**
"Lager verdensbarnebibliotek"

120. November 20, 2002 **Fox 5 TV News** by John Henrehan
Live 1.5 minutes on 5:00pm news

121. November 18, 2002 **All Things Considered on NPR** by David Kestenbaum
”Library for Kids Goes Online” (11 minutes)

122. October, 2002 **Digital Computer Magazine**
Review of PhotoMesa

123. September 23, 2002 **ComputerSweden** by Anders Lotsson
”Square Zoom in the Hand”

124. August 19, 2002 **Ohio Repository** by Joan Renner
”Ensuring validity is a big concern in electronic voting”

125. August 18, 2002 **Ohio Repository** by Joan Renner
”Voting test shows pros, cons”

126. August 12, 2002 **eWeek**, by Anne Chen
”DateLens Stays Organized in C#”

127. August 5, 2002 **Grid Today**
”Bill Gates Highlights Academic Collaboration Key to Future”

128. July 29, 2002 **eWeek**, by Anne Chen
”Gates: .NET Won’t Happen Overnight”

129. July 29, 2002 **InfoWorld**, by Matt Berger
”Gates, academics joins on security, shared source”

130. July 29, 2002 **NetworkWorldFusion**, by Matt Berger
”Gates, academics joins on security, shared source”

131. May 9, 2002 **Washington Post (.COM Column)**, by Leslie Walker
”A Visual Rather Than Verbal Future”

132. May 9, 2002 **Washington Post Website**, by Eleanor Hong
”Human-Computer Interaction Lab at the University of Maryland” – Interview with me, Allison Druin, and Ben Shneiderman.

133. August 1, 2001 **Sun Microsystems Java Website**, by Jon Byous
”View With a Zoom: Browse and Zoom Digital Images in One Application” describes PhotoMesa and my treemap algorithms.

134. July 2, 2001 **ComputerWorld** by Sami Lais
”Treemaps Bloom” describes my photo browser application PhotoMesa which uses Jazz

135. June 4, 2001 **ComputerWorld** by Sami Lais
”Software for the 4th Dimension” describes TimeSearcher which uses Jazz

136. August 12, 2000 **New Scientist Magazine**
”Maximizing MinimalisM”, an article Zoomable User Interfaces, KidPad, and Fisheye Menus

137. Fall, 2000 **College Park**, by Tom Ventsias
”Zooming Ahead”, an article about Zoomable User Interfaces

138. June 26, 2000 **ComputerWorld**, by Sami Lais
”Zoomin’ Ahead”, an article about Zoomable User Interfaces and Fisheye Menus

139. September, 1999 **Sun Microsystems Java Website**, by Jon Byous
An interview with me under their face-to-face column.

140. December 21, 1998 **Baltimore Sun**
Reprinted in New York Newsday, Dec. 30, 1998
“Children first: In designing toys, one lab turns to the experts in the field.”

141. April 4, 1997 **The Chronicle of Higher Education** by Jeffrey R. Young
"New Ways of Organizing Data Could Change Nature of Computers"

142. February, 1997 **Nov'Art**
a French Magazine sponsored by Art3000, a society devoted to integration of technology and art.

143. October 23, 1996 **The New York Times Online (CyberTimes)** by Ashley Dunn
"Seeing the Forest of Knowledge for the Trees of Data"

144. June, 1995 **The X Advisor**, by Gary Welz
"Peripheral Visions: Zooming Through Information Space on Pad++"

3. TEACHING AND ADVISING

A. COURSES TAUGHT
i. General

Fall 2015 *Paths to CS* (CMSC198C/D/E) – 96 Students

Fall 2013 *Paths to CS* (CMSC198C/D/E, 1-3 credits) – 36 Students
CMSC198C
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.6 (College comparison: 2.8)
Effective teacher: 3.9 (College comparison: 2.9)
CMSC198D
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.8 (College comparison: 2.8)
Effective teacher: 4.0 (College comparison: 2.9)

Fall 2012 *Tech for CS Startups – Team taught* (CMSC 498E, 1 credit) – 19 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.0 (College comparison: 3.2)
Effective teacher: 3.7 (College comparison: 2.9)

