

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**AMAZON.COM, INC.,
AMAZON.COM SERVICES LLC, and
AMAZON WEB SERVICES, INC.,**
Petitioners,

v.

SOUNDCLEAR TECHNOLOGIES, LLC,
Patent Owner.

U.S. Patent No. 9,223,487

DECLARATION OF CRAIG ROSENBERG, PH.D.

<i>Amazon v. SoundClear</i> US Patent 9,223,487 Amazon Ex. 1002

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I, Craig Rosenberg, Ph.D., do hereby declare:

1. I am making this declaration at the request of Petitioners Amazon.com, Inc., Amazon.com Services LLC, and Amazon Web Services, Inc. (collectively, “Amazon”). I have been retained by Amazon as a technical expert in this matter.

2. I am being compensated for my work on this case. My compensation does not depend on the content of this Declaration or the outcome of these proceedings.

I. BACKGROUND

A. Experience and Qualifications

3. My qualifications to testify about the patent in this case and the relevant technology are set forth in my curriculum vitae (“CV”), which I understand is being submitted as Exhibit 1016. In addition, a brief summary of my qualifications is included below.

4. I hold a Bachelor of Science in Industrial Engineering, a Master of Science in Human Factors, and a Ph.D. in Human Factors from the University of Washington School of Engineering. For 30 years, I have worked in various areas, including human factors, user interface design, software development, software architecture, systems engineering, and modeling and simulation, across a wide range of application areas, such as aerospace, communications, entertainment, and healthcare.

5. I graduated from the University of Washington in 1988 with a Bachelor of Science degree in Industrial Engineering. After graduation, I continued my studies at the University of Washington College of Engineering. In 1990, I obtained an M.S. in Human Factors. Human Factors is an engineering discipline that studies the design of products, processes, equipment, and systems to enhance their efficiency in interaction with humans. The goal of human factors is to reduce human error, increase productivity and efficiency, and enhance safety and comfort, with a specific focus on the interaction and interfaces between humans and the products, processes, or systems with which they interact. In 1994, I earned a Ph.D. in Human Factors, with a focus on advanced interface design. My B.S., M.S., and Ph.D. were all taught at the University of Washington College of Engineering.

6. During my doctoral studies, I worked as an Associate Assistant Professor of Human Factors at the University of Washington's Industrial Engineering Department. My duties included teaching, writing research proposals, designing and conducting funded human factors experiments for the National Science Foundation, and hiring and supervising students. While studying at the University of Washington, I also worked as a human factors researcher, designing and conducting advanced human factors experiments related to virtual environments, interface design, stereoscopic displays, and advanced visualization research, which the National Science

Foundation funded. My duties included user interface design, system design, software development, graphics programming, experimental design, and interfacing between hardware and software.

7. I have published twenty-one research papers in professional journals and proceedings in the areas of user interface design, computer graphics, and the design of spatial, stereographic, and auditory displays. I also authored a book chapter on augmented reality displays in the book “Virtual Environments and Advanced Interface Design” (Oxford University Press, 1995). In addition, I created one of the first virtual spatial musical instruments called the MIDIBIRD that utilized the MIDI protocol, two six-dimensional spatial trackers, a music synthesizer, and a computer graphics workstation to create an advanced and novel musical instrument.

8. For the past 21 years, I have served as a consultant for Global Technica, Sunny Day Software, Stanley Associates, Techrizon, CDI Corporation, and the Barr Group. In this capacity, I have provided advanced engineering services for many companies.

9. I consulted for the Boeing Company for over 16 years as a senior human factors engineer, user interface designer, and software architect for a wide range of advanced commercial and military programs. Many of the projects that I was involved with at Boeing involved advanced software development, user interface design, agent-based software, and modeling and simulations in the areas of missile

defense, homeland security, battle command management, computer-aided design, networking and communications, air traffic control, location-based services, and Unmanned Aerial Vehicle (“UAV”) command and control. Additionally, I served as the lead system architect, developing advanced air traffic controller workstations and air traffic control analysis applications, toolsets, and trade study simulations for Boeing Air Traffic Management.

10. I was also the architect of the Boeing Human Agent Model. The Boeing Human Agent Model is an advanced model for simulating human sensory, cognitive, and motor performance as applied to the roles of air traffic controllers, pilots, and UAV operators. In another project, I served as the lead human factors engineer and user interface designer for Boeing’s primary vector and raster computer-aided drafting and editing system, which produces maintenance manuals, shop floor illustrations, and service bulletins for aircraft manufactured by the Boeing Commercial Aircraft Company. Additional responsibilities during my time as a consultant include system engineering, requirements analysis, functional specification, use case development, user stories, application prototyping, modeling and simulation, object-oriented software architecture, graphical user interface analysis, and design, as well as software development using UML, C++, C#, and Java.

11. In 1995 and 1996, I was hired as the lead human factors engineer and user interface designer for the first two-way pager produced by AT&T. Prior to this

technology, individuals could receive pages but had no way to respond using their pager. This new technology enabled users to use a small, handheld device to receive and send canned or custom text messages, access and update their address book, and view and update their personal calendar. This high-profile project involved designing the entire feature set, user interface/user interaction design and specification, as well as all graphical design standards.

12. From 1999–2001, I was the lead human factors engineer and user interface designer for a company called Eyematic Interfaces, where I was responsible for all user interface design and development activities associated with real-time mobile handheld 3D facial tracking, animation, avatar creation, and editing software for a product for Mattel. My work involved user interface design, human factors analysis, requirements gathering and analysis, and functional specifications.

13. I was the lead user interface designer for a company called ObjectSpeed, which developed a portable handheld telephone for use in homes and businesses that had many of the same capabilities that we take for granted in mobile cellular phones. This portable multifunction device supports voice, email, chat, video conferencing, internet radio, streaming media, Microsoft Outlook integration, photo taking and sharing, etc. The ObjectSpeed device was specifically designed and developed as a portable handheld device.

14. I was the lead UI designer for Ahaza, a company that builds IPv6 routers. I designed the user interfaces for configuring and controlling these advanced network hardware devices. My responsibilities included requirements analysis, functional specification, user interface design, user experience design, and human factors analysis.

15. I am the founder, inventor, user interface designer, and software architect of WhereWuz. WhereWuz is a company that develops advanced mobile software for GPS-enabled smartphones and handheld devices. WhereWuz allows users to record exactly where they have been and query this data in unique ways for subsequent retrieval based on time or location. WhereWuz was specifically designed and developed to run on small handheld devices.

16. I am the co-founder of a medical technology company called Healium. Healium developed advanced wearable and handheld user interface technology, enabling physicians to interact more effectively with electronic medical records.

17. I am the co-founder of StratoScientific, a medical technology company. StratoScientific is developing an innovative case for a smartphone that transforms a standard handheld device into a full-featured digital stethoscope, incorporating visualization and machine learning for telemedicine and automated diagnosis.

18. I designed and developed a large software project for Disney World, called xVR, which enabled operational employees to use a handheld device to view

the current and historical status of all guests within multiple attractions and one of their restaurants. The application could run in a real-time/live mode, displaying data collected from sensors that show the location and status of all guests within the attraction. The application could also be run in a fast time/simulated mode. The application was developed on a laptop computer and was specifically designed to run on various devices, including laptops, PCs, smartphones, and tablets.

19. I have received several awards for my engineering work relating to interface design, computer graphics, and the design of spatial, stereographic, and auditory displays, including a \$10,000 scholarship from the I/ITSEC for advancing the field of interactive computer graphics for flight simulation and a Link Foundation award for furthering the field of flight simulation and virtual interface design. I have also created computer graphic illustrations for several popular book covers and animations for a movie produced by MIRAMAR.

B. Materials Considered

20. In preparing this Declaration, I have considered the following materials:

Exhibit No.	Description
1001	U.S. Patent No. 9,223,487 (“the ’487 patent”)
1003	U.S. Patent Publ. No. 2010/0090971 (“Choi”)

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Exhibit No.	Description
1004	European Patent No. 2,175,354 (“Yach”)
1005	U.S. Patent Publ. No. 2008/0309632 (“Westerman-632”)
1006	U.S. Patent Publ. No. 2006/0274046 (“Hillis”)
1007	U.S. Patent Publ. No. 2011/0077851 (“Ogawa”)
1008	PCT Publ. No. WO 2010/091496 (“McGibney”)
1009	U.S. Patent Publ. No. 2011/0074718 (“Yeh”)
1010	U.S. Patent Publ. No. 2010/0235793 (“Ording”)
1011	U.S. Patent Publ. No. 2008/0036743 (“Westerman-743”)
1012	U.S. Patent No. 7,256,773 (“Kolmykov-Zotov”)
1013	U.S. Patent Publ. No. 2009/0153492 (“Popp”)
1014	U.S. Patent Publ. No. 2012/0180003 (“Sawayanagi”)

21. I have reviewed the full file history of the ’487 patent. I have also relied on my education, training, and experience, and my knowledge of pertinent literature in the field of the ’487 patent.

II. APPLICABLE LEGAL STANDARDS

22. I have been asked to provide my opinion as to whether claims 1-3 and 10-12 of the '487 patent would have been obvious to a person of ordinary skill in the art at the time of the alleged invention, in view of the prior art.

23. I am an engineer by training and profession. The opinions I am expressing in this report involve the application of my education, training, and technical knowledge and experience to the evaluation of certain prior art with respect to the '487 patent.

24. Although I have been involved as a technical expert in patent matters before, I am not an expert in patent law. Therefore, the attorneys from Knobbe, Martens, Olson & Bear, LLP have provided me with guidance as to the applicable patent law in this matter. The paragraphs below outline my understanding of how to apply current principles related to patent validity to my analysis.

A. Claim Construction

25. It is my understanding that in determining whether a patent claim is obvious in view of the prior art, the Patent Office construes the claim by giving the claim terms their plain and ordinary meaning, as they would have been understood by a person of ordinary skill in the art at the time of the invention in view of the intrinsic record (patent specification and file history). For the purposes of this review, and to the extent necessary, I have interpreted each claim term in accordance

with its plain and ordinary meaning as it would have been understood by a person of ordinary skill in the art at the time of the invention, in view of the intrinsic record. I have been instructed that the time of the invention is September 28, 2011, which I understand to be the earliest claimed priority date of the '487 patent.

26. I understand that a patent and its prosecution history are considered “intrinsic evidence” and are the most important sources for interpreting claim language in a patent. I also understand that in reading the claim, I must not import limitations from the specification into the claim terms; in other words, I must not narrow the scope of the claim terms by implicitly adding disclosed limitations that have no express basis in the claims. The prosecution history of related patents and applications can also be relevant.

27. I understand that sources extrinsic to a patent and its prosecution history (such as dictionary definitions and technical publications) may also be used to help interpret the claim language, but that such extrinsic sources cannot be used to contradict the unambiguous meaning of the claim language that is evident from the intrinsic evidence.

28. Unless expressly stated herein, I have applied the plain and ordinary meaning of the claim terms, which I understand is the meaning that a person of ordinary skill in the art would have given to terms in September 2011 based on a review of the intrinsic evidence.

B. Obviousness

29. It is my understanding that a claim is “obvious” if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the alleged invention. I understand that an obviousness analysis involves a number of considerations. I understand that the following factors must be evaluated to determine whether a claim would have been obvious: (i) the scope and content of the prior art; (ii) the differences, if any, between each claim of the ’487 patent and the prior art; (iii) the level of ordinary skill in the art in September 2011; and (iv) additional considerations, if any, that indicate that the invention was obvious or not obvious. I understand that these “additional considerations” are often referred to as “secondary considerations” of non-obviousness or obviousness.

30. It is my understanding that something is “inherent in,” and therefore taught by, the prior art, if it necessarily flows from the explicit disclosure of the prior art. I understand that the fact that a certain result or characteristic *may be* present in the prior art is not sufficient to establish inherency. However, if the result or characteristic is *necessarily* present based upon the explicit disclosure in the prior art, it is inherent in the prior art and is therefore disclosed.

31. I also understand that the frame of reference when evaluating obviousness is what a hypothetical person of ordinary skill in the pertinent art would have

known in September 2011. I understand that the hypothetical person of ordinary skill is presumed to have knowledge of all pertinent prior art references.

32. I understand that a prior art reference may be a pertinent prior art reference (or “analogous art”) if it is in the same field of endeavor as the patent or if it is pertinent to the problem that the inventors were trying to solve. A reference is reasonably pertinent if it logically would have commended itself to an inventor’s attention in considering the problem at hand. If a reference relates to the same problem as the claimed invention, that supports use of the reference as prior art in an obviousness analysis. Here, all of the references relied on in my obviousness analysis below are in the same field of endeavor as the ’487 patent, e.g., computer gestures and commands. The references are also pertinent to a particular problem the inventor was focused on, e.g., identifying and simplifying touch commands.

33. It is my understanding that the law recognizes several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include:

- combining prior art elements according to known methods to yield predictable results;
- simple substitution of one known element for another to obtain predictable results;

- a predictable use of prior art elements according to their established functions;
- using known techniques to improve similar devices (methods, or products) in the same way;
- applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success (in which case a claim would have been obvious to try);
- 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 would have been predictable to one of ordinary skill in the art; and
- some 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 prior art reference teachings to arrive at the claimed invention.

34. I understand that “secondary considerations” must be considered as part of the obviousness analysis when present. I further understand that the secondary considerations may include: (1) a long-felt but unmet need in the prior art that was satisfied by the claimed invention; (2) the failure of others; (3) skepticism by experts;

(4) commercial success of a product covered by the patent; (5) unexpected results achieved by the claimed invention; (6) industry praise of the claimed invention; (7) deliberate copying of the invention; and (8) teaching away by others. I also understand that evidence of the independent and nearly simultaneous “invention” of the claimed subject matter by others is a secondary consideration supporting an obviousness determination and may support a conclusion that a claimed invention was within the knowledge of a person of ordinary skill as of September 2011. I am not aware of any evidence of secondary considerations that would suggest that the claims of the ’487 patent would have been nonobvious in September 2011.

35. I understand that when assessing obviousness, using hindsight is impermissible; that is, what is known today or what was learned from the teachings of the patent should not be considered. The patent should not be used as a road map for selecting and combining items of prior art. Rather, obviousness must be considered from the perspective of a person of ordinary skill at the time the alleged invention was made – September 2011 in this case.

36. I also understand that an obviousness analysis must consider the invention as a whole, as opposed to just a part or element of the invention. I understand this “as a whole” assessment to require showing that one of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with

no knowledge of the claimed invention, would have selected the elements from the prior art and combined them in the claimed manner.

III. PERSON OF ORDINARY SKILL IN THE ART

37. It is my understanding that when interpreting the claims of the '487 patent and evaluating whether a claim would have been obvious, I must do so based on the perspective of a person of ordinary skill in the art at the relevant priority date. I have been instructed to assume for the purposes of my opinions that the relevant priority date of the '487 patent is September 28, 2011.

38. I understand that in determining the level of ordinary skill in the art, several factors are considered. Those factors may include: (i) the type of problems encountered in the art; (ii) prior art solutions to those problems; (iii) the rapidity with which innovations are made; (iv) the sophistication of the technology; and (v) the educational level of active workers in the field. A person of ordinary skill in the art must have the capability of understanding the scientific and engineering principles applicable to the pertinent art.

39. Based on my review of the specification and claims of the '487 patent, it is my opinion that a person of ordinary skill in the art would have had a minimum of a bachelor's degree in computer engineering, computer science, user interface design, human factors, electrical engineering, mechanical engineering, or a similar field, and approximately three years of industry or academic experience in a field

related to computer gestures and commands. Work experience could substitute for formal education and additional formal education could substitute for work experience.

40. My conclusions below that the claims of the '487 patent would have been obvious would remain the same even if the priority date, field of endeavor, or level of ordinary skill were slightly different.

41. I meet the above definition of a person of ordinary skill in the art, and did so as of September 2011. Also, I have worked with persons of ordinary skill in the art through my professional and academic experiences, and I have an understanding of their skill level as of September 2011.

IV. TECHNOLOGY BACKGROUND

42. The '487 patent describes the use of a common “pinching” gesture on a touchscreen device to perform a known function: selecting the objects inside a rectangle defined by the initial touch points. The “pinching” or “inward drag” gesture and the idea of using such a gesture to select objects on a screen, as well as the calculation described in the '487 patent for detecting the inward drag gesture, were well-known by September 2011 as I discuss below.

