

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,**
Petitioners

v.

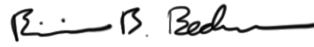
MAXELL, LTD.,
Patent Owner

Inter Partes Review No.: IPR2025-01316

**DECLARATION OF DR. BENJAMIN B. BEDERSON IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 10,812,646**

I hereby declare under penalty of perjury under the laws of the United States of America that the following is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code.

Date: July 17, 2025



Benjamin B. Bederson

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EXHIBITS

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1004	U.S. Patent No. 9,736,217 (“Esaka”)
1005	U.S. Patent No. 9,454,251 (“Guihot”)
1006	U.S. Patent No. 9,521,247 (“Bandyopadhyay”)
1007	U.S. Patent No. 10,375,343 (“Sharif-Ahmadi”)
1008	U.S. Patent Application Publication 2012/0129496 (“Park”)
1009	U.S. Patent Application Publication 2014/0019994 (“Miyazawa”)
1010	Amy K. Karlson et. al., <i>AppLens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices</i> , PROCEEDINGS OF THE SIGCHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS (CHI 2005), 201-210 (2005), https://doi.org/10.1145/1054972.1055001 .
1011	Benjamin B. Bederson et. al., <i>DateLens: A Fisheye Calendar Interface for PDAs</i> , 11 ACM TRANSACTIONS ON COMPUTER-HUMAN INTERACTION 1, 90-119 (March 2004), https://doi.org/10.1145/972648.972652 .
1012	KARLSON, A. ET. AL., HANDBOOK OF RESEARCH ON USER INTERFACE DESIGN AND EVALUATION FOR MOBILE TECHNOLOGY, “Understanding One Handed Use of Mobile Devices,” 86-101 (Lumsden, Jo ed., 2007).
1013	SCH-i600 SERIES USER GUIDE (Samsung Telecommunications America, Inc., 2003).
1014	WILLIAM LIDWELL ET. AL., UNIVERSAL PRINCIPLES OF DESIGN, 142-143 (Rockport Publishers 2003), ISBN 978-1-59253-587-3.
1015	Ben Shneiderman, DESIGNING THE USER INTERFACE: STRATEGIES FOR EFFECTIVE HUMAN-COMPUTER INTERACTION, 74-75 (Addison-Wesley, 3 rd ed. 1998), ISBN 0-201-69497-2.

TABLE OF CLAIMS

[1pre] A portable terminal apparatus comprising:
[1a] a display;
[1b] an operation input interface configured to receive an input corresponding to a user operation;
[1c] a wireless communication interface configured to perform communication over a wireless local area network; and
[1d] a processor programmed to control state transitions of the portable terminal apparatus to and from a sleep state and further performing a plurality of display modes, the plurality of display modes including:
[1e] a first display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a first condition, wherein the first condition is met when a control screen for remotely and wirelessly controlling an external device via the wireless communication interface is not displayed on the display before the portable terminal apparatus enters a sleep state;
[1f] a second display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a second condition, wherein the second condition is met when the wireless communication interface is unable to communicate with the external device and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state; and
[1g] a third display mode during which a control icon and a first screen to be moved to a screen for performing authentication to execute an unlock operation are displayed on the display when the portable terminal apparatus wakes up from a sleep state based on a third condition, wherein the third condition is met when the wireless communication interface is able to communicate with the external device and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state,
[1h] wherein the control screen is used to execute control operations on the external device based on the input received by the operation input interface, and
[1i] wherein, when the control icon is selected in the third display mode without the unlock operation, the wireless communication interface transmits a remote control signal corresponding to the selected control icon to the external device.
[2pre] The portable terminal apparatus according to claim 1,

[2a] wherein the portable terminal apparatus is a smartphone and the external device is used for display of a video content.
[3pre] The portable terminal apparatus according to claim 1,
[3a] wherein the control screen includes a plurality of selectable control icons that enable a user to execute control operations on content being displayed under the control of the external device, the control operations including an operation for selection of content to be displayed.
[4pre] The portable terminal apparatus according to claim 1, further comprising:
[4a] a GPS receiver;
[4b] a sensor determining a movement state of the portable terminal apparatus;
[4c] an infrared sensor;
[4d] a gyro sensor determining angular movement of the portable terminal apparatus; and
[4e] a physical button executing a predetermined operation when a user pushes the physical button.
[5pre] The portable terminal apparatus according to claim 1, further comprising:
[5a] a plurality of physical buttons,
[5b] wherein the simultaneous pushing of the plurality of physical buttons results in a single predetermined operation being executed by the portable terminal apparatus.
[6pre] The portable terminal apparatus according to claim 1,
[6a] wherein the unlock operation in the first display mode, the second display mode, and the third display mode is initiated by sliding the first screen.
[7pre] The portable terminal apparatus according to claim 1,
[7a] wherein in the third display mode the control icon and the first screen are displayed simultaneously on the display and are arranged such that at least a portion of the control icon is displayed in a top half of the display screen.
[8pre] The portable terminal apparatus according to claim 1,
[8a] wherein the wireless communication interface is configured to communicate with the external device by implementing an encryption scheme.
[9pre] The portable terminal apparatus according to claim 8,
[9a] wherein the encryption scheme is WEP (Wired Equivalent Privacy).
[10pre] The portable terminal apparatus according to claim 8,
[10a] wherein the encryption scheme is WPA (WiFi Protected Access).
[11pre] The portable terminal apparatus according to claim 8,
[11a] wherein the encryption scheme is WPA (WiFi Protected Access) 2.
[12pre] The portable terminal apparatus according to claim 1,
[12a] wherein the portable terminal apparatus has a function not to display the control icon even in the third display mode.

[13pre] The portable terminal apparatus according to claim 1,
[13a] wherein the portable terminal apparatus is configured to allow a user to select whether to display the control icon even in the third display mode.
[14pre] A method executed by a portable terminal apparatus, the method comprising:
[14a] receiving, by an operation input interface, an input corresponding to a user operation;
[14b] performing wireless communication over a wireless local area network;
[14c] controlling state transitions of the portable terminal apparatus to or from a sleep state;
[14d] performing a plurality of display modes, the plurality of display modes including:
[14e] a first display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on a display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a first condition, wherein the first condition is met when a control screen for remotely and wirelessly controlling an external device via performing the wireless communication is not displayed on the display before the portable terminal apparatus enters a sleep state;
[14f] a second display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a second condition, wherein the second condition is met when the portable terminal apparatus is unable to communicate with the external device via performing the wireless communication and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state; and
[14g] a third display mode during which a control icon and a first screen to be moved to a screen for performing authentication to execute an unlock operation are displayed on the display when the portable terminal apparatus wakes up from a sleep state based on a third condition, wherein the third condition is met when the portable terminal apparatus is able to communicate with the external device via performing the wireless communication and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state, wherein the control screen is used to execute control operations on the external device based on the input received by the operation input interface; and
[14h] transmitting via wireless communication a remote control signal corresponding to the selected control icon to the external device when the control icon is selected in the third display mode without unlock operation.

[15pre] The method according to claim 14,
[15a] wherein the control screen includes a plurality of selectable control icons that enable a user to execute control operations on content being displayed under control of the external device, the control operations including an operation for selection of content to be displayed.
[16pre] The method according to claim 14, further comprising:
[16a] determining a position of the portable terminal apparatus;
[16b] determining a movement state of the portable terminal apparatus;
[16c] determining angular movement of the portable terminal apparatus; and
[16d] executing a predetermined operation when a user pushes a physical button.
[17pre] The method according to claim 14, further comprising:
[17a] executing a single predetermined operation when a user simultaneously pushes a plurality of physical buttons on the portable terminal apparatus.
[18pre] The method according to claim 14,
[18a] wherein the unlock operation in the first display mode, the second display mode, and the third display mode is initiated by sliding the first screen.
[19pre] The method according to claim 14,
[19a] wherein in the third display mode the control icon and the first screen are displayed simultaneously on the display and are arranged such that at least a portion of the control icon is displayed in a top half of the display screen.
[20pre] The method according to claim 14,
[20a] wherein performing the wireless communication with the external device includes implementing an encryption scheme.
[21pre] The method according to claim 20,
[21a] wherein the encryption scheme is WEP (Wired Equivalent Privacy).
[22pre] The method according to claim 20,
[22a] wherein the encryption scheme is WPA (WiFi Protected Access).
[23pre] The method according to claim 20,
[23a] wherein the encryption scheme is WPA (WiFi Protected Access) 2.
[24pre] The method according to claim 14,
[24a] wherein the portable terminal apparatus has a function not to display the control icon even in the third display mode.
[25pre] The method according to claim 14,
[25a] wherein the portable terminal apparatus is configured to allow a user to select whether to display the control icon even in the third display mode.

I. INTRODUCTION

1. My name is Dr. Benjamin B. Bederson. I have been asked by Petitioners Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. to provide my expert opinions in support of the above-identified petition for inter partes review of U.S. Patent No. 10,812,646 (“’646 patent,” EX1001), challenging the validity of claims 1-25 (the “Challenged Claims”).

2. In summary, it is my opinion that the references cited below render obvious the Challenged Claims. My detailed opinions on the claims are set forth below and summarized in the following chart.

Ground	Claims	Stat. Basis	Prior Art
1	1-3, 7, 12-15, 19, 24-25	35 U.S.C. § 103	Esaka in view of Guihot and the knowledge of a person of ordinary skill in the art (“POSITA”)
2	4-6, 16-18	35 U.S.C. § 103	Esaka in view Guihot, Bandyopadhyay and the knowledge of a POSITA
3	8-11, 20-23	35 U.S.C. § 103	Esaka in view Guihot, Sharif-Ahmadi and the knowledge of a POSITA

3. I am being compensated for my time at the rate of \$750 per hour. This compensation is not contingent upon my performance, the outcome of this matter, or any issues involved in or related to this matter. I have no other interest in this proceeding.

II. BACKGROUND AND QUALIFICATIONS

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

5. Since 1998, I have been a Professor of Computer Science at the University of Maryland (“UMD”), where I have joint appointments at the Institute for Advanced Computer Studies and the College of Information Studies (Maryland’s “iSchool”), and am currently Professor Emeritus.

6. I was also Associate Provost of Learning Initiatives and Executive Director of the Teaching and Learning Transformation Center from 2014 to 2018.

7. I am a member and previous director of the Human-Computer Interaction Lab (“HCIL”), the oldest and one of the best-known Human-Computer Interaction research groups in the country.

8. I was also cofounder and Chief Scientist of Zumobi, Inc. from 2006 to 2014, a Seattle-based startup that is a publisher of content applications and advertising platforms for smartphones.

9. I am also co-founder and co-director of the International Children’s Digital Library (“ICDL”), a web site launched in 2002 that provides the world’s largest collection of freely available online children’s books from around the world

with an interface aimed to make it easy for children and adults to search and read children's books online.

10. I am also co-founder and prior Chief Technology Officer of Hazel Analytics, a data analytics company.

11. In addition, I have for more than 15 years consulted for numerous companies in the area of user interfaces, including Microsoft, Logitech, the Palo Alto Research Center, Sony, Lockheed Martin, Hillcrest Labs, and NASA Goddard Space Flight Center.

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

13. One of the motivations I considered in the design of user interfaces was to make consistent experiences for users even when the system worked on different devices. For example, in 2005, I published a paper describing AppLens and LaunchTile, graphical user interfaces specifically designed to provide "users with a consistent interface and interaction model across devices." EX1010, 201. As

shown in the figure from the paper below, the interface included “Blue”, a blue onscreen button used to “unify the shell and applications with a consistent visual metaphor. Blue provides a consistent point of reference for zooming and panning navigation, with onscreen tiles, menus, and functions maintaining a consistent relative position to Blue.” EX1010, 204.

14. Another example of a GUI that I designed was for DateLens, a mobile calendar application described in a 2004 paper. EX1011. I designed that calendar application to work the same way whether it was running on mobile or desktop. The paper describes that a goal “was to design a calendar interface that would scale down to smaller devices such as mobile phones, and up to larger devices such as desktop displays. This is important since individuals are likely to access their calendar information from these and other devices. Offering a single interface across devices would give users a consistent experience, and, eventually, the ability to more readily switch between devices using whichever one is more accessible.” EX1011, 91. “The Pocket PC calendar was seen by participants to be consistent with other Microsoft calendar products, and this was viewed positively.” EX1011, 110. The following two figures from that paper show DateLens running on a mobile device (Figure 1) and desktop computer (Figure 4).

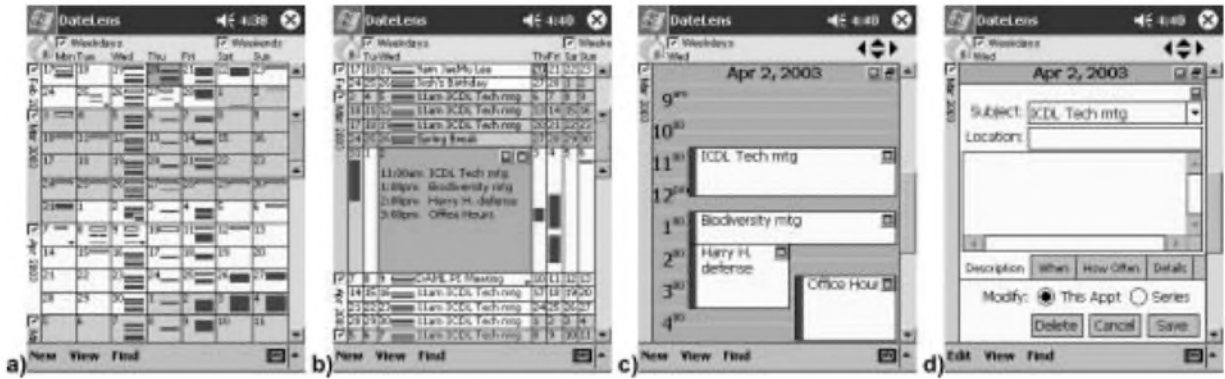


Fig. 1. The DateLens interface with the view configured to show 12 weeks and consecutive levels of detail as the view is: a) shown as an overview; b) zoomed into one day; c) focused on that day; and d) zoomed into an appointment. All transitions between views are animated.

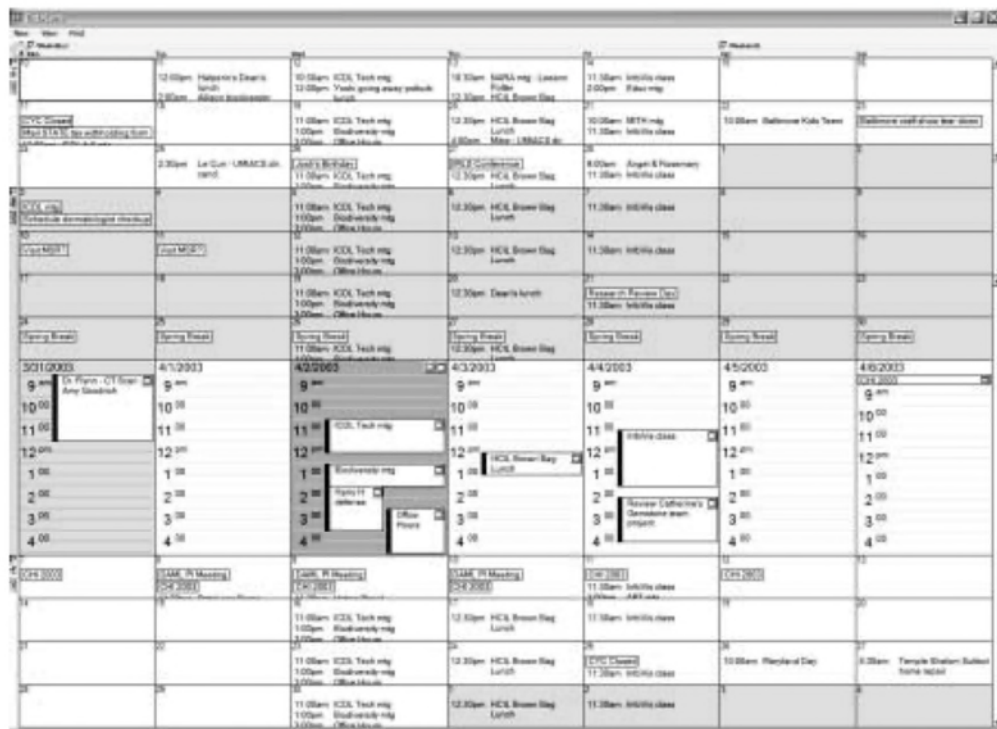


Fig. 4. DateLens scaled up to 1400 × 1050 pixels on a desktop computer. There is room to display an entire week with the full day representation, even while showing three months of the calendar.

EX1011, Figs. 1, 4.

15. My work with Hillcrest Labs in 2005 through 2009 was focused on helping them build a television electronic program guide for their “HoME UI”

experience as represented by this image¹ that includes screenshots from their mid-2000's product. My recollection is that this software was shipped on some set top boxes in that time frame.

16. At UMD, my research is in the area of Human-Computer Interaction (“HCI”), a field that relates to the development and understanding of computing systems to serve users’ needs. Researchers in this field are focused on making universally usable, useful, efficient, and appealing systems to support people in their wide range of activities. My approach is to balance the development of innovative technology that serves people’s practical needs. Example systems following this approach that I have built include PhotoMesa (software for end users to browse personal photos), DateLens (2002 software for end users to use their mobile devices to efficiently access their calendar information), LaunchTile (2005 “home screen” software for mobile devices to allow users to navigate apps in a zoomable environment), SpaceTree (2001 software for end users to efficiently browse very large hierarchies), ICDL (as described above), and StoryKit (a 2009 iPhone app for children to create stories).

17. LaunchTile led to my creation of Zumobi in 2006, where I was responsible for investigating new software platforms and developing new user

¹ <http://www.smart2zero.com/news/wireless-rd-firm-interdigital-buys-sensor-processing-tech-developer>

interface designs that provide efficient and engaging interfaces to permit end users to access a wide range of content on mobile platforms (including the iPhone and Android-based devices). For example, I designed and implemented software called “Ziibii,” a “river” of news for iPhone, software called “ZoomCanvas,” a zoomable user interface for several iPhone apps, and iPhone apps including “Inside Xbox” for Microsoft and Snow Report for REI.

18. At the International Children’s Digital Library (ICDL), I have since 2002 been the technical director responsible for the design and implementation of the web site, www.childrenslibrary.org (originally at www.icdlbooks.org). In particular, I have been closely involved in designing the user interface as well as the software architecture for the web site since its inception in 2002.

19. Beginning in the mid-1990s, I have been responsible for the design and implementation of numerous other web sites in addition to the ICDL. For example, I designed and built my own professional web site when I was an Assistant Professor of Computer Science at the University of New Mexico in 1995 and have continued to design, write the code for, and update both that site (which I moved to the University of Maryland in 1998, currently at <http://www.cs.umd.edu/~bederson/>) as well as numerous project web sites, such as Pad++, <http://www.cs.umd.edu/hcil/pad++/>.

20. I received the Janet Fabri Memorial Award for Outstanding Doctoral Dissertation for my Ph.D. work in robotics and computer vision. I have combined my hardware and software skills throughout my career in Human-Computer Interaction research, building various interactive electrical and mechanical systems that couple with software to provide an innovative user experience.

21. My work has been published extensively in more than 160 technical publications, and I have given about 100 invited talks, including 9 keynote lectures. I have won a number of awards including the Brian Shackel Award for “outstanding contribution with international impact in the field of HCI” in 2007, and the Social Impact Award in 2010 from Association for Computing Machinery’s (“ACM”) Special Interest Group on Computer Human Interaction (“SIGCHI”). ACM is the primary international professional community of computer scientists, and SIGCHI is the primary international professional HCI community. I have received two “Test of Time” awards² from IEEE InfoVis for my 2001 and 2002 work on visualizing hierarchies, including those containing digital photos.

² <https://ieevis.org/year/2021/info/awards/test-of-time-awards;>
[https://ieevis.org/year/2022/info/awards/test-of-time-awards.](https://ieevis.org/year/2022/info/awards/test-of-time-awards)

22. I have been honored by both professional organizations. I am an “ACM Distinguished Scientist,” which “recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field.”

23. I am a member of the “CHI Academy,” which is described as follows: “The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry, and led the research and/or innovation in human-computer interaction.” The criteria for election to the CHI Academy are: (1) cumulative contributions to the field; (2) impact on the field through development of new research directions and/or innovations; and (3) influence on the work of others.

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

25. I have designed, programmed, and publicly deployed dozens of user-facing software products that have cumulatively had millions of users. I am the co-inventor of 14 U.S. patents and 20 U.S. patent applications. The patents are generally directed to user interfaces/experience.

26. My qualifications, publications, professional experience and expertise are set forth more fully in my curriculum vitae, attached as Exhibit A.

III. SUMMARY OF MATERIALS REVIEWED AND CONSIDERED

27. All of the opinions contained in this Declaration are based on the documents I reviewed and my knowledge and professional judgment. In forming the opinions expressed in this Declaration, while drawing on my experience and knowledge regarding graphical user interfaces, I read and considered the '646 patent, its prosecution history, as well as any other material referenced herein.

28. My opinions are guided by my appreciation of how a person of ordinary skill in the art would have understood the claims of the '646 patent at the time of the alleged invention, which I have been asked to assume is the 2014 time frame.

IV. RELEVANT PATENT LAW AND LEGAL STANDARDS

29. I am not an attorney. My understanding of my role in this matter is that I am to apply my scientific and technical expertise in technical matters to the determination of whether or not the challenged claims are patentable. To do this, I

will use certain informal explanations of the required legal standards that have been provided to me by the attorneys for Petitioner.

A. Date of Invention

30. I have been asked to use the date of the filing of the earliest application to which priority is claimed (*i.e.*, July 15, 2014) as the date of invention for purposes of my analysis.

B. Anticipation

31. I am informed and understand that a patent claim is invalid under 35 U.S.C. § 102 if a prior art disclosure teaches every element required by the claim, either expressly or inherently. The identical invention must be shown in as complete detail as is contained in the claim. When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art.

C. Obviousness

32. I am informed and understand that a patent claim is invalid under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art to which the subject matter pertains. Obviousness, as has been explained to me, is based on (i) the scope and content of the prior art, (ii) the differences between the prior art and the claim, (iii) the level

of ordinary skill in the art, and (iv) any secondary indicia of non-obviousness (e.g., “secondary considerations” such as commercial success in the market place of the claimed invention), to the extent that they exist.

33. I further understand that obviousness may be demonstrated by showing that it would have been obvious to combine the teachings of more than one item of prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of a person having ordinary skill in the art, the following are examples of approaches and rationales that may be considered:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of a known technique 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;
- Applying a technique or approach that would have been obvious to try (choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);

- 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 a person having 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 further understand that an invention may be obvious if one of ordinary skill in the art, facing a wide range of needs created by developments in the field, would have seen an obvious benefit to the solutions tried by the applicant. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, it may be obvious to a person of ordinary skill to try the known options. If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique would have been obvious.

35. I further understand that a person of ordinary skill in the art is a hypothetical person who is presumed to be aware of all of the relevant art at the

time of the invention. The person of ordinary skill may be able to fit together the teachings of multiple patents and/or printed publications employing ordinary creativity and the common sense that familiar items may have uses in another context or beyond their primary purposes.

36. I also understand that when considering the obviousness of a patent claim, one should consider whether a teaching, suggestion, or motivation to combine the references exists so as to avoid impermissibly applying hindsight when combining or modifying the prior art. I understand this test should not be applied rigidly, but that the test can be important to avoid such hindsight.

37. I also understand that one of ordinary skill in the art must have a reasonable expectation of success in combining or modifying prior art references.

38. I also understand that all elements of a claim must be considered in an obviousness analysis.

D. Standard of Proof

39. I understand that the standard to prove unpatentability in an inter partes review proceeding is by a preponderance of the evidence, which means more likely than not.

V. THE '646 PATENT

A. Summary of the '646 Patent

40. The '646 patent discloses a mobile device; *e.g.*, a smartphone, for remotely controlling another device; *e.g.*, a TV, and which may continue being

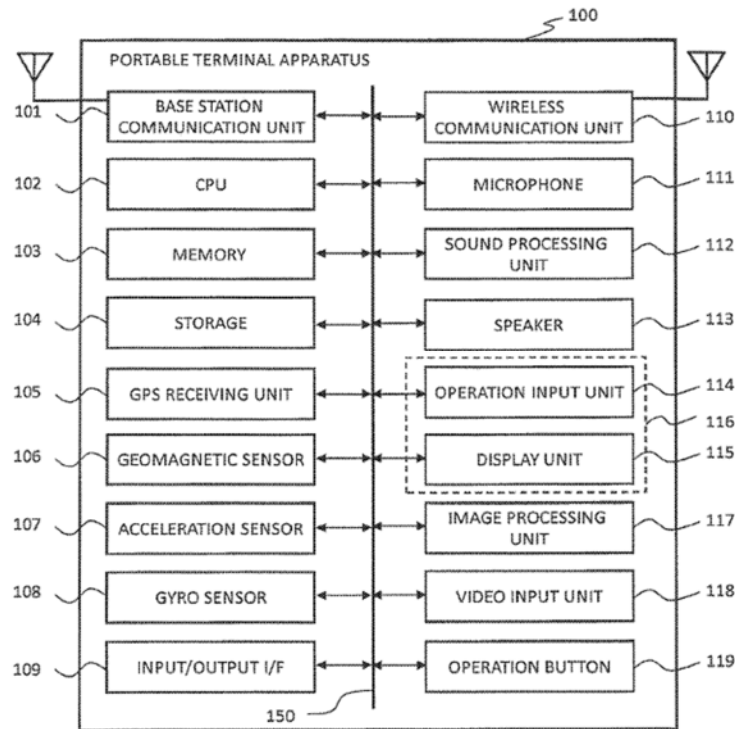
used as a remote control device from a lock screen upon waking up from a sleep state when certain conditions are met. EX1001, 11:18-32, claim 1.

41. The '646 patent purports to improve user convenience because if the conditions are met, the user need not go through the steps of unlocking the lock screen to continue using the device as a remote control. EX1001, 2:8-20, 7:25-28.

42. Figure 1 of the '646 patent, below, shows a block diagram of the portable terminal apparatus (*e.g.*, smartphone), according to an embodiment. It includes a “base station communication unit 101, a CPU 102, a memory 103, a storage 104, a GPS (Global Positioning System) receiving unit 105, a geomagnetic sensor 106, an acceleration sensor 107, a gyro sensor 108, an input/output I/F 109, a wireless communication unit 110, a microphone 111, a sound processing unit 112, a speaker 113, an operation input unit 114, a display unit 115, a touch panel 116, an image processing unit 117, a video input unit 118, and an operation button 119.” EX1001, 4:1-16.