Spring 2012 *Reading Seminar: Future of HCI – Team taught* (CMSC 838B, 1 credit) – 13 Students

Fall 2011 *Social Computing Seminar* (CMSC 838B, 3 credits) – 20 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.7 (College comparison: 3.2)
Effective teacher: 3.8 (College comparison: 3.2)

Fall 2011 *Intro to Human-Computer Interaction* (CMSC 434) – 37 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.5 (College comparison: 3.2)
Effective teacher: 3.5 (College comparison: 3.0)

Spring 2011 *Intro to Human-Computer Interaction* (CMSC 434) – 42 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 2.9 (College comparison: 3.2)
Effective teacher: 3.0 (College comparison: 3.0)

Fall 2010 *Reading Seminar in Human Computation* (CMSC 838B, 1 credit) – 9 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.8 (College comparison: 3.2)
Effective teacher: 3.9 (College comparison: 3.5)

Fall 2010 *Digital Cultures and Creativity* (HDCC 105, co-taught) – 56 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 2.4 (College comparison: 2.5)
Effective teacher: 3.2 (College comparison: 3.4)

Spring 2010 *Object-Oriented Programming I* (CMSC 131H) – 10 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.8 (College comparison: 2.9)
Effective teacher: 4.0 (College comparison: 3.0)

Fall 2009 *Intro to Human-Computer Interaction* (CMSC 434) – 39 Students
Student Evaluations (Scale: 0 Poor – 4 Excellent)
Students "learned a lot": 3.3 (College comparison: 3.2)
Effective teacher: 3.5 (College comparison: 3.0)

Spring 2008	*Intro to Human-Computer Interaction* (CMSC 434) – 32 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students "learned a lot": 3.1 (College comparison: 3.1) Effective teacher: 3.2 (College comparison: 3.0)
Spring 2005	*Developing User Interfaces* (CMSC 498B) – 14 Students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.6 Instructor's teaching: 3.8
Spring 2004	*Object Oriented Programming I* (CMSC 131) – 75 Students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.0 Instructor's teaching: 2.9
Spring 2003	*Information Visualization* (CMSC 828B) – 17 Students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.1 Instructor's teaching: 3.4
Spring 2002	*Developing User Interfaces* (CMSC 498B) – 25 Students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.6 Instructor's teaching: 3.9
Fall 2001	*Human Computer Interaction* (CMSC 434/828S) – 50 Students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.5 Instructor's teaching: 3.6
Spring 2001	*Information Visualization* Taught by Catherine Plaisant and Ben Shneiderman due to my illness
Fall 2000	*Human Computer Interaction* (CMSC 434/828S) – 50 Student*s* No evaluation due to my illness
Spring 2000	*Computer Graphics* (CMSC 427) – 45 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.4 Instructor's teaching: 3.3
Fall 1999	*Human Computer Interaction* (CMSC 434/828S) – 44 Students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.9 Instructor's teaching: 3.9
Spring 1999	*Zoomable User Interfaces* (CMSC 838B) – 15 Students
Fall 1998	*Software Engineering* (CMSC 435) – 45 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.6 Instructor's teaching: 3.5
Spring 1998	*Computer Graphics* (CMSC 427) – 24 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.7 Instructor's teaching: 3.7
Spring 1997	*Software Engineering* (CS460) @ UNM (Didn't receive evaluations)
Fall 1996	*Introduction to Data Structures* (CS251) - 100 Students @ UNM (Didn't receive evaluations)

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Spring 1996	*Human Computer Interaction* (CS462) @ UNM Student Evaluations (ICES scale: 1 poor - 6 excellent) Course content: 5.2 Instructor: 5.5 Course in general: 5.2
Spring 1996	*Computers & Society* (CS491/591) @ UNM Introduced this course for the first time in the CS dept. 1 credit seminar Student Evaluations (ICES scale: 1 poor - 6 excellent) Course content: 4.9 Instructor: 4.8 Course in general: 4.8
Spring 1996	Taught one week *Computer Ethics* @ UNM section of a new five week introductory class on computing at UNM (CS101). Did this two times.