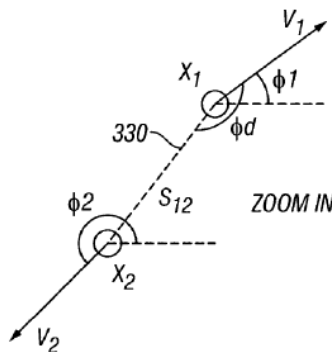
A. Detecting a Pinching Gesture by Analyzing Vectors and Angles

43. Methods for detecting multi-touch gestures on touchscreen devices were known by 2004. For example, Hillis (filed in 2004) described an “interactive

display” controlled by “user gestures identified on a touch detecting display surface.” (EX-1006 (Hillis) ¶[0007].) Hillis explained that, when contact locations are detected, a computer program determines a velocity for each contact location. (*Id.* ¶¶[0007]-[0008], [0028]-[0029].) Based on the position and velocity information, gestures are identified. (*Id.*; *id.* ¶[0021].) The identified gestures are then associated with commands. (*Id.*)

44. Hillis disclosed that, when “a user establishes and moves two contact locations,” the “[v]elocities ... are determined for each of the contact points, including magnitudes and directions[.]” (EX-1006 (Hillis) ¶[0034].) These magnitudes and directions define “velocity vectors” (*id.* ¶[0036]) that extend from the first and second touch points at a first moment in time, respectively, to touch positions occurring at a later moment. (*Id.* ¶¶[0028]-[0029], [0031], [0035], Figs. 4-5.)

45. Figure 5 of Hillis shows the first and second vectors, $\vec{v}_1$ and $\vec{v}_2$, for a gesture in which the two touch positions, $\vec{x}_1$ and $\vec{x}_2$, are spreading:



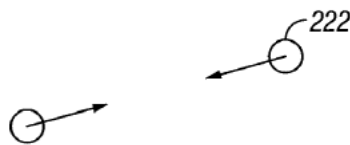
(EX-1006 (Hillis), Fig. 5.) To analyze the gesture, Hillis disclosed deriving “line

segment S_{12} 330 connecting the positions $\vec{x}_1$ and $\vec{x}_2$.” (*Id.* ¶[0035].)

46. Hillis then analyzed the angles (ϕ_1 and ϕ_2) of each vector and compared them. If they are similar, the system identified the gesture as a “panning” movement of the display. (EX-1006 (Hillis) ¶[0034].)

47. If the angles are not similar, then “the angle ϕ_d between the line segment S_{12} 330 connecting the positions $\vec{x}_1$ and $\vec{x}_2$ and either of the two velocities is considered.” (EX-1006 (Hillis) ¶[0035].) “If the line segment S_{12} and the velocity are found to be in approximate alignment,” the system identified the gesture as a zoom request. (*Id.*)

48. Figure 5 described a spreading motion (for a zoom-in command), but Hillis also disclosed that “an approaching motion of the two contact locations results in an outward zoom 222.” (EX-1006 (Hillis) ¶[0031].) That gesture, analogous to a pinching gesture, is shown in Figure 4:



(*Id.*, Fig. 4.) Thus, Hillis disclosed a method of detecting when two touch points are “approaching” each other: derive a line between the two touch points, determine the vectors (magnitude and direction) of movement of each touch point, and then calcu-

late the angle between the vector and the straight line. If the line segment and velocities are in “approximate alignment,” then the gesture is identified as a spreading or approaching gesture (analogous to reverse-pinch and pinching gestures). (*Id.* ¶[0035].) Then, the length of the line segment over time is considered. (*Id.*) If it is decreasing, then the touch points are approaching each other (e.g., a pinching gesture) and the gesture is identified as a request for a particular command associated with that gesture (e.g., an outward zoom).

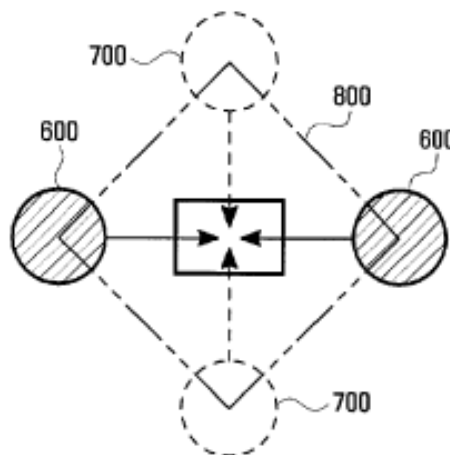
49. Hillis distinguished the spreading and approaching gestures from a situation in which the vectors are “approximately perpendicular to the line segment[,]” in which case the gesture is identified as a request to rotate the display. (EX-1006 (Hillis) ¶[0036].)

B. Pinch-to-Select Functions

50. Hillis described using an approaching multi-touch gesture to perform a particular function—zooming out. This functionality became widely known with Apple’s launch of the iPhone in 2007. But many references described using pinching gestures for various commands, including but not limited to zooming. And, by 2011, using a pinching gesture to define an area on a touchscreen display and select objects within that area was known in the art and had been described in many references. (*See, e.g.*, EX-1013 (Popp) at Fig. 3, ¶[0032] (2007 application disclosing a “touch-sensitive display surface” in which a “finger-pinch made with the thumb and the

index finger of a user” produces a “finger-pinch drawn boundary box gesture input” that sets a “rectangular shaped geographic boundary 54 in a space between the thumb and the index finger that defines a selected geographic area 56”).)

51. In 2009, Samsung filed a patent application describing a “touchscreen device” and methods of “handling objects displayed on the screen with diverse multi-touch gestures.” (EX-1003 (Choi), Abstract.) Choi disclosed that, when two initial touch points are detected and then an “inward drag event” occurs (e.g., a pinching gesture), the system draws “imaginary lines” to define a rectangular “pickup coverage area.” (*Id.* ¶¶[0189]-[0190].) The device then “selects the objects” “in the pickup coverage area.” (*Id.*) The touch points 600 and the rectangular area 800 are shown in Choi’s Figure 58:



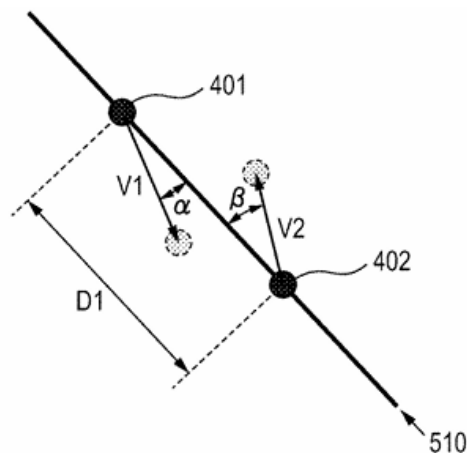
(*Id.*, Fig. 58 (excerpt); *see also id.*, Figs. 59, 60.) Many other references disclosed similar pinch-to-select functionality.

V. THE '487 PATENT

A. Overview

52. The '487 patent describes detecting a pinching gesture on a generic touchscreen device and then, in response to the gesture, selecting objects in an area defined by the initial touch points. The patent admits that touchscreen devices were known and that various gestures were known for selecting objects. (EX-1001 (the '487 patent), 1:15-39, 6:18-21 (device may be “a smartphone” or personal computer), 8:9-15.) The '487 patent's purported advance over the prior art is to allow a user to “give a command for a process by easy operation.” (*Id.*, 1:48-56, 5:18-22.)

53. The patent describes a method for detecting a pinch gesture. First, the system detects two touch positions (401, 402) and calculates vectors (V1, V2) for each touch position, as shown in Figure 5:



(*Id.*, 9:51-66, Fig. 5.)

54. The system then determines whether the touch positions are approaching each other. (*Id.*, 9:51-66.) To do so, the system: (a) derives a straight line 510 between the initial touch points; (b) calculates the angles (α , β) between the straight line and each vector; and (c) compares those angles to a prescribed angle. (*Id.*, 10:5-13.) If both angles are smaller than the prescribed angle and the distance between the touch points (D1) decreases over time, then the two touch points are considered to be “approach[ing] each other” (e.g., pinching motion). (*See* EX-1001 (the ’487 patent), 9:57-61.)

55. When a pinching motion is detected, a known command results: the system sets a rectangular area as shown in Figure 4C, where the initial touch points (401, 402) represent opposite corners of the rectangle. (*Id.*, 10:40-48; *see also id.*, 10:49-53.) Objects within the area (e.g., icons 310A-C) are selected. (*Id.*, 10:54-60.)

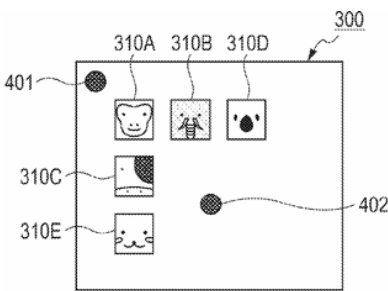


Fig. 4A

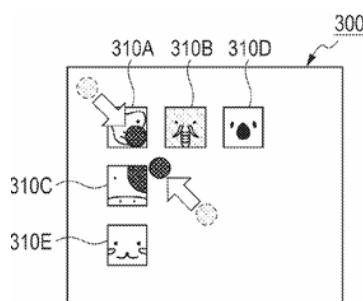


Fig. 4B

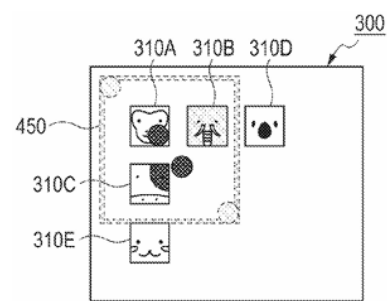


Fig. 4C

(*Id.*, Figs. 4A-4C.)

VI. CLAIMS 1, 11, AND 12 WOULD HAVE BEEN OBVIOUS IN VIEW OF CHOI AND HILLIS.

A. Claim 1

56. The preamble of claim 1 recites “[an] electronic apparatus[.]” Choi discloses this. (EX-1003 (Choi), Abstract (“touchscreen-enabled device”), ¶¶[0003] (invention “relates to virtually any electronic device having a touchscreen display”), [0011] (“device equipped with a touchscreen that senses multi-touch input”), [0042] (“The present invention provides a device having a touchscreen that provides detection and recognition of touch gestures formed on the screen, and interpreting the touch event into a command such that that the user can move, delete, copy, and modify the objects displayed on the screen by means of the touchscreen.”).)

57. I note that the first five claim elements (elements 1[a]-1[e] below) recite known, conventional components of a generic touchscreen device. (*See, e.g.*, EX-1001 (the ’487 patent), 6:12-21 (The “electronic apparatus 100 may be a smartphone, a tablet-type terminal device with a touch panel, or a personal computer with a touch panel”).) Choi discloses these claim elements.

1. 1[a]: Display

58. Element 1[a] recites “a display.” Choi discloses that its electronic device includes a “display unit 2330” that “displays ... the applications running in the device[.]” (EX-1003 (Choi) ¶[0230]; *id.* ¶¶[0222]-[0223] (invention can be applied to “all types of display device[s]”), [0231] (“the touchscreen is a display”), [0232].)

Choi discloses that conventional touchscreen devices include a “display panel for displaying visual data[.]” (*Id.* ¶[0007].) Thus, Choi discloses this limitation.

2. 1[b]: Indicating Section

59. Element 1[b] recites “an indicating section for indicating objects on the display.” Choi discloses indicating (e.g., displaying) objects on the display. (EX-1003 (Choi), Abstract (“objects displayed on the screen”), ¶¶[0003], [0012], [0014], [0016], [0042], [0169], [0190]-[0191], Fig. 3.) Thus, Choi discloses this limitation.

3. 1[c]: Touch Panel

60. Element 1[c] recites “a touch panel superposed on the display[.]” The ’487 patent admits that touch panels were well-known. (EX-1001 (the ’487 patent), 1:19-23 (touch panels are widespread), 1:24-38.) Moreover, Choi discloses that its touchscreen may include “a touch panel in front of the display unit 2330.” (EX-1003 (Choi) ¶[0232]; *id.* ¶[0231] (display unit 2330 “can be implemented with a touchscreen[.]” which “is a display having a touch sensitive surface that can detect touch events”).) Choi also discloses that conventional touchscreen devices included a “touch panel” in front of the display screen. (*Id.* ¶[0007].) Thus, Choi discloses this limitation.

4. 1[d]: Acquiring Section for Detecting Touches

61. Element 1[d] recites “an acquiring section for detecting user’s touches to the touch panel and acquiring positions of the user’s touches to the touch panel as touch positions.”

62. Choi discloses that the device can “detect touch events.” (EX-1003 (Choi) ¶[0231].) Then, “if a touch event is detected ..., the touchscreen locates the position such that a software program performs an action in response to the touch event.” (*Id.*; *id.* ¶¶[0233] (“if the user makes a touch event at a specific position on the touchscreen, the touchscreen detects the position and sends position information to the control unit”), [0167] (the device “first detects a touch event (1301) and recognizes touch points (coordinates) made by the touch event (1303)”), [0188]-[0191] (describing identifying the location of touch points 600), Figs. 48 (step 1303 (“recognize touch points (coordinates)”), 58-60 (showing touch points 600).) Choi therefore discloses that its touch panel includes an acquiring section for detecting and locating a user’s touches, and thus discloses this limitation.

5. 1[e]: Selecting Section

63. Claim 1 recites “a selecting section” that performs the operations recited in the remaining claim elements. Element 1[e] recites that the selecting section is “[i] for deciding whether or not first and second touch positions are acquired by the acquiring section, [ii] for calculating a distance between the first and second

touch positions, and [iii] for deciding whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of time.”

Choi discloses these limitations.

64. Regarding element 1[e][i], Choi discloses a “touch gesture detector 2351” that “detects a touch gesture formed on the touchscreen” and “can discriminate between single touch gestures and multi-touch gestures.” (EX-1003 (Choi) ¶[0245].) The touch gesture detector outputs touch gesture information to the touch gesture analyzer, which determines the type of touch. (*Id.* ¶¶[0245]-[0246].) Thus, Choi discloses a section for deciding whether or not first and second touch positions are acquired by the acquiring section.

65. Regarding element 1[e][ii], Choi discloses that “[o]nce the two touch points are recognized, the device calculates the distance ‘L’ between the two touch points (1305).” (EX-1003 (Choi) ¶[0167]; *id.* ¶¶[0168], [0180]-[0187], [0246], Figs. 48 (Step 1305 (“calculate distance between two touch points”)), 49.)

66. Regarding element 1[e][iii], Choi discloses that the device “tracks movements of the two touch points to detect an inward drag event (i.e. an event in which the two touch points are dragged to approach with each other as shown in FIG. 49) (1313).” (EX-1003 (Choi) ¶[0169]; *id.* ¶¶[0061]-[0062] (determining whether the touch points are “dragged to approach each other”), [0183] (describing “inward drag event”), [0187], Fig. 49.) Choi also discloses that, when an inward

drag event is detected, the device calculates “the distance L2 between the two touch points after the inward drag event has completed[.]” (EX-1003 (Choi) ¶[0183].) As shown in Figure 49, the distance between the touch points decreases over time. (*Id.*, Figs. 49, 54.) Thus, Choi discloses limitations 1[e][i]-1[e][iii].

67. Even if Choi did not expressly or inherently disclose limitations 1[e][i]-1[e][iii], they are disclosed by Hillis. Hillis discloses a display surface “capable of detecting when and where a user touches the display surface.” (EX-1006 (Hillis) ¶[0021]; *id.* ¶¶[0007]-[0008].) Based on that information, “user gestures are identified.” (*Id.* ¶[0021]; *id.* ¶¶[0028], [0009]-[0010].) Hillis discloses “considering a recent history of the contact positions” to determine a “discrete sequence of velocities,” which include both a “rate and direction of motion.” (*Id.* ¶[0029]; *id.* ¶[0034].)