43. The '646 patent's “operational input unit 114” is the touch pad or touch screen of the display, where the “operational input unit 114 detects the touch position to receive a command displayed at the touch position.” EX1001, 5:1-12.

FIG. 1

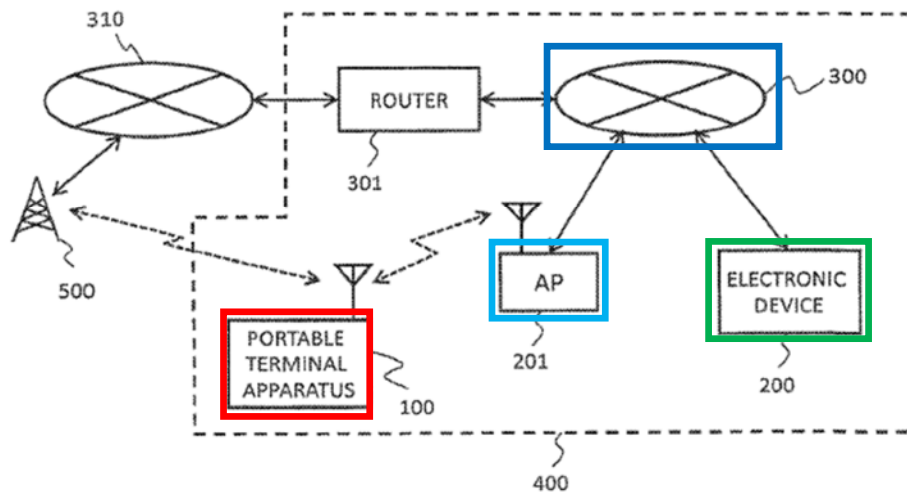


EX1001, Fig. 1.

44. The '646 patent discloses that apparatus 100 (*e.g.*, smartphone) controls “electronic device 200 [green box below],” which is described as “a television receiver (to be referred to as a TV, hereinafter).” EX1001, 5:36-37.

45. Figure 2 of the '646 patent, below, shows that “the portable terminal apparatus 100 [red box below] can remotely control the electronic device 200 via the home network 300 [dark blue box below],” which includes access point “AP 201 [light blue box below].” EX1001, 5:55-62, 6:4-12, 6:23-25, 6:37-49, 6:58-7:5, Fig. 2.

FIG. 2



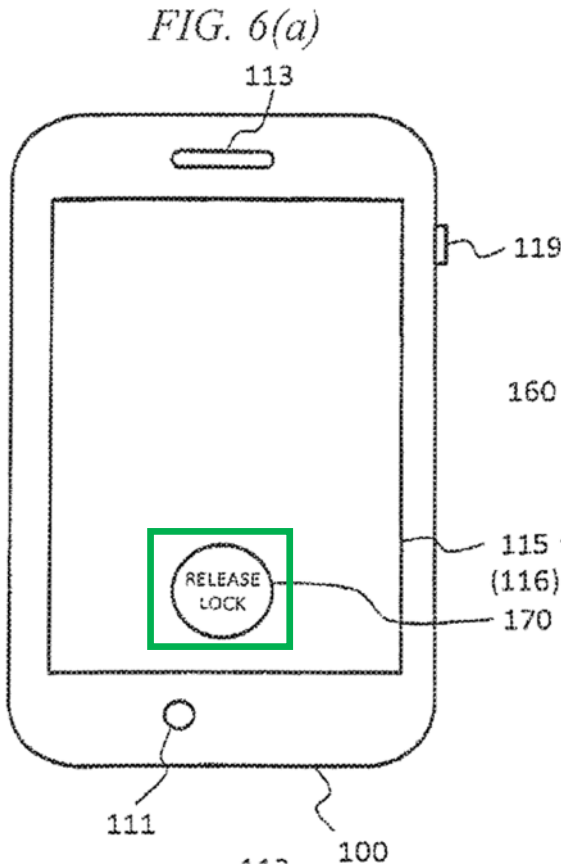
EX1001, Fig. 2.

46. The '646 patent discloses three different possible display cases (or modes) for the apparatus 100 upon waking up from a sleep state. EX1001, 9:7-60, Fig. 5.

47. The first display case “is a case in which a state immediately before the sleep state is a state in which the remote control screen has not been displayed. That is, immediately before the sleep state, the apparatus has performed an operation other than a program for remote control. In this case, the apparatus is started up with a normal lock screen being displayed on a touch panel 116.” EX1001, 10:57-63.

48. Thus, when the apparatus 100 was not used as a remote control immediately before entering a sleep state (*e.g.*, perhaps it was used as a phone), the normal lock screen, without any remote control icon, is displayed.

49. Fig. 6(a), below, “shows an example of the normal lock screen [in which] ... only a lock release button 170 [green box below] is displayed on the touch panel 116.” EX1001, 7:50-53; Fig. 6(a).



EX1001, Fig. 6(a).

50. “The second case is a case in which ... immediately before the sleep state ... the remote control screen has been displayed and it is not possible to communicate with the AP 201. In this case, the apparatus is started up with the normal lock screen being displayed on the touch panel 116. This is, ... although the remote control screen has been displayed immediately before the sleep state

and the user has performed a remote control operation, the user has carried the portable terminal apparatus 100 outside [*e.g.*, out of range of the AP 201] in the sleep state ... and is not located near an electronic device 200.” EX1001, 10:64-11:10.

51. Thus, even when the user was using the apparatus 100 as a remote control immediately before entering a sleep state, only the normal lock screen is displayed, without a remote control icon, if the apparatus cannot communicate with the AP 201.

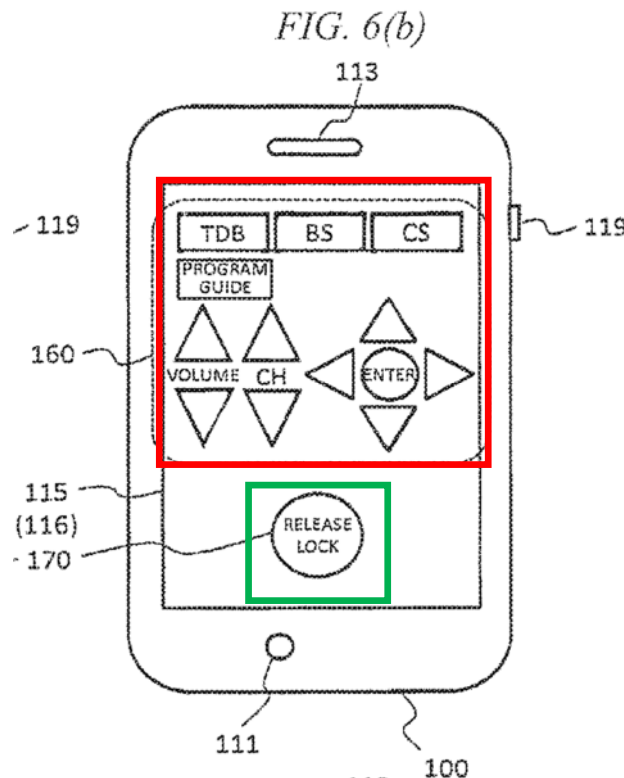
52. Fig. 6(a), above, shows the normal lock screen. EX1001, 7:50-53; Fig. 6(a).

53. Regarding the second case, the '646 patent further states that under these conditions, when the user is not within range of the AP 201, it “is no problem in starting up the apparatus on the normal lock screen. In contrast, in this state, if the apparatus is started up on the remote control display lock screen, the remote control screen which cannot be used is displayed, and as a result, the apparatus is poor in operability.” EX1001, 9:32-38.

54. Stated another way, if the apparatus wakes up with the remote control icon displayed on the lock screen, and the apparatus is out of range to be used as a remote control, this is inconvenient to the user.

55. “The third case is a case in which ... immediately before the sleep state ... the remote control screen has been displayed and it is also possible to communicate with the AP 201. In this case, the apparatus [100] is started up with the remote control display lock screen being displayed on the touch panel 116.”
EX1001, 11:18-23.

56. Fig. 6(b), below, “shows an example of the ... remote control display lock screen ... [in which] the lock release button 170 [green box below] and the remote control button 160 [red box below] are displayed on the touch panel 116.”
EX1001, 8:18-21; Fig. 6(b).



EX1001, Fig. 6(b).

57. Regarding the third case, the '646 patent further states “[w]hen the portable terminal apparatus 100 is located inside the communication range with the AP 201, it indicates that the user ... is located near the electronic device 200. Since it is very likely that the user has released the sleep mode of the ... apparatus 100 to remotely control the electronic device 200, starting up the apparatus on the remote control display lock screen allows the user quickly to perform a remote control operation. This improves the operability.” EX1001, 11:23-32.

58. Also regarding the third case, the '646 patent discloses that although the lock release button 170 [green box above] and the remote control button 160 [red above] are displayed on the touch panel 116, “the remote control buttons 160 need not always be displayed simultaneously with the lock release button” and that the user may select whether to display the remote control buttons 160 along with the lock release button 170. EX1001, 8:61-9:3.

59. Lastly, the '646 patent discloses the portable terminal apparatus 100 may include certain standard features commonly found on smartphones and other mobile devices at the time of the alleged invention.

60. Some of those standard features include buttons that, when pressed either individually, or simultaneously, perform certain functions. EX1001, 5:22-30.

61. Other standard features include encryption schemes for the wireless communications, as well as motion and location detection systems. EX1001, 7:67-8:4, 4:42-49, 4:39-41.

B. File History and Priority Date of the '646 Patent

62. The '646 patent was filed on September 19, 2019 and claims priority to U.S. Patent Application No. 16/370,233, filed on March 29, 2019, and U.S. Patent Application No. 15/326,365, filed as PCT/JP2014/068826 on July 15, 2014. EX1001, (22), (63).

63. Twenty-five claims issued on October 20, 2020. EX1002, 1 (Issue Notification).

C. State of the Art

64. As the '646 patent acknowledges, it was known in the art to use a mobile device, *e.g.*, a smartphone, for a variety of applications including use as a remote control to control another device (*e.g.*, a television) via a wireless local area network (LAN) connection. EX1001, 1:20-35.

65. The '646 patent also acknowledges it was known that such mobile devices are often set to be “put into a sleep state when a predetermined time (*e.g.*, 30 seconds) of a non-operation state has passes.” EX1001, 1:66-2:2.

66. The '646 patent goes on to describe a perceived problem with such prior art mobile devices is that when a “predetermined time has passed since the

previous remote control operation, since the [mobile device] is put into the sleep state, it is necessary to ... perform a lock function release operation such as the password authentication or the pattern authentication before performing a remote control operation.” EX1001, 2:2-15.

67. I have used a wide range of mobile phones since the 1990s. All these phones were battery operated and had features to conserve battery power. Every single one of the mobile phones that I have used had some form of “sleep” or “standby” mode wherein the phone would continue to operate in a low-power mode with a display being off while being able to receive phone calls. In fact, since a major point of mobile phones is to make calls while being mobile (and thus running on a battery), all mobile phones that I am aware of supported this form of operation. That is, they could operate in a low power mode, typically called sleep or standby with a display being off while continuing to be able to receive calls. To conserve battery power, these phones enter the sleep or standby mode after a preset time period of inactivity, typically less than a minute.

68. As part of my work on a 2007 paper, I studied a “flip phone” called the Samsung SCH-i600, shown in the figure below. EX1012. A “flip phone” is a cell phone with a hinged body that opens and closes. We selected Samsung SCH-i600 because this phone was typical of common flip phones of the time in its shape and general functionality. As is common with flip phones, Samsung SCH-i600 had

a flip cover connected at the top to the body of the phone using a hinge. I recall that the front surface of the flip cover had a small display (front display) and the back of the flip cover had a larger display (back display). When the flip cover is open, the back display is visible and when the flip cover is closed, the back display is covered by the phone body and is not visible.

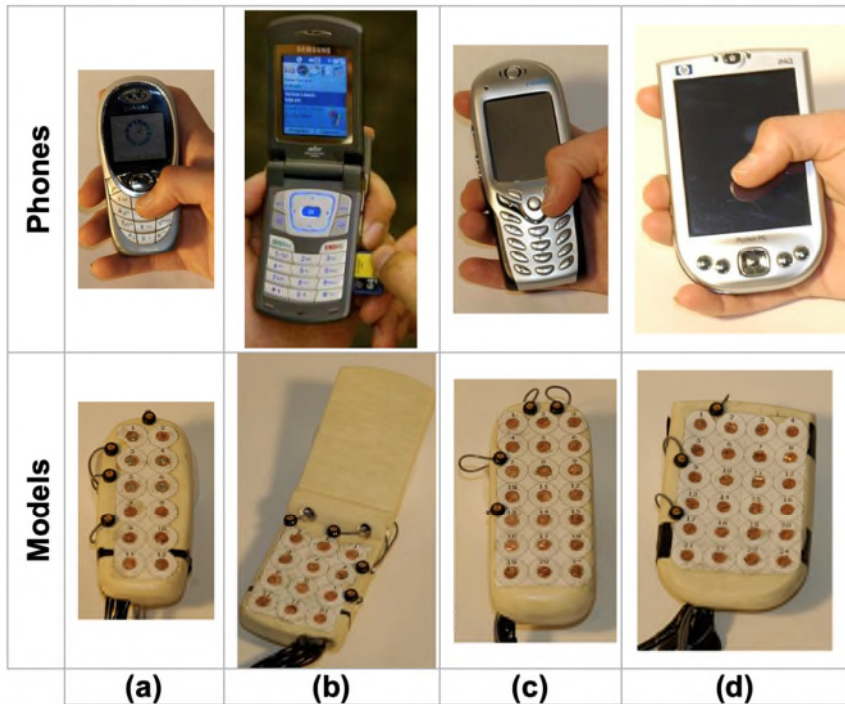


Figure 4. Devices we chose to represent a range of sizes and forms (top row) together with their study-ready models (bottom row): (a) SMALL, (b) FLIP, (c) LARGE, and (d) PDA.

69. The Samsung SCH-i600, as I remember, also had a sleep or a power saving mode, and the large display on the inside of the flip cover would turn off when closed. The inside display would wake up and display content as in the figure above when the phone was physically opened.

SCH-i600 closed view



2

SCH-i600 open view



Version 3 Build 13192 WG17 July 25, 2003

3

70. Images of this phone from the 2003 user manual of Samsung SCH-i600 are reproduced above. EX1013. My recollection is that the front display on the outside of the phone stayed on even when the flip cover was closed (as depicted in the image on the right above), although it would go off after some time.

POWER MANAGEMENT OPTIONS

Option	Function
Main battery	View remaining battery power.
Brightness level	Set the brightness level of the display.
Backlight time out	Set the amount of time the display screen backlight remains illuminated after a period of inactivity.
Power saving time out	Set the amount of time before the display screen goes blank after a period of inactivity.
In-call screen time out	Set the amount of time before the display screen goes blank while in a call.

71. The user manual confirms that it has several power management options where the display screen goes blank. For example, it had a “Power saving time out” option that enables the user to “[s]et the amount of time before the display screen goes blank after a period of inactivity.” *Id.* It also has an “In-call screen time out” option where the user could “[s]et the amount of time before the display screen goes blank while in a call.” *Id.* When the screen goes blank, it is off.

72. As demonstrated below and in the specific grounds, it was well known in the art that although a mobile device enters a sleep state, a user could nonetheless access certain applications, including remote control applications, from the lock screen and without first entering either a password or pattern to unlock the screen.

73. It was also well known that allowing such access to applications on the lock screen improved the user’s experience and provided added convenience since the user could continue using the mobile device as a remote control, or another application upon picking up the mobile device again after laying it down for some time.

74. For example, it was known that if a user was using the mobile device as a remote control, the user might place the remote control down for a period of time and the mobile device would enter a sleep state.

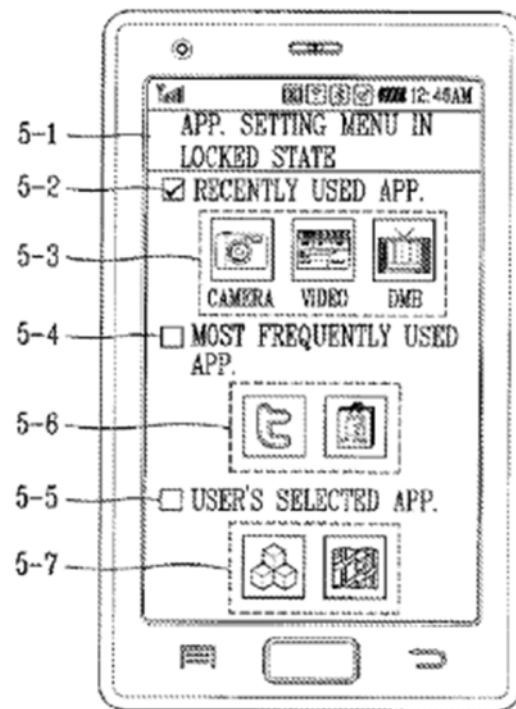
75. It was also known that, in this scenario, if the user picked up the mobile device while it is in the sleep state, the user most likely intended to use the mobile device in the same manner; *e.g.*, as a remote control to control the same different device; *e.g.*, TV.

76. One such example is U.S. Patent Application Publication 2012/0129496 to Park, published May 24, 2012 (“Park”). EX1008. Park discloses “[a] mobile terminal including ... a touch screen ... a wireless communication unit configured to wirelessly communicate with at least one other terminal ... and a controller configured to enter the touch screen into a locked state, to display a lock screen and an application program icon for executing an application program on the lock screen when entering the locked state.” EX1008, Abstract.

77. In connection with Fig. 5, below, Park also discloses “an application program (APP) setting menu ... for setting an application program to be displayed on the display unit 402 when the touch screen is in a locked state.” EX1008, [0083]. The setting menu includes “recently used application program(s),” “most frequently implemented application program(s),” and “user’s selected application program(s).” EX1008, [0084]. “The controller 401 may also display icons indicating the application programs as well as an icon for releasing the lock on the display unit 402 when the touch screen is in the locked state.” EX1008, [0087].

78. Thus, it was known in the art that a mobile device can not only allow a user to access an application displayed on a locked screen, along with displaying an icon for releasing the lock, but that the application could be the one the user most recently used.

FIG. 5



EX1008, Fig. 5.

79. Another example is U.S. Patent Application Publication 2014/0019994 to Miyazawa, published January 16, 2014 ("Miyazawa"). EX1009. Miyazawa discloses "the CPU 201 can initiate an application based on detection of a trigger without clearing the lock function. Consequently, when using the information processing terminal 20 to operate an external device which belongs in

the same subnet, the user can omit at least a cumbersome operational procedure of selecting an application and initiating the selected application. Thus, the user can hold and immediately use the information processing terminal as is the case with a normal remote controller.” EX1009, [0028].

80. Mizayawa further discloses that the “trigger” detected may be, *e.g.*, “the user’s depression of a key which determines recovery ... from a sleep state.” EX1009, [0030]. Thus, Mizayawa discloses that upon waking up from a sleep state, a remote control application is displayed without clearing the lock function (*i.e.*, displayed on the lock screen) and that the user can immediately use the device as a remote controller.

81. And like Park, Miyazawa also discloses that the application displayed on the lock screen may be the last application used. Specifically, Miyazawa states “the CPU 201 may preferentially select the last application used as the current application to be used and initiate the application.” EX1009, [0035].

82. Lastly, Miyazawa discloses that whether or not the application is initiated depends on the detection of a remote device on the same network. If the remote device is not detected, the application will not be displayed, and vice versa.

83. For example, in connection with Fig. 5, Miyazawa discloses “if the information processing terminal 20 fails to detect a registered external device which belongs in the same subnet (that is, at home), the CPU 20 does not continue

the process of initiating the application. On the other hand, if the information processing terminal 20 detects a registered external device which belongs in the same subnet, the CPU continues the process of initiating the application.” EX1009, [0024].

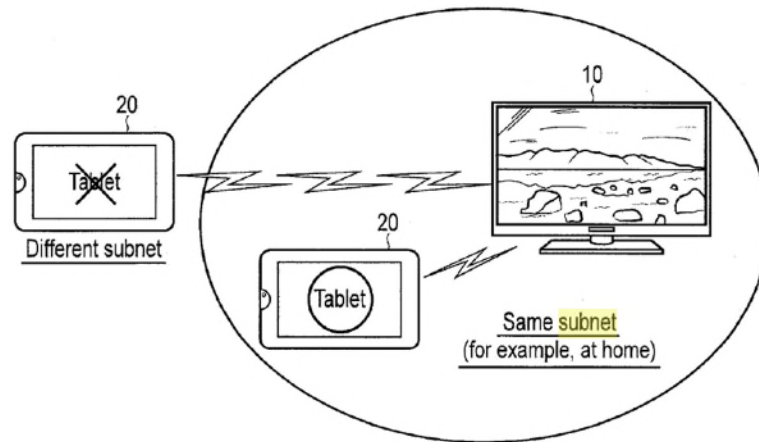


FIG. 5

EX1009, Fig. 5.

84. There were also commercial products that used smartphones to stream content to televisions and allow those phones to work as a remote control to control the television. For example, by 2013, Google had started selling the Google Chromecast. As described in a 2013 review³, an HDMI “dongle”, available for just

3

<https://web.archive.org/web/20130801011233/https://www.theverge.com/2013/7/29/4566718/google-chromecast-review>

\$35, allowed users to “send[] the video to your TV” from your phone. It describes that “the Chromecast takes over while your device becomes a remote.”



85. It was well-known to a POSITA that user interfaces would typically be designed with consistency and simplicity in mind so that no more design elements should be used than were needed and that designs should be consistent throughout and even across applications. It is a truism of Graphical User Interface (GUI) design that “simple is good.” GUIs very can quickly become “bloated” which is well-known to interfere with usability. Through the early 2000s, Microsoft Office became well-known for its “bloat” relating to its display of too many menu items and toolbars. As described in a January 18, 2007 New York

Times article⁴, Microsoft responded to its “reputation for bloat and complexity” by replacing those menu items and toolbars with a new “Ribbon” user interface that is “simpler to use”. As described in a 2003 book titled “Universal Principles of Design”, this approach follows a well-known interface design principle that “[g]iven a choice between functionally equivalent designs, the simplest design should be selected.” EX1014, 142. On that same page, Albert Einstein is quoted describing this approach: “Everything should be made as simple as possible, but not simpler.” *Id.*

86. Another set of well-known design principles are Ben Shneiderman’s “Eight Golden Rules of Interface Design” that are described in his 1998 book “Designing the User Interface.” EX1015, 74. The first principle is “[s]trive for consistency.” Shneiderman describes this rule saying that “[c]onsistent sequences of actions should be required in similar situations; identical terminology should be used in prompts, menus, and help screens; and consistent color, layout, capitalization, fonts, and so on should be employed throughout.” *Id.*

87. Another of the eight golden rules of interface design is to “[r]educe short-term memory load” that “requires that displays be kept simple.” *Id.*, 75.

⁴ <https://www.nytimes.com/2007/01/18/technology/18pogue.html>

These well-known goals of simplicity are balanced with supporting users to be efficient.

88. A third of Shneiderman's eight golden rules is to "[e]nable frequent users to use shortcuts." *Id.*, 74. That is, if a user does something with regularity, the interface should be designed to offer shortcuts to make those activities easy and efficient to perform.

VI. CLAIM CONSTRUCTION

89. I have been asked to offer opinions related to the construction of certain terms in this analysis. I understand that in this proceeding, patent claims are construed using the same claim construction standard that would be used to construe the claim in district court, including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

90. For all terms in the '646 patent claims, I applied the plain and ordinary meaning that a POSITA would have for the terms.

VII. LEVEL OF ORDINARY SKILL IN THE ART

91. I have considered the level of ordinary skill in the art relevant to the '646 patent. I understand that factors such as the education level of those working in the field, the sophistication of the technology, the types of problems encountered

in the art, the prior art solutions to those problems, and the speed at which innovations are made may help establish the level of skill in the art.

92. After reviewing the '646 patent, the relevant portions of the prosecution history of the '646 patent, and cited references, it is my opinion that the relevant art of the '646 patent is in the field of user interface design.

93. Based upon my knowledge of this field, I conclude that a person of ordinary skill in the art ("POSITA") at the time of the earliest filing date of the '646 patent (July 15, 2014), and for that matter, at all subsequent times through the present, would have had a Bachelors' degree in Computer Science, Electrical or Computer Engineering or a comparable field of study, plus approximately one or two years of professional experience with user interface design for mobile devices or other relevant industry experience. Additional graduate education could substitute for professional experience, and significant experience in the field could substitute for formal education.

94. I am and was at the time of the earliest filing date at least a person of skill in the relevant art, of a level at least as high as or more than ordinarily skilled persons, and I am able to provide insight and opinions into the understandings of such persons at all relevant times by virtue of my education, training and experience.

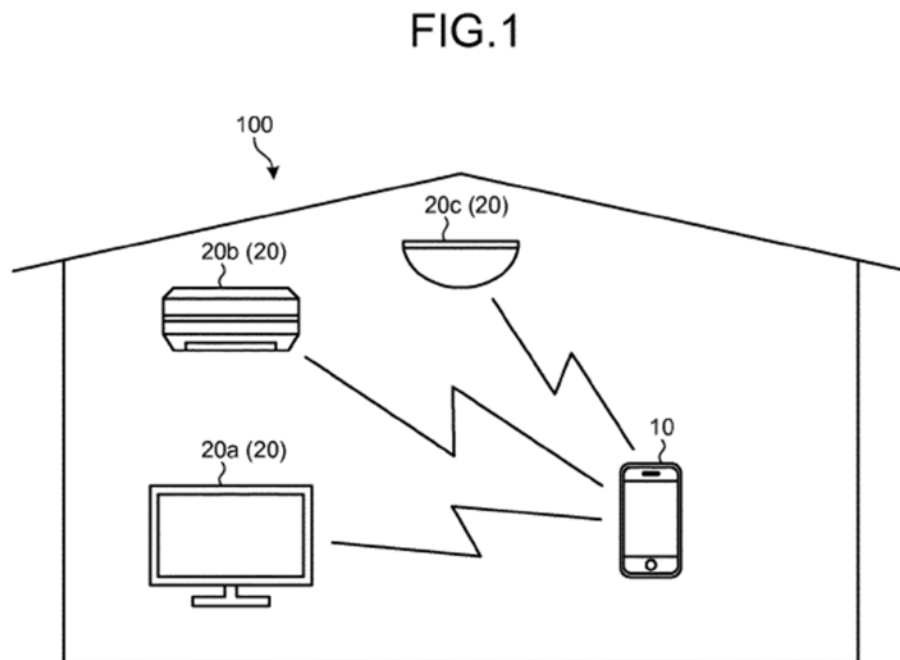
VIII. OVERVIEW OF PRIOR ART

95. In forming my opinions as discussed herein, I have relied on the following prior art, legal standards, documents and other materials.