ii. Specialized

Fall 2016	*Learning Analytics Research Group (TLTC 708)* – 1 credit, 3 students, 20 participants
Spring 2016	*Learning Analytics Research Group* – 0 credits, 30 participants
Fall 2015	*Learning Analytics Reading Group* – 0 credits, 20 participants
Spring 2015	*Learning Analytics Reading Group* – 0 credits, 20 participants
Fall 2003	*Readings in HCI Seminar* (CMSC 838B) – 1 credit, 13 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.9 Instructor's teaching: 3.8
Fall 2001	*Readings in HCI Seminar* (CMSC 838B) – 1 credit, 12 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.8 Instructor's teaching: 3.8
Fall 2000	*Readings in HCI Seminar* (CMSC 838B) – 1 credit, 15 students
Fall 1999	*Readings in HCI Seminar* (CMSC 838B) – 1 credit, 6 students
Spring 1999	*Zoomable User Interfaces* (CMSC 838B) – 15 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 3.5 Instructor's teaching: 3.2
Fall 1998	*Readings in HCI Seminar* (CMSC 838B) - 1 credit, 9 students Student Evaluations (Scale: 0 Poor - 4 Excellent) Course quality: 4.0 Instructor's teaching: 3.8

F. ADVISING RESEARCH DIRECTION
i. Undergraduate

	Independent Study Advisor:
2013	Andrej Resevic – new Paths to Computer Science course
2012 – 2013	Danny Michaelis – new Paths to Computer Science course
2010 – 2011	Jonathan Speiser Worked on tournament programmer in educational technologies group
2003-2004	Christian Klein Studied effect of animation when scrolling while reading

2000 – 2002	Rob Sherman Customized undergraduate degree in HCI & Law – focused on voting systems
Fall 2001	Steve Betten Visualizations for real-time monitoring
Spring 2000/ Fall 2000	Beth Weinstein Geographical interfaces for digital library for children
Spring 1999	Nuno Pereria End-user customizable systems
Spring 1996	Philip Eckenroth and Mike Tipping Built a 3D modeling system
Fall 1995	Josh Saiz Novel searching techniques in Pad++ (dynamic indicators)

ii. Master's

Thesis Committee:

2005	Julie Staub in Applied Math. Research on Chaum's scheme for encrypted voter receipts.
1999	George Ziets in Psychology. Advisor is Kent Norman. Research is on gauge design for multiple orders of magnitude.

Independent Study Advisor:

2013	Alina Goldman (iSchool) – Motivation in a self-paced computer science course
2012	Adam O'Sullivan – Computer vision for relative phone location
2000	Stephanie Thibeault (Dance Dept.) Technology and dance
1996	Ellen Killion Built a software library access tool in Pad++
1995	Tom Claus Worked on KidPad
1995	Sam Cancilla Shared calendar application in Pad++
1995	David Rogers Tossing for user interfaces
1995	Richard Bleakman Interfaces for teaching genetic algorithms
1995	Tom Claus Worked on Pad++

iii. Doctorate

Dissertation Advisor:

2017	Tak Yeon Lee, Ph.D. (2017) in Computer Science. "Toward Symbiotic Human-AI Interaction Focusing on Programming by Example". **Currently at Adobe Research.**
2016	Adil Yalcin, Ph.D. (2016) in Computer Science. "Towards Rapid, Effective, and Expressive Visual Data Exploration". **Currently founding startup to commercialize his dissertation research - https://keshif.me/.**