68. In Hillis, “a user establishes and moves two contact locations” and the “[v]elocities ... are determined for each of the contact points, including magnitudes and directions[.]” (*Id.* ¶[0034].) This defines a “line segment S₁₂” connecting the two contact points, $\vec{x}_1$ and $\vec{x}_2$. (*Id.* ¶[0035].) The length of the line segment is then “considered” to see “[i]f the length is decreasing[.]” (*Id.*)

69. Thus, Hillis discloses (1) deciding whether or not first and second touch positions are acquired by the acquiring section (e.g., whether a user “establishes” two contact locations), (2) calculating a distance between the first and second touch positions (e.g., considering length of line connecting $\vec{x}_1$ and $\vec{x}_2$), and (3) deciding

whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of time (e.g., determining “[i]f the length is decreasing”).

70. A person of ordinary skill in the art would have been motivated to combine the teachings of Choi and Hillis, and would have had a reasonable expectation of success in doing so, for the reasons I discuss below. (*Id.*; see ¶¶109-119, below.)

71. Thus, Choi and/or Hillis disclose this limitation.

6. 1[f]: Setting a Rectangular Area

72. Element 1[f] recites that the selecting section is for “setting a rectangular area with respect to the display and selecting an object or objects contained in the rectangular area in cases where it is decided that the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time.” Choi discloses this limitation. Alternatively, it would have been obvious in view of Hillis.

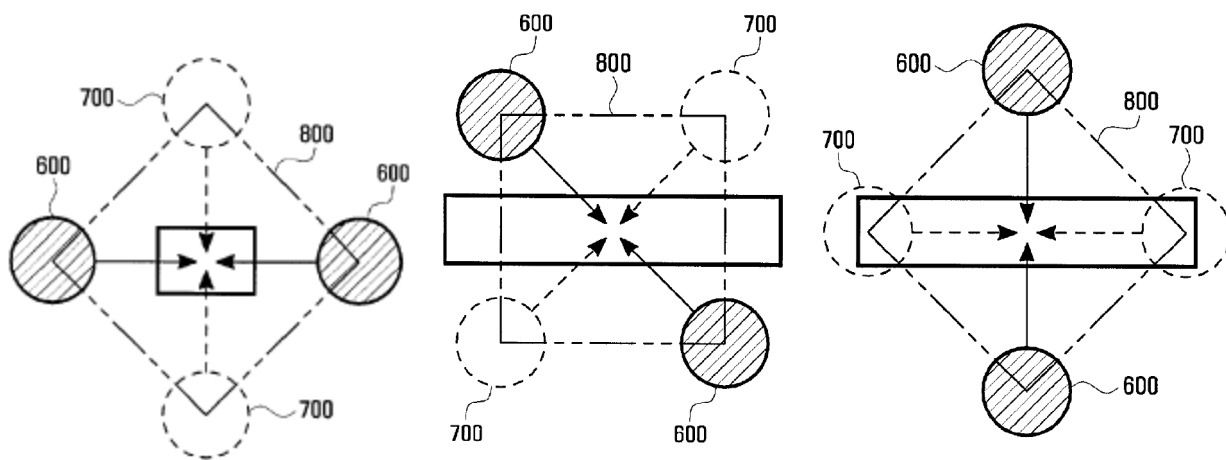
73. As I discuss above for element 1[e], Choi and Hillis both disclose determining whether “the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time.” (*See* ¶¶63-71, above.)

74. In those circumstances, the system detects an inward drag event and “defines a pickup function coverage area and discovers objects within the pickup

function coverage area (1311).” (*Id.*; EX-1003 (Choi) ¶[0168], Fig. 48 (Step 1311).)

The system then selects “the object within the pickup function coverage area (1315).” (EX-1003 (Choi) ¶[0169].)

75. Choi discloses that the area defined by its inward drag event is rectangular. Choi explains that, “if a multi-touch event with two initial touch points occurs and then an inward drag event occurs with two dragged touch points 600, the device recognizes the two dragged touch points 600 and creates two imaginary points 700 at of [sic] 90 degree angles.” (*Id.* ¶[0189].) “Next, the device draws an imaginary line connecting the dragged touch points 600 and the imaginary touch points 700 so as to define a pickup coverage area 800.” (*Id.* ¶[0190].) “Next, the device searches the pickup coverage area for objects and selects the objects [] in the pickup coverage area.” (*Id.* ¶[0190].) The coverage area 800 is rectangular because the boundary lines are created at 90° angles to the touch points:



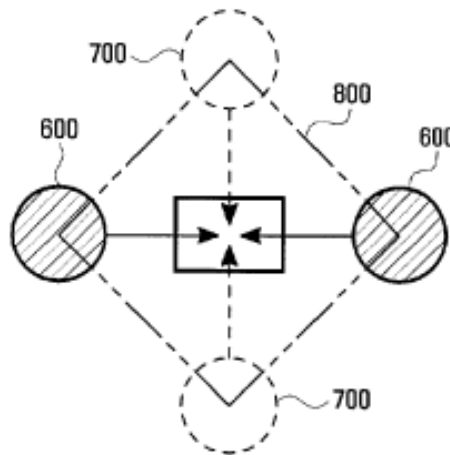
(EX-1003 (Choi), Figs. 58 (excerpt), 60; *id.*, Fig. 59.)

76. Thus, Choi discloses setting a rectangular area with respect to the display and selecting an object or objects contained in the rectangular area. Moreover, it does so in cases where it is decided that the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time as recited. (*Id.*) Doing so also would have been obvious in view of Hillis for the reasons I discuss above. (See ¶¶63-71, above.)

77. Accordingly, Choi and/or Hillis disclose this limitation.

7. 1[g]: Corners of Rectangle Coincident with Initial Touch Points

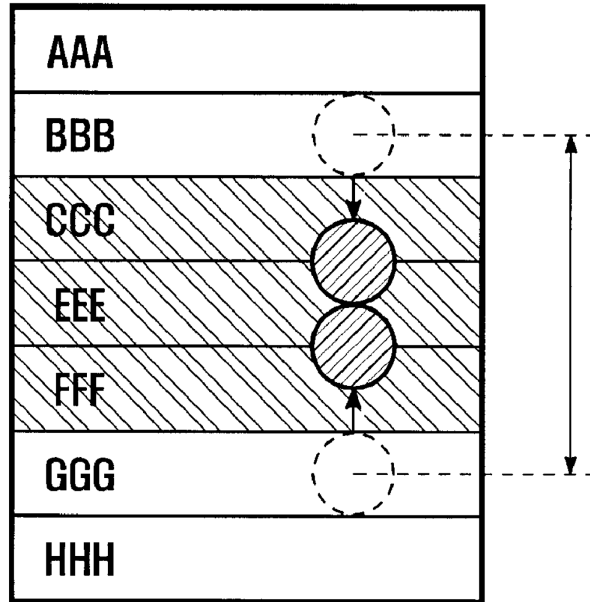
78. Element 1[g] recites that the “two opposite corners of the rectangular area are respectively coincident with the first and second touch positions occurring at an initial stage of the user’s touches to the touch panel.” Choi discloses that the initial touch points (e.g., 600) define the corners of the rectangular area. (EX-1003 (Choi) ¶¶[0189]-[0191], [0123], Figs. 58-60.) For example, Figure 58 shows the rectangular area (800) defined by the touch points (600) before they are dragged inward (e.g., as shown by the arrows):



(EX-1003 (Choi), Fig. 58 (excerpt).)

79. Even if Choi did not expressly disclose this limitation, Choi renders it obvious. For example, Choi discloses that one of several options for how its system selects items in response to an inward drag gesture is that the device “recognizes the two touch points made by the touch event [e.g., the initial touch points] and selects the objects CCC, EEE, and FFF placed between the two touch points at the same time regardless of the inward drag event following the touch event.” (EX-1003 (Choi) ¶[0186].) Choi shows this:

FIG . 56

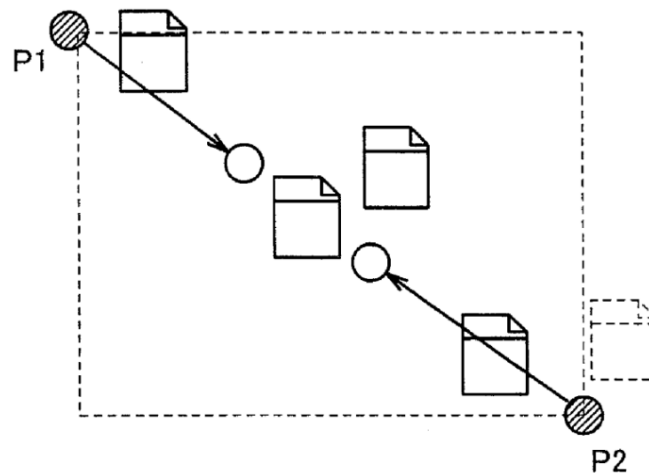


(EX-1003 (Choi), Fig. 56.) Thus, Choi shows that objects within the initial touch points (e.g., the touch points formed by dotted lines) are selected in response to an inward drag event (e.g., shown by arrows indicating that the initial, dotted line touch points are dragged to the final, shaded touch points). (*Id.*) A person of ordinary skill in the art would have understood based on this disclosure that such an option would have been available for Choi's Figure 58 embodiment as well—that is, that the rectangular selection area would be defined by the initial touch points regardless of where the touch points end after the inward drag event. (*Id.*)

80. A person of ordinary skill in the art would further have understood that Choi's system could select items based on the initial touch points, and that doing so

would simply be a routine design choice, because doing so was known to persons of ordinary skill in the art by the '487 patent's earliest possible priority date. For example, Sawayanagi¹ discloses that its system “may identify a rectangle in which two contacts P1 and P2 *indicated initially* are at opposite corners as an area defined by the pinch-in gesture, and may identify icons, each of which is at least partially included in that rectangle[.]” (EX-1014 (Sawayanagi) ¶[0075] (emphasis added).) Sawayanagi shows that objects inside the rectangle defined by initial touch points (P1, P2) are selected:

FIG.18



(EX-1014 (Sawayanagi), Fig. 18.) Sawayanagi further distinguishes this system

¹ I understand that Sawayanagi, while not prior art to the '487 patent, may show the level of ordinary skill in the art and/or explain how a person of ordinary skill in the art would have understood disclosure in a prior art reference because Sawayanagi claims priority to a Japanese application that was filed before the '487 patent's earliest possible priority date. (EX-1014 (Sawayanagi).)

from one that relies on the final touch points, and shows a person of ordinary skill in the art would have understood that either method could be implemented. (*See id.* ¶¶[0075]-[0076], claim 1 (system “identifies a file presented by an icon displayed in an area defined by said two contacts at least either of before and after being moved”).) Thus, a person of ordinary skill in the art would have understood that selecting items based on initial touch points is a simple, feasible design choice and would have found such a system obvious in view of Choi.

81. Thus, Choi discloses, or at least renders obvious, this limitation.

8. 1[h]: Vectors and Angles

82. Element 1[h] recites that the selecting section is for deriving a “first vector,” a “straight line,” and a “second vector,” for calculating a “first angle” and a “second angle,” and for deciding whether the first and second angles are smaller than a “prescribed angle.” Hillis discloses or renders obvious each of these limitations.

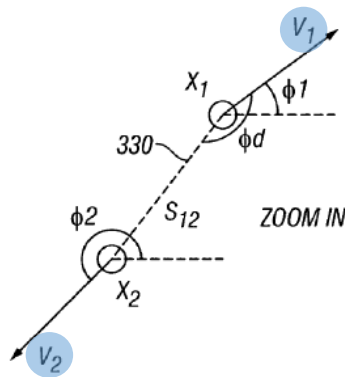
83. Although Choi discloses determining the type of gesture (e.g., “inward drag event in which the two touch points are dragged to approach with each other” (EX-1003 (Choi) ¶[0246])), Choi does not detail the mathematics that determines whether the two touch points approach each other. Hillis discloses those calculations.

a. First and Second Vectors

84. Element 1[h] first recites “deriving a first vector extending from the first touch position occurring at a first moment to the first touch position occurring at a second moment after the first moment” and a corresponding limitation for deriving a second vector.

85. Hillis discloses that when “a user establishes and moves two contact locations,” the “[v]elocities ... are determined for each of the contact points, including magnitudes and directions[.]” (EX-1006 (Hillis) ¶[0034].) These magnitudes and directions define Hillis’s “velocity vectors” (*id.* ¶[0036]) which, like the ’487 patent’s vectors, extend from first and second touch points at a first moment to touch positions at a later moment. (*Id.* ¶¶[0028] (software “records over time the discrete sequence of positions”), [0029] (“By considering a recent history of the contact positions, a discrete sequence of velocities $\vec{v}_1(n)$, including both a rate and direction of motion, is determined for each distinct contact”), [0031] (describing the movement of touch points over time to determine gesture and associated command), [0035] (velocities determined when user establishes “and moves” contact locations), Figs. 4-5, claims 1, 12, 20, 29.)

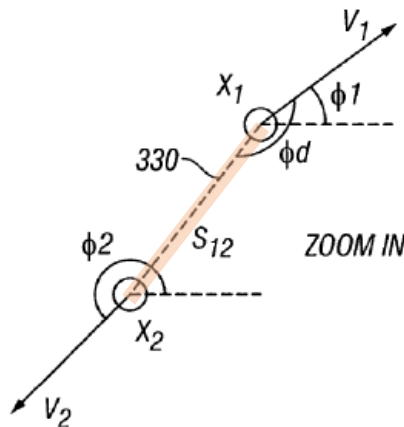
86. Hillis illustrates the first and second vectors $\vec{v}_1$ and $\vec{v}_2$, labeled V_1 and V_2 , for a gesture in which two touch points are spreading(e.g., an outward drag event):



(EX-1006 (Hillis), Fig. 5.)² Thus, Hillis discloses deriving the first and second vectors. (*Id.*)

b. Straight Line Between Initial Touch Points

87. Element 1[h] then recites “deriving a straight line connecting the first and second touch positions occurring at the first moment.” Hillis discloses deriving “line segment S_{12} 330 connecting the positions $\vec{x}_1$ [first touch position at first moment] and $\vec{x}_2$ [second touch position at first moment.]” (EX-1006 (Hillis) ¶[0035].)



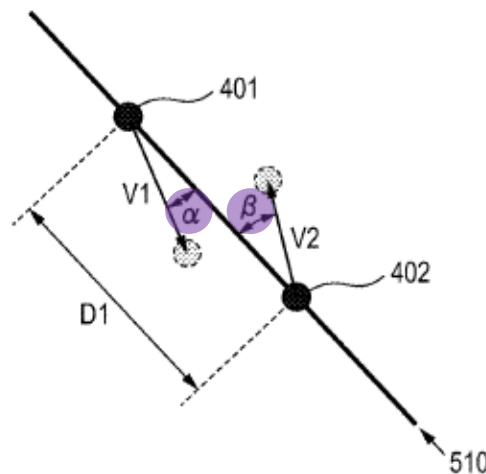
(*Id.*, Fig. 5.) Thus, Hillis discloses this limitation. (*Id.*) I note that Choi also

² Figures herein may be colored and/or annotated for clarity.

discloses deriving a straight line between two touch points. (See EX-1003 (Choi) ¶¶[0178]-[0179], Figs. 51-52.)

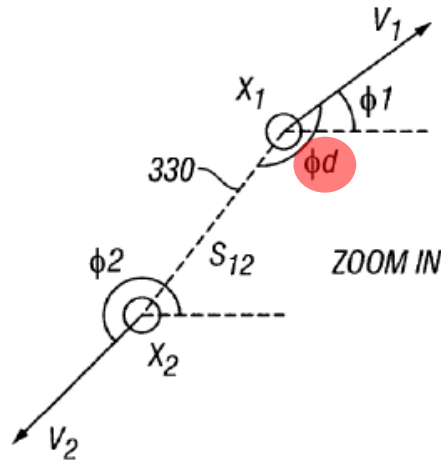
c. First and Second Angles

88. Element 1[h] then recites that the selecting section is “for calculating a first angle between the first vector and the straight line” and “for calculating a second angle between the second vector and the straight line.” These angles are labeled α and β in Figure 5 of the '487 patent:



(EX-1001 (the '487 patent), Fig. 5.)

89. Hillis discloses calculating the same angle, which Hillis labels ϕ_d in Fig. 5:



(EX-1006 (Hillis), Fig. 5; *id.* ¶[0035] (“the angle ϕ_d between S_{12} and $\vec{v}_1$ is considered”).)