A. U.S. Patent No. 9,736,217 (“Esaka”)

96. U.S. Patent No. 9,736,217 (“Esaka”) was filed on May 19, 2014 and claims priority to PCT Application No. PCT/JP2013/066884, which was filed on June 19, 2013. EX1004, cover page.

97. Referring to Fig. 1, below, Esaka discloses “a personal digital assistant [‘PDA’] (for example, a smart phone or a tablet computer) 10” that “is part of a remote control system 100, in which the [PDA] 10 may be used to control device 20 such as a TV 20a.” EX1004, 2:12-30, Fig. 1.



EX1004, Fig 1.

98. Esaka's objective is to follow the "intention of the user" and to "improve[]" the "convenience of the user." EX1004, 10:5-9, 10:19-25.

99. For example, Esaka discloses "when the motion sensor 16 detects the movement of the [PDA] 10 and the network determination module determines 14a determines that the communication module 11 is connected to the network, ... the display ... display[s] the operational screens ... for operating the ... target device 20 on the locked screen." EX1004, 10:10-18.

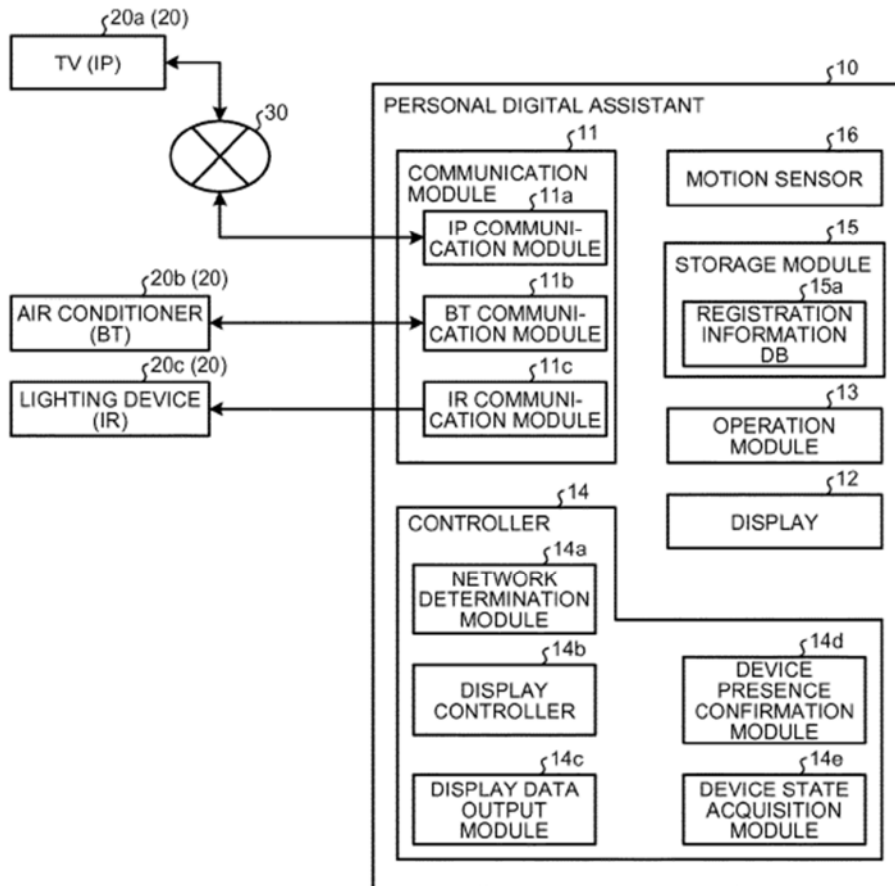
100. Thus, "the convenience of the user can be improved because the operational screen is displayed at an appropriate timing following intention of the user." EX1004, 10:19-25.

101. Referring to Fig. 2, below, Esaka discloses how PDA 10 wirelessly controls TV 20. EX1004, 2:32-47.

102. For example, Esaka discloses "the communication module 11 of the [PDA] 10 comprises an IP communication module 11a ... [that] is communicably [sic] connected to the TV 20a via the home network 30" (EX1004, 2:39-44) where "[t]he TV 20a is communicably connected to a home network 30 comprising a router installed at home." EX1004, 2:32-34.

103. Esaka further discloses "[t]he IP communication module 11a is configured to be capable of transmitting a predetermined operation signal (remote control signal) to the TV 20a by performing IP communication." EX1004, 2:44-47.

FIG.2

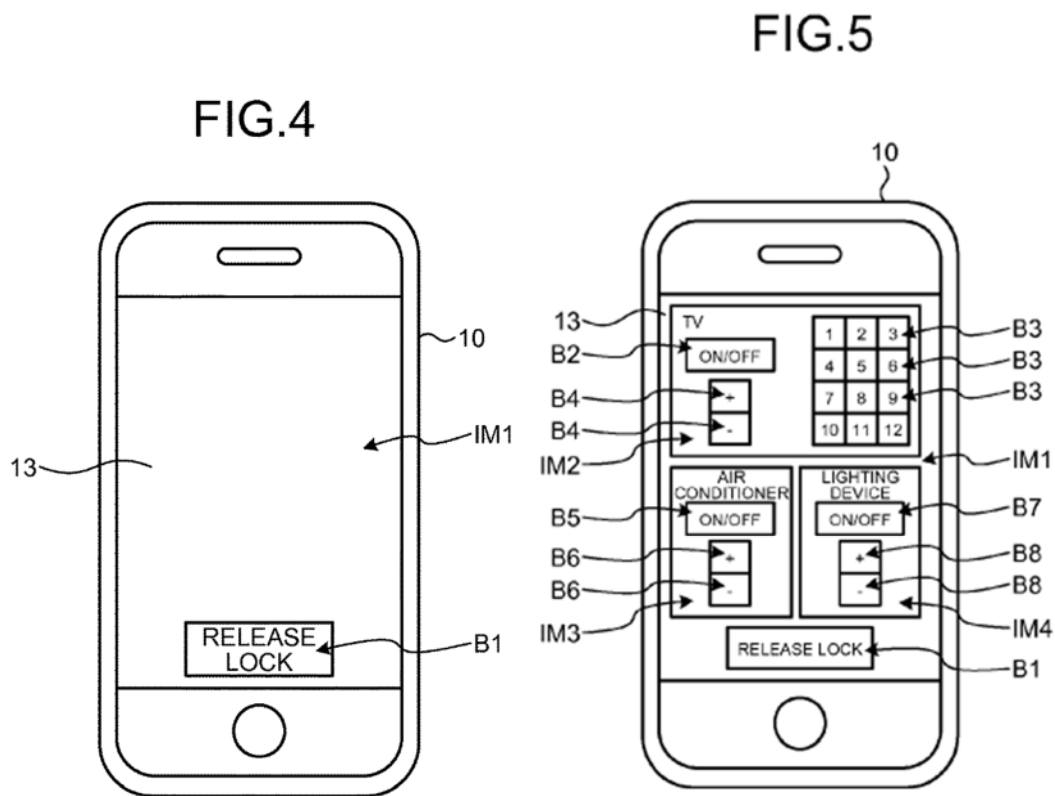


EX1001, Fig. 2.

104. Esaka further discloses that only after confirming the PDA 10 can communicate with the remote device 20 upon awakening from a sleep state are the operational screens displayed on the lock screen; otherwise they are not. EX1004, claim 1 (first PDA 10 “display[s], on a screen of the electronic apparatus, a locked screen,” then “determin[es] whether the electronic apparatus is connected with a first network of the first electronic apparatus under the lock condition,” and then it displays, only “upon confirmation that a plurality of electronic apparatuses are

present, at least one of a plurality of operational interfaces corresponding to the first electronic apparatus on the locked screen.”).

105. Fig. 4, below, shows the lock screen IM1 without the operational screens displayed; and Fig. 5, below, shows the lock screen IM1 with operational screens IM2-IM4 displayed. EX1001, 3:22-26.



EX1004, Figs. 4 and 5.

106. In the case of Fig. 5, where the operational screens IM2-IM4 are displayed on the lock screen IM1, Esaka discloses “the operation target device 20 [] can be securely operated by using the [PDA] 10 ... on the locked screen IM1, so that convenience of the user can be improved.” EX1004, 10:5-9.

107. Esaka further notes that “[e]ach of the operational screens IM2 to IM4 (refer to FIG. 5) is a screen on which various buttons for operating the operation target device 20 are displayed, and the user can perform various operations on the operation target device 20 by performing an operation of pushing down the various buttons displayed on the operation module 13.” EX1004, 4:55-61, Fig. 5.

B. U.S. Patent No. 9,454,251 (“Guihot”)

108. U.S. Patent No. 9,454,251 (“Guihot”) was filed on June 26, 2013. EX1005, cover page.

109. Guihot discloses a “mobile device[], such as [a] smartphone[] [...] that] can be used to control presentation of media content on a television.” EX1005, 1:14-16.

110. Guihot discloses that existing user interfaces “detract from the user’s experience” because they “require[e] the user to unlock the mobile device (e.g., by entering a password, passcode, drawing a particular pattern on the touchscreen, etc.) and/or navigate to or even restart the dedicated remote control application.” EX1005, 1:24-34.

111. To improve the user’s experience, Guihot discloses that the mobile device “can launch a dedicated remote control application that presents a control interface to the user” but that “the screen of the mobile device is often turned off after a certain period of inactivity.” EX1005, 1:16-21. “To continue controlling the

television with the control interface of the dedicated remote control application, the user is required to wake up the mobile device” and it would “detract from the user’s experience” for “the user to unlock the mobile device (e.g., by entering a password [...])” before using the remote control again. EX1005, 1:24-32. To remedy this, Guihot discloses “controlling a remote device using a touch screen of a mobile device in a display inhibited state.” EX1005, 1:35-37.

112. Fig. 2B of Guihot, below, shows that “the remote control application is running on mobile device 202 in which a lock screen is presented to a user” and that “[i]n some implementations, remote control interface 230 [red box below] can include a lock icon 232 [green box below] which can indicate to a user that mobile device 202 is at a lock screen.” EX1005, 12:8-41; Fig. 2B.

113. Guihot further discloses that this screen “can be configured to control any suitable functions of the remote device to be controlled,” including, *e.g.*, “play, pause, control volume, rewind, [or] fast forward.” EX1005, 7:20-45, 10:6-48.

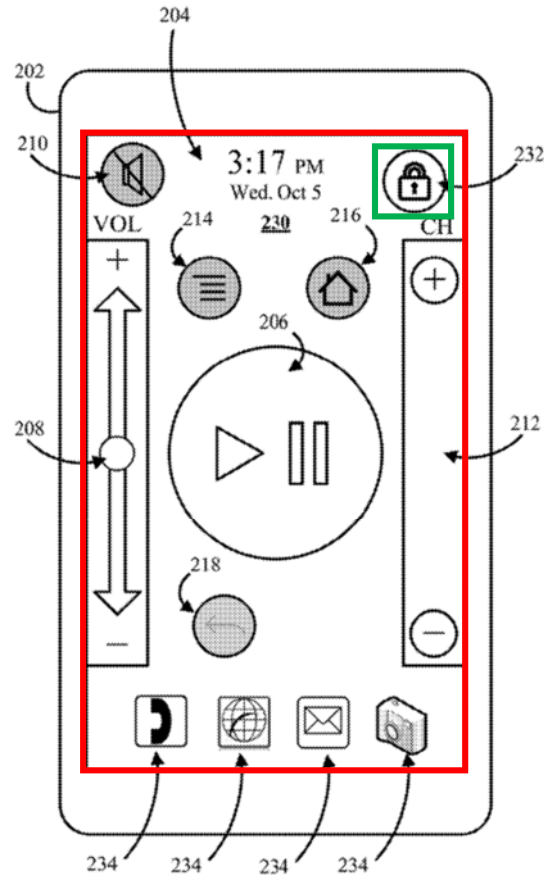


FIG. 2B

EX1005, Fig. 2B.

114. Lastly, Guihot discloses that the user can choose whether, or not, to display the remote control interface 230 on the lock screen. EX1005, 12:21-29.

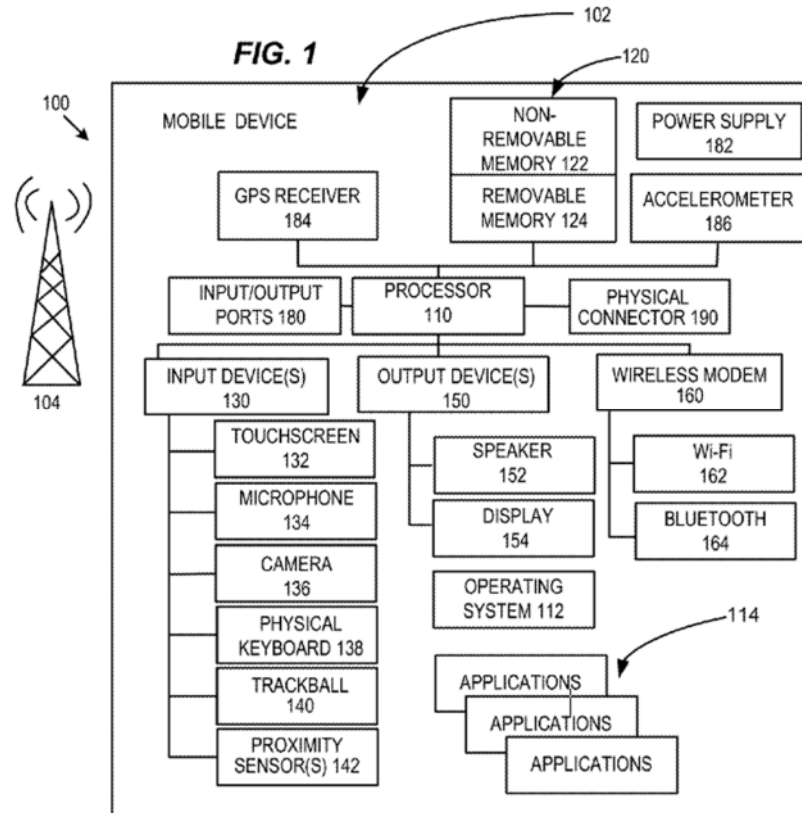
C. U.S. Patent No. 9,521,247 (“Bandyopadhyay”)

115. U.S. Patent No. 9,521,247 (“Bandyopadhyay”) was filed on July 23, 2014 and claims priority to U.S. Patent Application No. 12/940,913, which was filed on November 5, 2010. EX1006, cover page.

116. Bandyopadhyay discloses a mobile device; *e.g.*, a smartphone, including conventional sensors, physical buttons, and a user interface for accessing an application from a lock screen. EX1006, 1:23-25, 1:55-64.

117. Bandyopadhyay's disclosure is focused on "enhancing user experiences when using a mobile device." EX1006, 1:14-17, 1:24-27 ("there is a need for improving the user experience by allowing quick access to the image-capture functionality of mobile devices while also preventing accidental and/or unauthorized access to other functionalities on the device.").

118. Bandyopadhyay further describes a mobile device that "can support one or more input devices 130, such as a touch screen" (EX1006, 8:21-25), has "[a] wireless modem [that] can be coupled to an antenna (not shown) and can support two-way communications between the processor 110 and external devices" (EX1006, 8:31-37), has a "proximity sensor 142" that "emit[s] an infrared beam and receive[s] a reflected infrared beam" (EX1006, 8:21-24, 9:1-7), and has "a satellite navigation system receiver 184, such as a Global Positioning System (GPS) receiver, an accelerometer 186, [and] a gyroscope (not shown)." EX1006, 8:44-47; Fig. 1.

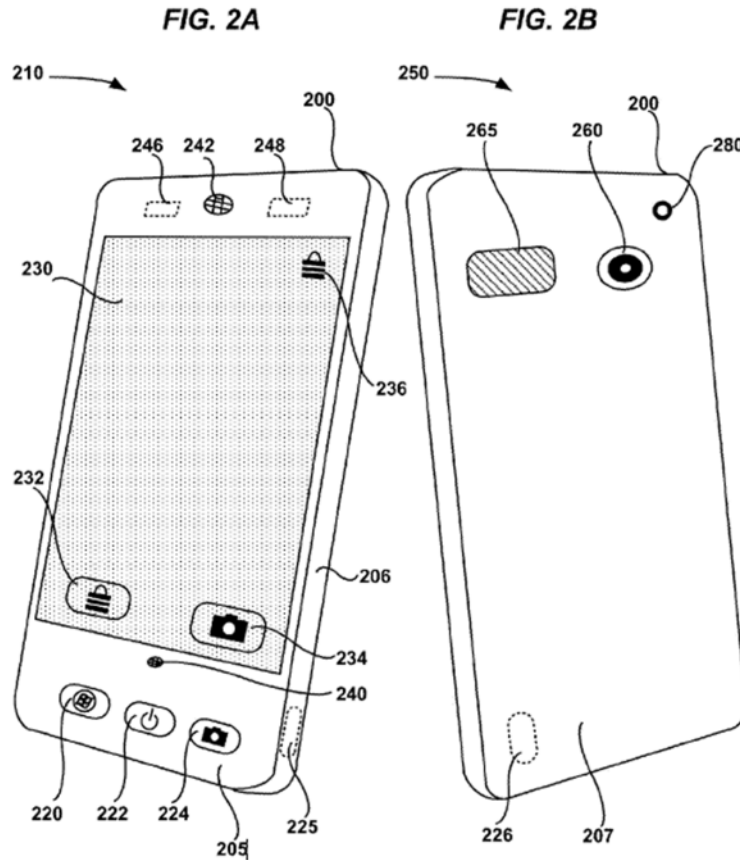


EX1006, Fig. 1.

119. Referring to Figs 2A and 2B, below, Bandyopadhyay also discloses “several hardware buttons, including a home button 220, a power button 222, and a camera shutter (image-capture) button 224” and when “the end user presses and holds the camera button [224], a camera application ... is launched and a live viewfinder appears on the mobile device display screen.” EX1006, 8:54-62, 10:5-35, 13:60-63; Figs. 2A and 2B.

120. Moreover, if a “user press[es] and hold[s] a camera button and one or more other buttons (e.g., a power button 220) simultaneously for at least a

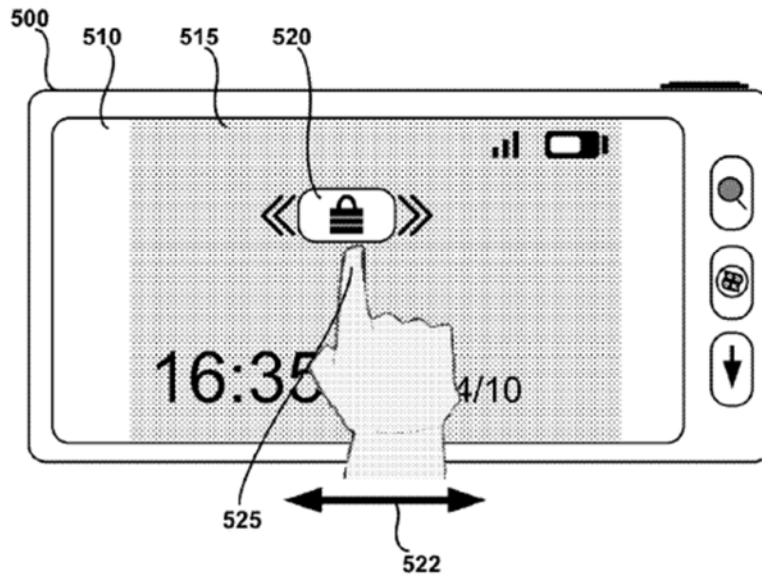
predetermined duration (e.g., one second),” (EX1006, 14:33-45), “the mobile device launches the camera application.” EX1006, 14:33-45, Fig. 2A.



EX1006, Figs 2A, 2B.

121. Lastly, Bandyopadhyay discloses “an unlock slider control 520” to initiate unlocking the lock screen. EX1006, 12:15-25; Fig. 5A.

FIG. 5A



EX1006, Fig. 5A.

D. U.S. Patent No. 10,375,343 (“Sharif-Ahmadi”)

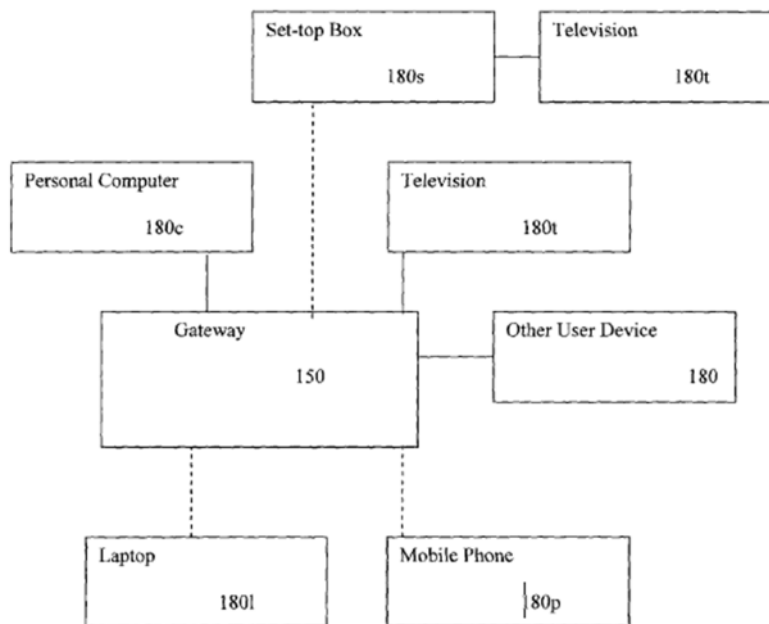
122. U.S. Patent No. 10,375,343 (“Sharif-Ahmadi”) was filed on April 2, 2013 and claims priority to Canadian patents 2,773,342, filed on March 30, 2012 and 2,791,935, filed on October 3, 2012. EX1007, cover page.

123. Sharif-Ahmadi discloses “[a] method of controlling a television with a mobile phone” via “an application ... displaying the functions of a remote control on a touchscreen.” EX1007, 5:45-50.

124. The application on the mobile phone controls the television through “receipt of input on the mobile phone, communicating the input to the gateway; [and] on receipt of the input from the gateway communicating the input to the television.” EX1007, 5:50-52.

125. Referring to Fig. 3, Sharif-Ahmadi further discloses “a network (or ‘micro-cloud’) of service nodes, referred to as gateways 150 [highlighted, below],” in which “[e]ach gateway acts as one node within a content distribution network (‘CDN’ 15), and is used to forward content to one or more user devices 180 that are registered to use that particular gateway 150.” EX1007, 6:63-7:8.

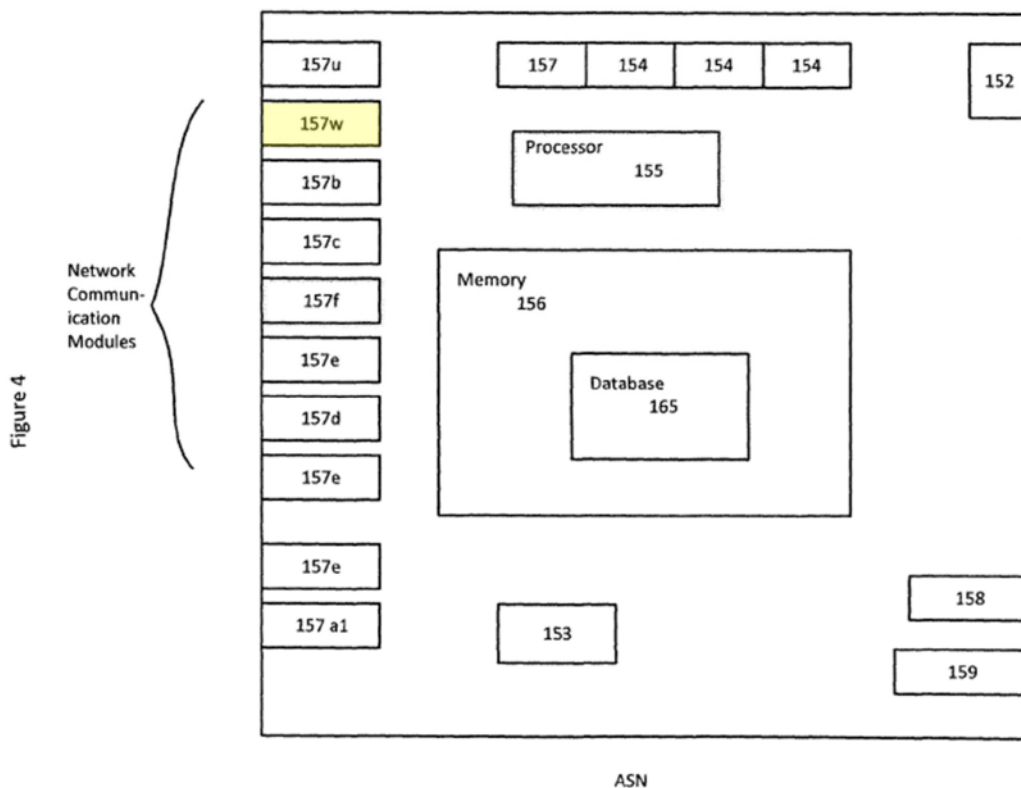
FIG. 3



EX1007, Fig. 3.

126. Lastly, Sharif-Ahmadi discloses “gateway 150 should offer several security features [including] ... encryption/decryption of video streams” (EX1007, 25:32-35) and that “communication modules 157, such as Wi-Fi port 157w

[highlighted below in Fig. 4]” “should support ... other features such as security (WEP, WPA, and WPA2).” EX1007, 7:47-56, 8:22-26.



EX1007, Fig. 4.

IX. GROUND 1: CLAIMS 1-3, 7, 12-15, 19, 24-25 ARE OBVIOUS IN VIEW OF ESAKA, GUIHOT, AND THE KNOWLEDGE OF A POSITA

A. Motivation to Combine

127. At the time of the '646 Patent, a POSITA would have been motivated to combine Esaka and Guihot.

128. As an initial matter, both references are directed to essentially the same subject matter; *e.g.*, a mobile device such as a smartphone that can be used as

a remote control for another device such as a TV. EX1004, 2:12-30; EX1005, 1:14-16.

129. Both Esaka and Guihot also disclose that the remote control can be accessed from the smartphone's lock screen under certain circumstances to further improve the user's convenience by not requiring the user to first enter a password to unlock the screen before being able to use the device as a remote control. EX1004, 4:55-61, 10:5-9, claim 1; EX1005, 1:16-37, Fig. 2B.

130. Further, both Esaka and Guihot intend to improve the user's convenience, at least in part by presenting the user with the remote control on the lock screen when it is apparent that the user was using the smartphone as a remote control in particular circumstances. EX1004, 10:5-9, 10:19-25; EX1005, 1:28-34.

131. For example, Esaka discloses that the device should check whether it can communicate with the TV before it displays the remote icons on the lock screen. EX1004, claim 1.