2014	Alex Quinn, Ph.D. (2014) in Computer Science. "Crowdsourcing Decision Support: Frugal Human Computation for Efficient Decision Input Acquisition". **Currently Assistant Professor of ECE at Purdue.**
2012	Chang Hu, Ph.D. (2012) in Computer Science. "Crowdsourced Monolingual Translation". **Currently at Microsoft.**
2007	Amy Karlson, Ph.D. (2007) in Computer Science. Research on personal information management. **Winner of Microsoft Graduate Fellowship. Two CHI papers nominated for best paper. Worked at Microsoft Research for several years.**
2006	Bongshin Lee, Ph.D. (2006) in Computer Science. "Interactive Visualization for Trees and Graphs". **Co-first place winner of IEEE InfoVis 2004 Contest. Currently at Microsoft Research.**
2005	Hilary Hutchinson, Ph.D. (2005) in Computer Science. "Children's Interface Design for Searching and Browsing". **Awarded UMD CS Minker Fellowship. Awarded NSF Graduate Fellowship. Currently at Google.**
2005	Bongwon Suh, Ph.D. (2005) in Computer Science. "Image Management Using Pattern Recognition". **Worked at PARC, then at Adobe Research, now Assoc. Prof. at Seoul National University (Korea).**
2003	Lance Good, Ph. D. (2003) in Computer Science. "Zoomable User Interfaces for the Authoring and Delivery of Slide Presentations". **Worked at PARC as researcher for several years, now at Google.**
2003	Juan Pablo Hourcade, Ph.D. (2003) in Computer Science. "User Interface Technologies and Guidelines to Support Children's Creativity, Collaboration, and Learning". **Currently Assoc. Prof. of Computer Science at the University of Iowa.**
1998	Jason Stewart, Ph.D. (1998) in Computer Science at UNM. Research is on collaborative user interfaces for children using Pad++. **Awarded 1995 DEC Fellowship at UNM.**
	Dissertation Committee:
2020	Virginia Leigh Byrne (2020) in Education. Advisor is Diane Jass Ketelhut. "The Chilling Effect of Cyberbullying on Women's Social Presence in Online Discussions"
2019	Zhenpeng Zhao (2019) in Computer Science. Advisor is Niklas Elmqvist. "Data-Driven Storytelling for Casual Users"
2016	Uran Oh, Ph.D. (2016) in Computer Science. Advisor is Leah Findlater. "Accessible On-Body Interaction for People with Visual Impairments"
2016	Kotaro Hara, Ph.D. (2016) in Computer Science. Advisor is Jon Froehlich. "Scalable methods to collect and visualize sidewalk accessibility data for people with mobility impairments"
2014	Aaron Dinin, Ph.D. (2014) in English. Advisor is Martha Nell Smith. "Hacking Literature: A Study in the Technology of Language."
2014	Brian Danielak, Ph.D. (2014) in College of Education. Advisor is Andy Elby. "How Electrical Engineering Students Design Computer Programs."
2013	Irene Eleta Mogollon, Ph.D. (2013) in iSchool. Advisor is Jen Golbeck. "Multilingual use of Twitter: Language Choice and Language Bridges in a Social Network."
2013	John Alexis Guerra Gomez, Ph.D. (2013) in Computer Science. Advisor is Ben Shneiderman. "Exploring Differences in Multivariate Datasets Using Hierarchies: An Interactive Information Visualization Approach"
2013	Sureyya Tarkan, Ph.D. (2013) in Computer Science. Advisor is Ben Shendierman. "Interactive Visual Displays for Results Management in Complex Medical Workflows"
2010	Taowei David Wang, Ph.D. (2010) in Computer Science. Advisor is Ben Shneiderman. "Interactive Visualization Techniques for Searching Temporal Categorical Data"