90. Hillis discloses calculating “the angle ϕ_d between the line segment S_{12} 330 connecting the positions $\vec{x}_1$ and $\vec{x}_2$ and either of the two velocities[.]” (EX-1006 (Hillis) ¶[0035].) In Figure 5, Hillis considers the angle ϕ_d between line S_{12} and vector $\vec{v}_1$, but the same determination is made for the angle between line S_{12} and vector $\vec{v}_2$. (*Id.*)

91. Thus, Hillis discloses a selecting section for calculating a first angle (ϕ_d) between the first vector ($\vec{v}_1$) and the straight line (S_{12}) and for calculating a second angle (ϕ_d) between the second vector ($\vec{v}_2$) and the straight line (S_{12}). (*Id.*) But even if Hillis did not disclose calculating angle between both vectors ($\vec{v}_1$, $\vec{v}_2$) and the connecting line (S_{12}), doing so would have been obvious to a person of ordinary skill in the art for the reasons I discuss below. (See ¶¶97-106, below.)

d. Comparison of First and Second Angles

92. Element 1[h] next recites that the selecting section is “for deciding whether or not the first angle is smaller than a prescribed angle, and for deciding whether or not the second angle is smaller than the prescribed angle.” Hillis discloses this limitation.

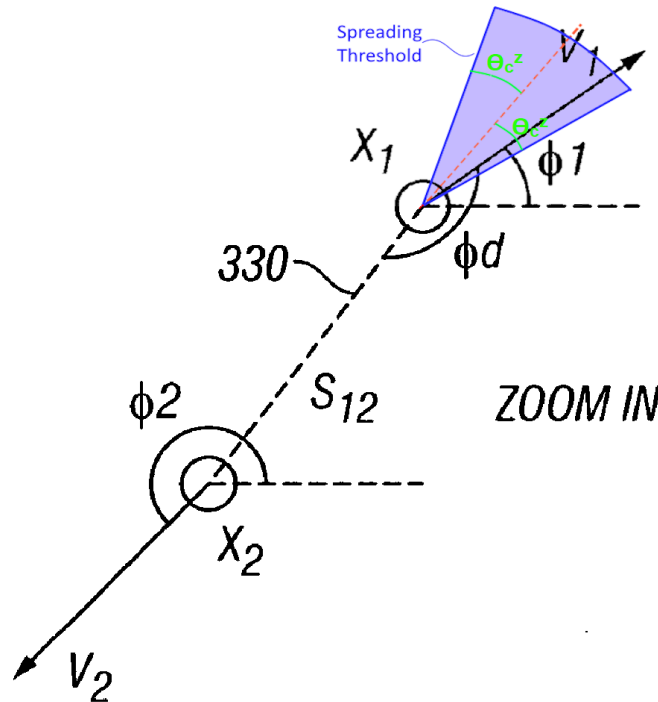
93. Hillis discloses that “the angle ϕ_d ... is considered” and, if “the line segment S_{12} and the velocity are *found to be in approximate alignment*, then the gesture is identified as a request for a zoom of the display.” (EX-1006 (Hillis) ¶[0035] (emphasis added).) To determine whether the vectors and the line are in approximate alignment, the angles between them are compared to a “predetermined tolerance” represented as Θ_c^z . (*Id.* ¶[0034]-[0035].)

94. Hillis’s Figure 5 shows an example in which the touch points are being separated, and the vector $\vec{v}_1$ is considered. (EX-1006 (Hillis), Fig. 5, ¶[0035].) Hillis discloses that determining whether the line segment S_{12} and vector $\vec{v}_1$ are in “approximate alignment” is performed using the following equation:

$$|\pi - \phi_d| < \Theta_c^z$$

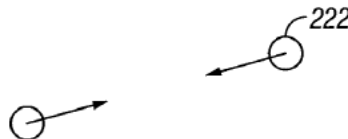
(*Id.*) The left side of this equation represents the difference in angle between a perfect outward drag gesture (e.g., one that is at π radians, or 180° , from the line S_{12}) and the vector $\vec{v}_1$, which is at angle ϕ_d . That difference must be less than the predetermined tolerance (Θ_c^z) for the inequality to be true. If it is true, then the gesture

will be identified as a request to zoom the display. Thus, if the tolerance Θ_c^z is 30° , then the gesture will be identified as a request to zoom the display if ϕ_d is between 150° and 210° . (*Id.*) This hypothetical range is shown in the annotated version of Figure 5 below:



(EX-1006 (Hillis), Fig. 5.)

95. Hillis's Figure 4 shows another exemplary gesture comprising "an approaching motion of the two contact locations":



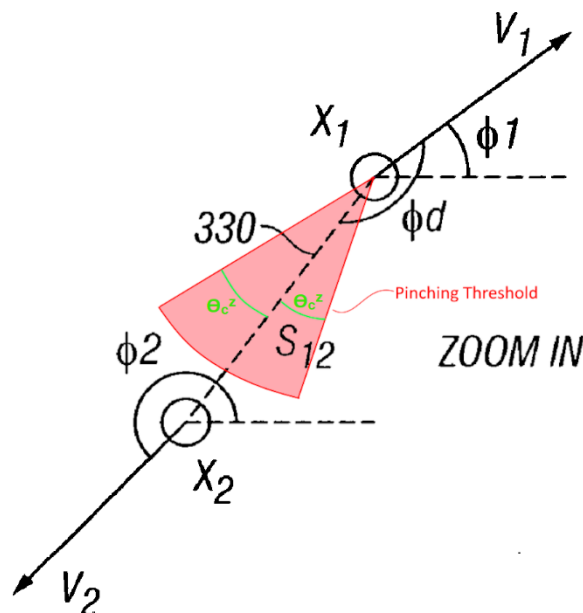
(EX-1006 (Hillis), Fig. 4.) Hillis associates this gesture with an "outward zoom."

(*Id.* ¶[0031].)

96. A person of ordinary skill in the art would have understood from Hillis that, to determine whether the vector $\vec{v}_1$ and the line segment S_{12} are in “approximate alignment” *when the touch points are approaching each other* as in Figure 4 (rather than spreading apart as in Figure 5), Hillis would determine whether the vector $\vec{v}_1$ is within the predetermined tolerance (Θ_c^z) of the line segment S_{12} . That is, when the angle ϕ_d satisfies either of the two inequalities:

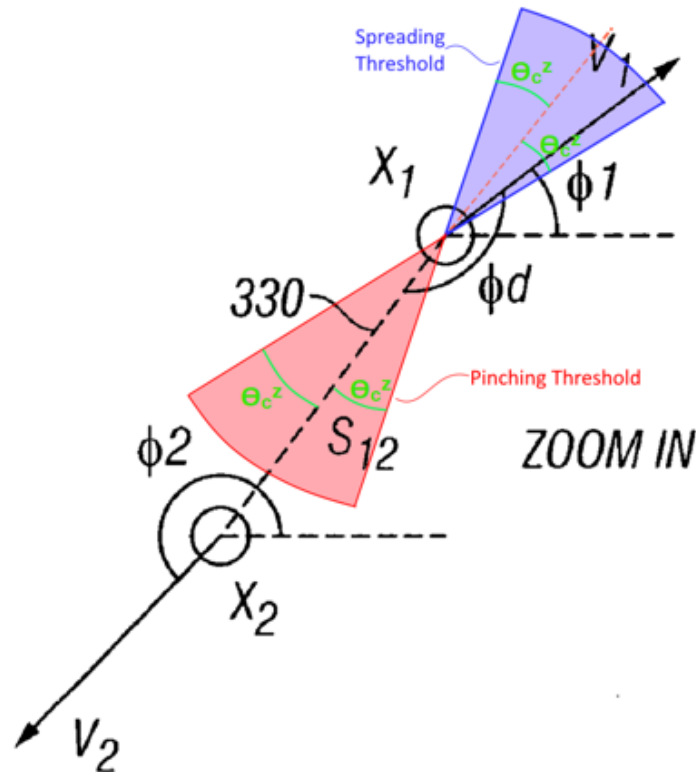
$$\phi_d < \Theta_c^z \text{ or } 2\pi - \phi_d < \Theta_c^z$$

In other words, if the tolerance Θ_c^z is 30° , then the gesture will be identified as an outward zoom if ϕ_d is either less than 30° or greater than 330° . This range is shown in the annotated version of Figure 5 below:



(EX-1006 (Hillis), Fig. 5.) A person of ordinary skill in the art would have understood this based on the basic principle of vertical angles, which dictates that opposite

angles formed by the same straight lines are the same. Thus, if the threshold for “approximate alignment” is as Hillis discloses for a spreading gesture, then the threshold of “approximate alignment” in a pinching gesture would be analogous:



(EX-1006 (Hillis), Fig. 5.) A person of ordinary skill in the art would further have understood that analogous, geometrically equivalent calculations are performed to determine whether the vector $\overrightarrow{v_2}$ is likewise in approximate alignment with the line segment S_{12} .

97. Hillis teaches considering the angle between the line and “either” vector. (EX-1006 (Hillis) ¶[0035].) To the extent this disclosure of Hillis does not

disclose considering the angles between the line segment and *both* vectors, a person of ordinary skill in the art would have been motivated to do so in view of Hillis for several reasons.

98. First, Hillis discloses that “inexperienced users ... may be overwhelmed by the power and flexibility” of its gestures. (EX-1006 (Hillis) ¶[0033].) For example, “an imperfect attempt to zoom” (spreading) can result in “a combined inward zoom and a slight rotation” that may leave the user “confused or disoriented.” (*Id.*) A person of ordinary skill in the art would have understood that comparing both angles to the “predetermined tolerance” would limit the risk of “imperfect” touch gestures and would reduce confusion and disorientation. Specifically, it would help restrict the pinch gesture to situations in which both touch points are within the “predetermined tolerance” rather than detecting this gesture when a single touch point meets that criteria—a scenario where a user is less likely to have intended the gesture.

99. Second, calculating both angles would provide more accurate gesture detection. For example, suppose a person of ordinary skill in the art implementing Hillis set a predetermined tolerance of 30°, and a user performed a gesture where the angle of $\vec{v}_1$ was 15° and the angle of $\vec{v}_2$ was 90°. If a person of ordinary skill in the art only considered the angle of $\vec{v}_1$ (15°), then it would satisfy the “approximate alignment” criteria and the gesture would be identified as a pinch. But if the angle

of $\vec{v}_2$ had been considered, it might be characterized as a rotate gesture. (See EX-1006 (Hillis) ¶[0036], Fig. 5.) A person of ordinary skill in the art would have been motivated to ensure that the gesture considers whether *both* touch points are moving toward each other in “approximate alignment” to accurately characterize the gesture as a pinch.

100. Third, it would have been common sense for a person of ordinary skill in the art to consider both angles because the calculations are known, simple, and easily understood; the benefits of doing so would have been known to a person of ordinary skill in the art, as I discuss above; and the solution represents merely repeating an existing calculation.

101. Fourth, the modification is merely the simple addition of one known element (considering the angle of the second vector) to another known element (Hillis’s gesture detection) to obtain predictable results (a more accurate gesture detection method that considers both angles).

102. Fifth, the modification uses of a known technique (considering the angle of the second vector) to improve a similar device and method (Hillis’s gesture detection) in the same way.

103. Sixth, the modification applies a known technique (considering the angle of the second vector) to a known device and method (Hillis’s gesture detection)

that is ready for improvement and yields predictable results (a more accurate gesture detection method).

104. Seventh, the modification represents a choice from a finite number of identified, predictable options. A person of ordinary skill in the art implementing Hillis's gesture detection method could consider the angle of the first vector, the angle of the second vector, or both. Thus, at a minimum, it would have been obvious to a person of ordinary skill in the art to try calculating and analyzing the angles for both vectors.

105. A person of ordinary skill in the art would have reasonably expected success in the modification at least because the calculations for each vector are easily derived mathematically from Hillis's disclosure. Implementing such a system was well within the skill of a person of ordinary skill in the art. Moreover, as I discuss above, such a modification would merely reflect the repetition of a known calculation (Hillis's angle calculation) to detect a known gesture (an inward drag).

106. Thus, Choi and Hillis disclose this limitation or render it obvious.

9. 1[i]: Selecting Objects

107. Element 1[i] repeats prior limitations and recites that the selecting section sets the rectangular area and selects objects in that area "in cases where it is decided that" the distance between the first and second touch positions decreases and the first and second angles are smaller than the prescribed angle. Element 1[f]

recited setting the rectangular area and selecting objects within that area “in cases where it is decided that ... the distance between the first and second touch positions decreases in accordance with the lapse of time.” Thus, element 1[i] adds that the area is set and objects are selected when both the first and second angle are smaller than the “prescribed angle.”

108. Choi discloses setting the rectangular area and selecting objects in that area upon recognition of two touch points and an inward drag event. (See ¶¶72-77, above.) And, as I discuss above, it would have been obvious to a person of ordinary skill in the art to use Hillis’s angle calculations and comparison to a “predetermined tolerance” to detect when a user of Choi’s device performed an “inward drag event” (as opposed to another gesture such as a rotation gesture). (See ¶¶82-106, above.) Thus, Choi and Hillis together disclose and render obvious this limitation.

10. Motivation to Combine

109. A person of ordinary skill in the art would have been motivated to use Hillis’s calculations to detect the inward drag event described in Choi for several reasons.

110. First, Choi suggests the combination. Choi teaches using an “inward drag” gesture to select objects within an area. But Choi does not disclose detailed calculations for detecting an “inward drag” gesture. A person of ordinary skill in

the art therefore would have looked to other references, like Hillis, for details of detecting such events and distinguishing “inward drag” gestures from other gestures.

111. Second, Choi discloses that it is advantageous for a gesture system to “allow[] the user to handle the objects efficiently and intuitively.” (EX-1003 (Choi) ¶[0254].) Hillis explains that its method for detecting gestures reduces user confusion and disorientation. (EX-1006 (Hillis) ¶[0033].) Thus, a person of ordinary skill in the art would have been motivated to implement Hillis’s gesture detection methods (e.g., calculating and comparing angles to a predetermined tolerance) to improve the user experience, making the experience more efficient and intuitive.

112. Third, although Hillis pairs a particular command with the inward drag gesture (zoom out), Hillis explicitly states that “[t]hose skilled in the art will appreciate that ... *different executions for such gestures* may be chosen.” (EX-1006 (Hillis) ¶[0031].) In view of this teaching, a person of ordinary skill in the art would have been motivated to use Hillis’s method for detecting a pinching gesture for the area-selection execution Choi describes.

113. Fourth, Choi and Hillis are both directed to user interfaces for touch-enabled electronic devices. (*E.g.*, EX-1003 (Choi), Abstract; EX-1006 (Hillis), Abstract.) They each address systems and methods for managing digital objects through touch inputs and share the goal of enhancing interaction between users and the graphical elements displayed on a touchscreen. (*Id.*) A person of ordinary skill

would have been motivated to combine these similar references to obtain the usability, responsiveness, and intuitiveness benefits of each.

114. Fifth, the combination represents nothing more than the simple addition of a known element (Hillis's vector and angle calculations for detecting an inward drag) to another known element (Choi's inward-drag-to-select function) to obtain the predictable results of accurately detecting an inward-drag gesture to define a selection area.

115. Sixth, the combination represents the use of a known technique (Hillis's detection of an inward-drag gesture) to improve a similar device and method (Choi's system, including the inward-drag-to-select function) in the same way.

116. Seventh, the combination merely applies a known technique (Hillis's method of inward-drag gesture detection) to a known device and method (Choi's inward-drag-to-select function) that is ready for improvement and yields predictable results (accurately detecting the inward-drag gesture).

117. A person of ordinary skill in the art would have reasonably expected success in using Hillis's inward-drag detection method to detect the inward-drag event described in Choi for several reasons. First, modifying Choi to implement Hillis's mathematical calculations for identifying a known gesture was within the skill of a person of ordinary skill in the art. (*See* EX-1003 (Choi) ¶¶[0221], [0257].) As I discuss above, such a combination would merely reflect the use of a known

calculation (from Hillis) to detect a known gesture (Choi's inward drag). Further, Hillis's gesture detection techniques are based on age-old geometric and mathematical concepts and would have been trivial for a person of ordinary skill in the art to implement in Choi's system.