132. Similarly, Guihot discloses that if the smartphone was previously used as a remote control prior to entering a sleep state the remote icons should be displayed on the lock screen. EX1005, 1:16-32, 7:20-45, 10:21-30, 11:11-12:40.

133. A POSITA would be motivated to combine Esaka's disclosure to check whether the smartphone can communicate with the TV with Guihot's disclosure to check whether the smartphone was previously used as a remote

control prior to entering a sleep state because both scenarios are directed to the stated goal of improving user convenience and reducing user burden by enabling use of the smartphone as a remote control without requiring the user to first unlock the screen by entering, *e.g.*, a password.

134. A POSITA also would have been capable of combining the disclosures of Esaka and Guihot to do so as it would have been straight-forward and within the capabilities of a POSITA. *See, e.g.*, EX1004, 2:12-30, 4:55-61, 10:5-9, 10:19-25, claim 1; EX1005, 1:28-34.

135. A POSITA would have also understood it follows the intention of a user to give the user quick access to the application it was using just prior to setting the device down—and therefore would be motivated to utilize Guihot’s prior use verification. EX1005, 1:28-34, 7:20-45, 10:31-33, 10:58-12:41.

136. Similarly, a POSITA would have understood that it follows the intention of the user to use Esaka’s disclosure to verify that the smartphone can communicate with the external device prior to displaying remote control icons on the lock screen. EX1004, claim 1.

137. It would actually decrease user convenience to display remote control icons for an external device that the smartphone cannot communicate with.

138. Combining Esaka with Guihot would simply involve a known technique (adding an additional logic step to the user interface software program)

to yield predictable results (a program that verifies both whether the smartphone can communicate with the TV, and whether the smartphone was previously used as a remote control).

139. A POSITA would have had a reasonable expectation of success in the combination because Esaka's user interface already has a logic step that considers whether the smartphone can communicate with the TV; adding another logic step to the user interface software that considers Guihot's determination whether the device was previously used as a remote control (i.e., whether the remote control icons were displayed immediately prior to entering sleep mode). EX1004, claim 1; EX1005, 1:16-37.

140. POSITA would have had a reasonable expectation that this modification would be successful because the teachings of Esaka and Guihot both make clear that these logic steps are designed to follow the intention of the user and can be predictably nested together in any software program without undue experimentation. EX1004, 4:55-61, 10:5-9, 10:19-25, claim 1; EX1005, 1:16-37.

141. This modification also yields predictable results because it requires no change to Esaka's smartphone or TV hardware or industrial design. EX1004, 2:32-47, 3:19-26, 4:30-40, 4:44-55, Fig. 2, Fig. 4.

142. If Patent Owner argues the portions of Esaka and Guihot cited below relate to different, incompatible embodiments (which they do not), it would have

been obvious to a POSITA to combine such embodiments into a single device at least because such embodiments are described in the same prior art reference, are fully compatible with each other, and could be combined with minimal effort to achieve predictable results.

B. Claim 1

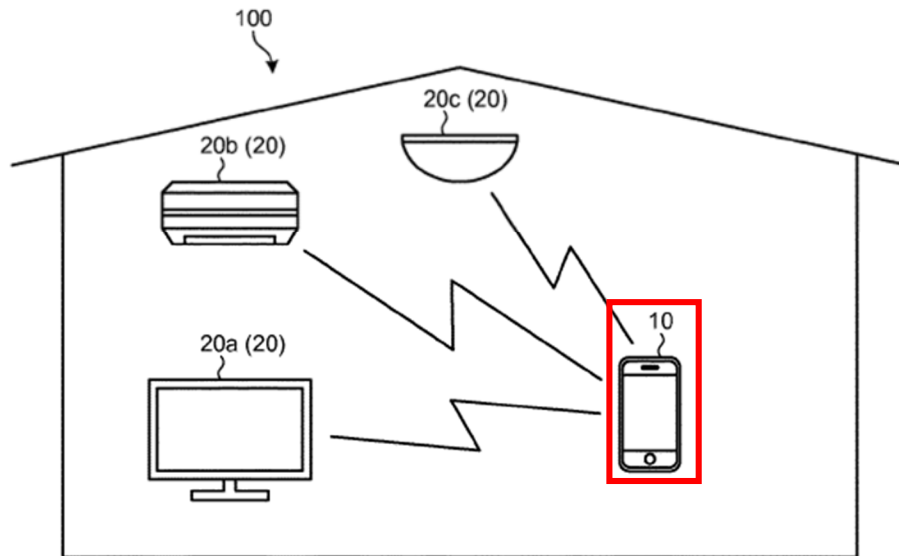
1. [1pre] A portable terminal apparatus comprising:

143. To the extent the preamble is limiting, Esaka discloses it.

144. For example, Esaka discloses an electronic device such as “a personal digital assistant [‘PDA’] (for example, a smart phone or a tablet computer) 10 [red in Figs. 1 and 2, below].” EX1004, 2:12-17.

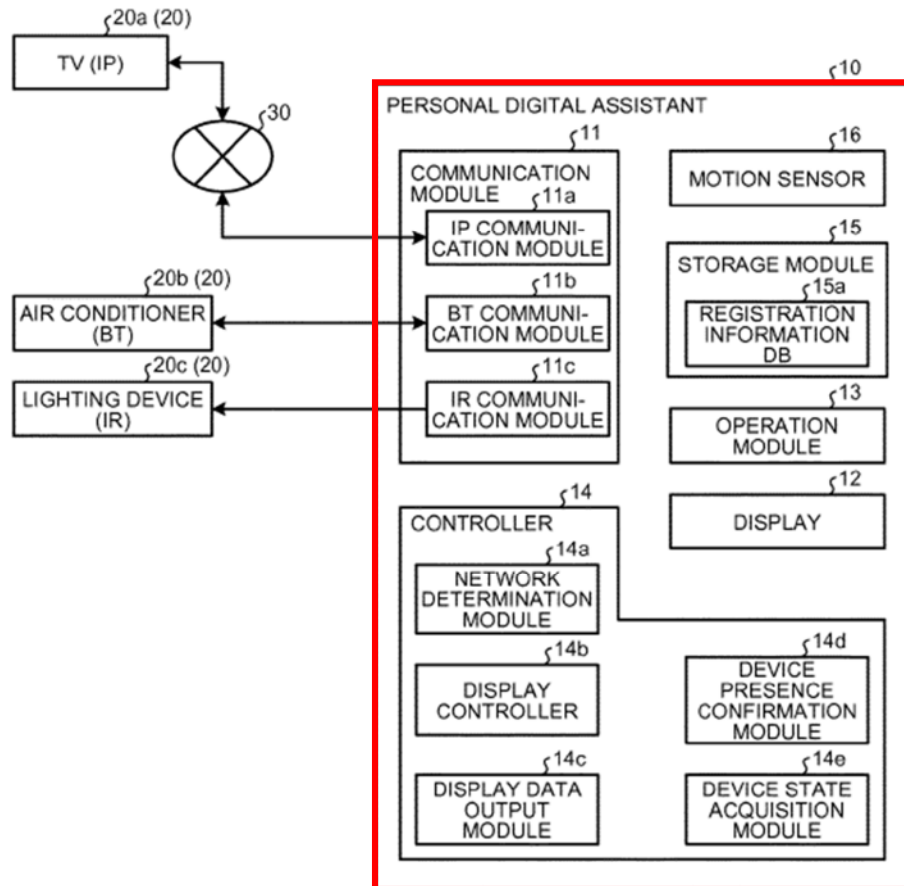
145. In particular, Esaka discloses that the PDA 10 is part of a remote control system 100, in which the PDA 10 may be used to control device 20 such as a TV (20a), air conditioner (20b), or lighting device (20c). EX1004, 2:18-30, Figs. 1-5.

FIG.1



EX1004, Fig 1.

FIG.2

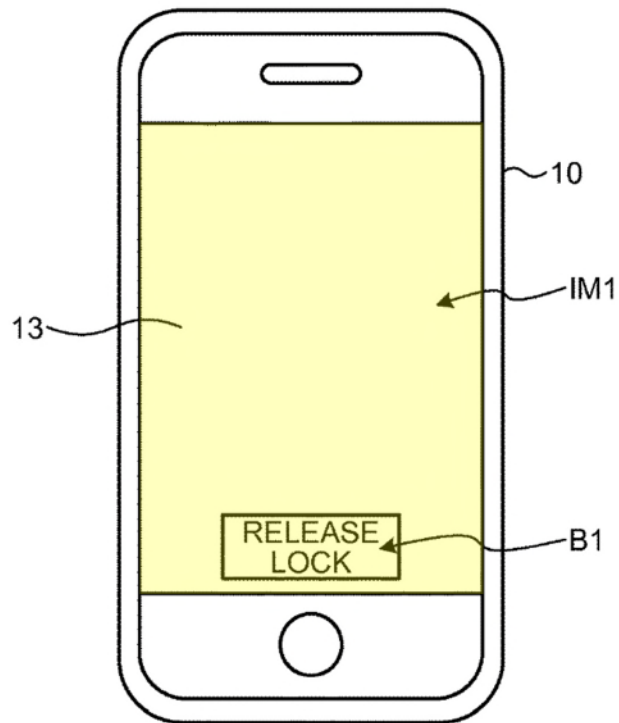


EX1004, Fig 2.

2. [1a] a display;

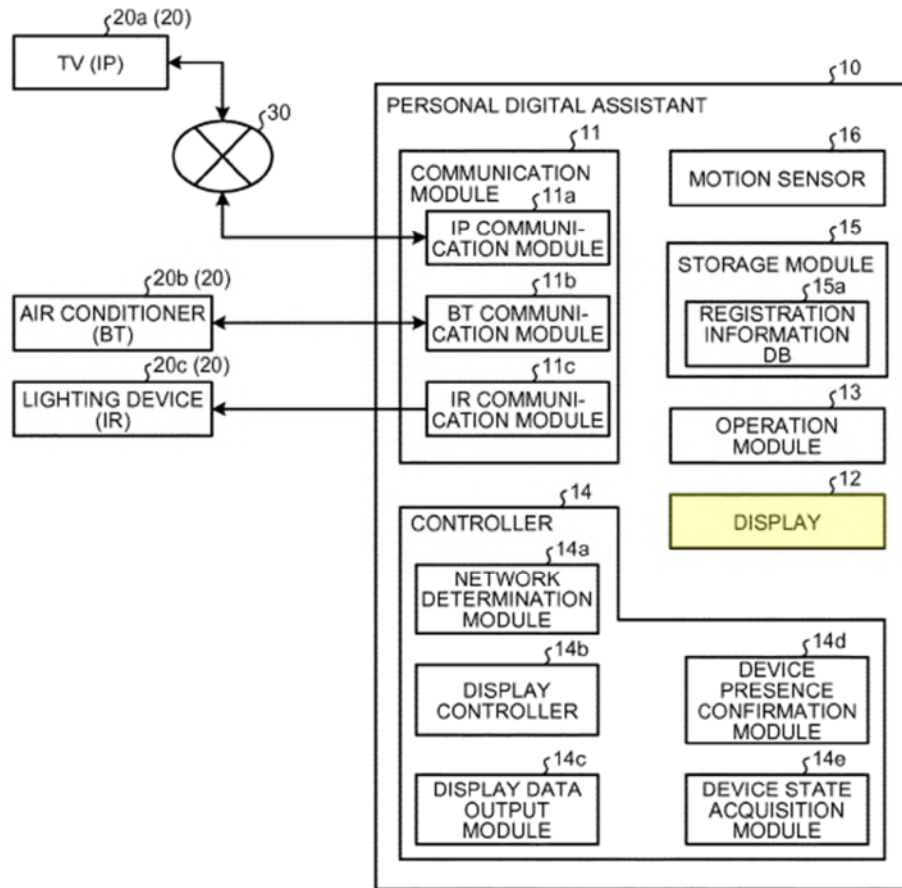
146. Esaka discloses “[t]he display 12 [highlighted yellow in Figs. 4 and 2, below] of the [PDA] 10 comprises a liquid crystal panel that can display an image.” EX1004, 3:19-26.

FIG.4



EX1004, Fig 4.

FIG.2

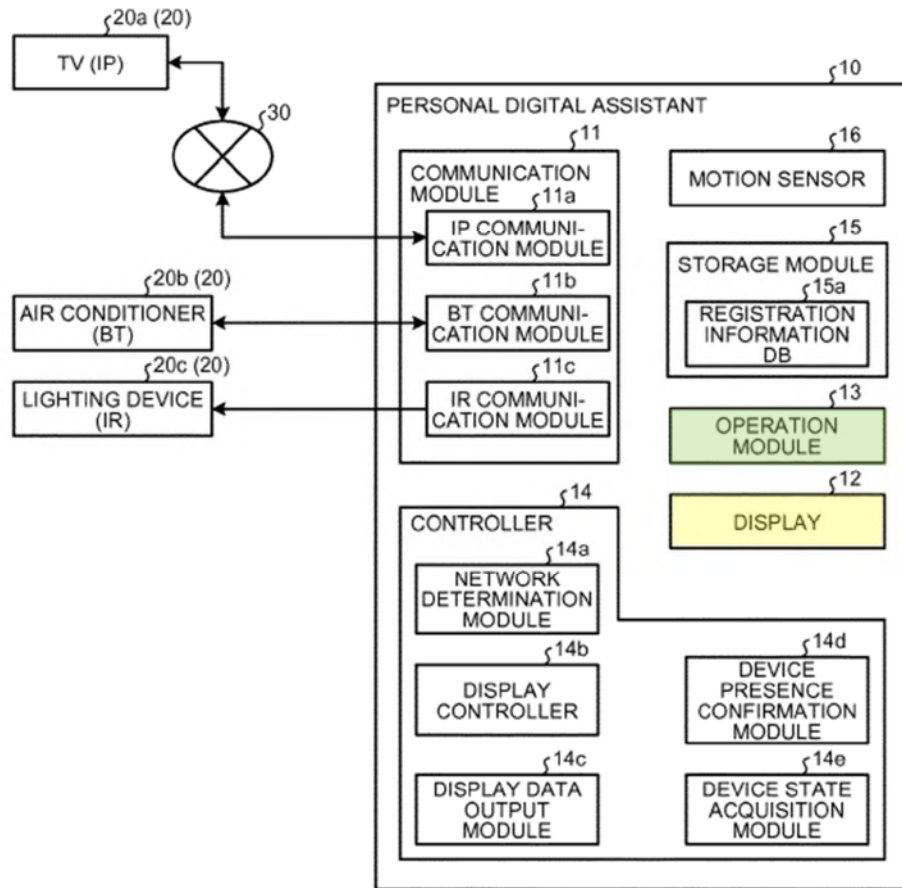


EX1004, Fig 2.

3. [1b] an operation input interface configured to receive an input corresponding to a user operation;

147. Esaka discloses “[t]he operation module 13 [highlighted green, below] of the [PDA] 10 comprises a touch panel using the display 12 [highlighted yellow, below].” EX1004, 3:19-26, Fig. 2.

FIG.2



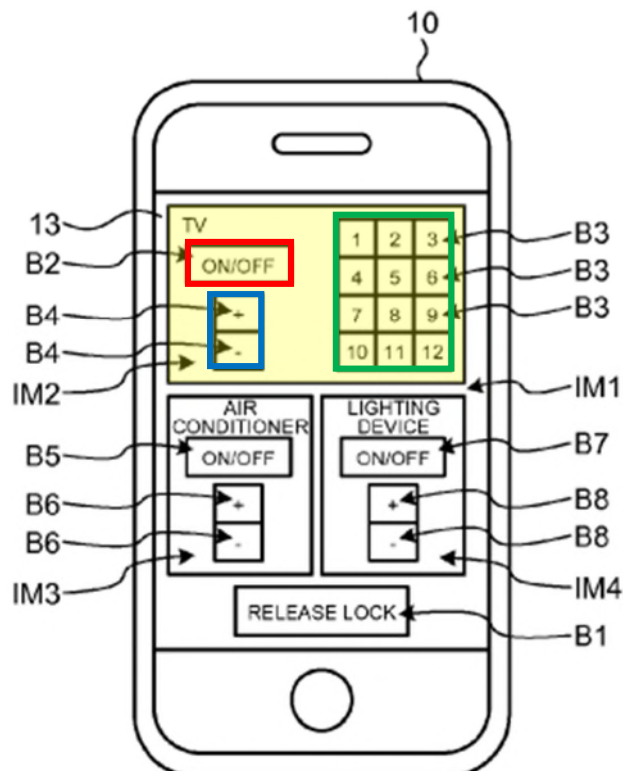
EX1004, Fig 2.

148. Esaka further discloses that “[e]ach of the operational screens IM2 to IM4 (refer to FIG. 5) is a screen on which various buttons for operating the operation target device 20 are displayed, and the user can perform various operations on the operation target device 20 by performing an operation of pushing down the various buttons displayed on the operation module 13.” EX1004, 4:55-61.

149. Esaka also discloses, in connection with Figure 5 (below), “the operational screen IM2 [highlighted yellow, below] for operating the TV 20a displays a power supply button ... B2 [red box below] for switching on/off the power supply of the TV 20a, a plurality of channel selection buttons ... B3 [green box below] for selecting channels of the TV 20a, and a sound volume adjustment button ... B4 [blue box below] for adjusting the sound volume of the TV 20a.”

EX1004, 4:61-5:3, Fig. 5.

FIG.5



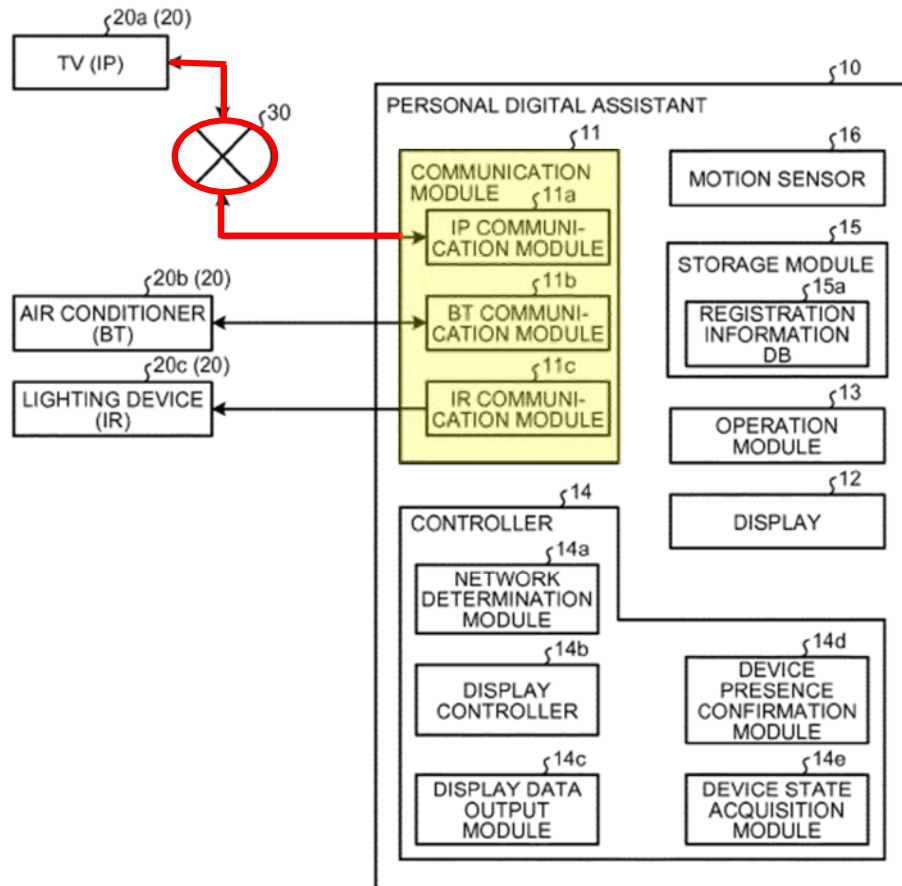
EX1004, Fig. 5.

4. [1c] a wireless communication interface configured to perform communication over a wireless local area network; and

150. With reference to Fig. 2, below, Esaka discloses “the communication module 11 [highlighted yellow] of the [PDA] 10 comprises an IP communication module 11a ... [that] is communicatably [sic] connected [red link] to the TV 20a via the home network 30” (EX1004, 2:39-44) where “[t]he TV 20a is communicably connected to a home network 30 comprising a router installed at home.” EX1004, 2:32-34.

151. Esaka further discloses “[t]he IP communication module 11a is configured to be capable of transmitting a predetermined operation signal (remote control signal) to the TV 20a by performing IP communication [red link].” EX1004, 2:44-47.

FIG.2



EX1004, Fig 2.

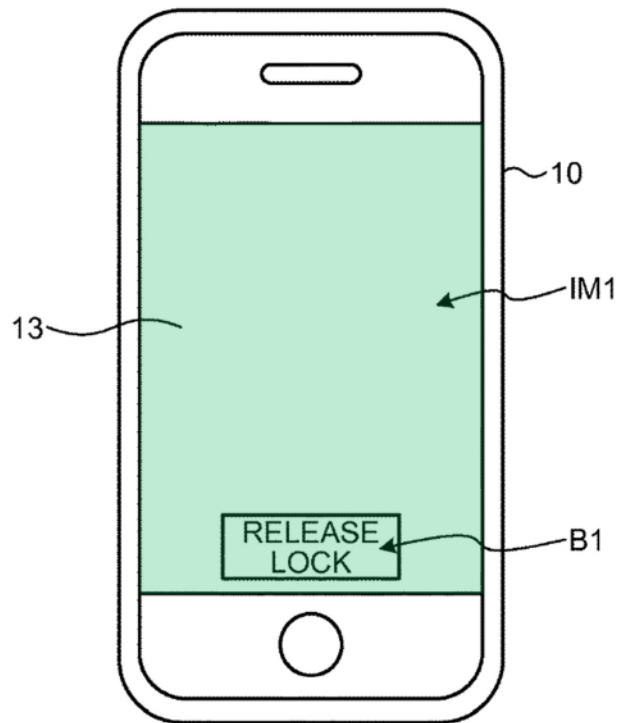
152. To the extent Esaka does not expressly disclose a “wireless local area network,” based on these disclosures it would have been obvious to a POSITA. For example, Esaka’s disclosure of a router and IP (internet protocol) communications for controlling the TV, as well as other disclosed well-known wireless communication links, *e.g.*, infrared (EX1004, Fig. 2, IR 11c) and Bluetooth (EX1004, Fig. 2, BT 11b), strongly suggests to a POSITA that the home network

30 is a wireless local area network. At the very least it would have been obvious to a POSITA that home network 30 is a wireless local area network.

5. [1d] a processor programmed to control state transitions of the portable terminal apparatus to and from a sleep state and further performing a plurality of display modes, the plurality of display modes including:

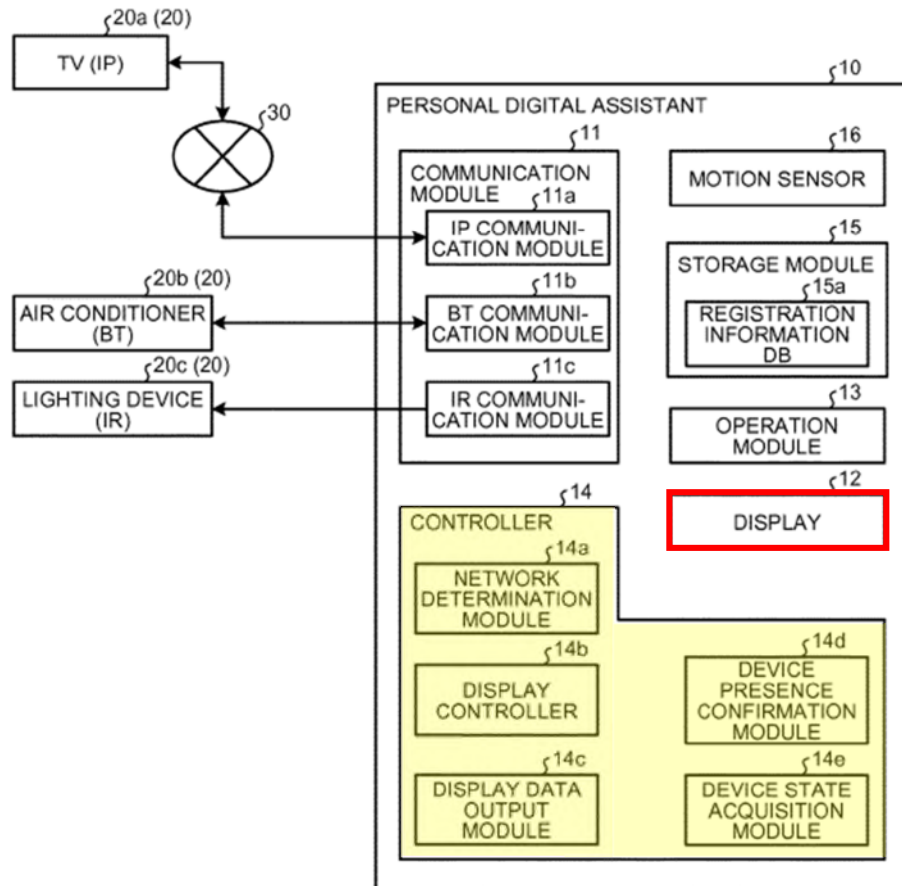
153. Esaka discloses a processor programmed to control state transitions of the portable terminal apparatus to and from a sleep state where it discloses “the display controller 14b of the controller 14 [highlighted yellow in Fig. 2, below] performs control of activating the display 12 [red box in Fig. 2, below] from the OFF state to the ON state to display the locked screen IM1 (highlighted green in Fig. 4, below) on the display 12.” EX1004, 4:30-40, Figs. 2, 4.

FIG.4



EX1004, Fig 4.

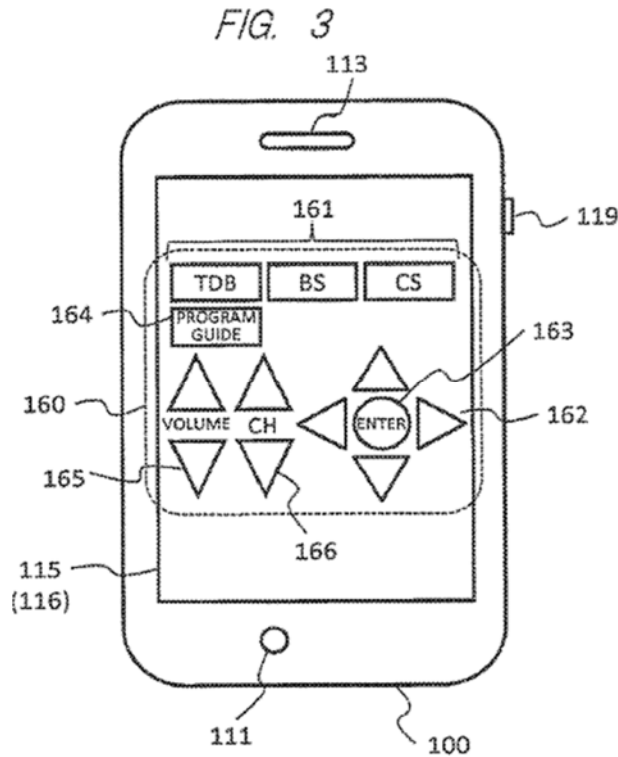
FIG.2



EX1004, Fig 2.