2009	Jerry Fails, Ph.D. (2009) in Computer Science. Advisor is Allison Druin. "Mobile Collaboration for Young Children"
2008	Chunyuan Liao, Ph.D. (2008) in Computer Science. Advisor is Francois Guimbretiere. "PapierCraft: A New Paper-Based Interface To Support Interaction With Digital Documents"
2008	Aleks Aris, Ph.D. (2008) in Computer Science. Advisor is Ben Shneiderman. "Visualization & Exploring Networks Using Semantic Substrates"
2008	Adam Perer, Ph.D. (2008) in Computer Science. Advisor is Ben Shneiderman. "Integrating Statistics and Visualization to Improve Exploratory Social Network Analysis"
2008	Walky Rivadeneira, Ph.D. (2008) in Psychology. Advisor is Kent Norman. "Tag Clouds: How Format and Categorical Structure Affect Categorization Judgement"
2007	Matthias Mayer, Ph.D. (2007) in Dept. Informatik, Universität Hamburg where I was an outside reader. Advisor is Prof. Dr. Arno Rolf. "Visualizing Web Sessions".
2007	Leslie Eugene Chipman, Ph.D. (2007) in Computer Science. Advisor is Allison Druin. "Collaborative Technology for Young Children's Outdoor Education".
2006	Haibin Ling, Ph.D. (2006) in Computer Science. Advisor is David Jacobs. "Techniques for Image Retrieval: Deformation Insensitivity and Automatic Thumbnail Cropping".
2005	Jinwook Seo, Ph.D. (2005) in Computer Science. Advisor is Ben Shneiderman. "Information Visualization Design for Multidimensional Data: Integrating the Rank-By-Feature Framework with Hierarchical Clustering".
2005	Jen Golbeck, Ph.D. (2005) in Computer Science. Advisor is Jim Hendler. "Computing and Applying Trust in Web-Based Social Networks".
2003	Harry Hochheiser, Ph.D. (2003) in Computer Science. Advisor is Ben Shneiderman. Research on interfaces for time-series data.
2002	Jenny Sterling, Ph.D. (2002) in Music. Advisor is Laszlo Payerle. Research on educational software she developed to teach undergrad music form. She won the campus award on educational technologies from the Center for Teaching Excellence.
2001	Mike Beynon, Ph.D. (2001) in Computer Science. Advisor is Joel Saltz. Research on filter-based programming model for grid computing.
2001	Angela Boltman, Ph.D. (2001) in Education, Advisor is Allison Druin. Research on KidPad's effect on children's storytelling.
2001	Jeff Heflin, Ph.D. (2001) in Computer Science. Advisor is Jim Hendler. Research on the semantic web.
2001	Egemen Tanin, Ph.D. (2001) in Computer Science. Advisor is Ben Shneiderman. Research on browsing large online databases using exploratory overviews.
2000	Vasanth Philomin, Ph.D. (2000) in Computer Science. Advisor is Larry Davis. Research on real-time computer vision for in-car navigation and warning systems.
2000	Byoung-Kee Yi, Ph.D. (2000) in Computer Science. Advisor is Christos Faloutsos. Research on similarity search and data mining in time-sequence databases.
2000	Chris North, Ph.D. (2000) in Computer Science. Advisor is Ben Shneiderman. Research on tight coupling between different visualizations.
1999	Richard Potter, Ph.D. (1999) in Computer Science. Advisor is Ben Shneiderman. Research on pixel data access for end-user customization.
1999	Harald Winroth, Ph.D. (1999) in Computer Science at the Royal Institute of Technology (KTH) in Stockholm, SWEDEN. I was invited to be the *opponent*. Advisor is Jan-Olof Eklundh Research on dynamic projective geometry.

1999	Ismail Haritaoglu, Ph.D. (1999) in Computer Science. Advisor is Larry Davis. Research on real-time computer vision for tracking people.
1999	Zhijun Zhang, Ph.D. (1999) in Computer Science. Advisors are Vic Basili and Ben Shneiderman. Research on perspective-based usability inspection techniques.
1998	Elaine Raybourne, Ph.D. (1998) in Communication and Journalism at the University of New Mexico. Advisor is Ed Rogers. Dissertation is on the use of MUDs for anonymous role-playing to teach about issues of culture, identity, and power.
1998	Fan-Tao Pu, Ph.D. (1998) in Computer Science, Advisor is David Mount. Research on data structures for view-independent 3D object visibility detection.
1998	Eser Kandogan, Ph.D. (1998) in Computer Science, Advisor is Ben Shneiderman. Research on a technique for window management – elastic windows.
1996	Eric Freeman, Ph.D. (1996) in Computer Science at Yale University. Advisor is David Gelernter. "Lifestreams", a computer interface that eliminates the need for filenames by indexing all files and connecting applications to a database.
	Proposal Committee:
2019	Maddalena Romano in Geographic Information Systems (City College of New York) Advisor is Carsten Kessler. "Distributed WiFi for Distributed GIS"
2018	Virginia Leigh Byrne in Education. Advisor is Diane Jass Ketelhut. "The Chilling Effect of Cyberbullying on Women's Social Presence in Online Discussions"
2017	Zhenpeng Zhao in HCI. Advisor is Niklas Elmqvist. "A Framework of Media Types for Data-Driven Storytelling"
2012	Irene Eleta in iSchool. Advisor is Jen Golbeck. "Multilingual Use of Twitter: Language Choice and Language Bridges in a Social Network"
2012	John Alexis Guerra Gómez in Computer Science. Advisor is Ben Shneiderman. "Exploring Differences in Trees by Comparing Structure and Node Value Changes: An Interactive Information Visualization Approach"
2011	Alex Quinn in Computer Science. Advisor is me. "Crowdsourcing Decision Support: Frugal Human Computation for Efficient Decision Input Acquisition"
2011	Sureyya Tarkan in Coputer Science. Advisor is Ben Shneiderman. "Enhancing Timely Management of Workflow with Interactive Visual Displays and Actions for Situation Awareness Processing"
2010	Chris Hayden in Computer Science. Advisors are Mike Hicks and Jeff Foster. "Clear and Correct Runtime Upgrades"
2010	Chang Hu in Computer Science. Advisor is me. "Translation by Collaboration Between Monolinguals"
2008	Walky Rivadeneira in Psychology. Advisor is Kent Norman. "Tag Clouds: How Format and Categorical Structure Affect Categorization Judgement"
2007	Jerry Fails in Computer Science. Advisor is Allison Druin. Research on children's collaborative mobile interfaces.
2005	Haibin Ling in Computer Science. Advisor is David Jacobs. Research on invariance in computer vision.
2001	Jaime Montemayor in Computer Science. Advisor is Allison Druin. Research on physical programming for children.
2001	Harry Hochheiser in Computer Science. Advisor is Ben Shneiderman. Research on interfaces for time-series data.