118. Moreover, Choi discloses that its own "touch gesture analyzer" uses similar "distance" and "direction" parameters to identify when "an inward drag event" (e.g., pinch gesture) has occurred. (EX-1003 (Choi) ¶[0246] ("[T]he touch gesture analyzer 2353 compares the *distance* L between the two touch points of a touch event of the multi-touch gesture and a predetermined threshold value Th and then checks the *direction* of the drag event following the touch event. If the distance L is equal to or greater than the threshold Th, and the drag event is an inward drag event in which the two touch points are dragged to approach with each other, the touch gesture analyzer 2353 determines the multi-touch gesture is a pickup [i.e. pinch] gesture").) Because Choi and Hillis already use similar systems to detect an inward drag gesture, a person of ordinary skill in the art would have reasonably expected success in combining the references' teachings and using angular calculations to detect inward-drag gestures, as was disclosed in Hillis, to identify the inward-drag gesture described in Choi.

119. Thus, Choi and Hillis disclose or render obvious each limitation of claim 1, and claim 1 as a whole would have been obvious to a person of ordinary skill in the art.

B. Claims 11 and 12

120. Independent claims 11 and 12 are a method claim and a non-transitory computer-readable medium claim, respectively, that recite virtually identical limitations to those addressed above for claim 1, including a display, a touch panel, a pinch gesture, and selecting objects in a rectangular area. The chart below shows how the elements of the claims correspond:

Claim 1	Claim 11	Claim 12
1[pre]: An electronic apparatus comprising:	11[pre]: A method of controlling an electronic apparatus, comprising the steps of:	12[pre]: A non-transitory computer readable medium storing a computer program causing a computer to implement:
1[a]: a display;	11[a]: indicating objects on a display;	12[a]: an indicating section for indicating objects on a display;
1[b]: an indicating section for indicating objects on the display;		
1[c]: a touch panel superposed on the display;	11[b]: detecting user's touches to a touch panel superposed on the display and acquiring positions of the user's touches to the touch panel as touch positions;	12[b]: an acquiring section for detecting user's touches to a touch panel superposed on the display and acquiring positions of the user's touches to the touch panel as touch positions; and
1[d]: an acquiring section for detecting user's touches to the touch panel and acquiring positions of the user's touches to the touch panel as touch positions; and		

1[e]: a selecting section for deciding whether or not first and second touch positions are acquired by the acquiring section, for calculating a distance between the first and second touch positions, and for deciding whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of time;	11[c]: deciding whether or not first and second touch positions are acquired by the detecting and acquiring step;	12[c]: a selecting section for deciding whether or not first and second touch positions are acquired by the acquiring section, for calculating a distance between the first and second touch positions, and for deciding whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of time;
	11[d]: calculating a distance between the first and second touch positions;	
	11[e]: deciding whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of time; and	
1[f]: the selecting section being further for setting a rectangular area with respect to the display and selecting an object or objects contained in the rectangular area in cases where it is decided that the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time;	11[f]: setting a rectangular area with respect to the display and selecting an object or objects contained in the rectangular area in cases where it is decided that the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time;	12[d]: the selecting section being further for setting a rectangular area with respect to the display and selecting an object or objects contained in the rectangular area in cases where it is decided that the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time;
1[g]: wherein two opposite corners of the rectangular area are respectively coincident with the first and second touch positions occurring at an initial stage of the user's	11[g]: wherein two opposite corners of the rectangular area are respectively coincident with the first and second touch positions occurring at an initial stage of the user's	12[e]: wherein two opposite corners of the rectangular area are respectively coincident with the first and second touch positions occurring at an initial stage of the user's

touches to the touch panel;	touches to the touch panel;	touches to the touch panel;
1[h]: wherein the selecting section is for deriving a first vector extending from the first touch position occurring at a first moment to the first touch position occurring at a second moment after the first moment, for deriving a straight line connecting the first and second touch positions occurring at the first moment, for deriving a second vector extending from the second touch position occurring at the first moment to the second touch position occurring at the second moment, for calculating a first angle between the first vector and the straight line, for calculating a second angle between the second vector and the straight line, for deciding whether or not the first angle is smaller than a prescribed angle, and for deciding whether or not the second angle is smaller than the prescribed angle; and	11[h]: wherein the setting and selecting step comprises deriving a first vector extending from the first touch position occurring at a first moment to the first touch position occurring at a second moment after the first moment, deriving a straight line connecting the first and second touch positions occurring at the first moment, deriving a second vector extending from the second touch position occurring at the first moment to the second touch position occurring at the second moment, calculating a first angle between the first vector and the straight line, calculating a second angle between the second vector and the straight line, deciding whether or not the first angle is smaller than a prescribed angle, and deciding whether or not the second angle is smaller than the prescribed angle; and	12[f]: wherein the selecting section is for deriving a first vector extending from the first touch position occurring at a first moment to the first touch position occurring at a second moment after the first moment, for deriving a straight line connecting the first and second touch positions occurring at the first moment, for deriving a second vector extending from the second touch position occurring at the first moment to the second touch position occurring at the second moment, for calculating a first angle between the first vector and the straight line, for calculating a second angle between the second vector and the straight line, for deciding whether or not the first angle is smaller than a prescribed angle, and for deciding whether or not the second angle is smaller than the prescribed angle; and
1[i]: wherein the selecting section is for setting the rectangular area and se-	11[i]: wherein the setting and selecting step further comprises setting the rec-	12[g]: wherein the selecting section is for setting the rectangular area and

lecting the object or objects contained in the rectangular area in cases where it is decided that the distance between the first and second touch positions decreases in accordance with the lapse of time, the first angle is smaller than the prescribed angle, and the second angle is smaller than the prescribed angle.	tangular area and selecting the object or objects contained in the rectangular area in cases where it is decided that the distance between the first and second touch positions decreases in accordance with the lapse of time, the first angle is smaller than the prescribed angle, and the second angle is smaller than the prescribed angle.	selecting the object or objects contained in the rectangular area in cases where it is decided that the distance between the first and second touch positions decreases in accordance with the lapse of time, the first angle is smaller than the prescribed angle, and the second angle is smaller than the prescribed angle.
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These limitations are disclosed by the prior art, and the claims would have been obvious to a person of ordinary skill in the art, for the reasons I discuss above. (*See* ¶¶56-119, above.)

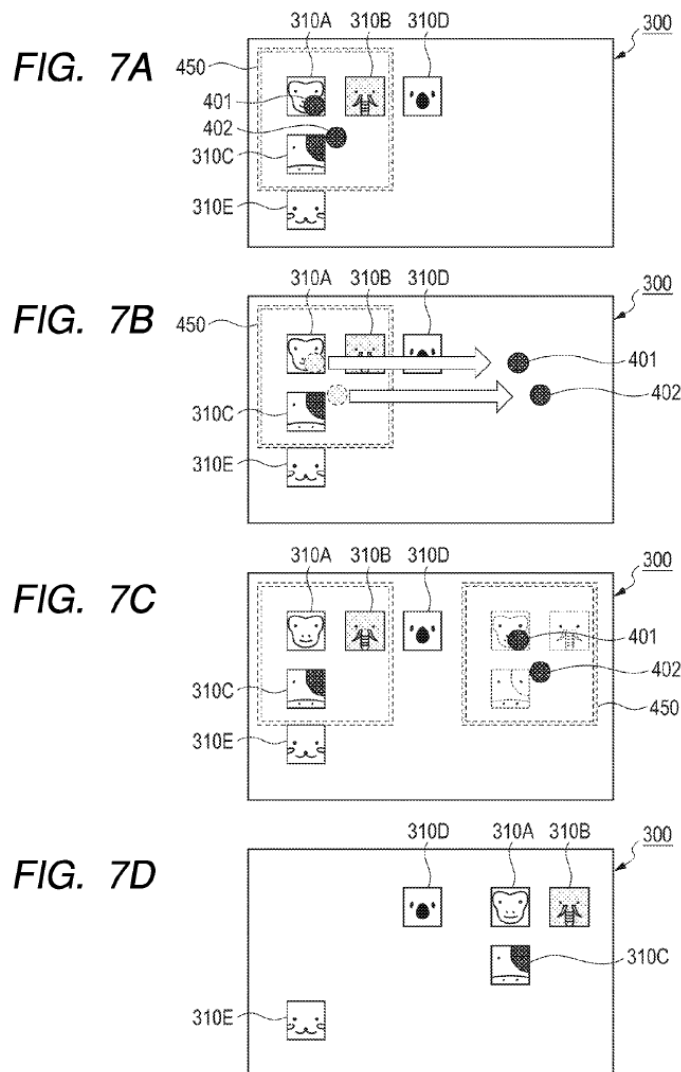
VII. CLAIMS 2 AND 3 WOULD HAVE BEEN OBVIOUS IN VIEW OF CHOI, HILLIS, OGAWA, AND OPTIONALLY MCGIBNEY.

121. As I discuss above, the limitations of claim 1 are disclosed by Choi and/or Hillis. (*See* ¶¶56-119, above.) Those references in combination with Ogawa and/or McGibney disclose the additional limitations of claims 2-3.

A. Claim 2

122. Claim 2 depends from claim 1 and further recites a “moving section.” This moving section decides (1) “whether or not the distance between the first and second touch positions is substantially constant after the object or objects contained in the rectangular area are selected” and (2) “whether or not the first and second

touch positions are slid in substantially a same direction after the object or objects contained in the rectangular area are selected.” In “cases where it is decided that the distance between the touch positions is substantially constant” and the touch positions are slid in “substantially a same direction,” then the selected object or objects are moved “along said same direction.” The ’487 patent’s Figures 7A-7D illustrate this moving operation:



(EX-1001 (the ’487 patent), Figs. 7A-7D.)

1. Choi

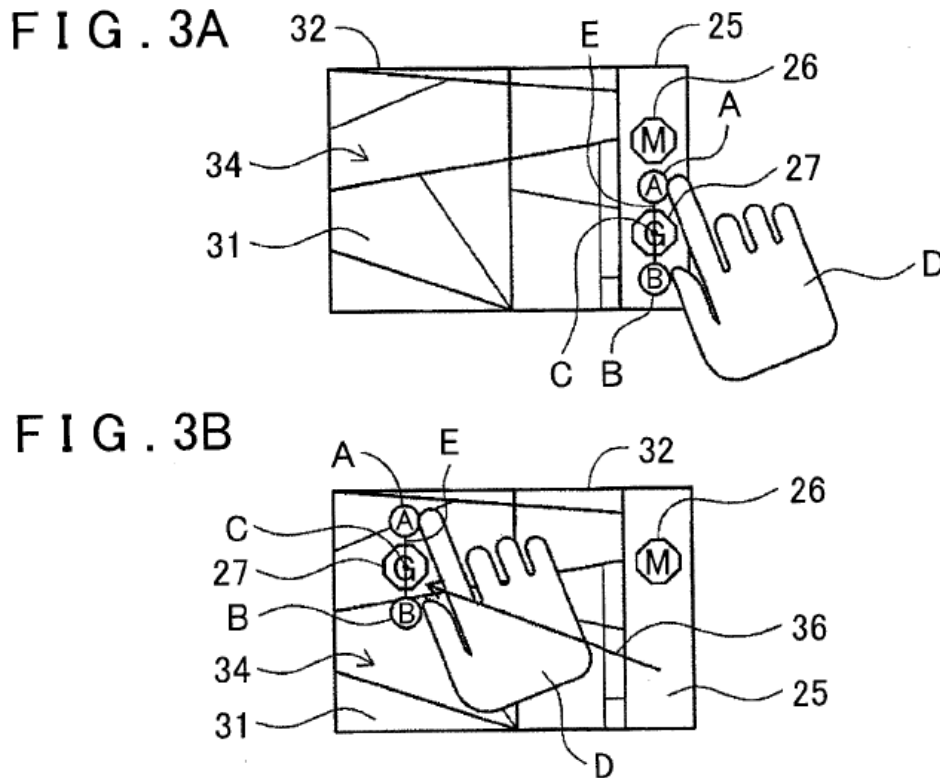
123. As I discuss above, Choi and Hillis together disclose “selecting objects” as recited in claim 1. (See ¶¶63-119, above.) Choi further discloses using gestures to pick up and move objects that have been selected. For example, Choi discloses that a user can first perform an inward drag gesture to select objects (EX-1003 (Choi) ¶¶[0062]-[0063]); then, the user can lift their fingers to “pick up” the objects (*id.* ¶¶[0064]-[0065]); finally, the user can perform an outward drag operation to “release” the objects (*id.* ¶[0083]). (*See also id.* ¶[0047], Figs. 26-34, 41.)

124. Thus, Choi discloses moving selected objects, but does so using different gestures than those recited in the '487 patent. However, Ogawa and/or McGibney disclose the claimed moving gestures.

2. Ogawa

125. Ogawa discloses using a touch gesture to select objects, similar to Choi. (EX-1007 (Ogawa) ¶[0050].) Ogawa further discloses that the selected objects can then be relocated with the same gesture recited in the '487 patent. Specifically, Ogawa discloses that, “if the operator moves the [selected] respective points ... in the direction of an arrow 36 while keeping a positional relationship between the two touched points ... it is determined that the destination icon 27 is being moved.” (*Id.* ¶[0051].) Ogawa further discloses that moving occurs when touch points are moved

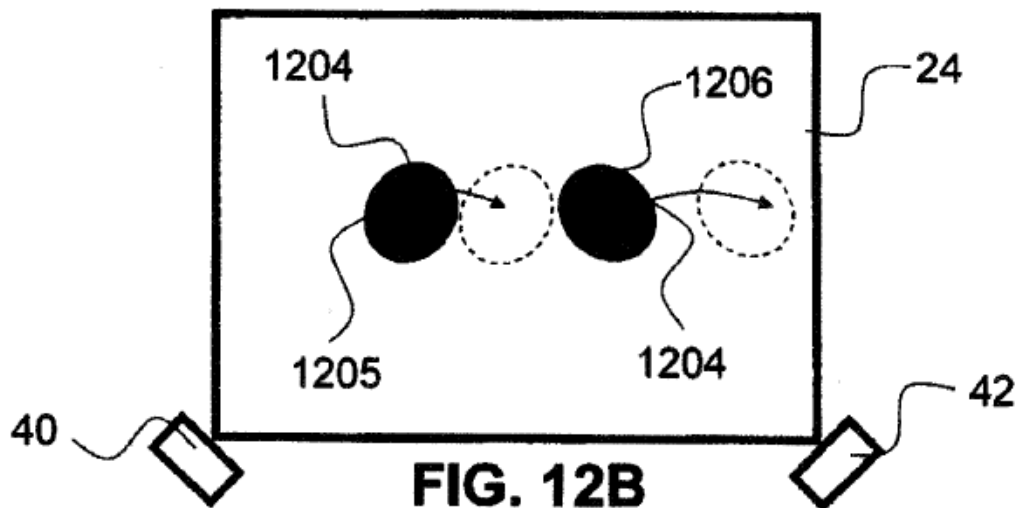
“in the same direction while keeping the space therebetween[.]” (*Id.* ¶[0068].) Ogawa’s Figures 3A-3B illustrate the moving gesture:



(*Id.*, Figs. 3A-3B.) A person of ordinary skill in the art would have understood that, when Ogawa discloses that movement of the selected object(s) occurs when the touch points are moved “while keeping a positional relationship between the touch points” and “in the same direction while keeping the space therebetween,” Ogawa is disclosing that the move functionality occurs when the “first and second touch positions are slid in substantially a same direction” and when the “distance between the first and second touch positions is substantially constant” as recited in claim 2. Thus, Ogawa discloses this limitation.

3. McGibney

126. Even if Ogawa did not disclose that the distance between the touch points is “substantially constant” during the gesture, McGibney discloses it. McGibney discloses that a two-touch-point slide gesture is detected when the touch points “move in one direction” and “maintain[] approximately the same distance apart from one another.” (EX-1008 (McGibney) ¶[0073].) McGibney’s Figure 12B illustrates this gesture:



(*Id.*, Fig. 12B.) Thus, McGibney discloses deciding whether the distance between the first and second touch positions is substantially constant and whether the first and second touch positions are slid in substantially a same direction.

4. Motivation to Combine

127. For the reasons below, a person of ordinary skill in the art would have been motivated to combine (1) the teachings of Choi (as modified by Hillis), which

together disclose selecting objects using an inward drag gesture, with (2) the teachings of Ogawa, which discloses detecting a sliding gesture to move selected objects, and (3) optionally the teachings of McGibney, which likewise discloses detecting a sliding gesture, to arrive at the claimed system.