154. Esaka further discloses that “[a]n OFF state represents a state in which the display 12 displays no image (standby state; refer to FIG. 3). The display 12 is configured to be in the OFF state when the user leaves the personal digital assistant 10 unattended without any operation performed for a predetermined time or more.”

EX1004, 3:26-31, Fig. 3.



EX1004, Fig. 3.

155. To the extent PO argues that Esaka does not expressly disclose that the display controller 14b controls the state transition from the ON state to the OFF state when PDA 10 is unattended for a predetermined time, it would have been obvious to a POSITA that display controller 14b performs this function. For example, a POSITA would have understood that because the display 12 is “configured” to be in the OFF state when the user leaves the PDA 10 unattended without any operation performed for a predetermined time or more, display 12 is configured this way via the display controller 14b, which could be programmed to perform this function.

156. Moreover, as described above, Esaka expressly discloses that the display controller 14b “performs control of activating the display 12 from the OFF state to the ON state.” EX1004, 4:30-40.

157. Additionally, as described above in the State of the Art section (Section V.C.), in my experience, every battery powered mobile device with a display I have ever seen had power saving features where the display could automatically be turned off to enter a sleep state after a period of time. This was standard behavior of such devices and was well-known by a POSITA.

158. Thus, it would have been obvious to a POSITA that the simplest implementation would be for the same display controller 14b to perform control of de-activating the display 12 from the ON state to the OFF state.

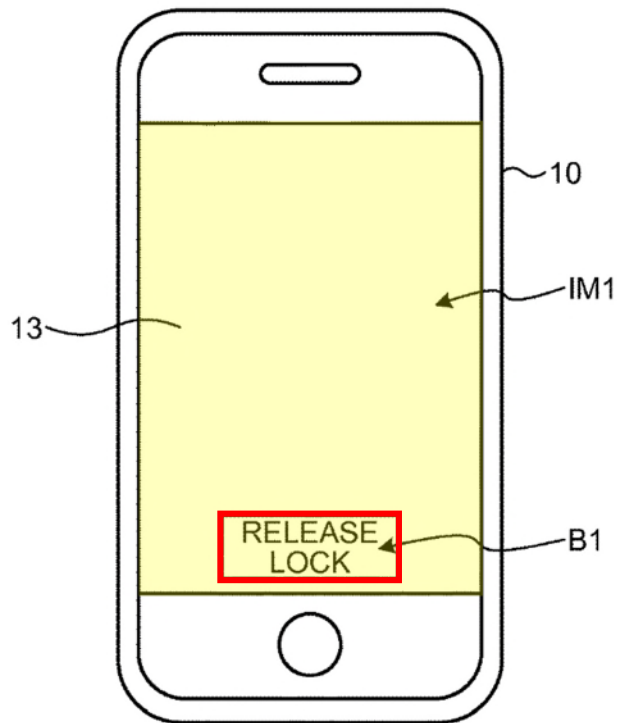
159. Esaka discloses a processor programmed to control state transitions because the “processing flow [is] performed by the controller 14” as shown in Esaka’s Figure 7. EX1004, 7:16-22, Fig. 7.

6. **[1e] a first display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a first condition, wherein the first condition is met when a control screen for remotely and wirelessly controlling an external device via the wireless communication interface is not**

**displayed on the display before the portable terminal
apparatus enters a sleep state;**

160. Esaka discloses a first display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without displaying a control icon. Specifically, Esaka discloses a “locked screen is exemplified as the locked screen IM1 (refer to FIG. 4) [highlighted yellow, below]” and that “the operation restriction on the personal digital assistant 10 can be released by the user pushing down (touching) a lock releasing button B1 [red box, below] displayed on the locked screen IM1,” which describes a first screen for performing authentication to execute an unlock operation. EX1004, 4:44-55, Fig. 4.

FIG.4



EX1004, Fig. 4.

161. To the extent PO argues that Esaka does not expressly disclose performing authentication to execute an unlock operation, authentication requirements for unlocking a screen were well known in the art. For example, Guihot discloses “entering a password, passcode, drawing a particular pattern on the touchscreen.” EX1005, 1:28-32.

162. Further, as shown in Fig. 4 (above), Esaka discloses a first display mode where the first screen to be moved to a screen for performing authentication (locked screen) is displayed on the display without display of a control icon.

EX1004, 4:44-50.

163. Esaka also discloses a first display mode where the first screen is displayed, without display of a control icon, when the portable terminal apparatus wakes up from a sleep state. For example, Esaka discloses “[t]he motion sensor 16 reacts when the user lifts up the [PDA] 10 left unattended for a predetermined time or more at home (the [PDA] 10 of which display 12 is in the OFF state) to operate the operation target device 20 [*i.e.*, wakes up from a sleep state] ... the display controller 14b ... then performs control of activating the display 12 to display the locked screen IM1 (refer to FIG. 4) on the display 12.” EX1004, 6:18-34.

164. Although Esaka also discloses that, upon wake-up, “the operational screens IM2 to IM4” are also displayed “on the locked screen” (EX1004, 6:18-34), Esaka also discloses that the operational screens (control icons) [IM2-IM4] need not be displayed on the lock screen. EX1004, 11:22-25 (“the processing of displaying the operational screen on the locked screen is not necessarily performed”); EX1004, 10:10-25, FIG. 4 (displays only the locked screen IM1 without the operational icons IM2-IM4).

165. Finally, Esaka, together with the knowledge of a POSITA, discloses the above-described first display mode when a first condition is met—*i.e.*, when a control screen for remotely and wirelessly controlling an external device via the wireless communication interface is not displayed on the display before the portable terminal apparatus enters a sleep state.

166. Put simply, the first condition is met, and the operational icons will not be displayed on the lock screen, when the portable terminal apparatus was not being used as a remote control device just prior to entering a sleep state.

167. While Esaka does not expressly disclose whether the PDA 10 was used as a remote control just prior to entering a sleep state, it does disclose its objectives are to follow the “intention of the user” and to “improve[]” the “convenience of the user.” EX1004, 10:5-9, 10:19-25.

168. For example, Esaka discloses “when the user lifts up the personal digital assistant 10 with his/her hand to operate the operation target device 20 ... the operational screen for operating the operation target device 20 is displayed, so that the convenience of the user can be improved because the operational screen is displayed at an appropriate timing following intention of the user.” EX1004, 10:19-25.

169. Moreover, it was known in the art that a mobile device being used as a remote control could display the remote control icon on a lock screen if the remote control application was the last application being used by the user. Section V.C; EX1008, [0083-0084]; EX1009, [0035].

170. In light of Esaka’s objective to follow the user’s apparent intent, and the knowledge of a POSITA based on the state of the art at the time of the alleged invention, a POSITA would understand this disclosure to mean that because the

user was using the PDA 10 as a remote control device just prior to entering a sleep state (*i.e.*, by displaying the operational icons to control an operation target device 20 upon wake-up), it follows the user's intention to use the PDA 10 as a remote control device again when it is next picked up and awakes from sleep state.

171. Esaka discloses that PDA 10 can be, *e.g.*, a smart phone. EX1004, 2:13-14. Thus, a POSITA would understand that the user could use the PDA 10 for many other uses aside from a remote control device. Such other uses can include reading and drafting emails, text messaging, talking on the phone, surfing the web, video chats, to name just a few. *See, e.g.*, EX1005, 17:59-62 (email).

172. If the user was using the PDA 10 only for email, prior to entering a sleep state, it makes no sense for PDA 10 to display operational screens for a remote control device upon wake-up.

173. In that case, following the user's intent, as understood by a POSITA in view of the above-described state of the art, means to display a lock screen without remote control icons, or perhaps with, *e.g.*, email operational controls displayed, because there is no recent history of the user using the PDA 10 as a remote control device. It makes sense that the user wants to continue using PDA 10 in the same manner it was used prior to entering a sleep state (*e.g.*, for email), rather than for an entirely different use, such as a remote control device.

174. Esaka also discloses one of the purposes of its invention is “so that convenience of the user can be improved.” EX1004, 10:5-9. Once again, in light of this disclosure in Esaka, as well as the state of the art at the time of the alleged invention, a POSITA would understand that Esaka’s disclosure of improving the user’s convenience (*i.e.*, displaying the operational icons to control an operation target device 20 upon wake-up) only makes sense if the user was using the PDA 10 as a remote control device just prior to entering a sleep state. This is the simplest and most obvious way to improve the user’s convenience.

175. For example, if the user was using the PDA 10 for email just prior to entering a sleep state, it makes no sense to display operational icons for a remote control upon wake-up. That would not improve the user’s convenience, because there is no indication the user would find it convenient to have remote control operational icons displayed on the lock screen. To the contrary, it would likely hinder and inconvenience the user to display remote control operational icons on wake-up if the user intended to continue to use the PDA 10 as an email device. In this example, the user would first need to remove unwanted remote control operational icon(s) from the screen before they could access the desired email application.

176. This analysis is consistent with the general knowledge of a POSITA as described in the State of the Art section (Section V.C.) that it was well-known to

design user interfaces that were as simple as possible. To avoid “bloat” and to avoid confusing users by presenting interface elements that were irrelevant, a POSITA would be motivated to NOT include remote control elements if the system had determined for any reason that it was unlikely for the user to want to perform remote control actions.

177. Based on these express disclosures of Esaka, as well as the state of the art, a POSITA would understand that if the remote control operational icons are not displayed on the lock screen at wake-up, it is because the control screen was not displayed just prior to entering a sleep state— *i.e.*, the user was not using PDA 10 as a remote control device just prior to entering a sleep state.

178. Thus, Esaka discloses to a POSITA the claimed first display mode when the claimed first condition is met.

179. To the extent PO argues that a POSITA would not reasonably understand or infer from Esaka that the first display mode is disclosed, at the very least it would have been obvious to a POSITA that, based on the state of the art and the express disclosure in Esaka that operational icons are displayed on the locked screen to comply with the user’s intent and to improve the user’s convenience.

180. Based on basic principles of user interface design, and as was well-known in the state of the art, the operational icons would not be displayed on the

locked screen if they were not previously displayed on the screen just prior to entering a sleep state, as required by the first display mode's first condition.

181. In other words, it would have been obvious to a POSITA that if the user was not using the PDA 10 as a remote control device just prior to entering a sleep state, the remote control operational icons would not be displayed on the lock screen upon wake-up as doing so would be contrary to the user's apparent intent and would inconvenience the user.

7. **[1f] a second display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a second condition, wherein the second condition is met when the wireless communication interface is unable to communicate with the external device and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state; and**

182. Esaka and/or Guihot disclose a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display. *See* §IX.B.6. Also as described above, Esaka further discloses the first screen (lock screen) is displayed without display of a control icon when the portable display apparatus wakes up from a sleep state. *See* §VI.B.6.

183. Esaka, together with Guihot and the knowledge of a POSITA in view of the state of the art, further discloses, or renders obvious, the second display mode when a second condition is met—*i.e.*, when the wireless communication

interface is unable to communicate with the external device and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state.

184. Put simply, the second condition is met if the portable terminal apparatus was used as a remote control before sleep, but, despite this, the remote control icons are not displayed on the locked screen upon wake-up because the portable terminal apparatus cannot wirelessly communicate with the external device.

185. Guihot discloses that it was known in the art to use a mobile device (portable terminal apparatus) as a remote control, with the remote control screen displayed on the display, before the mobile device enters a sleep state. Specifically, Guihot discloses “a mobile device can launch a dedicated remote control application that presents a control interface to the user” whereafter “the screen of the mobile device is often turned off after a period of inactivity” and “[i]n order to continue controlling the television ... the user is required to wake up the mobile device ... [which] can also include requiring the user to unlock the mobile device (e.g., by entering password [...]).” EX1005, 1:16-32; *see also* Section V.C.; EX1009 [0028] (“the CPU 201 can initiate an application ... without clearing the lock function” and “the user can omit at least a cumbersome operational procedure of selecting ... and initiating the selected application. Thus, the user can ...

immediately use the information processing terminal as is the case with a normal remote controller.”).

186. Thus, Guihot, together with the knowledge of a POSITA, discloses that the mobile device was used as a remote control, and displaying the remote control screen, before entering a sleep state; *i.e.*, one of the conditions of the second display mode.

187. Esaka also discloses, or renders obvious, the second condition of the second display mode; *i.e.*, if the portable terminal apparatus cannot wirelessly communicate with the external device.

188. For example, claim 1 of Esaka expressly discloses a scenario in which the operational interface is unusable if the electronic apparatus is not connected with the network, and unable to communicate with the external device. EX1004, claim 1 (“the operational interface on the locked screen is not usable under the lock condition, if it is determined that the electronic apparatus is not connected with the first network”).

189. Although claim 1 seems to state that the operational interface is displayed, despite being unusable, Esaka also expressly discloses that “displaying the operational screen on the locked screen is not necessarily performed.” EX1004, 11:22-25.

190. Thus, based on these disclosures in Esaka, at the very least it would have been obvious to a POSITA that if the PDA is unable to communicate with the external device via the network, the remote control operational interface would not be displayed on the lock screen since the user would be unable to use it even if it were displayed.

191. In another example, Esaka's claim 1 discloses that the electronic apparatus "display[s], on a screen of the electronic apparatus, a locked screen." EX1004, claim 1. Then it "determin[es] whether the electronic apparatus is connected with a first network of the first electronic apparatus under the lock condition."

192. Next, Esaka discloses "displaying, upon confirmation that a plurality of electronic apparatuses are present, at least one of a plurality of operational interfaces corresponding to the first electronic apparatus on the locked screen." EX1004, claim 1. Thus, Esaka discloses that before at least one operational interface is displayed, the electronic apparatus first confirms whether it is connected to a network and able to communicate with a plurality of electronic apparatuses. In other words, if the electronic apparatus cannot confirm it is connected to a network and is able to communicate with a plurality of electronic apparatuses, then the at least one operational interface will not be displayed on the display.

193. Lastly, it was already known in the art that if a mobile device was previously used as a remote control (EX1005, 1:16-21), and that if the mobile device cannot communicate with a remote device, the remote control icon is not displayed on the lock screen. Section V.C; EX1009, [0024] (“if the ... terminal 20 fails to detect a registered external device which belongs in the same subnet ... the CPU 20 does not continue the process of initiating the application.”).

194. It also would have been obvious to a POSITA that if a mobile device cannot communicate with a remote device, the remote control icon is not displayed on the lock screen. If the mobile device cannot communicate with the remote device, *e.g.*, the user left the house and is no longer close to the TV, it would be inconvenient to display the remote control icon since the user does not intend to use the mobile device as a remote control.

195. In light of the express disclosures in Esaka, and the state of the art, at the very least, it would have been obvious to a POSITA that if the mobile device cannot communicate with a remote device, the remote icon is not displayed on the lock screen.

8. **[1g] a third display mode during which a control icon and a first screen to be moved to a screen for performing authentication to execute an unlock operation are displayed on the display when the portable terminal apparatus wakes up from a sleep state based on a third condition, wherein the third condition is met when the wireless communication interface is able to communicate with the external device**

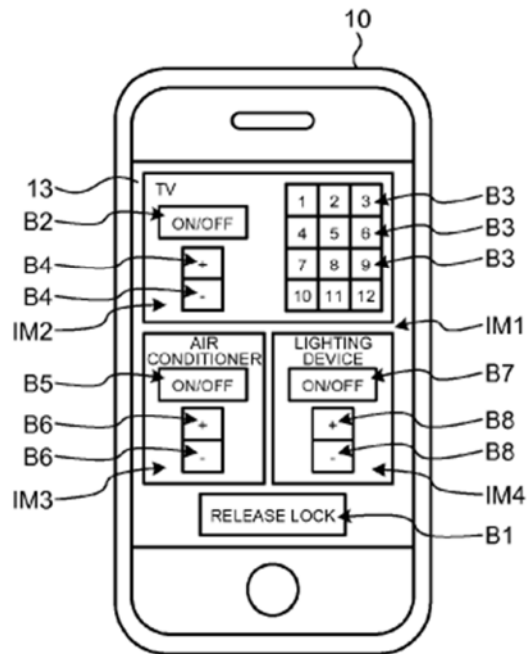
and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state,

196. Referring to Fig. 5, below, Esaka discloses a third display mode during which a control icon and a first screen to be moved to a screen for performing authentication to execute an unlock operation are displayed on the display when the portable terminal apparatus wakes up from a sleeps state.

197. For example, Esaka discloses “[t]he motion sensor 16 reacts when the user lifts up the [PDA] 10 left unattended for a predetermined time or more at home (the [PDA] 10 of which display 12 is in the OFF state) to operate the operation target device 20 [*i.e.*, wakes up from a sleep state] ... the display controller 14b ... then performs control of activating the display 12 to display the locked screen IM1 ... and displays the operational screens on IM2-IM4 (refer to Fig. 5) for operating the operation target device 20 on the locked screen IM1.

EX1004, 6:18-34.

FIG.5



EX1004, Fig. 5.

198. In addition, Guihot discloses a third display mode during which a control icon and a first screen to be moved to a screen for performing authentication to execute an unlock operation are both displayed on the display when the portable terminal apparatus wakes up from a sleep state.

199. Specifically, Guihot discloses that it was known that “a mobile device can launch a dedicated remote control application that presents a control interface to the user,” that “the screen of the mobile device is often turned off after a certain period of inactivity,” and that when the user “wake[s] up the mobile device,” it would “detract from the user’s experience” to “unlock the mobile device.”

EX1005, 1:16-32; see §IX.B.7. To remedy this, Guihot discloses “controlling a remote device using a touch screen of a mobile device in a display inhibited state.” EX1005, 1:35-37. In other words, the mobile device displays the remote control interface on the lock screen when the mobile device wakes up from a sleep state.

200. Figure 2B of Guihot, below, shows “the remote control application [yellow highlighted] is running on mobile device 202 in which a lock screen [red circle] is presented to a user.” EX1005, 12:8-41, Fig. 2B.

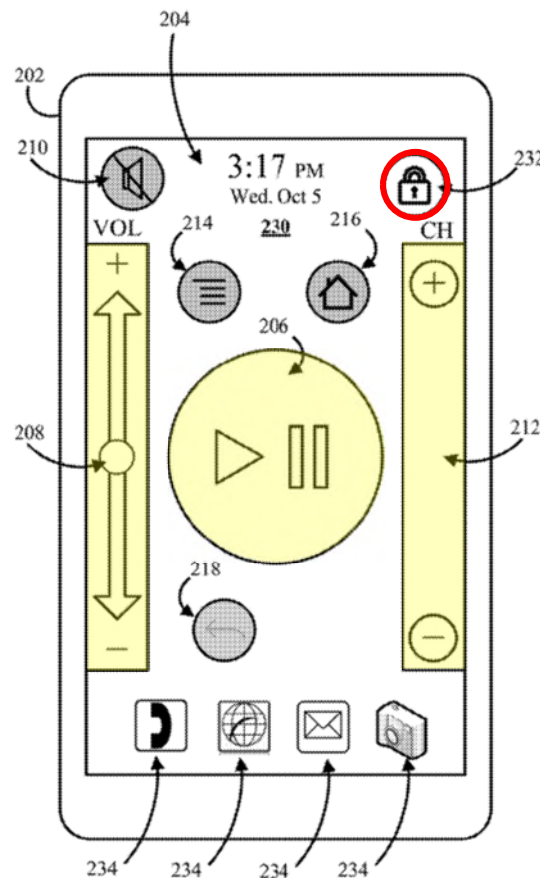


FIG. 2B

EX1005, Fig. 2B.

201. Esaka, together with Guihot, discloses the claimed third condition—*i.e.*, “when the wireless communication interface is able to communicate with the external device and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state.” EX1001, claim 1.

202. First, Esaka discloses that the mobile device is able to wirelessly communicate with the external device. EX1004, claim 1. As described above (Section IX.B.7.), Esaka discloses that the mobile device “determine[es] whether [it] is connected with a first network ... under the lock condition.” EX1004, claim 1.

203. Then, Esaka discloses “displaying, upon confirmation that a plurality of electronic apparatuses are present, at least one of a plurality of operational interfaces corresponding to the first electronic apparatus on the locked screen.” EX1004, claim 1. In other words, Esaka discloses displaying the operational interface (control icons) on the locked screen when the mobile device (portable terminal apparatus) determines it is able to communicate with at least a first electronic apparatus (external device).

204. Second, as described above, Guihot discloses that the control screen is displayed on the display before the portable terminal apparatus enters a sleep state. *See* EX1005, 1:16-37; Section IX.B.7.

9. [1h] wherein the control screen is used to execute control operations on the external device based on the input received by the operation input interface, and

205. As described above (see §IX.B.3.), Esaka discloses an operation input interface configured to receive an input corresponding to a user operation. Esaka also discloses that “[e]ach of the operational screens IM2 to IM4 (refer to FIG. 5) is a screen on which various buttons for operating the operation target device 20 are displayed, and the user can perform various operations on the operation target device 20 by performing an operation of pushing down the various buttons displayed on the operation module 13.” EX1004, 4:55-61.

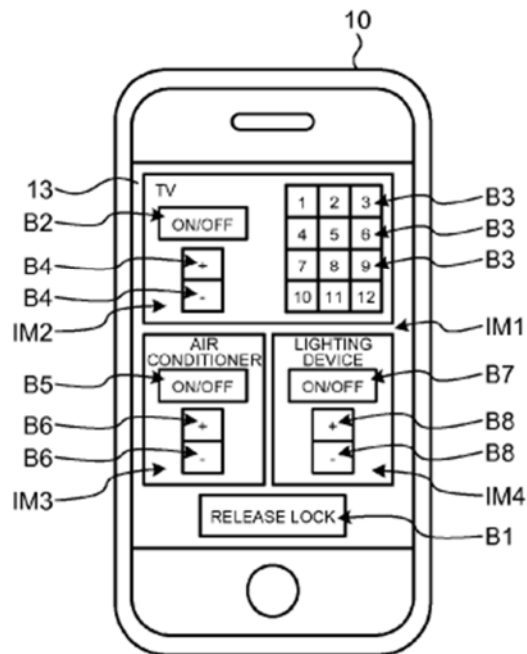
206. Similarly, Guihot discloses that the control screen is used to execute control operations on the external device based on the input received by the operation input interface. Specifically, Guihot discloses that the control screen “can be configured to control any suitable functions of the remote device to be controlled.” EX1005, 7:20-45. For example, the control screen shown at step 106 in Guihot’s Figure 1 can “play, pause, control volume, rewind, [or] fast forward” content on the external device. EX1005, 7:20-45.

10. [1i] wherein, when the control icon is selected in the third display mode without the unlock operation, the wireless communication interface transmits a remote control signal

corresponding to the selected control icon to the external device.

207. For example, referring to Fig. 5, below, in which the control icon is displayed on the lock screen (*i.e.*, third display mode), Esaka discloses “a user can operate the operation target devices 20 (the TV 20a, the air conditioner 20b, and the lighting device 20c) by operating the operation module 13 of the personal digital assistant 10 ... to transmit an operation signal corresponding to the user’s operation.” EX1004, 2:55-61.

FIG.5



EX1004, Fig. 5.

C. Claim 2

- 1. [2pre] The portable terminal apparatus according to claim 1,**

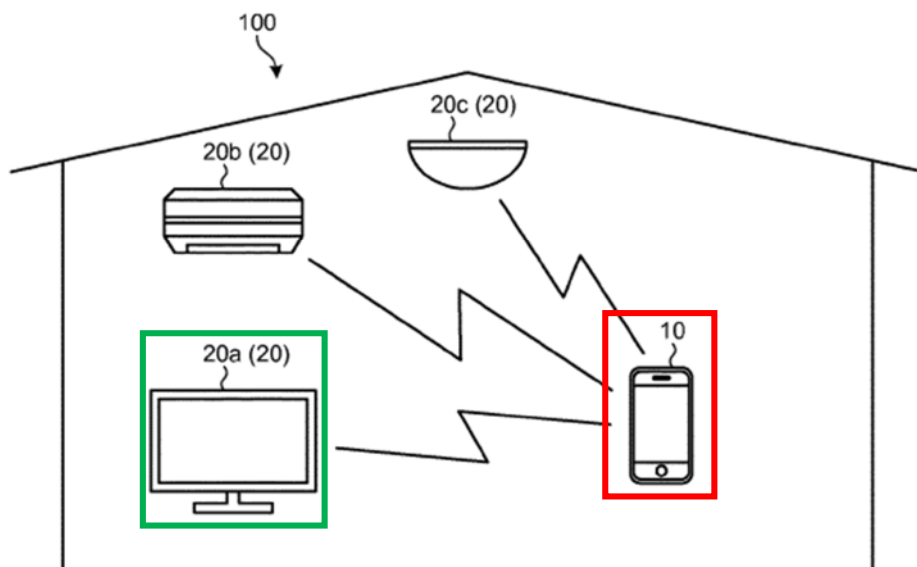
208. *See* Section IX.B.

- 2. [2a] wherein the portable terminal apparatus is a smartphone and the external device is used for display of a video content.**

209. For example, Esaka discloses “a personal digital assistant (for example, a smart phone [...]) 10” (red boxes, below in Figs. 1 and 2). EX1004, 2:12-17; Figs. 1, 2.