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2001	Angela Boltman in Education. Advisor is Allison Druin. Research on the technology of storytelling.
2000	Jeff Heflin in Computer Science. Advisor is Jim Hendler. Research on knowledge representation on the Web.
1998	Egemen Tanin in Computer Science. Advisor is Ben Shneiderman. Research on query previews.
1998	Thanarat Horprasert in Computer Science. Advisor is Larry Davis. Research on real-time computer vision.
1998	Vasanth Philomin in Computer Science. Advisor is Larry Davis. Research on real-time computer vision.
1998	Chris North in Computer Science. Advisor is Ben Shneiderman. Research on Tightly Coupled Windows.

iv. Post-doc

2009-2012	Tom Yeh working in applied computer vision and HCI (co-mentored with Larry Davis). **Currently at Univ. of Colorado, Boulder.**

4. SERVICE

A. PROFESSIONAL

i. Office and Committee Memberships

2015 – 2018	SIGCHI Adjunct Chair for Awards
2015	TOCHI Special Issue Editor
2015	Learning @ Scale Program Committee
2014	Learning @ Scale Program Committee
2011	CHI 2011 Papers Subcommittee Co-chair
2010	CHI 2010 Papers Subcommittee Co-chair
2005 – 2016	US ACM Committee member
2004 – 2007	SIGCHI Adjunct Chair for US Public Policy Committee
2000	CHI Conference Video Paper Co-Chair
1999	CHI Conference Video Paper Chair
1998	UIST Technical Program Committee
1998	UIST Conference Panel Chair, Technical Program Committee
1998	CHI Conference Video Co-Chair.

ii. Editorial Boards

2015 – 2018	**PeerJ Computer Science**, PeerJ
2012 – 2018	**Transactions on Computer-Human Interaction (TOCHI)**, ACM Press
2007 – 2014	**Foundations and Trends in HCI** (Editor-in-chief), NOW Publishers
2002 – 2016	**Information Visualization**, Palgrave Press

iii. Advisory Boards

2016 – 2018	**Coursera**, Mountain View, CA Coursera Council advisory group
2012 – 2015	**Barrie School**, Silver Spring, MD Board of Trustees for this independent K-12 school 2013 – 2016: Secretary

2003	**Microsoft Research**, Redmond, WA University Relations Faculty Advisory Board	

iv. Other non-University committees, commissions, panels, etc.