128. First, Choi suggests the combination. Choi discloses that it is advantageous for a gesture system to “allow[] the user to handle the objects efficiently and intuitively” and that the gestures be “formed with fingers as if handling physical objects.” (EX-1003 (Choi) ¶¶[0254]-[0255].) A person of ordinary skill in the art would have understood that, because it is Choi’s inward drag gesture that selects objects, the sliding gesture of Ogawa and/or McGibney could be performed without first performing Choi’s lifting gesture (e.g., the user could perform an inward drag gesture to select objects and then, without lifting their fingers, perform a sliding gesture to move the selected objects). This would improve the efficiency and intuitiveness of the overall gesture because it would allow the user to perform the entire gesture in a single, fluid motion rather than requiring the user to perform part of the gesture, then lift their fingers and move elsewhere to perform the remainder. Furthermore, the modified gesture satisfies Choi’s aim of mimicking the handling of physical objects, since physical objects can also be slid from one place to another using the hands. This is also the reason that the gesture would still fulfill Choi’s

aims even if the user was required to lift their fingers between the inward drag gesture and the sliding gesture.

129. Second, Choi further suggests the combination because it discloses that “many variations and/or modifications of the basic inventive concepts herein taught ... will still fall within the spirit and scope of the present invention.” (EX-1003 (Choi) ¶[0257].)

130. Third, Choi, Hillis, Ogawa, and McGibney are all directed to systems for touch interaction with graphical interfaces. (*E.g.*, EX-1003 (Choi), Abstract; EX-1006 (Hillis), Abstract; EX-1007 (Ogawa), Abstract; EX-1008 (McGibney), Abstract.) McGibney discloses techniques for detecting and processing simultaneous contacts on a touch-sensitive surface, including gesture recognition. These techniques are broadly applicable to any system requiring precise handling of user input via touch, particularly in cases where multiple points of contact must be interpreted. Ogawa also discloses multi-touch gestures (*e.g.*, pinching and rotation) to manipulate icons and execute commands and implements accurate gesture recognition and classification. A person of ordinary skill in the art would have recognized that such gesture processing techniques are portable across various applications, including to those disclosed in Choi and Hillis, because they rely on the same types of input (*e.g.*, multi-touch). Thus, implementing Ogawa and/or McGibney’s teachings in Choi and Hillis’s systems would have involved routine engineering, and a person of ordinary

skill in the art would have been motivated to do so to achieve the benefits Ogawa and McGibney describe.

131. Fourth, the combination represents merely the simple addition of one known element (Ogawa and/or McGibney’s sliding gesture) to another known element (Choi’s system, as modified by Hillis) to obtain predictable results (a gesture system that uses a sliding gesture to move selected objects).

132. Fifth, the combination represents the use of a known technique (sliding gesture as in Ogawa and/or McGibney) to improve a similar device and method (Choi’s gesture system, as modified by Hillis) in the same way.

133. Sixth, the combination applies a known technique (sliding gesture as in Ogawa and/or McGibney) to a known device and method (Choi’s gesture system, as modified by Hillis) that is ready for improvement and yields predictable results (a gesture system that uses a sliding gesture to move selected objects).

134. A person of ordinary skill in the art would have reasonably expected success in the combination for several reasons. First, Choi discloses that “many variations and/or modifications of the basic inventive concepts herein taught ... will still fall within the spirit and scope of the present invention,” leading a person of ordinary skill in the art to reasonably expect success. (EX-1003 (Choi) ¶[0257].) Second, sliding gestures like those disclosed in Ogawa and McGibney were well-known in the art. For example, Microsoft’s Surface Table, a multi-touch tabletop

system released in 2007, supported two-finger sliding gestures. Furthermore, as I discuss above, the combination merely represents the simple addition of a known element (a sliding gesture) to a known system (Choi's, as modified by Hillis). Such a modification was well within the skill of a person of ordinary skill in the art.

135. Thus, Choi, Hillis, Ogawa, and/or McGibney disclose or render obvious each limitation of claim 2, and claim 2 would have been obvious as a whole to a person of ordinary skill in the art.

B. Claim 3

136. Claim 3 depends from claim 2 and recites limitations that describe a method of accomplishing what is claimed in claim 2. For example, claim 2 recites “deciding whether or not the distance between the first and second touch positions is substantially constant.” Claim 3 recites a particular method for doing so, i.e., that the moving section “calculate[es] a first distance” between the touch positions at a “first moment” and a “second distance” between the touch positions at a “second moment,” and then “calculate[s] a variation” between the first and second distances and decides if the “calculated variation is within a prescribed allowable range.”

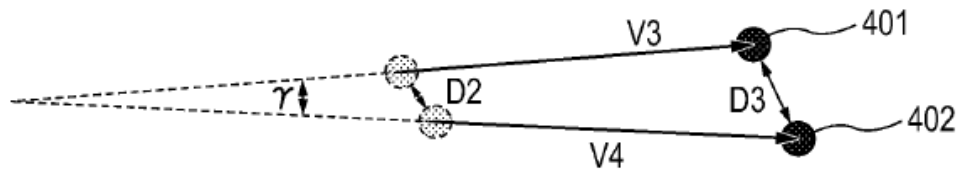
137. Based on the disclosure of Choi, Hillis, Ogawa, and/or McGibney, it would have been obvious to a person of ordinary skill in the art to use the method recited in claim 3 to determine whether the distance between the first and second

touch positions is substantially constant. First, Choi and Hillis both disclose calculating the distance between touch positions at first and second moments in time for the purpose of comparing them. (See ¶¶63-71, above.) Second, Ogawa and McGibney disclose that a sliding gesture is detected when the distance between touch positions at first and second moments in time remains approximately the same. (See ¶¶125-126, above.) A person of ordinary skill in the art would have understood that requiring the variation between distances over time to remain “within a prescribed allowable range” is inherent in, or at least suggested by, Ogawa’s disclosure that the touch points must “keep[] a positional relationship” and “keep[] the space there-between” and/or McGibney’s disclosure that the touch points must “maintain[] approximately the same distance apart from one another.” (*Id.*) Thus, the references disclose, or at least suggest, this portion of the limitation.

138. Claim 3 further recites that the moving section derives first and second vectors, just as in claim 1, and then “calculate[s] an angle between the first and second vectors” and “decide[s] whether or not the calculated angle is smaller than a prescribed angle.” This accomplishes claim 2’s limitation of “deciding whether or not the first and second touch positions are slid in substantially a same direction.”

139. The ’487 patent illustrates the angle (γ) between the first and second vectors described in claim 3:

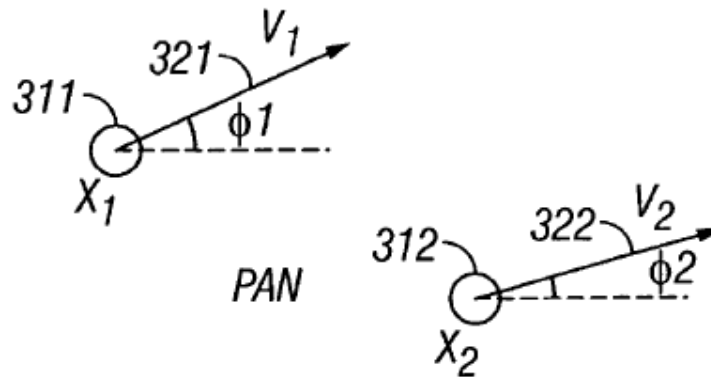
FIG. 8



(EX-1001 (the '487 patent), Fig. 8.)

140. Ogawa discloses that for a sliding gesture to be detected, the touch points must move “in the same direction”; similarly, McGibney discloses that the touch points must “move in one direction.” (See ¶¶125-126, above.)

141. Hillis discloses a gesture detection calculation that determines whether the first and second touch points move in the same direction. (EX-1006 (Hillis) ¶[0034] (“If the directions are found to be similar ... the identified gesture is associated with a panning [e.g., sliding] movement”).) The “pan” gesture is executed when two velocity vectors, originating at their respective touch points, move in the same direction. (*Id.*) The respective directions (ϕ_1 and ϕ_2) of the velocity vectors ($\vec{v}_1$ and $\vec{v}_2$, labeled V_1 and V_2 in the figure below) are determined by calculating the angle between each vector and an arbitrary baseline:



(EX-1006 (Hillis), Fig. 5.)

142. Hillis’s two touch points X₁ and X₂ are moving in “substantially [the] same direction” when the difference between their associated angles (φ₁ and φ₂) is small (e.g., smaller than a prescribed angle). (EX-1006 (Hillis) ¶[0034].) In Hillis, this determination is represented by the equation

$$|\phi_1 - \phi_2| < \Theta_c^p$$

which, in plain terms, states that the difference between the two angles φ₁ and φ₂ is less than a prescribed angle Θ_c^p. (*Id.*) The calculated difference between φ₁ and φ₂ is equivalent to the angle γ of the ’487 patent.

143. A person of ordinary skill in the art would have been motivated to combine the teachings of Choi (which, as modified by Hillis, discloses using an inward drag gesture to select objects), Ogawa and/or McGibney (which disclose moving

selected objects based on a sliding gesture wherein two touch points maintain a constant distance and move in the same direction), and Hillis (which discloses a method of detecting a sliding gesture) to arrive at the claimed system for several reasons.

144. First, a person of ordinary skill in the art would have been motivated to implement a sliding gesture to move selected objects for the reasons I discuss above for claim 2. (See ¶¶127-135, above.)

145. Second, Ogawa and McGibney suggest the combination. Ogawa and McGibney disclose criteria for detecting a sliding gesture, but lack detail on how to perform calculations to determine if the criteria are met. A person of ordinary skill in the art would have been motivated to look to Choi and Hillis, which disclose the requisite calculations.

146. Third, the combination represents merely the simple addition of one known element (Hillis and/or Choi's sliding gesture calculations) to another known element (Ogawa and/or McGibney's sliding gesture) to obtain predictable results (effectively detecting sliding gestures).

147. Fourth, the combination uses a known technique (Hillis and/or Choi's calculations) to improve a similar device and method (Ogawa and/or McGibney's sliding gesture) in the same way.

148. Fifth, the combination applies a known technique (Hillis and/or Choi's calculations) to a known device and method (Ogawa and/or McGibney's sliding gesture) that is ready for improvement and yields predictable results (effectively detecting sliding gestures).

149. A person of ordinary skill in the art would have reasonably expected success in the modification for several reasons, including for the reasons I discuss above for claim 2. (*See* ¶¶127-135, above.) Additionally, sliding gestures as in Ogawa and McGibney, and calculations as in Hillis and Choi, were well-known in the art, further leading a person of ordinary skill in the art to reasonably expect success. Furthermore, as I discuss above, the combination merely represents the simple addition of a known element (Hillis and/or Choi's sliding gesture calculations) to a known method (Ogawa and/or McGibney's sliding gesture). Such a modification was well within the skill of a person of ordinary skill in the art.

150. Thus, Choi, Hillis, Ogawa, and/or McGibney disclose or render obvious each limitation of claim 3, and claim 3 would have been obvious as a whole to a person of ordinary skill in the art.

VIII. CLAIM 10 WOULD HAVE BEEN OBVIOUS IN VIEW OF CHOI, HILLIS, YEH, AND ORDING.

151. As I discuss above, the limitations of claim 1 are disclosed by Choi and/or Hillis. (See ¶¶56-119, above.) Those references, Yeh, and/or Ording disclose the additional limitations of claim 10.

152. Claim 10 depends from claim 1 and further recites a “menu indicating section” that performs four functions after the object(s) in the rectangular area are selected: (1) “calculating a first variation of the first touch position”; (2) “calculating a second variation of the second touch position”; (3) “deciding whether or not both the first and second variations remain within a prescribed allowable range for at least a prescribed time interval”; and (4) “indicating a list of commands a user can give” with respect to the object(s) when “both the first and second variations remain within the prescribed allowable range for at least the prescribed time period.” In other words, when the touch points are substantially stationary for a prescribed time interval, a menu with various commands may be displayed. (EX-1001 (the ’487 patent), 19:25-32.) The patent shows the touch points (401, 402) and resulting menu in Figures 19A-19B:

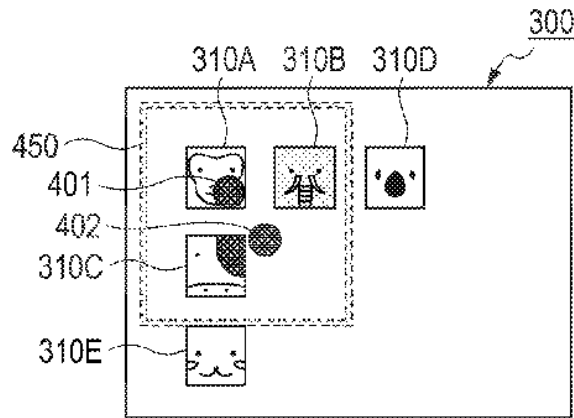


FIG. 19A

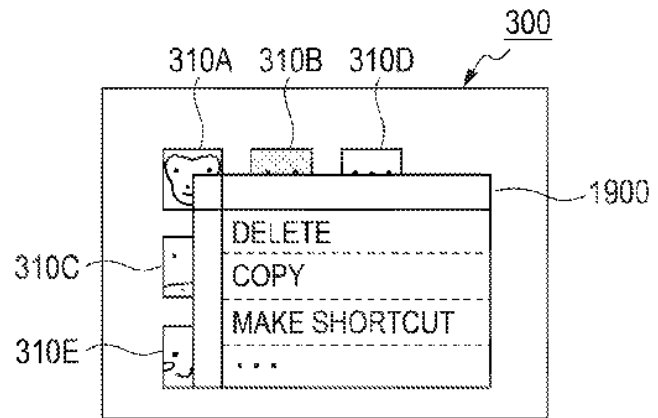


FIG. 19B

(EX-1001 (the '487 patent), Figs. 19A-19B.)

153. This claim merely recites a well-known “press-and-hold” or “dwell” gesture, which was known in the art. For example, Microsoft’s Surface Table, Apple’s iOS, and Windows 7’s multi-touch API each supported long-press, hold, or dwell gestures prior to 2011.

154. Yeh discloses a “dwell” gesture in which a “finger touches a touch coordinate P1 on the touch panel 1 when $T=T1$. After the finger stays at the touch coordinate P1 for a period of dwell time,” a dwell gesture is detected and the appropriate action taken. (EX-1009 (Yeh) ¶[0020].) When a dwell gesture is detected, a “frame item” (e.g., a menu) is presented surrounding the touch location. (*Id.*; *id.*, Fig. 2B.) Yeh’s menu may include “a drag up item 22, a copy item 24, a forward item 26, a paste item 28, a drag down item 30, an undo item 32, a back item 34, and a delete item 36.” (*Id.*)

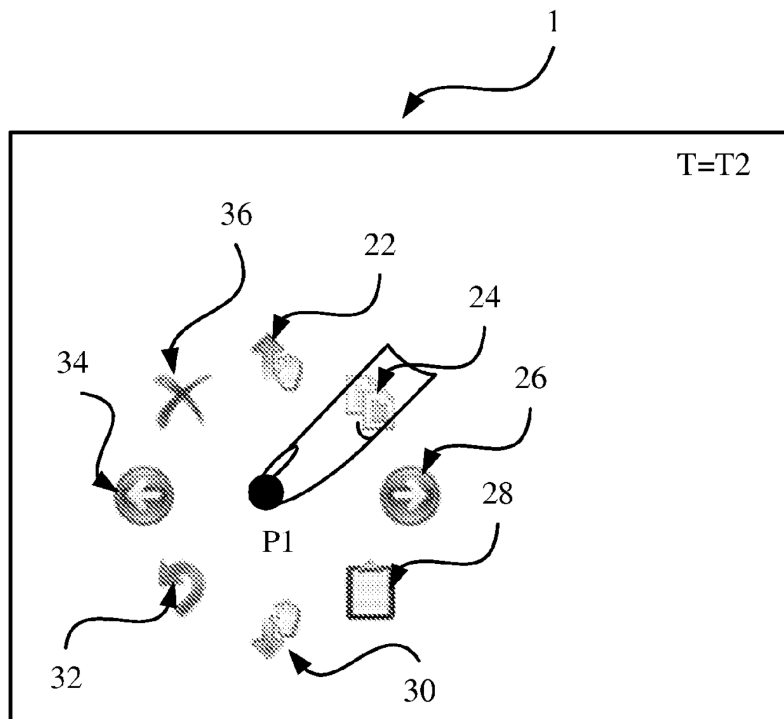


FIG. 2B

(EX-1009 (Yeh), Fig. 2B.) A person of ordinary skill in the art would have understood that at least some of these menu items relate to selected objects—for example, at least the copy, forward, and delete items. Thus, Yeh discloses displaying a list of commands a user can give with respect to the selected object or objects (e.g., copy, forward, delete) when a touch point is substantially stationary for at least a prescribed time interval.