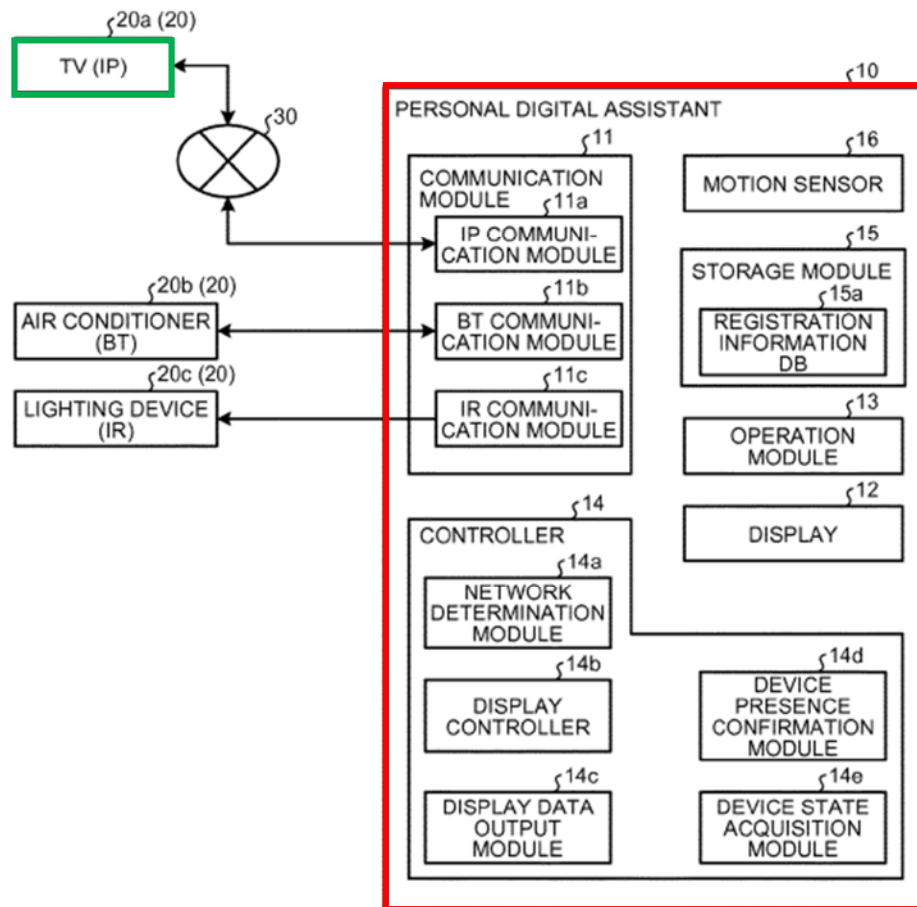
210. Esaka further discloses that the external device is used for display of a video content, because it discloses a TV 20a (green boxes, below in Figs. 1 and 2). EX1004, 2:18-30, 6:53-59 (“when the TV 20a is in a state of displaying and reproducing video [...], an operational screen comprising a pause button, a fast forward button, and a rewinding button for the video is displayed as the operational screen for operating the TV 20a.”), Figs. 1 and 2.

FIG.1



EX1004, Fig. 1.

FIG.2



EX1004, Fig. 2.

D. Claim 3

1. [3pre] The portable terminal apparatus according to claim 1,

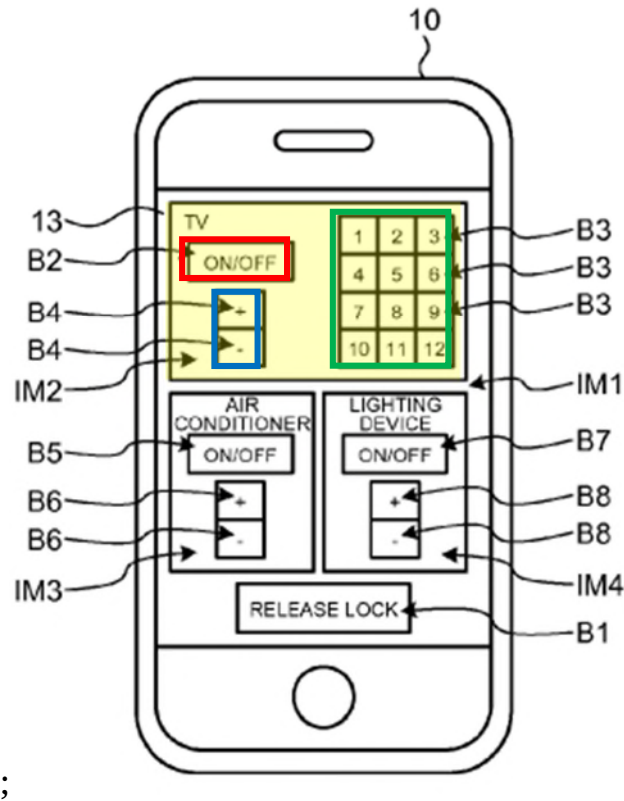
211. See Section IX.B.

2. [3a] wherein the control screen includes a plurality of selectable control icons that enable a user to execute control operations on content being displayed under the control of

**the external device, the control operations including an
operation for selection of content to be displayed.**

212. For example, Esaka discloses a plurality of selectable control icons or buttons on operational screen IM2 (highlighted yellow, below), including “a power supply button (a button on which the characters ‘ON/OFF’ are displayed) B2 for switching on/off the power supply of the TV 20a [controlling content being displayed on TV 20a, red box, below], a plurality of channel selection buttons (buttons on which the numerals ‘1’, ‘2’, . . . , ‘12’ are displayed) B3 for selecting channels of the TV 20a [selection of content to be displayed on TV 20a, green box, below], and a sound volume adjustment button (a button on which the characters ‘+’ and ‘—’ are displayed) B4 for adjusting the sound volume of the TV 20a [controlling content being displayed on TV 20a, blue box, below].” EX1004, 4:61-5:3, Fig. 5.

FIG.5



EX1004, Fig. 5.

213. Additionally, Guihot discloses a plurality of selectable control icons in remote control interface 200 which “can include play/pause button 206, a volume control 208, a mute button 210, a channel control 212 [*e.g.*, for selection of content to be displayed], a guide button 214, a home button 216, and a back button 218” (highlighted yellow, below). EX1005, 8:1-7. “Remote control interface 230 shown in the example of FIG. 2B can include various user interface elements for controlling operation of a remote device, which can include user interface elements

206-218, described above in connection with FIG. 2A.” EX1005, 8:1-12, 12:14-18,

Fig. 2B. A POSITA would have found it obvious to use buttons with icons as disclosed in Guihot as such icon-based buttons were well-known. Furthermore, a POSITA would have looked to disclosures such as those in Guihot to improve the usability of the user interface consistent with the previously described motivations of both Esaka and Guihot to do so.

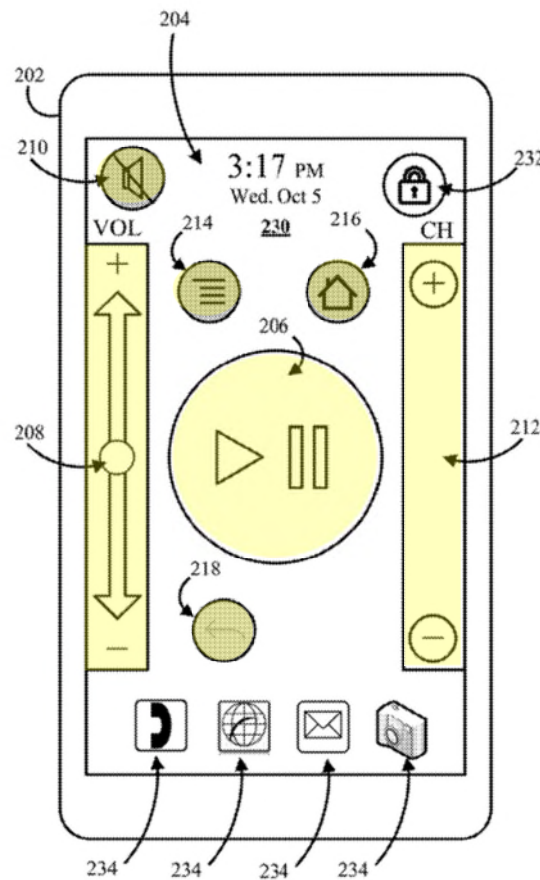


FIG. 2B

EX1005, FIG. 2B.

E. Claim 7

- 1. [7pre] The portable terminal apparatus according to claim 1,**

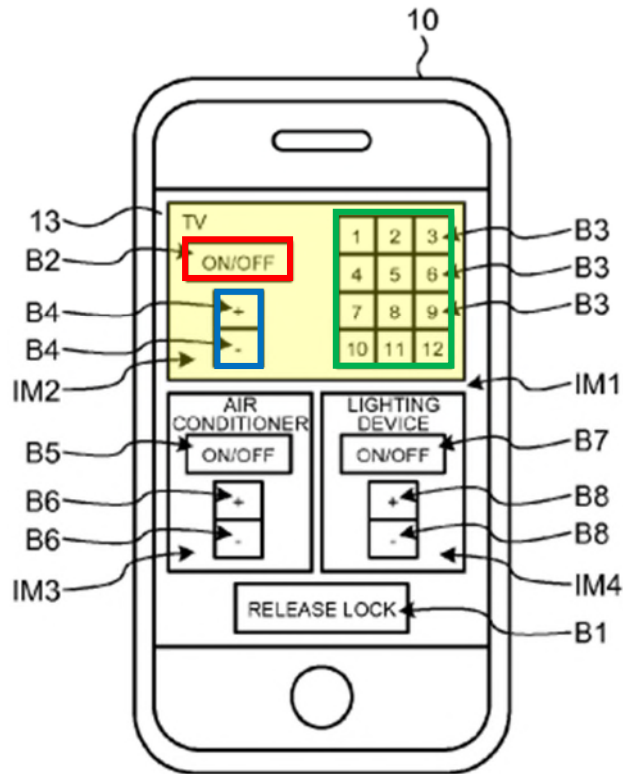
214. *See* Section IX.B.

- 2. [7a] wherein in the third display mode the control icon and the first screen are displayed simultaneously on the display and are arranged such that at least a portion of the control icon is displayed in a top half of the display screen.**

215. Esaka discloses control icons included in operational screens IM2-IM4 (control icons B2 through B8) are displayed simultaneously with the first screen—i.e., the “release lock” icon B1. EX1004, Fig. 5.

216. Esaka also discloses that at least a portion of the operational screens, e.g., IM2 (including control icons B2 through B4), are displayed in a top half of the display screen. EX1004, Fig. 5.

FIG.5



EX1004, Fig. 5.

F. Claim 12

1. [12pre] The portable terminal apparatus according to claim 1,

217. See Section IX.B.

2. [12a] wherein the portable terminal apparatus has a function not to display the control icon even in the third display mode.

218. As described above, Esaka together with Guihot disclose the third display mode in which both the control icon and the first screen (locked screen) are displayed on the display. *See* §VI.B.8.

219. Esaka further discloses that although conditions may exist that necessitate displaying both the operational screen (control icon) and the locked screen (first screen) on the display (*i.e.*, the third display mode), the operational screen nonetheless may not be displayed on the display with the locked screen.

220. Specifically, Esaka discloses “[i]n the embodiment, when it is determined that the personal digital assistant is connected to the network registered in advance (home network corresponding to the TV) and the display of the personal digital assistant is activated, the processing of displaying the operational screen on the locked screen [*i.e.*, the third display mode] is necessarily performed.

221. However, in the present technology, the processing of displaying the operational screen on the locked screen is not necessarily performed in the case described above.” EX1004, 11:17-25.

G. Claim 13

1. [13pre] The portable terminal apparatus according to claim 1,

222. *See* Section IX.B.

2. [13a] wherein the portable terminal apparatus is configured to allow a user to select whether to display the control icon even in the third display mode.

223. As described above (§XI.F.2), Esaka discloses wherein the portable terminal apparatus has a function not to display the control icon even in the third display mode.

224. Guihot further discloses that the portable terminal apparatus allows the user to select whether to display the control icon even in the third display mode. For example, Guihot discloses “[i]n some implementations, remote control interface 230 [highlighted below] can include a lock icon 232 [red circle, below] which can indicate to a user that mobile device 202 is at a lock screen [third display mode]. Additionally, selection of lock icon 232 can [...] cause the mobile device to inhibit presentation of remote control interface 230 (or present remote control interface 230 if presentation has previously been inhibited) [...].” EX1005, 12:14-29.

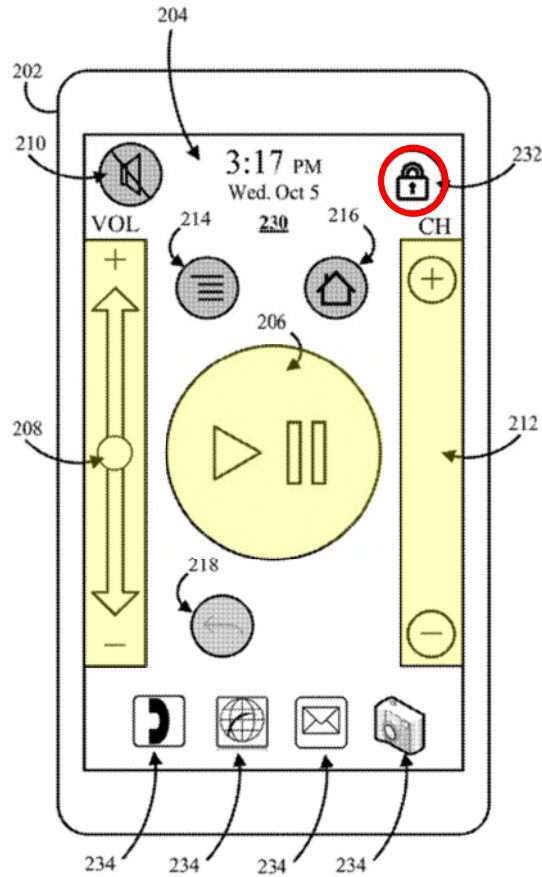


FIG. 2B

EX1005, Fig. 2B.

H. Claim 14

1. [14pre] A method executed by a portable terminal apparatus, the method comprising:

225. See Section IX.B.1.

2. [14a] receiving, by an operation input interface, an input corresponding to a user operation;

226. See Section IX.B.3.

3. **[14b] performing wireless communication over a wireless local area network;**

227. *See* Section IX.B.4.

4. **[14c] controlling state transitions of the portable terminal apparatus to or from a sleep state;**

228. *See* Section IX.B.5.

5. **[14d] performing a plurality of display modes, the plurality of display modes including:**

229. *See* Section IX.B.5.

6. **[14e] a first display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on a display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a first condition, wherein the first condition is met when a control screen for remotely and wirelessly controlling an external device via performing the wireless communication is not displayed on the display before the portable terminal apparatus enters a sleep state;**

230. *See* Section IX.B.6.

7. **[14f] a second display mode during which a first screen to be moved to a screen for performing authentication to execute an unlock operation is displayed on the display without display of a control icon when the portable terminal apparatus wakes up from a sleep state based on a second condition, wherein the second condition is met when the portable terminal apparatus is unable to communicate with the external device via performing the wireless communication and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state; and**

231. *See* Section IX.B.7.

8. **[14g] a third display mode during which a control icon and a first screen to be moved to a screen for performing authentication to execute an unlock operation are displayed on the display when the portable terminal apparatus wakes up from a sleep state based on a third condition, wherein the third condition is met when the portable terminal apparatus is able to communicate with the external device via performing the wireless communication and the control screen is displayed on the display before the portable terminal apparatus enters a sleep state, wherein the control screen is used to execute control operations on the external device based on the input received by the operation input interface; and**

232. *See* Sections IX.B.8, IX.B.9.

9. **[14h] transmitting via wireless communication a remote control signal corresponding to the selected control icon to the external device when the control icon is selected in the third display mode without unlock operation.**

233. *See* Section IX.B.10.

I. Claim 15

1. **[15pre] The method according to claim 14,**

234. *See* Section IX.H.

2. **[15a] wherein the control screen includes a plurality of selectable control icons that enable a user to execute control operations on content being displayed under control of the external device, the control operations including an operation for selection of content to be displayed.**

235. *See* Section IX.D.2.

J. Claim 19

1. **[19pre] The method according to claim 14,**

236. *See* Section IX.H.

2. **[19a] wherein in the third display mode the control icon and the first screen are displayed simultaneously on the display and are arranged such that at least a portion of the control icon is displayed in a top half of the display screen.**

237. *See* Section IX.E.2.

K. Claim 24

1. **[24pre] The method according to claim 14,**

238. *See* Section IX.H.

2. **[24a] wherein the portable terminal apparatus has a function not to display the control icon even in the third display mode.**

239. *See* Section IX.F.2.

L. Claim 25

1. **[25pre] The method according to claim 14,**

240. *See* Section IX.H.

2. **[25a] wherein the portable terminal apparatus is configured to allow a user to select whether to display the control icon even in the third display mode.**

241. *See* Section IX.G.2.

X. GROUND 2: CLAIMS 4-6 AND 16-18 ARE OBVIOUS IN VIEW OF ESAKA, GUIHOT, BANDYOPADHYAY, AND THE KNOWLEDGE OF A POSITA

A. Motivation to Combine

242. As described above (Section IX.A.), a POSITA would have been motivated to combine Esaka and Guihot.

243. At the time of the '646 Patent, a POSITA also would have been motivated to combine Esaka and Guihot with Bandyopadhyay. Each of those references describe a mobile device such as a conventional smartphone comprising conventional hardware and a conventional user interface. EX1004, 2:32-47, 3:19-26, Fig. 2; EX1005, 10:6-30; EX1006, 1:23-25, 1:55-64, 8:21-25, 8:31-37, 8:44-47, 8:54-62, 9:1-7, 10:5-35, 12:15-25, Figs. 2A, 2B, 5A.

244. All three references are also directed toward providing a user with easier and more convenient access to certain applications while the device is in locked state. EX1004, Abstract; EX1005, 3:51-56; EX1006, Abstract.

245. Moreover, although Esaka and Guihot disclose smartphones, they lack detail on conventional sensors, buttons, and user interface unlock mechanisms that were well known at the time of the purported invention. A POSITA would have looked to other references in the same field for such additional conventional features to be added to the smartphones disclosed in either Esaka or Guihot. Moreover in light of the similarities between all three references, a POSITA would have known of all three.

246. Bandyopadhyay discloses these conventional sensors, buttons, and user interface unlock mechanism that were well known at the time for use on smartphones. EX1006, 1:23-25, 1:55-64, 8:21-25, 8:31-37, 8:44-47, 8:54-62, 9:1-7, 10:5-35, 12:15-25, Figs. 2A, 2B, 5A.

247. A POSITA would know that while touch screen based virtual buttons could work well, there were distinct advantages of using physical buttons on mobile devices. Their tactile or “haptic” feedback enables users to operate the devices “eyes-free”, by touch alone. This enables users to, for example, change the volume with physical buttons without taking their eyes away from another task. This is particularly helpful for visually impaired users. Physical buttons also tend to work more reliably and accurately when wearing gloves or in specialized situations – such as when the screen is wet and may not detect finger interaction well. For at least these reasons, in my experience, users often prefer physical buttons.

248. In light of these known benefits, a POSITA would have been motivated to add Bandyopadhyay’s conventional sensors, buttons, and user interface unlock mechanism to the smartphones disclosed in Esaka and Guihot. Moreover, a POSITA would have been capable of combining the disclosure of Bandyopadhyay with that of Esaka and/or Guihot to do so.

249. A POSITA would have recognized the benefit of using Bandyopadhyay’s conventional sensors, buttons, and user interface unlock mechanism in Esaka and Guihot because Bandyopadhyay teaches these conventional components as part of a typical smartphone known at the time of the

purported invention. EX1006, 1:23-25, 1:55-64, 8:21-25, 8:31-37, 8:44-47, 8:54-62, 9:1-7, 10:5-35, 12:15-25, Figs. 2A, 2B, 5A.

250. A POSITA would have understood, for example, that the design of Bandyopadhyay's conventional sensors, buttons, and user interface would improve user convenience because it describes a typical smartphone already known to users.

251. The benefit of utilizing a known smartphone, familiar to users in function and user interface, would have motivated a POSITA to make this combination.

252. Combining the disclosure of Bandyopadhyay with that of Esaka and Guihot would simply involve adding known components (Bandyopadhyay's sensors, buttons, and user interface) to known devices of the same type (Esaka or Guihot's smartphone) but that did not disclose all such additional components to yield predictable results (a smartphone with physical buttons, motion and location sensors, etc.) so that it can sense when it has been picked up or whether it is physically close to an external device like a TV.

253. A POSITA would have had a reasonable expectation that the modification would be successful because, for example, the teachings of Esaka and Guihot disclose that the smartphone enters a sleep or low power state, and that it can sense when it has been picked up, but do not disclose precisely which sensors

it utilizes. Esaka, Guihot, and Bandyopadhyay would be predictably combined due to the predictability of the smartphone art and the known utilization of conventional sensors, buttons, and user interface design.

254. If Patent Owner argues the portions of Esaka, Guihot, and Bandyopadhyay cited below relate to different, incompatible embodiments (which they do not), it would have been obvious to a POSITA to combine such embodiments into a single device at least because such embodiments are described in the same prior art reference, are fully compatible with each other, and could be combined with minimal effort to achieve predictable results.

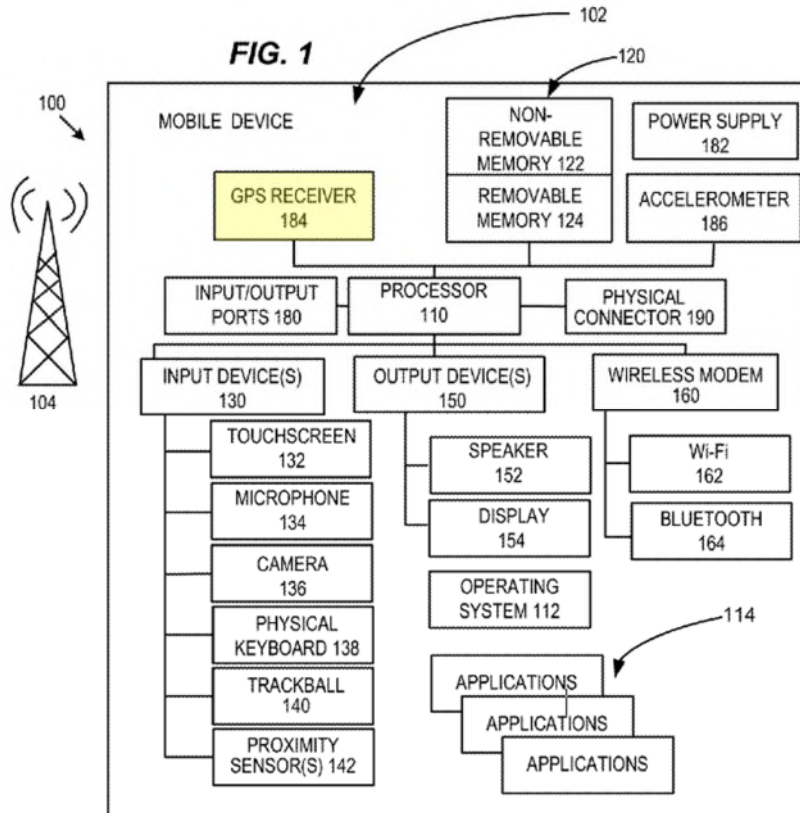
B. Claim 4

1. [4pre] The portable terminal apparatus according to claim 1, further comprising:

255. *See* Section IX.B.

2. [4a] a GPS receiver;

256. For example, Bandyopadhyay discloses “[t]he mobile device can further include [...] a satellite navigation system receiver 184, such as a Global Positioning System (GPS) receiver,” (highlighted yellow, below). EX1006, 8:44-47, Fig. 1.

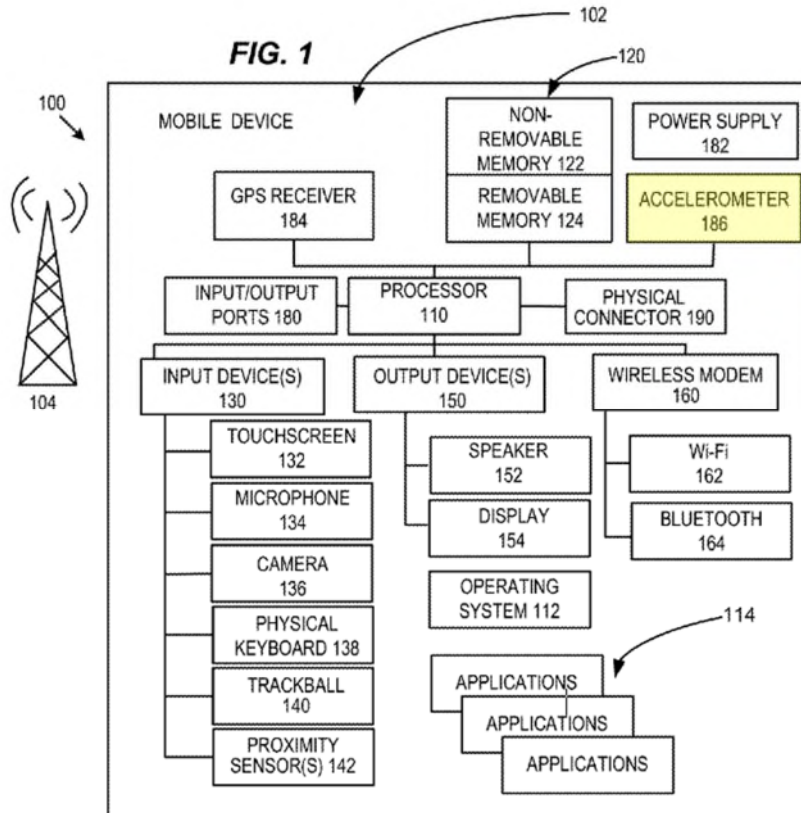


EX1006, Fig. 1.

3. [4b] a sensor determining a movement state of the portable terminal apparatus;

257. For example, Bandyopadhyay discloses “[t]he mobile device can further include [...] an accelerometer 186,” (highlighted below). EX1006, 8:44-47, 12:42-47 (“the mobile device can receive input data from an input source such as [...] one or more accelerometers”), Fig. 1.

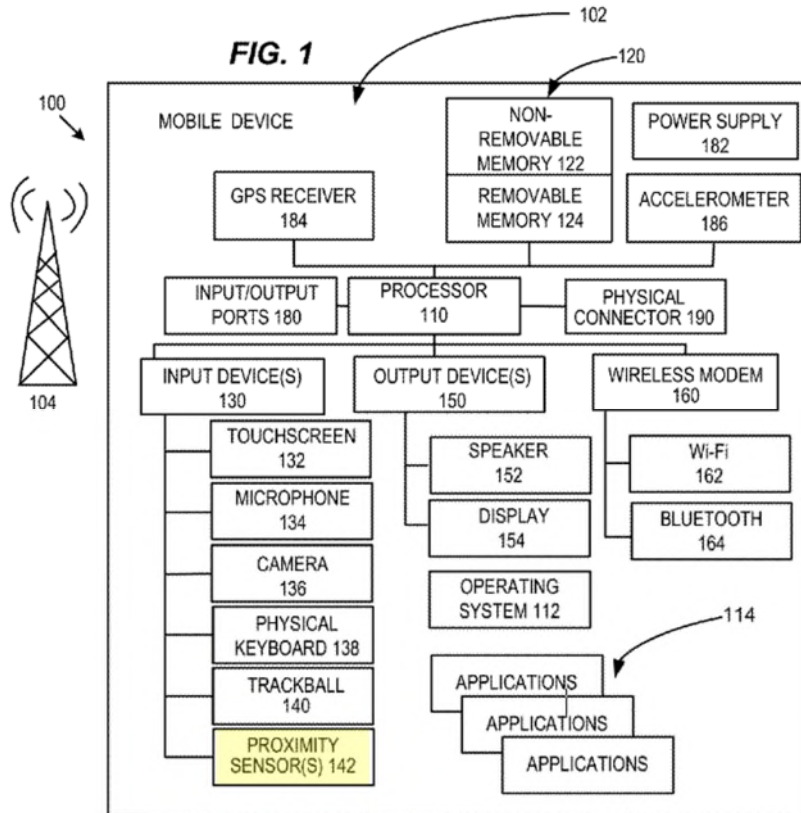
258. A POSITA would understand an accelerometer to be a sensor that can determine the movement state of the device it is in.