2012	**Judge for Joan Ganz Cooney, National STEM Video Game Challenge**

vi. Paid Consultancies

2022 – present	**IT Park University** Honorary Rector to help lead new tech educational institution	**Tashkent, Uzbekistan**
2022 – present	**EPAM** Chief Academic Advisor - help with corporate educational programs and creation of new universities	**Newtown, PA**
2020 – 2022	**Logitech** Consultant to help with new product development	**Seattle, WA**
2009 – present	**Consulting as an expert witness** largely for patent infringement cases for a range of clients	**Windsor, MA**
2006 – 2014	**Zumobi, Inc.** Founder of startup company to create mobile information services software	**Seattle, WA**
2008 – 2009	**Microsoft Research** Consultant to help with products related to my research	**Seattle, WA**
2005 – 2009	**Hillcrest Laboratories, Inc.** Advisor to help this start-up develop novel in-home entertainment system	**Rockville, MD**
2003 – 2008	**Windsor Interfaces, Inc.** President and CEO of start-up company to commercialize some HCIL projects	**Chevy Chase, MD**
2005	**ScholarOne, Inc.** Consultant to help them with visualization in their scholarly publication and conference management software	**Charlottsville, VA**
2004 – 2005	**ATTAP, Inc.** Consultant to help this start-up develop novel mobile device interfaces for personal information management	**New York, NY**
2003	**Microsoft Research Corp** On University Relations Faculty Advisory Board	**Redmond, WA**
2001 – 2003	**PARC** Advised on project to support brainstorming	**Palo Alto, CA**
2000	**NASA Goddard Space Flight Center** Designed prototype visualizations for satellite constellation control	**Greenbelt, MD**
1999 – 2001	**Swedish Institute of Computer Science (SICS)** Worked on European Union KidStory project	**Stockholm, Sweden**
1998 – 1999	**Lockheed Martin Astronautics** Advised on use of Pad++ for image analyst application	**Denver, CO**
1996 – 1997	**Sony Research Corporation** Advised on use of Pad++ for product development	**New York, NY**

B. UNIVERSITY
i. Departmental

2013 – 2014	CS Educational Transformation Committee co-chair
2008 – 2012	CS Teaching Evaluation Committee
2008 – 2011	CS Department Council
2007 – 2010	Software Engineering Field Committee chair
2010	UMIACS APT Committee
2009	CS Faculty Search Committee
2007	Chair of APT committee for Evan Golub's promotion to Senior Lecturer
2006	Undergraduate curriculum committee
2006	CS Distinguished Lecturer committee
2004	UMIACS steering committee
2004	High school programming contest
2004	Undergraduate curriculum
2003 – 2005	CS Department Council
2002	CFAR faculty recruiting committee
2001 – 2002	Lab committee
2001 – 2002	On department faculty recruiting committee
2001	Taught 1.5 hour course for high school students in Governor's program.
2000	Represented the computer science department on Capitol Hill for an exhibition to encourage Congressional appropriations for NSF.
2000	Helped with Computer Science Dept. research review day – made departmental demo.
1999 – 2000	Technical staff liaison – to help CS admin and technical staff.
1999	Helped with Computer Science Programming Contest
1996 – 1997	Graduate Admissions coordinator for the UNM Computer Science Department.

iii. University

2016 – 2018	USM Faculty Workload Workgroup
2015 – 2018	DIT Learning Technology Working Group
2015 – 2017	Senate Library Council Committee
2015 – 2018	Senate Educational Affairs Committee
2014 – 2018	Provost's Data Policy Advisory Committee
2013 – 2018	USM Academic Transformation Advisory Committee
2013 – 2018	Future of Information Alliance brainstorming board
2013 – 2018	DIT Technology Accessibility Committee
2013 – 2014	Journalism Faculty Search Committee
2013 – 2014	Learning @ Technology Working Group for DIT
2012 – 2013	Provost's Commission on Blended and Online Education

2012 – 2013	VP IT/CIO – IT Council
2012	CMNS Distinguished Research Scientist Prize comittee
2011	VP / CIO Search Committee
2010	UMD Campus-Wide Mobile App Programming Contest Chair
2002 – 2005	Advisory board member for MITH (Maryland Institute for Technology and the Humanities)
2000	Served on search committee for new intellectual property manager for Office of Technology Commercialization.
2000	Ran event for Maryland Day – opened lab to children to use KidPad to tell collaborative stories

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