155. However, Yeh does not provide specific disclosure regarding how to determine whether a touch point is substantially stationary. Ording discloses that a “stationary (or substantially stationary) pressing gesture” may be detected when contact points from a user’s fingers “move[] less than a predefined amount (e.g., 1-3mm)

in a predefined time (e.g., 0.4 seconds).” (EX-1010 (Ording) ¶[0326].) Consistent with Choi and Hillis, which disclose gestures that involve multiple touch points, Ording discloses that dwell or pressing gestures may be detected using more than one finger, including “by two fingers that includes contact ... by a first finger at a first location in the content and concurrent contact ... by a second finger at a second location in the content[.]” (*Id.*) Thus, Ording discloses detecting whether two touch points are substantially stationary (e.g., detecting a dwell or stationary pressing gesture) by measuring the variation in the touch points and comparing it to a prescribed allowable range (e.g., 1-3mm) for a prescribed time interval (e.g., 0.4 seconds). (*Id.*)

156. Ording further discloses that gestures, including two-finger gestures, may be used to display a menu containing a list of commands a user may give with respect to a selected object or objects (e.g., copy, cut, paste, undo, etc.). (EX-1010 (Ording) ¶¶[0332], [0342]-[0346].) Thus, Ording also discloses displaying a menu of commands relating to selected content in response to a user’s gesture. (*Id.*)

157. A person of ordinary skill in the art would have been motivated to combine the teachings of Choi and Hillis (which together disclose detecting and evaluating first and second touch positions) with Yeh (which discloses displaying a contextual menu in response to a dwell gesture) and Ording (which discloses a method for detecting a two-finger dwell gesture) to arrive at the system recited in claim 10 for several reasons.

158. First, Choi suggests the combination. Choi discloses that it is advantageous to “allow[] the user to handle the objects efficiently and intuitively.” (EX-1003 (Choi) ¶[0254].) A dwell gesture, which takes a small amount of time and effort (EX-1009 (Yeh) ¶[0033]; EX-1010 (Ording) ¶[0326]; EX-1012 (Kolmykov-Zotov), 2:40-57), is an efficient way to summon a menu that can be intuitively used to act on selected objects. Furthermore, detecting a dwell gesture using Ording’s method allows a user to trigger the gesture without keeping their finger perfectly steady, meaning the user can trigger the gesture intuitively and efficiently. (EX-1010 (Ording) ¶[0326]; EX-1012 (Kolmykov-Zotov), 2:40-57.)

159. Second, Choi further suggests the combination because it discloses that “many variations and/or modifications of the basic inventive concepts herein taught ... will still fall within the spirit and scope of the present invention.” (EX-1003 (Choi) ¶[0257].)

160. Third, Yeh suggests the combination. Yeh teaches using a dwell gesture to request display of a menu, but does not disclose a specific gesture detection method. A person of ordinary skill in the art therefore would have looked to Ording for details regarding how to detect such gestures. Furthermore, a person of ordinary skill in the art would have been motivated to evaluate both the first and second touch points of Choi and Hillis for a dwell gesture (as in Yeh) using Ording’s method of

detecting a two-finger dwell at least because doing so would allow the user to conveniently request display of a menu without lifting their finger from the screen. (*See* EX-1011 (Westerman-632) ¶[0192] (gesture detected “during the touch stroke”).)

161. Fourth, each of the references is broadly directed to improving graphical user interface responsiveness and intuitiveness for touchscreen devices. For example, Choi and Hillis are directed to systems for detecting gestures and executing commands, while Yeh and Ording focus on using multi-touch gestures to manipulate graphical elements, including repositioning. (*E.g.*, EX-1003 (Choi), Abstract; EX-1006 (Hillis), Abstract; EX-1009 (Yeh), Abstract; EX-1010 (Ording), Abstract.) A person of ordinary skill in the art would have understood that these disclosures are technically complementary and interoperable, leading a person of ordinary skill to easily combine the teachings to achieve the benefits disclosed by the references.

162. Fifth, the combination represents merely the simple addition of one known element (Yeh and/or Ording’s two-finger dwell) to another known element (Choi’s system, as modified by Hillis) to obtain predictable results (using a two-finger dwell gesture to summon a menu).

163. Sixth, the combination uses a known technique (Yeh and/or Ording’s two-finger dwell) to improve a similar device and method (Choi’s gesture system, as modified by Hillis) in the same way.

164. Seventh, the combination applies a known technique (Yeh and/or Ording’s two-finger dwell) to a known device and method (Choi’s gesture system, as modified by Hillis) that is ready for improvement and yields predictable results (using a two-finger dwell gesture to summon a menu).

165. A person of ordinary skill in the art would have reasonably expected success in the modification for several reasons. First, Choi discloses displaying a menu in response to the user “selecting a menu option” or pressing a designated key; displaying a menu in response to a dwell gesture is merely a “variation[] and/or modification[] of the basic inventive concepts herein taught” and “still fall[s] within the spirit and scope of the present invention.” (EX-1003 (Choi) ¶¶[0144], [0257].) Second, dwell gestures like those disclosed in Yeh and Ording were well-known in the art, and were commonly used to trigger the display of menus. (*See, e.g.*, EX-1006 (Hillis), EX-1011 (Westerman-632), EX-1009 (Yeh), EX-1012 (Kolmykov-Zotov), EX-1010 (Ording).) Furthermore, as I discuss above, the combination merely represents the simple addition of a known element (a two-finger dwell gesture) to a known system (Choi’s system, as modified by Hillis). Such a modification was well within the skill of a person of ordinary skill in the art. (*See, e.g.*, EX-1006 (Hillis) ¶[0031] (person of ordinary skill in the art could choose different execution for gesture).)

166. Thus, Choi, Hillis, Yeh, and/or Ording disclose, or at least suggest, each limitation of claim 10, and claim 10 would have been obvious as a whole to a person of ordinary skill in the art.

IX. CLAIMS 1, 11, AND 12 WOULD HAVE BEEN OBVIOUS IN VIEW OF YACH, WESTERMAN-632, AND HILLIS.

A. Claim 1

167. The preamble of claim 1 recites “[an] electronic apparatus[.]” Yach discloses an electronic apparatus. (EX-1004 (Yach) ¶[0001] (disclosing a “a portable electronic device”); *id.* ¶¶[0006], [0015]-[0016], [0021], [0035], Figs. 2, 5-22.)

1. 1[a]: Display and 1[b]: Indicating Section

168. Element 1[a] recites “a display” and element 1[b] recites “an indicating section for indicating objects on the display.”

169. Yach discloses that the “portable electronic device includ[es] a touch screen display[.]” (EX-1004 (Yach) ¶[0001], Figs. 2, 5-22.) Yach’s display, including objects (e.g., selectable features 124) indicated on the display, is shown in Figure 16:

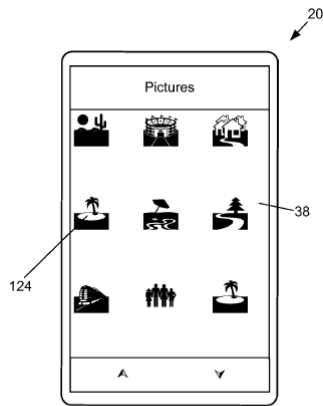


Figure 16

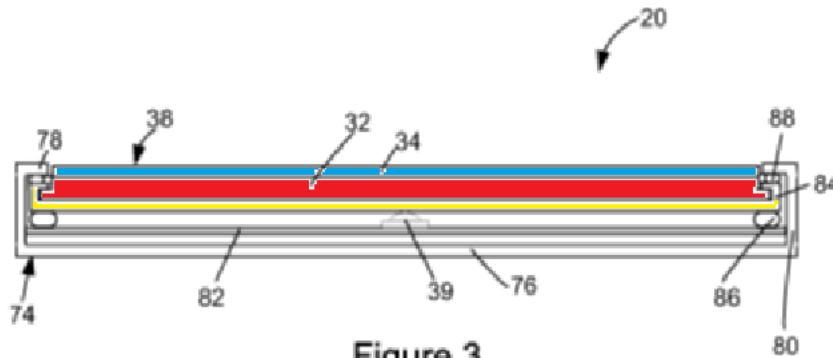
(EX-1004 (Yach), Fig. 16, Abstract.) Thus, Yach discloses these limitations.

2. 1[c]: Touch Panel and 1[d]: Acquiring Section for Detecting Touches

170. Element 1[c] recites “a touch panel superposed on the display[.]” The ’487 patent admits that devices having “touch panels” that detect touches were well-known, and therefore these limitations cannot make the claim patentable. (EX-1001 (the ’487 patent), 1:19-23 (touch panels are “wide spread”), 1:24-38.)

171. Element 1[d] recites “an acquiring section for detecting user’s touches to the touch panel and acquiring positions of the user’s touches to the touch panel as touch positions[.]”

172. Yach explains that its “display” and “touch-sensitive overlay” are “supported on a support tray[.]” (EX-1004 (Yach) ¶[0037].) Yach’s Figure 3 illustrates this structure, with the touch panel annotated in blue, the display in red, and the support structure in yellow:



(EX-1004 (Yach), Fig. 3; *id.* ¶¶[0035]-[0036], [0039], Abstract.) Thus, Yach discloses a touch panel (e.g., touchscreen) (blue) superposed on the display (red).

173. Yach further discloses that its touch panel detects users’ touches and acquires positions of those touches. For example, Yach discloses that its touch panel “detect[s] a first touch event at a first location on the touch screen display [and] detect[s] a second touch event at a second location on the touch screen display[.]” (EX-1004 (Yach) ¶[0006].) As Yach’s touch panel detects a touch, “the X and Y location [i.e. touch position] of a touch event are both determined [i.e. acquired][.]” (*Id.* ¶[0040]; *id.* ¶¶[0005]-[0007], [0042]-[0050], [0055]-[0060], [0064]-[0068], [0074]-[0080], Fig. 4.)

174. Thus, Yach discloses elements 1[c] and 1[d].

3. 1[e]: Selecting Section

175. Claim 1 recites “a selecting section” that performs the operations recited in the remaining claim elements. Element 1[e] recites that the selecting section is “[i] for deciding whether or not first and second touch positions are acquired by

the acquiring section, [ii] for calculating a distance between the first and second touch positions, and [iii] for deciding whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of time.”

176. As I discuss above (*see* ¶¶63-108, above), Hillis discloses a display surface “capable of detecting when and where a user touches the display surface.” (EX-1006 (Hillis) ¶¶[0021], [0007]-[0008].) Based on that information, “user gestures are identified.” (*Id.*; *id.* ¶¶[0009]-[0010], [0028].) Hillis detects when “a user establishes and moves two contact locations” and in response “[v]elocities . . . are determined for each of the contact points, including magnitudes and directions[.]” (*Id.* ¶[0034].) Hillis considers the length of a “line segment S_{12} ” connecting the two contact points, $\vec{x}_1$ and $\vec{x}_2$. (*Id.* ¶[0035].) “If the length is decreasing,” the gesture is identified as a pinching motion which, in Hillis, results in an “outward zoom” command. (*Id.*)

177. Thus, as I discuss above, Hillis discloses (1) “deciding whether or not first and second touch positions are acquired by the acquiring section” (e.g., whether a user “establishes” two contact locations), (2) “calculating a distance between the first and second touch positions” (e.g., considering the length of the line connecting positions $\vec{x}_1$ and $\vec{x}_2$), and (3) “deciding whether or not the calculated distance between the first and second touch positions decreases in accordance with the lapse of

time” (e.g., determining “[i]f the length [of line segment S_{12}] is decreasing”). (See ¶¶67-69, above.)

4. 1[f]: Setting a Rectangular Area

178. Element 1[f] recites that the selecting section is for “setting a rectangular area with respect to the display and selecting an object or objects contained in the rectangular area in cases where it is decided that the first and second touch positions are acquired and the distance between the first and second touch positions decreases in accordance with the lapse of time.”

179. Yach discloses that, once two touch events are detected and the X and Y locations of those touch points are determined, a rectangular area is set:

The area boundaries are then determined based on the X and Y location of the first touch event and the X and Y location of the second touch event. In the present example, the boundaries are set to form *a rectangular area* with each side of the rectangle defined by the touch event closest to each side. Thus, the uppermost touch sets the upper-most boundary while the lower-most touch sets the lower-most boundary. Similarly, each of the right and left side boundaries are set based on the right and leftmost touches. It will therefore be appreciated that each touch event sets a pair of boundaries of the rectangular area and the pair of boundaries that are set depends on the relative locations of each of the touch events.

(EX-1004 (Yach) ¶[0077] (emphasis added).) The rectangular area 130 is defined by the touch points H and G as shown:

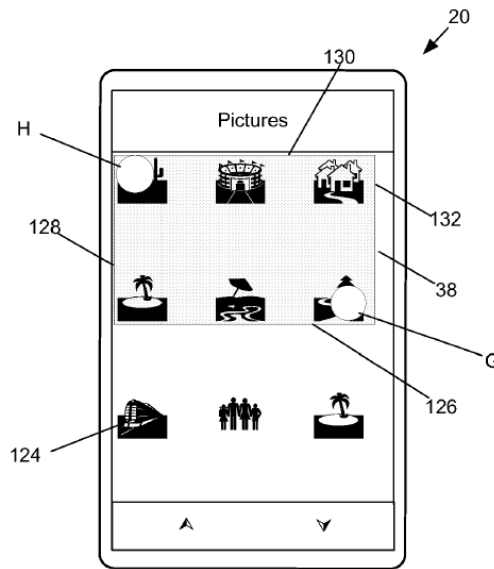


Figure 17

(EX-1004 (Yach), Fig. 17.)

180. Yach further discloses selecting object(s) contained in the rectangular area. For example, Yach discloses that “[a]ll of the thumbnails 124 that are located within the rectangular area having the boundaries 126, 128, 130, 132 are selected.” (*Id.* ¶[0078], Fig. 17; *id.* ¶¶[0042], [0055]-[0060], [0064]-[0068].) Thus, Yach discloses setting a rectangular area and selecting object(s) inside it in response to detecting two touch points.

181. Yach’s system does not require the user to make any additional gesture beyond simply touching the screen at two points. However, it would have been obvious to configure Yach’s system to set the rectangular area and select objects further in response to determining that the distance between the two touch points is

decreasing (e.g., a pinching motion) in view of Westerman-632. Westerman-632 discloses that “finger pinching, rotation and tapping gestures ... can be created to effect user commands to select an object, move an object, scroll an object, and the like.” (EX-1005 (Westerman-632) ¶[0059].) For example, Westerman-632 discloses that a user could pinch to select a file, which could then be dragged to a printer icon to print the file. (*Id.* ¶[0066].) A person of ordinary skill in the art would have been motivated to combine the references, and would have had a reasonable expectation of success in doing so, for the reasons I discuss below. (*See* ¶¶188-196, below.)

182. Thus, Yach and Westerman-632 disclose this limitation.

5. 1[g]: Corners of Rectangle Coincident with Initial Touch Points

183. Element 1[g] recites that the “two opposite corners of the rectangular area are respectively coincident with the first and second touch positions occurring at an initial stage of the user’s touches to the touch panel.”