EX1006, Fig. 1.

4. [4c] an infrared sensor;

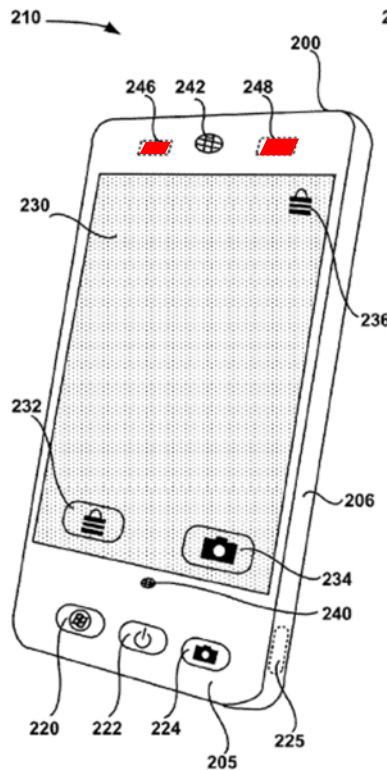
259. For example, Bandyopadhyay discloses that “[t]he mobile device 100 can support one or more input devices 130, such as a [...] proximity sensor 142 [highlighted yellow, below].” EX1006, 8:21-24, Fig. 1.



EX1006, Fig. 1.

260. Bandyopadhyay further discloses that “[i]n some examples, the proximity sensors 246 and 248 emit an infrared beam and receive a reflected infrared beam, which is reflected off the surface of a nearby object that has been illuminated by the emitted infrared beam,” (red boxes, below). EX1006, 9:1-7, Fig. 2A, *see also* EX1006, 5:44-54.

FIG. 2A



EX1006, Fig. 2A.

5. [4d] a gyro sensor determining angular movement of the portable terminal apparatus; and

261. For example, Bandyopadhyay discloses “[t]he mobile device can further include [...] a gyroscope (not shown).” EX1006, 8:44-48.

262. A POSITA would understand a gyroscope to be a gyro sensor that can determine angular movement of a device within which it is included.

6. [4e] a physical button executing a predetermined operation when a user pushes the physical button.

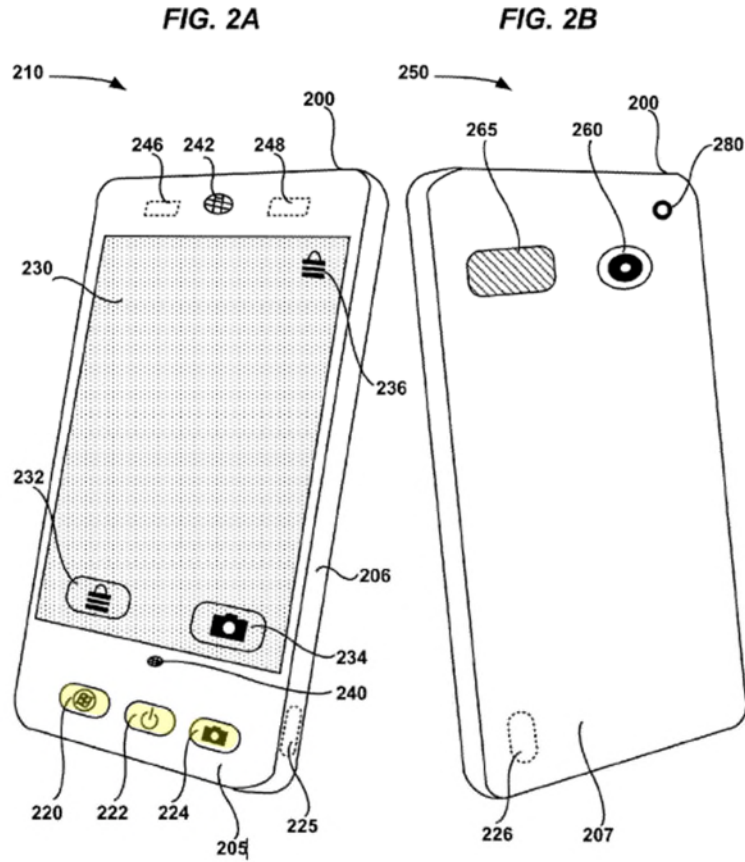
263. For example, Bandyopadhyay discloses “the mobile device 200 includes several hardware buttons, including a home button 220, a power button

222, and a camera shutter (image-capture) button 224” (highlighted below).

EX1006, 8:54-62, Fig. 2A, *see also* EX1006, 10:5-14, 10:15-35.

264. Bandyopadhyay further discloses “a first option, dubbed ‘Camera Button Press & Hold,’ [which] involves a mobile device user pressing and holding a dedicated hardware camera button [224] connected to the mobile device while the mobile device is in an above-lock mode for a predetermined time (e.g., for one second).” EX1006, 13:47-51. It further states that “[w]hen the end user presses and holds the camera button [224], a camera application ... is launched and a live viewfinder appears on the mobile device display screen.” EX1006, 13:60-63.

265. A POSITA would understand that this “Camera Button Press & Hold” using Bandyopadhyay’s camera shutter button 224 executes a predetermined operation to launch the camera application. EX1006, 13:47-14:14.



EX1006, Figs 2A, 2B.

C. Claim 5

1. [5pre] The portable terminal apparatus according to claim 1, further comprising:

266. See Section IX.B.

2. [5a] a plurality of physical buttons,

267. See Section IX.B.6.

3. **[5b] wherein the simultaneous pushing of the plurality of physical buttons results in a single predetermined operation being executed by the portable terminal apparatus.**

268. For example, Bandyopadhyay discloses “the mobile device 200 includes several hardware buttons, including a home button 220, a power button 222, and a camera shutter (image-capture) button 224.” EX1006, 8:54-62, Fig. 2A.

269. Bandyopadhyay further discloses “[a] third option, dubbed ‘Key Combination Press,’ [which] involves a mobile device user pressing and holding a camera button and one or more other buttons (e.g., a power button 220) simultaneously for at least a predetermined duration (e.g., one second).” EX1006, 14:33-45. Bandyopadhyay next discloses that “[a]fter a press and hold of these two buttons is detected, the mobile device launches the camera application and the live viewfinder is displayed on the screen.” EX1006, 14:33-45.

D. Claim 6

1. **[6pre] The portable terminal apparatus according to claim 1,**

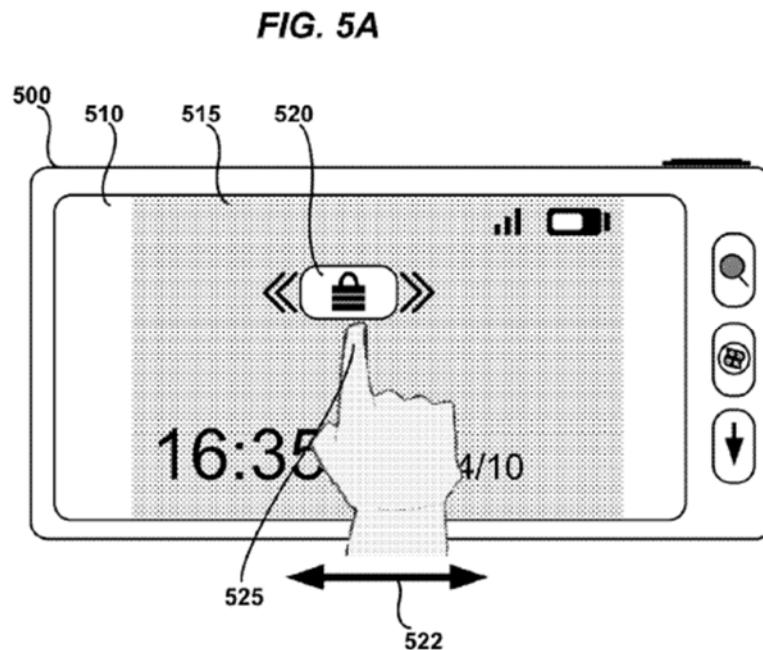
270. *See* Section IX.B.

2. **[6a] wherein the unlock operation in the first display mode, the second display mode, and the third display mode is initiated by sliding the first screen.**

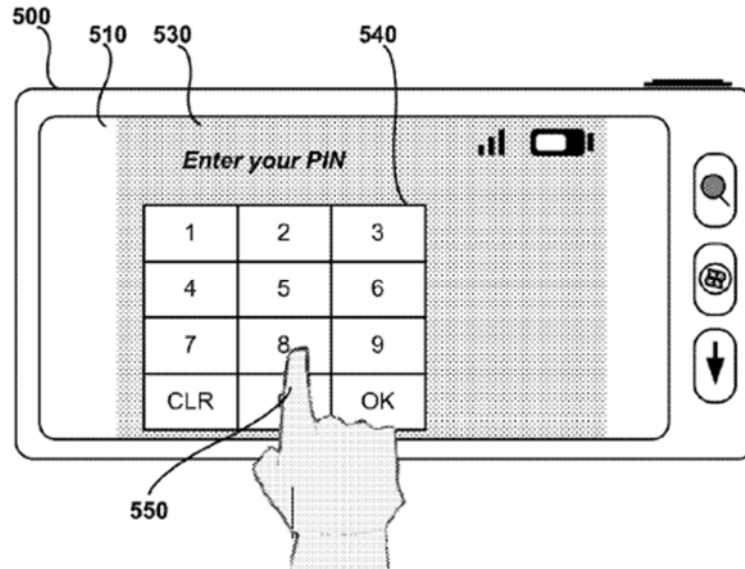
271. For example, in connection with Fig. 5A, below, Bandyopadhyay discloses “a mobile device 500 having a touch screen display 510, which is

displaying a lock screen 515, including an unlock slider control 520.” EX1006, 12:15-25.

272. Bandyopadhyay further discloses “[a] mobile device user can slide/drag a finger 525 in the direction indicated by the arrows displayed with the unlock slider control 520 (finger motion is in either of the directions indicated by the arrow 522) in order to request the device to present an authentication screen, for example, as shown in FIG. 5B.” EX1006, 12:15-25, Fig. 5A.



EX1006, Fig. 5A.



EX1006, Fig. 5B.

E. Claim 16

1. **[16pre] The method according to claim 14, further comprising:**

273. *See Section IX.H.*

2. **[16a] determining a position of the portable terminal apparatus;**

274. *See Section IX.B.2.*

3. **[16b] determining a movement state of the portable terminal apparatus;**

275. *See Section IX.B.3.*

4. **[16c] determining angular movement of the portable terminal apparatus; and**

276. *See Section IX.B.5.*

5. **[16d] executing a predetermined operation when a user pushes a physical button.**

277. *See* Section IX.B.6.

F. Claim 17

1. **[17pre] The method according to claim 14, further comprising:**

278. *See* Section IX.H.

2. **[17a] executing a single predetermined operation when a user simultaneously pushes a plurality of physical buttons on the portable terminal apparatus.**

279. *See* Section IX.C.3.

G. Claim 18

1. **[18pre] The method according to claim 14,**

280. *See* Section IX.H.

2. **[18a] wherein the unlock operation in the first display mode, the second display mode, and the third display mode is initiated by sliding the first screen.**

281. *See* Section IX.D.2.

XI. GROUND 3: CLAIMS 8-11 AND 20-23 ARE OBVIOUS IN VIEW OF ESAKA, GUIHOT, SHARIF-AHMADI, AND THE KNOWLEDGE OF A POSITA

A. Motivation to Combine

282. As described above (Section IX.A.), a POSITA would have been motivated to combine Esaka and Guihot.

283. A POSITA also would have been motivated to combine Sharif-Ahmadi with Esaka and Guihot because they each describe a similar type of mobile device, such as a smartphone, acting as a remote control for an external device, such as a TV. EX1004, 2:12-30; EX1005, 1:14-16; EX1007, 5:45-52.

284. Both Esaka and Guihot disclose a smartphone, but they lack detail on the type of secure or encrypted wireless network over which the smartphone can communicate with the TV, that was well known at the time of the purported invention, and therefore a POSITA would have looked to other references in the field for details of such a device.

285. Sharif-Ahmadi discloses these conventional encrypted wireless networks that were well known at the time. EX1007, 6:63-7:30, 7:34-62, 8:22-26. Further, Guihot discloses that some applications, like email, are considered “privileged actions” that merit additional security and require “the user to perform an unlock action or series of actions before granting access to the email application.” EX1005, 17:46-48. Similarly, Esaka is also concerned with providing operational screens that “can be securely operated.” EX1004, 10:5-9. Therefore, a POSITA, knowing both Guihot and Esaka are concerned with security, but did not disclose well-known security features such as, *e.g.*, encrypted wireless communications, would look to a reference that discloses other ways to secure the communications of the mobile device.

286. A POSITA would have known of and would have been motivated to combine the security features of Sharif-Ahmadi's with the smartphones disclosed in Esaka and Guihot. A POSITA also would have been capable of combining the disclosures in Esaka, Guihot, and Sharif-Ahmadi to do so as it would have involved only simple software modifications.

287. A POSITA would have recognized the benefit of using Sharif-Ahmadi's secure wireless network in Esaka and Guihot because Sharif-Ahmadi teaches these secure wireless networks as part of a typical smartphone known at the time of the purported invention. EX1007, 6:63-7:30, 7:34-62, 8:22-26. A POSITA would have understood, for example, that the design of Sharif-Ahmadi's conventional secure wireless networks would improve user convenience because it describes a typical home wireless network already known to users. The benefit of utilizing a known smartphone and home wireless network, familiar to users, would have motivated a POSITA to make this combination.

288. Combining Esaka and Guihot with Sharif-Ahmadi would simply involve applying known techniques (Sharif-Ahmadi's secure wireless networks) to a known device that simply did not disclose all components (Esaka's or Guihot's smartphone and home network) to yield predictable results (a smartphone that communicates with a TV over a secure wireless network).

289. A POSITA would have had a reasonable expectation that the modification would be successful because the teachings of Esaka and Guihot disclose that the smartphone communicates with a TV over a home wireless network, but do not disclose the home wireless network's encryption or security. Esaka, Guihot, and Sharif-Ahmadi would be predictably combined due to the predictability of the smartphone art and the known utilization of secure wireless networks.

290. If Patent Owner argues the portions of Esaka, Guihot, and Sharif-Ahmadi cited below relate to different, incompatible embodiments (which they do not), it would have been obvious to a POSITA to combine such embodiments into a single device at least because such embodiments are described in the same prior art reference, are fully compatible with each other, and could be combined with minimal effort to achieve predictable results.

B. Claim 8

1. **[8pre] The portable terminal apparatus according to claim 1,**

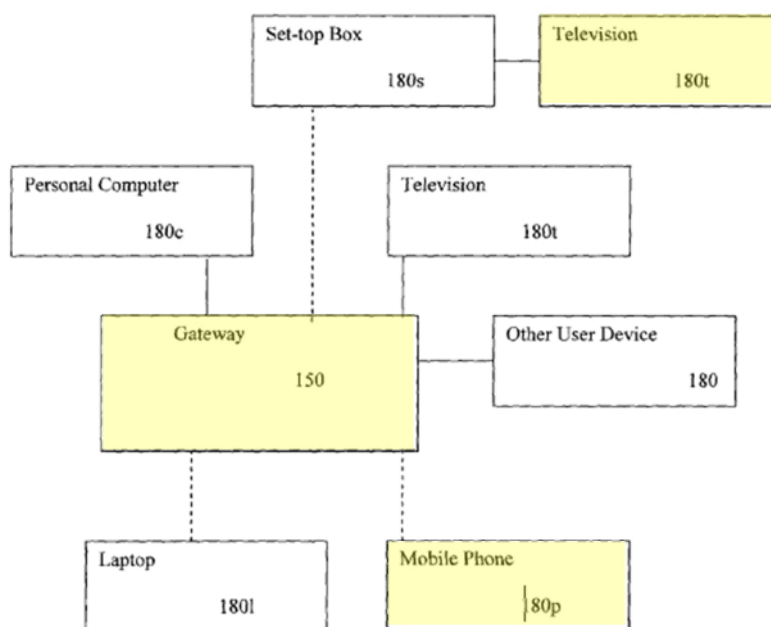
291. *See* Section IX.B.

2. **[8a] wherein the wireless communication interface is configured to communicate with the external device by implementing an encryption scheme.**

292. Sharif-Ahmadi discloses “a network (or ‘micro-cloud’) of service nodes, referred to as gateways 150,” in which “[e]ach gateway acts as one node

within a content distribution network ('CDN' 15), and is used to forward content to one or more user devices 180 that are registered to use that particular gateway 150." EX1007, 6:63-7:8. Sharif-Ahmadi's Figure 3 shows that "gateway 150 is connected to TV 180_t, mobile phone 180_p (which may be a smart phone)," where "wired connections are shown in solid lines and wireless in broken lines." EX1007, 7:9-30.

FIG. 3

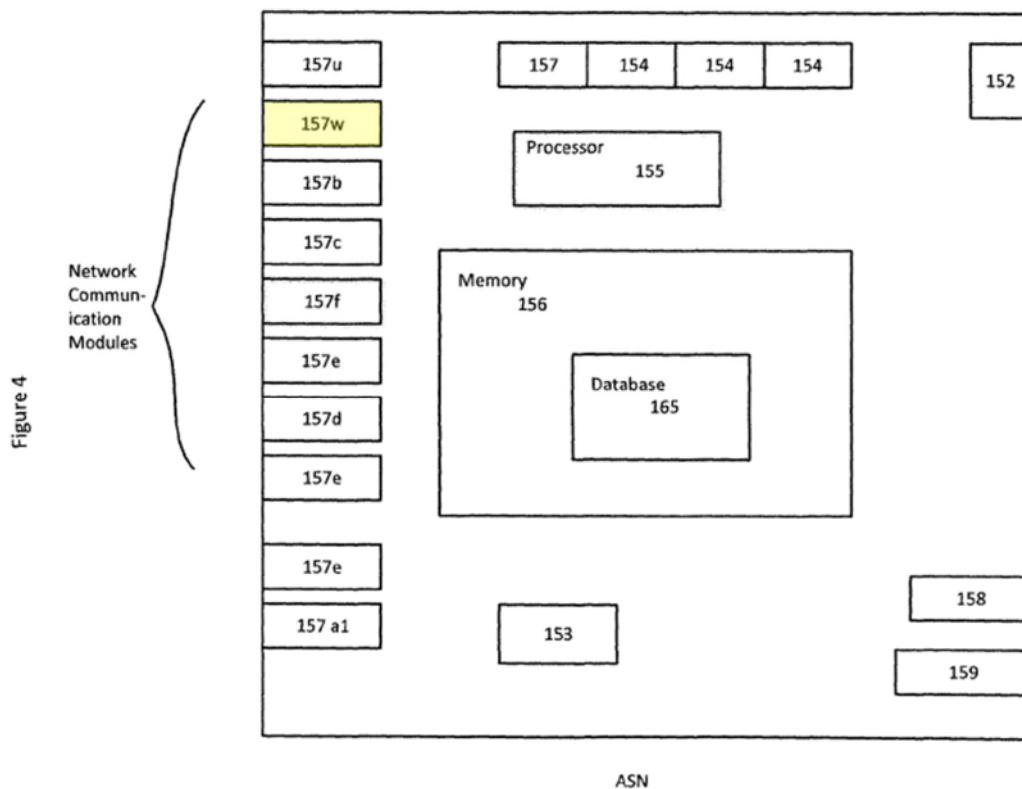


EX1007, Fig. 3.

293. Sharif-Ahmadi further discloses that in Figure 4, "[g]ateway 150 also includes network communication modules 157, such as Wi-Fi port 157w." EX1007, 7:34-62.

294. Sharif-Ahmadi also discloses that “Wi-Fi port 157w should support 802.11b/802.11g and other features such as security (WEP, WPA, and WPA2). Gateway 150 will serve as a Wi-Fi access point.” EX1007, 8:22-26.

295. A POSITA would understand Sharif-Ahmadi’s disclosure of “security” such as WEP, WPA, and WPA2 as a wireless communication encryption scheme.



EX1007, Fig. 4.

C. Claim 9

1. [9pre] The portable terminal apparatus according to claim 8,

296. See Section IX.B.

2. [9a] wherein the encryption scheme is WEP (Wired Equivalent Privacy).

297. As noted in §XI.B.2., Sharif-Ahmadi discloses a WEP encryption scheme. EX1007, 8:22-26.

D. Claim 10

1. [10pre] The portable terminal apparatus according to claim 8,

298. See Section IX.B.

2. [10a] wherein the encryption scheme is WPA (WiFi Protected Access).

299. As noted in §XI.B.2., Sharif-Ahmadi discloses a WPA encryption scheme. EX1007, 8:22-26.

E. Claim 11

1. [11pre] The portable terminal apparatus according to claim 8,

300. See Section IX.B.

2. [11a] wherein the encryption scheme is WPA (WiFi Protected Access) 2.

301. As noted in §XI.B.2., Sharif-Ahmadi discloses a WPA2 encryption scheme. EX1007, 8:22-26.

F. Claim 20

1. [20pre] The method according to claim 14,

302. See Section IX.H.

2. **[20a] wherein performing the wireless communication with the external device includes implementing an encryption scheme.**

303. *See* Section XI.B.2.

G. Claim 21

1. **[21pre] The method according to claim 20,**

304. *See* Section IX.H.

2. **[21a] wherein the encryption scheme is WEP (Wired Equivalent Privacy).**

305. *See* Section XI.C.2.

H. Claim 22

1. **[22pre] The method according to claim 20,**

306. *See* Section XI.D.2.

2. **[22a] wherein the encryption scheme is WPA (WiFi Protected Access).**

307. *See* Section IX.H.

I. Claim 23

1. **[23pre] The method according to claim 20,**

308. *See* Section IX.H.

2. **[23a] wherein the encryption scheme is WPA (WiFi Protected Access) 2.**

309. *See* Section XI.E.2.

XII. CONCLUSION

310. I recognize that I may be subject to cross-examination in this proceeding.

311. I hereby declare that all statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further, I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and with the knowledge that such willful false statements may jeopardize the results of these proceedings. I declare under penalty of perjury that the foregoing is true and correct.

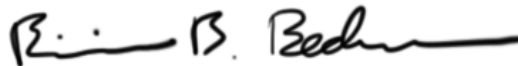
EXHIBIT A

Dr. Benjamin B. Bederson

University of Maryland, College Park
Professor Emeritus, Computer Science

bederson@umd.edu
www.cs.umd.edu/~bederson

I have read the following and certify that it is a current and accurate statement of my professional record as of July 15, 2025.



1. PERSONAL INFORMATION

EDUCATION

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

EMPLOYMENT & ROLES

3/22 – Present	J.S. Bryant School, Inc. Therapeutic high school for LGBTQ+ students Co-founder, Board member, Treasurer and Clerk	Cummington, MA
1/19 – Present	Bederson Expert Services, Inc. Technical and expert witness consulting	Windsor, MA
1/98 – Present	University of Maryland, Computer Science Dept./UMIACS 7/19 – Present: Professor Emeritus, Computer Science Department. 4/14 – 6/18: Associate Provost of Learning Initiatives, and Executive Director of Teaching and Learning Transformation Center 4/13 – 4/14: Special Advisor to the Provost on Technology and Educational Transformation 8/11 – 6/19: Professor 9/04 – 7/11: Associate Professor 6/00 – 9/06: Director of the Human-Computer Interaction Lab (HCIL) 1/98 – 8/04: Assistant Professor	College Park, MD
1/06 – Present	International Children's Digital Library Foundation Co-founder and Technical Director for this library of exemplary free online children's books from around the world. 7/17 – present: President, secretary and treasurer	Windsor, MA
10/14 – 4/23	Hazel Analytics, Inc. Co-founder & Board member: regulatory data analytics 10/14 – 12/19: Chief Technology Officer	Seattle, WA
9/06 – 10/14	Zumobi, Inc. Co-founder of VC-funded startup for mobile apps and advertising. 9/06–1/08: VP Client Technologies 1/08–10/14: Chief Scientist	Seattle, WA
6/03 – 11/08	Windsor Interfaces, Inc. Founder: Small company to commercialize HCIL products.	Chevy Chase, MD
1/95 – 8/97	University of New Mexico, Computer Science Department Assistant Professor in the Computer Science Department.	Albuquerque, NM
9/92 – 8/94	Bell Communications Research (Bellcore) Research Scientist in Computer Graphics and Interactive Media group.	Morristown, NJ

6/93 – 7/94	New York University, Media Research Laboratory Visiting Research Scientist.	New York, NY
9/90 – 8/92	Vision Applications, Inc. Research Scientist.	New York, NY
9/88 – 6/90	New York University, Computer Science Department Teaching Assistant.	New York, NY
1/87 – 5/87	North Slope Borough/North Slope Higher Education Center Instructor. Taught Computers & Society to rural Eskimo population.	Barrow, AK

2. RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

Note about publications:

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

A. BOOKS

i. Authored Books

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

ii. Edited Collections

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

iii. Book Chapters

1. Fails, J., Druin, A., **Bederson, B. B.**, Weeks, A., & Rose, A. (2009) A Child’s Mobile Digital Library: Collaboration, Community and Change. Druin, A. (Ed.) *Mobile Technology for Children: Designing for Interaction and Learning*, Morgan Kaufmann Press.
2. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., **Bederson, B. B.**, Conrad, F.G., Traugott, M.W. (2008) The Current State of Electronic Voting in the United States. Chen, H., Brandt, L., Dawes, S., Gregg, V., Hovy, E., Macintosh, A., Traunmüller, R., Larson, C. (Eds.) *Digital Government: Advanced Research and Case Studies*, Springer, 157-180.
3. Karlson, A., **Bederson, B. B.**, & Contreras-Vidal, Jose L. (2007) Understanding One Handed Use of Mobile Devices. Lumsden, Jo (Ed.), *Handbook of Research on User Interface Design and Evaluation for Mobile Technology*, Idea Group Reference, 86-101.
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6. Hollan, J. D., **Bederson, B. B.**, & Helfman, J. (1998). Information Visualization. Helander, M., Landauer, T. K., & Prabhu, P. V. (eds.), *The Handbook of Human Computer Interaction* (Chap. 2, 33-48). Amsterdam: Elsevier Press.