184. As described above, Yach discloses that “each side of the rectangle [is] defined by the touch event closest to each side.” (EX-1004 (Yach) ¶[0077].) Yach further discloses that “the uppermost touch sets the upper-most boundary while the lower-most touch sets the lower-most boundary” and “each of the right and left side boundaries are set based on the right and leftmost touches.” (*Id.* ¶[0077], claim 3,

Fig. 17.) Thus, even when combined with Westerman-632 and/or Hillis to set the rectangular area in response to a pinching motion, Yach discloses that the corners of the rectangular area are set based on the initial touch points because the initial touch points necessarily define the uppermost, lowermost, rightmost, and leftmost boundaries. Accordingly, Yach discloses this limitation.

6. 1[h]: Vectors and Angles

185. Element 1[h] recites that the selecting section is for deriving a “first vector,” a “straight line,” and a “second vector,” for calculating a “first angle” and a “second angle,” and for deciding whether the first and second angles are smaller than a “prescribed angle.” Hillis discloses and/or renders obvious this limitation as described above. (See ¶¶82-106, above.)

7. 1[i]: Selecting Objects

186. Element 1[i] repeats prior limitations and recites that the selecting section sets the rectangular area and selects objects in that area “in cases where it is decided that” the distance between the first and second touch positions decreases and the first and second angles are smaller than the prescribed angle.

187. Yach discloses setting the rectangular area and selecting objects. (See ¶¶178-182, above.) Westerman-632 discloses doing so in response to a pinching gesture. (See ¶181, above.) Hillis discloses pinch gesture detection based on calculations regarding the position and direction of touch points over time, as I discuss

above. (See ¶¶82-106, above.) Thus, Yach, Westerman-632, and Hillis together disclose this limitation.

8. Motivation to Combine

188. A person of ordinary skill in the art would have been motivated to modify Yach to replace Yach’s static-touch gesture with Westerman-632’s pinching gesture to select object(s), and would have been motivated to use Hillis’s calculations to detect the pinching gesture, for several reasons.

189. First, Westerman-632 suggests the combination because it teaches using a pinching gesture to select object(s) and explains that such a gesture “can allow a user to more efficiently and accurately effect intended operations.” (EX-1005 (Westerman-632) ¶¶[0007], [0027].) A person of ordinary skill in the art would have been motivated to combine the references to achieve the benefits disclosed by Westerman-632. (*Id.*)

190. Second, Westerman-632 discloses using a pinching gesture to select object(s), but does not disclose detailed calculations for detecting the gesture. A person of ordinary skill in the art therefore would have looked to Hillis, which discloses such calculations. In other words, Yach supplies the hardware and overall system, Westerman-632 adds the concept of using a pinching gesture to select objects, and Hillis provides the calculations for detecting that pinching gesture. A

person of ordinary skill would have recognized that this provides an easy-to-implement path to a more intuitive routine for selecting objects.

191. Third, a concern in the art at the time of the '487 patent (and still a concern today) was the problem of inadvertent touches. A person of ordinary skill in the art would have been motivated to require a user to perform a pinching gesture after touching the screen to confirm the user's intent to select objects, and would further have been motivated to implement Hillis's calculations because they would both allow the system to more effectively reject inadvertent touches and allow for greater accuracy in determining what inputs are intended to request object selection.

192. Fourth, the combination represents merely the simple addition of one known element (Westerman-632 and/or Hillis's pinching gesture) to another known element (Yach's system, including Yach's use of a rectangular bounding box to select elements) to obtain predictable results (selecting objects within an area based on a pinching gesture).

193. Fifth, the combination uses a known technique (Westerman-632 and/or Hillis's pinching gesture) to improve a similar device and method (Yach's system) in the same way.

194. Sixth, the combination applies a known technique (Westerman-632 and/or Hillis's pinching gesture) to a known device and method (Yach's system) that

is ready for improvement and yields predictable results (selecting objects within an area based on a pinching gesture).

195. A person of ordinary skill in the art would have reasonably expected success in the modification for several reasons. First, the use of a pinching gesture to manipulate objects displayed on a touch screen was well known. Furthermore, Hillis's gesture detection techniques are based on longstanding geometric and mathematical concepts. This would have led a person of ordinary skill in the art to reasonably expect success implementing Westerman-632's pinching gesture, including Hillis's calculations, in Yach's system. Additionally, as I discuss above, the combination merely represents the simple addition of a known element (a pinching gesture) to a known system (Yach's). Such a modification was well within the skill of a person of ordinary skill in the art.

196. Thus, Yach, Westerman-632, and Hillis disclose or render obvious each limitation of claim 1, and claim 1 would have been obvious as a whole to a person of ordinary skill in the art.

B. Claims 11 and 12

197. Independent claims 11 and 12 are a method claim and a non-transitory computer-readable medium claim, respectively, that recite virtually identical limitations to those addressed above for claim 1. (*See* ¶120, above.) These limitations are

disclosed by the prior art, and the claims would have been obvious to a person of ordinary skill in the art, for the reasons I discuss above. (See ¶¶167-196, above.)

X. CLAIMS 2 AND 3 WOULD HAVE BEEN OBVIOUS IN VIEW OF YACH, WESTERMAN-632, HILLIS, OGAWA, AND OPTIONALLY MCGIBNEY.

198. As I discuss above, the limitations of claim 1 are disclosed by Yach, Westerman-632, and/or Hillis. (See ¶¶167-196, above.) Those references, Ogawa, and/or McGibney disclose the additional limitations of claims 2-3.

A. Claim 2

199. Claim 2 depends from claim 1 and further recites a “moving section.” This moving section decides (1) “whether or not the distance between the first and second touch positions is substantially constant after the object or objects contained in the rectangular area are selected” and (2) “whether or not the first and second touch positions are slid in substantially a same direction after the object or objects contained in the rectangular area are selected.” In “cases where it is decided that the distance between the touch positions is substantially constant” and the touch positions are slid in “substantially a same direction,” then the selected object or objects are moved “along said same direction.”

200. As I discuss above, Yach, Westerman-632, and Hillis together disclose “selecting objects” as in claim 1. (See ¶¶175-196, above.) Westerman-632 further

discloses using gestures to move objects that have been selected. (EX-1005 (Westerman-632) ¶[0059] (gestures “can be created to effect user commands to ... move an object”).) While Westerman-632 does not disclose exactly how to implement such a gesture, Ogawa, McGibney, and/or Hillis provide that disclosure as I discuss above. (See ¶¶122-126, above.)

1. Motivation to Combine

201. A person of ordinary skill in the art would have been motivated to combine the teachings of Yach, Westerman-632, Hillis, Ogawa, and/or McGibney to implement a slide-to-move gesture in Yach’s system for several reasons.

202. First, Westerman-632 suggests the combination. Westerman-632 discloses that touch gestures can be used to move objects on a touch screen (EX-1005 (Westerman-632) ¶[0059]), but does not disclose how to implement such a gesture. A person of ordinary skill in the art therefore would have looked to Hillis, Ogawa, and McGibney, which disclose such methods. (*Id.*)

203. Second, Yach suggests the combination because it discloses that “modifications and variations [of its invention] may occur to those skilled in the art” and “are believed to be within the sphere and scope of the present disclosure.” (EX-1004 (Yach) ¶[0086].)

204. Third, the combination represents merely the simple addition of one known element (Ogawa and/or McGibney’s sliding gesture) to another known element (Yach’s system, as modified by Westerman-632 and Hillis) to obtain predictable results (using a sliding gesture to move selected objects).

205. Fourth, the combination uses a known technique (Ogawa and/or McGibney’s sliding gesture) to improve a similar device and method (Yach’s system, as modified by Westerman-632 and Hillis) in the same way.

206. Fifth, the combination applies a known technique (Ogawa and/or McGibney’s sliding gesture) to a known device and method (Yach’s system, as modified by Westerman-632 and Hillis) that is ready for improvement and yields predictable results (using a sliding gesture to move selected objects).

207. A person of ordinary skill in the art would have reasonably expected success in the combination for several reasons. First, Yach discloses that “modifications and variations [of its invention] may occur to those skilled in the art” and “are believed to be within the sphere and scope of the present disclosure.” (EX-1004 (Yach) ¶[0086].) Second, sliding gestures, as in Ogawa and McGibney, were well-known in the art. Additionally, as I discuss above, the combination merely represents the simple addition of a known element (a sliding gesture) to a known system (Yach’s, as modified by Westerman-632 and Hillis). Such a modification was well within the skill of a person of ordinary skill in the art.

208. Thus, Yach, Westerman-632, Hillis, Ogawa, and/or McGibney disclose or render obvious each limitation of claim 2, and claim 2 would have been obvious as a whole to a person of ordinary skill in the art.

B. Claim 3

209. Claim 3 depends from claim 2 and recites limitations that describe a method of accomplishing what is claimed in claim 2. For example, claim 2 recites “deciding whether or not the distance between the first and second touch positions is substantially constant.” Claim 3 recites a particular method for doing so, i.e., that the moving section “calculate[es] a first distance” between the touch positions at a “first moment” and a “second distance” between the touch positions at a “second moment,” and then “calculate[s] a variation” between the first and second distances and decides if the “calculated variation is within a prescribed allowable range.”

210. Claim 3 further recites that the moving section derives first and second vectors, just as in claim 1, and then “calculate[s] an angle between the first and second vectors” and “decides whether or not the calculated angle is smaller than a prescribed angle.” This accomplishes claim 2’s limitation of “deciding whether or not the first and second touch positions are slid in substantially a same direction.”

211. As I discuss above, Hillis, Ogawa, and/or McGibney disclose the additional limitations of claim 3. (See ¶¶136-150, above.) A person of ordinary skill in the art would have been motivated to combine the references’ teachings, and would

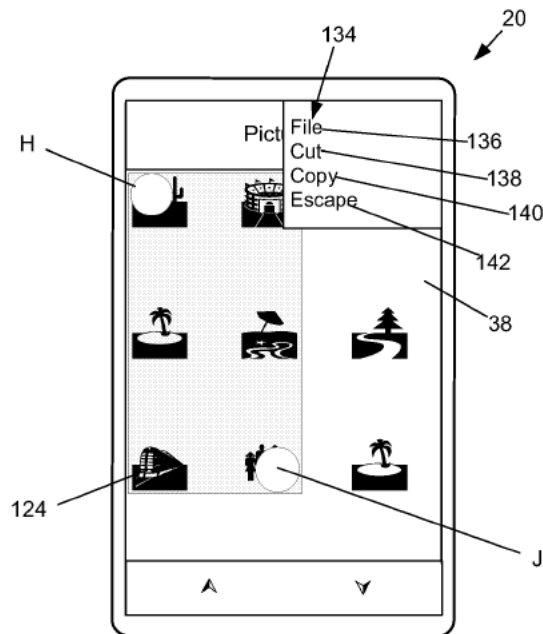
have had a reasonable expectation in doing so, for the reasons I discuss above. (*See* ¶¶127-135, 188-196, above.) Thus, Yach, Westerman-632, Hillis, Ogawa, and/or McGibney disclose or render obvious each limitation of claim 3, and claim 3 would have been obvious as a whole to a person of ordinary skill in the art.

XI. CLAIM 10 WOULD HAVE BEEN OBVIOUS IN VIEW OF YACH, WESTERMAN-632, HILLIS, YEH, AND ORDING.

212. Claim 10 depends from claim 1 and further recites a “menu indicating section” that performs four functions after the object(s) in the rectangular area are selected: (1) “calculating a first variation of the first touch position”; (2) “calculating a second variation of the second touch position”; (3) “deciding whether or not both the first and second variations remain within a prescribed allowable range for at least a prescribed time interval”; and (4) “indicating a list of commands a user can give” with respect to the object(s) when “both the first and second variations remain within the prescribed allowable range for at least the prescribed time period.” In other words, when the touch points are substantially stationary for a prescribed time interval, a menu with various commands may be displayed. (EX-1001, 19:25-32; *id.*, Figs. 19A-19B.)

213. As I discuss above, the limitations of claim 1 are disclosed by Yach, Westerman-632, and/or Hillis. (*See* ¶¶167-196, above.) Those references, Yeh, and/or Ording disclose the additional limitations of claim 10.

214. Yach discloses that its system can display a menu when “no further touch locations are determined” and “upon actuation of the switch 39.” (EX-1004 (Yach) ¶[0082].) This menu “can include any suitable options such as the options to "File" [], "Cut" [], "Copy" [] and "Escape.” (*Id.*)



(EX-1004 (Yach), Fig. 22.) Yach’s menu commands relate to the selected object(s) because Yach’s system “permits selection of multiple features and operation of functions on the features as a group.” (*Id.* ¶[0085]; *see also id.* ¶[0062].)

215. As I discuss above, Yeh and Ording disclose displaying a menu upon detection of a two-finger “dwell” or “stationary pressing” gesture, and in particular show that a person of ordinary skill in the art would have been motivated to do so in the manner recited in claim 10 with a reasonable expectation of success. (*See* ¶¶151-166, above.) Those same motivations apply here. (*Id.*) A person of ordinary skill

in the art would have been motivated to display Yach’s menu in response to such a “dwell” or “stationary pressing” gesture in the manner recited in claim 10 for several additional reasons.

216. First, using a gesture such as a dwell or pause rather than Yach’s mechanical switch simplifies the device and allows the user to more efficiently and fluidly activate the menu.

217. Second, Yach suggests the combination because it discloses that “modifications and variations [of its invention] may occur to those skilled in the art” and “are believed to be within the sphere and scope of the present disclosure.” (EX-1004 (Yach) ¶[0086].)

218. Third, the combination represents merely the simple addition of one known element (Yeh and Ording’s two-finger dwell gesture) to another known element (Yach’s system, as modified by Westerman-632 and Hillis) to obtain predictable results (using a two-finger dwell gesture to summon a menu).

219. Fourth, the combination uses a known technique (Yeh and Ording’s two-finger dwell gesture) to improve a similar device and method (Yach’s system, as modified by Westerman-632 and Hillis) in the same way.

220. Fifth, the combination applies a known technique (Yeh and Ording’s two-finger dwell gesture) to a known device and method (Yach’s system, as modified by Westerman-632 and Hillis) that is ready for improvement and yields predictable results (using a two-finger dwell gesture to summon a menu).

221. A person of ordinary skill in the art would have reasonably expected success in the combination for several reasons. First, Yach discloses that “modifications and variations [of its invention] may occur to those skilled in the art” and “are believed to be within the sphere and scope of the present disclosure.” (EX-1004 (Yach) ¶[0086]; *id.* ¶[0073] (disclosing alternative method for summoning menu).) Second, dwell gestures like those disclosed in Yeh and/or Ording were well-known in the art and were commonly used to trigger the display of menus. (*See, e.g.*, EX-1006 (Hillis), EX-1011 (Westerman-632), EX-1009 (Yeh), EX-1012 (Kolmykov-Zotov), EX-1010 (Ording).) Furthermore, as I discuss above, the combination merely represents the simple addition of a known element (a two-finger dwell gesture) to a known system (Yach’s system, as modified by Westerman-632 and Hillis). Such a modification was well within the skill of a person of ordinary skill in the art.

222. Thus, Yach, Westerman-632, Hillis, Yeh, and/or Ording disclose or render obvious each limitation of claim 10, and claim 10 would have been obvious as a whole to a person of ordinary skill in the art.

XII. SECONDARY CONSIDERATIONS OF NONOBVIOUSNESS

223. I am not aware of any secondary considerations of nonobviousness. If Patent Owner identifies any alleged evidence of secondary consideration in the future, I reserve the right to respond to that information.

XIII. CONCLUSION

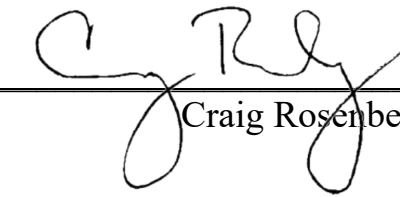
224. For the foregoing reasons, it is my opinion that claims 1-3 and 10-12 of the '487 patent would have been obvious to a person of ordinary skill in the art at the time of the alleged invention in view of the prior art discussed above.

225. I reserve the right to supplement my opinions in the future to address or respond to any issues that the Patent Owner may raise, as well as new information including, but not limited to, any claim constructions advanced by the Patent Owner or adopted by the Board in the Institution Decision, and respond to any alleged secondary considerations as they become available to me.

Amazon.com, Inc. v. SoundClear Technologies LLC
Declaration of Craig Rosenberg – U.S. Patent No. 9,223,487

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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.

Executed on July 29, 2025 at Shoreline, Washington.



Craig Rosenberg, Ph.D.