7. **Bederson, B. B.**, Hollan, J. D., Stewart, J., Rogers, D., Druin, A., Vick, D., Ring, L., Grose, E., & Forsythe, C. (1997). A Zooming Web Browser. C. Forsythe, J. Ratner, & E. Grose (eds.), *Human Factors and Web Development* (Chap. 19, 255-266). New Jersey: Lawrence Erlbaum.
8. **Bederson, B. B.**, & Druin, A. (1995). Computer Augmented Environments: Physical Spaces to Enrich Our Lives. Jakob Nielsen (eds.), *Advances in Human-Computer Interaction* (Vol. 5, Chap. 2, 37-66). New Jersey: Ablex Press.
9. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1993). A Miniaturized Space-Variant Active Vision System: Cortex-I. Richard Mammone (eds.), *Artificial Neural Networks for Speech and Vision*. Chapman-Hall Publishers.
10. Wallace, R. S., Ong, P.-W., **Bederson, B. B.**, & Schwartz, E. L. (1993). Connective Graphs in Space-Variant Active Vision. George A. Bekey & Ken Goldberg (eds.), *Neural Networks in Robotics*. Kluwer Academic Publishers.

B. REFEREED ARTICLES

i. Journals

1. **Bederson, B. B.**, Jin, G. Z., Leslie, P., Quinn, A. J., Zou, B. (2017) "Incomplete Disclosure: Evidence of Signaling and Countersignaling", in *American Economic Journal: Microeconomics*, (in press).
2. Anderson, L. B., Gardner, E. E., Wolvin, A., Kirby-Straker, R., Yalcin, A., & **Bederson, B. B.*** (2016), "Incorporating Learning Analytics into Basic Course Administration: How to Embrace the Opportunity to Identify Inconsistencies and Inform Responses", in *Journal of the Association for Communication Administration*, 35 (1), Winter-Spring 2016, pp 2-14.
3. Lee, T. Y., **Bederson, B. B.*** (2016) "Give the people what they want: studying end-user needs for enhancing the web", *PeerJ Computer Science*, Nov, 2016, 2:e91 <https://doi.org/10.7717/peerj-cs.91>
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11. Conrad, F.G., **Bederson, B. B.**, Lewis, B., Peytcheva, E., Traugott, M.W., Hanmer, M.J., Herrnson, P.S., & Niemi, R.G. (2009) "Electronic voting eliminates hanging chads but introduces new usability challenges", in *International Journal of Human-Computer Studies (IJHCS)*, Elsevier Press, 67 (1), 111-124.
12. Hanmer, M.J., Park, W-H., Traugott, M.W., Niemi, R.G., Herrnson, P.S., **Bederson, B. B.**, and Conrad, F.C. (2008) "Losing Fewer Votes: The Impact of Changing Voting Systems on Residual Votes", in *Political Research Quarterly*, Sage Publications, September, 2008. doi:10.1177/1065912908324201.

13. **Bederson, B. B.**, Clamage, A., Plaisant, C. (2008) Enhancing In-Car Navigation Systems with Personal Experience, in *Transportation Research Record (TRR)*, The National Academies, 2064 (2008) 33-42.
14. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., Francia, P.L., **Bederson, B. B.**, Conrad, F.G., Traugott, M. (2008) Voter's Evaluations of Electronic Voting Systems: Results from a Usability Field Study, *American Politics Research*, Sage Journals, 36 (4), July 2008, 580-611.
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18. Suh, B., and **Bederson, B. B.*** (2007) Semi-Automatic Photo Annotation Strategies Using Event Based Clustering and Clothing Based Person Recognition, *Interacting With Computers*, Elsevier, 19 (4), 524-544.
19. Hutchinson, H., **Bederson, B. B.**, Druin, A., (2007) Supporting Elementary-Age Children's Searching and Browsing: Design and Evaluation Using the International Children's Digital Library, *Journal of the American Society for Information Science and Technology*, John Wiley & Sons, 58 (11), 1618-1630.
20. Kang, H., Plaisant, C., Lee, B., **Bederson, B. B.***, (2007) NetLens: Iterative Exploration of Content-Actor Network Data, *Information Visualization*, Palgrave Macmillan, 6 (1), 18-31.
21. Lee, B., Parr, C.S., Plaisant, C., **Bederson, B. B.**, Veksler, V.D., Gray, W.D., Kotfila, C. (2006) TreePlus: Interactive Exploration of Networks with Enhanced Tree Layouts, *IEEE Transactions on Vision and Computer Graphics (TVCG)*, IEEE Press, 12 (6), 1414-1426.
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24. Hutchinson, H.B., Rose, A., **Bederson, B. B.**, Weeks, A.C., Druin, A. (2005) The International Children's Digital Library: A Case Study in Designing for a Multi-Lingual, Multi-Cultural, Multi-Generational Audience, *Information Technology and Libraries*, 24 (1), 4-12.
25. Herrnson, P.S., **Bederson, B. B.**, Lee, B., Francia, P. L., Sherman, R.M., Conrad, F.G., Traugott, M., Niemi, R.G. (2005) Early Appraisals of Electronic Voting, *Social Science Computing Review*, 23 (3), 274-292.
26. Hourcade, J. P., **Bederson, B. B.**, Druin, A., & Guimbretière, F. (2004) Differences in pointing task performance between preschool children and adults using mice, *Transactions on Computer-Human Interaction*, New York: ACM, 11 (4), 357-386.
27. Parr, C. S., Lee, B., & **Bederson, B. B.*** (2004). Visualizations for Taxonomic and Phylogenetic Trees. *Bioinformatics*, Oxford University Press, 20 (17), 2997-3004.
28. **Bederson, B. B.**, Grosjean, J., Meyer, J. (2004) Toolkit Design for Interactive Structured Graphics, *Transactions on Software Engineering*, New York: IEEE, 30 (8), 535-546.
29. Chipman, L. E., **Bederson, B. B.**, Golbeck, J. A. (2004) SlideBar: Analysis of a Linear Input Device. *Journal of Behaviour and Information Technology*, London, Taylor & Francis, 23 (1), 1-9.
30. **Bederson, B. B.**, Clamage, A., Czerwinski, M. P., & Robertson, G. G. (2004) DateLens: A Fisheye Calendar Interface for PDAs, *Transactions on Computer-Human Interaction*, New York: ACM, 11 (1), 90-119.
31. Hourcade, J. P., **Bederson, B. B.**, & Druin, A. (2004) Building KidPad: An Application for Children's Collaborative Storytelling, *Software: Practice & Experience*, New Jersey: John Wiley & Sons, Ltd, 34 (9), 895-914.

32. Druin, A., **Bederson, B. B.**, Weeks, A., Farber, A., Grosjean, J., Guha, M. L., Hourcade, J. P., Lee, J., Liao, S., Reuter, K., Rose, A., Takayama, Y., & Zhang, L. (2003). The International Children's Digital Library: Description and Analysis of First Use. *First Monday*, 8(5).
33. Druin, A., Reville, G., **Bederson, B. B.**, Hourcade, J. P., Farber, A., Lee, J., & Campbell, D. (2003) A Collaborative Digital Library for Children: A Descriptive Study of Children's Collaborative Behavior and Dialogue. *The Journal of Computer-Assisted Learning*, 19 (2), 239-248.
34. Hourcade, J.P., **Bederson, B. B.**, Druin, A., Rose, A., Farber, A., Takayama, Y. (2003). The International Children's Digital Library: Viewing Digital Books Online. *Interacting with Computers*, Elsevier Press, 15 (3), 151-167.
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37. Good, L., & **Bederson, B. B.*** (2002) Zoomable User Interfaces as a Medium for Slide Show Presentations, *Information Visualization*, Palgrave Macmillan, 35-49.
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39. **Bederson, B. B.**, & Meyer, J. (1998). Implementing a Zooming User Interface: Experience Building Pad++. *Software: Practice and Experience*, 28(10), 1101-1135.
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41. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1995). A Miniaturized Space-Variant Active Vision System: Cortex-I. *Machine Vision and Applications*, 8 (2), 101-109.
42. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1994). A Miniature Pan-Tilt Actuator: the Spherical Pointing Motor. *IEEE Transactions on Robotics and Automation*, 10(3), 298-308.
43. Wallace, R. S., Ong, P.-W., **Bederson, B. B.**, & Schwartz, E. L. (1994). Space-Variant Image Processing. *International Journal of Computer Vision*, 13(1), 71-90.

ii. Peer-Reviewed Published Full-Length Conference Papers

1. Yalçın, M. A., Elmqvist, N., & **Bederson, B. B.*** (2017) Raising the Bars: Evaluating Treemaps vs. Wrapped Bars for Dense Visualization of Sorted Numeric Data, *Proceedings of Graphics Interface (GI 2017)*, 41-49. DOI: <https://doi.org/10.20380/GI2017.06>
2. Quinn, A., & **Bederson, B. B.*** (2014) AskSheet: Efficient Use of Web Workers to Support Decision Making, *Proceedings of ACM CSCW (CSCW 2014)*, ACM Press, pp. 1456–1466.
3. Yeh, T., Chang, T.-H., Xie, B., Walsh, G., Watkins, I., Wongsuphasawat, K., Davis, L.S., & **Bederson, B. B.*** (2011) Creating Contextual Help for GUIs Using Screenshots, *Proceedings of ACM UIST (UIST 2011)*, ACM Press, 145-154.
4. Quinn, A., & **Bederson, B. B.*** (2011) Human Computation: A Survey and Taxonomy of a Growing Field, *Proceedings of ACM CHI (CHI 2011)*, ACM Press, 1403-1412.
5. Resnik, P., Buzek, O., Hu, C., Kronrod, Y., Quinn, A.J., & **Bederson, B. B.*** (2010) Improving Translation via Targeted Paraphrasing, *Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP 2010)*, 127-137.
6. Hu, C., **Bederson, B. B.**, & Resnik, P. (2010) Translation by Interactive Collaboration between Monolingual Users, *Proceedings of Graphics Interface (GI 2010)*, 39-46.

7. Dearman, D., Karlson, A., Meyers, B., & **Bederson, B. B.** (2010) Multi-Modal Text Entry and Selection on Mobile Devices, *Proceedings of Graphics Interface (GI 2010)*, 19-26.
8. Quinn, A., Hu, C., Arisaka, T., & **Bederson, B. B.*** (2008) Readability of Scanned Books in Digital Libraries, *Proceedings of ACM CHI (CHI 2008)*, ACM Press, 705-714. [22% acceptance rate]
9. Karlson, A., & **Bederson, B. B.*** (2008) One-Handed Touchscreen Input for Legacy Applications, *Proceedings of ACM CHI (CHI 2008)*, ACM Press 1399-1408. [22% acceptance rate]
10. **Bederson, B. B.**, Clamage, A., Plaisant, C., (2008) Enhancing In-Car Navigation Systems with Personal Experience, in *Proc. of the Transportation Research Board 87th annual meeting*, The National Academies, Washington, DC (2008) 1-11.
11. Karlson, A., & **Bederson, B. B.*** (2007) ThumbSpace: Generalized One-Handed Input for Touchscreen-Based Mobile Devices, *Proceedings of INTERACT 2007*, 324-338 – **Winner of Brian Shackel Award for making an “outstanding contribution with international impact in the field of HCI”.**
12. Druin, A., Weeks, A., Massey, S., & **Bederson, B. B.** (2007) Children’s Interests and Concerns When Using the International Children’s Digital Library: A four country case study, *Proceedings of the Joint Conference on Digital Libraries (JCDL 2007)*, 167-176. – **Nominated for Best Paper Award, came in #2.** [36% acceptance rate].
13. Parhi, P., Karlson, A., & **Bederson, B. B.*** (2006). “Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices”, *Proceedings of MobileHCI 2006*, ACM Press, 203-210. – **Winner of Best Historical Paper Award, September 2016.**
14. Hutchinson, H. B., **Bederson, B. B.**, & Druin, A. (2006). “The Evolution of the International Children’s Digital Library Searching and Browsing Interface”, *Proceedings of 5th International Conference for Interaction Design and Children (IDC 2006)*, ACM Press, 105-112. [38% acceptance rate]
15. Hutchinson, H., Druin, A., **Bederson, B. B.**, Reuter, K., Rose, A., Weeks, A. (2005) How do I Find Blue Books About Dogs? The Errors and Frustrations of Young Digital Library Users, *Proceedings of HCII 2005*, Las Vegas, NV (CD-ROM).
16. Shneiderman, B. & **Bederson, B. B.** (2005). “Maintaining Concentration to Achieve Task Completion”, *Proceedings of Designing User Experience (DUX 2005)*.
17. Karlson, A., **Bederson, B. B.**, & SanGiovanni, J. (2005). AppLens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices, *CHI Letters*, 7(1), 201-210. [25% acceptance rate] – **Nominated for Best Paper Award.**
18. Khella, A., **Bederson, B. B.*** (2004). Pocket PhotoMesa: A Zoomable Image Browser for PDAs. *In Proceedings of Mobile and Ubiquitous Multimedia (MUM 2004)* ACM Press, 19-24.
19. Lee, B., Parr, C. S., Campbell, D., & **Bederson, B. B.*** (2004). How Users Interact With Biodiversity Information Using TaxonTree. *In Proceedings of Advanced Visual Interfaces (AVI 2004)* ACM Press, 320-327. [25% acceptance rate]
20. Suh, B., Ling, H., **Bederson, B. B.**, & Jacobs, J. W. (2003). Automatic Thumbnail Cropping and Its Effectiveness. *UIST 2003, ACM Symposium on User Interface Software and Technology*, *CHI Letters*, 5(2), 95-104. [22% acceptance rate] – **Winner of Best Student Paper Award.**
21. **Bederson, B. B.**, Lee, B., Sherman, R., Herrnson, P. S., Niemi, R. G. (2003). Electronic Voting System Usability Issues. *CHI 2003, ACM Conference on Human Factors in Computing Systems*, *CHI Letters*, 5(1), 145-152. [16% acceptance rate]
22. Hutchinson, H., Mackay, W., Westerlund, B., **Bederson, B. B.**, Druin, A., Plaisant, C., Evans, H., Hansen, H., Conversy, S., Beaudouin-Lafon, M., Roussel, N., Lacomme, L., Eiderbäck, B., Lindquist, S., Sundblad, Y. (2003). Technology Probes: Inspiring Design for and with Families. *CHI 2003, ACM Conference on Human Factors in Computing Systems*, *CHI Letters*, 5(1), 17-24. [16% acceptance rate]
23. Knudtzon, K., Druin, A., Kaplan, N., Summers, K., Chisik, Y., Kulkarni, R., Moulthrop, S., Weeks, H., & **Bederson, B.** Starting an Intergenerational Technology Design Team: A Case Study. *In Proceedings of Interaction Design and Children (IDC 2003)* ACM Press, 51-58.

24. Baudisch, P., Cutrell, P., Robbins, D., Czerwinski, M., Tandler, P., **Bederson, B. B.**, & Zierlinger, A. (2003) Drag-and-Pop and Drag-and-Pick: Techniques for Accessing Remote Screen Content on Touch- and Pen-Operated Systems. *Proceedings of Interact 2003*, Austria: International Federation for Information Processing, 57-64. [33% acceptance rate]
25. Plaisant, C., Grosjean, J., & **Bederson, B. B.*** (2002) SpaceTree: Design Evolution of a Node Link Tree Browser. *Proceedings of Information Visualization Symposium (InfoVis 2002)* New York: IEEE, 57-64. [27% acceptance rate] – **Won 2022 IEEE Vis Test of Time Award in InfoVis**, <https://ieevis.org/year/2022/info/awards/test-of-time-awards>.
26. Suh, B., & **Bederson, B. B.*** (2002) OZONE: A Zoomable Interface for Navigating Ontology Information. *Proceedings of International Conference on Advanced Visual Interfaces (AVI 2002)*, ACM Press, Trento, Italy, 139-143. [30% acceptance rate]
27. Boltman, A., Druin, A., **Bederson, B.**, Hourcade, J.P., Stanton, D., O'Malley, C., Cobb, S., Benford, S., Fast, C., Kjellin, M., & Sundblad, Y. (2002). The nature of children's storytelling with and without technology. *Proceedings of American Educational Research Association (AERA) Conference*, New Orleans.
28. **Bederson, B. B.** (2001). PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps. *UIST 2001, ACM Symposium on User Interface Software and Technology*, CHI Letters, 3(2), 71-80. [19% acceptance rate]
29. Druin, A., **Bederson, B. B.**, Hourcade, J.P., Sherman, L., Revelle, G., Platner, M., Weng, S. (2001) Designing a Digital Library for Young Children. *In Proceedings of Joint Conference on Digital Libraries (JCDL 2001)* ACM Press, 398-405. [30% acceptance rate]
30. Benford, S., **Bederson, B. B.**, Åkesson, K., Bayon, V., Druin, A., Hansson, P., Hourcade, J. P., Ingram, R., Neale, H., O'Malley, C., Simsarian, K., Stanton, D., Sundblad, Y., & Taxén, G. (2000). Designing Storytelling Technologies to Encourage Collaboration Between Young Children. *CHI 2000, ACM Conference on Human Factors in Computing Systems*, CHI Letters, 2(1), 556-563. [19% acceptance rate]
31. **Bederson, B. B.**, Meyer, J., & Good, L. (2000). Jazz: An Extensible Zoomable User Interface Graphics Toolkit in Java. *UIST 2000, ACM Symposium on User Interface Software and Technology*, CHI Letters, 2(2), 171-180. [26% acceptance rate]
32. **Bederson, B. B.** (2000). Fisheye Menus. *UIST 2000, ACM Symposium on User Interface Software and Technology*, CHI Letters, 2(2), 217-225. [26% acceptance rate]
33. Gandhi, R., Kumar, G., **Bederson, B. B.**, & Shneiderman, B. (2000). Domain Name Based Visualization of Web Histories in a Zoomable User Interface. *In Proceedings of Eleventh International Workshop on Database and Expert Systems Applications – Second International Workshop on Web-Based Information Visualization (WebVis 2000)*, IEEE Computer Society, Los Alamitos, CA (2000), 591-598.
34. **Bederson, B. B.**, & Boltman, A. (1999). Does Animation Help Users Build Mental Maps of Spatial Information? *In Proceedings of Information Visualization Symposium (InfoVis 99)* New York: IEEE, 28-35. [23% acceptance rate]
35. Combs, T. T. A., & **Bederson, B. B.*** (1999). Does Zooming Improve Image Browsing? *In Proceedings of Digital Library (DL 99)* New York: ACM, 130-137. [21% acceptance rate]
36. Stewart, J., **Bederson, B. B.**, & Druin, A. (1999). Single Display Groupware: A Model for Co-Present Collaboration. *In Proceedings of Human Factors in Computing Systems (CHI 99)* ACM Press, 286-293. [25% acceptance rate]
37. Hightower, R. R., Ring, L., Helfman, J., **Bederson, B. B.**, & Hollan, J. D. (1998). Graphical Multiscale Web Histories: A Study of PadPrints. *In Proceedings of ACM Conference on Hypertext (Hypertext 98)* ACM Press, 58-65.
38. Druin, A., Stewart, J., Proft, D., **Bederson, B. B.**, & Hollan, J. D. (1997). KidPad: A Design Collaboration Between Children, Technologists, and Educators. *In Proceedings of Human Factors in Computing Systems (CHI 97)* ACM Press, 463-470. [22% acceptance rate]

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39. **Bederson, B. B.**, Hollan, J. D., Stewart, J., Rogers, D., Druin, A., & Vick, D. (1996). A Zooming Web Browser. In *Proceedings of SPIE Multimedia Computing and Networking* New York: IEEE, 260-271. <https://www.spiedigitallibrary.org/conference-proceedings-of-spie/2667/0000/Zooming-Web-browser/10.1117/12.235898.short>
 40. **Bederson, B. B.**, & Hollan, J. D. (1995). Advances in the Pad++ Zoomable Graphics Widget. In *Proceedings of USENIX Tcl/Tk '95 Workshop (Tcl/Tk 95)* New York: USENIX, 3.
 41. Furnas, G. W., & **Bederson, B. B.** (1995). Space-Scale Diagrams: Understanding Multiscale Interfaces. In *Proc. of Human Factors in Computing Systems (CHI 95)* ACM Press, 234-241. [29% acceptance rate]
 42. **Bederson, B. B.**, & Hollan, J. D. (1994). Pad++: A Zooming Graphical Interface for Exploring Alternate Interface Physics. In *Proc. of User Interface and Software Technology (UIST 94)* ACM Press, 17-26.
 43. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1993). Control & Design of the Spherical Pointing Motor. In *Proceedings of IEEE International Conference on Robotics and Automation (ICRA 93)* New York: IEEE, 2, 630-636.
 44. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1992). A Miniaturized Active Vision System. In *Proceedings of Eleventh International Conference on Pattern Recognition*, IEEE Press, 58-61.
 45. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1992). Two Miniature Pan-Tilt Devices. In *Proceedings of IEEE International Conference on Robotics and Automation*, New York: IEEE Press, (1), 658-663.
 46. Wallace, R. S., **Bederson, B. B.**, & Schwartz, E. L. (1992). Voice-Bandwidth Visual Communication Through Logmaps: the Telecortex. In *Proceedings of IEEE Workshop on Applications of Computer Vision* New York: IEEE Press, 4-10.

iii. Other Publications

1. Yalcin, M. A., Elmqvist, N., & **Bederson, B. B.*** (2017). Piled Bars: Dense Visualization of Numeric Data. Poster presented at Graphics Interfaces, 2017.
2. **Bederson, B. B.**, Barker, K., Owens, L., Kim, Y. J. & Palmer, K. (2017) Designing Organizations to Support Tech on Campus. Panel at SXSW Edu, Austin, TX, March 6, 2017.
3. Yalcin, M. A., Elmqvist, N., & **Bederson, B. B.*** (2016). Keshif: Out-of-the-Box Visual and Interactive Data Exploration Environment. In *Proceedings of IEEE VIS 2016 Workshop on Visualization in Practice: Open Source Visualization and Visual Analytics Software*.
4. Yalcin, M. A., Elmqvist, N., & **Bederson, B. B.*** (2016). Cognitive Stages in Visual Data Exploration. In *Proceedings of Beyond Time and Errors: Novel Evaluation Methods for Visualization (BELIV 2016)* at IEEE VIS 2016.
5. Roberts, S., Swan, L., & **Bederson, B. B.** (2016). “Fishing for Faculty: The Bait and Hooks”, Workshop in 2016 Professional and Organizational Development (POD) Conference, Louisville, KY, November, 2016.
6. Anderson, L. B., Gardner, E. E., Wolvin, A., Kirby-Straker, R., Yalcin, A., & **Bederson, B. B.*** (2015), “Incorporating Learning Analytics into Basic Course Administration: How to Embrace the Opportunity to Identify Inconsistencies and Inform Responses”. In *NCA 2015 - 101th Annual meeting of the National Communication Association*. **Top Paper in Basic Course Division**.
7. Anderson, L. B., Gardner, E. E., Wolvin, A., Kirby-Straker, R., Yalcin, A., & **Bederson, B. B.*** (2015), “Utilizing learning analytics to improve the basic course: A qualitative analysis of the instructor feedback captured in Revealer”. *Paper presented at the annual meeting of the Eastern Communication Association, Philadelphia, PA, June 2015*.
8. Hara, K., Hajiaghayi, M., & **Bederson, B. B.** (2015). FluTCHA: Using Fluency to Distinguish Humans from Computers, short paper and poster, WWW2015, Florence, Italy, May 18-22, 2015.
9. Teasley, S., & **Bederson, B. B.** (2015). Learning Analytics and iSchools: What, Why & Worries, at *iConference*, Session for Interaction and Engagement, March 24-27, 2015, Newport Beach, CA.

10. Xu, Z., Goldwasser, D., **Bederson, B. B.**, Lin, J. (2014) Visual Analytics of MOOCs at Maryland, *Poster at Learning @ Scale Conference (L@S '14)*.
11. **Bederson, B. B.**, Jin, G., Leslie, P., Quinn, A.J., & Zhou, B. (alphabetical order), (2014) "Incomplete Disclosure: Insights from Maricopa", International Industrial Organization Conference, April 11-13, 2014, Chicago.
12. Lee, T.Y., Mauriello, M.L., Ingraham, J., Sopan, A., Ahn, J., & **Bederson, B. B.*** (2012) "CTArcade: Learning Computational Thinking while Training Virtual Characters Through Game Play", WiP at CHI 2012, ACM Press, 2309-2314.
13. Cranor, L., **Bederson, B. B.**, & Quesenberry, W. (2012) "Occupy CHI! Engaging U.S. Policymakers", Panel in CHI 2012, ACM Press, 1139-1142.
14. **Bederson, B. B.**, Quinn, A. J., & Rose, A. (2012) SearchParty: Learning to Search in a Web-based Classroom, Workshop paper at CHI 2012.
15. Hu, C., Resnik, P., Kronrod, Y., & **Bederson, B. B.*** (2012) Deploying MonoTrans Widgets in the Wild. Note at CHI 2012, ACM Press, 2935-2938.
16. Hu, C., Resnik, P., Kronrod, Y., Eidelman, V., Buzek, O., & **Bederson, B. B.*** (2011) The Value of Monolingual Crowdsourcing in a Real-World Translation Scenario: Simulation using Haitian Creole Emergency SMS Messages. In *Proceedings of EMNLP 2011 Sixth Workshop on Statistical Machine Translation*, 399-404.
17. Kronrod, Y., Hu, C., Buzek, O., & Quinn, A.J. (2011) Using Monolingual Crowd to Improve Translation. Student poster at AAAS 2011. **Winner of poster in Math, Technology and Engineering category.**
18. **Bederson, B. B.**, & Quinn, A.J. (2011) Web Workers Unite! Addressing Challenges of Online Laborers. Alt.CHI paper at CHI 2011, ACM Press, 97-106.
19. Hu, C., **Bederson, B. B.**, & Resnik, P. (2011) MonoTrans2: A New Human Computation System to Support Monolingual Translation. Short paper at CHI 2011, ACM Press, 1133-1136.
20. Kronrod, Y., Buzek, O., Hu, C., Quinn, A., Resnik, P., & **Bederson, B. B.*** (2010) Using Crowdsourcing to Translate Without Bilinguals. Poster at CrowdConf 2010.
21. Hu, C., **Bederson, B. B.**, and Resnik, P. (2010) Translation by Iterative Collaboration Between Monolingual Users. Abstract and demo at the Human Computation Workshop (HCOMP 2010), 54-55.
22. Buzek, O., Resnik, P., & **Bederson, B. B.*** (2010) Error Driven Paraphrase Annotation using Mechanical Turk, In *Creating Speech and Language Data With Amazon's Mechanical Turk*, NAACL 2010 Workshop, 2010.
23. Chen, R., Rose, A., & **Bederson, B. B.*** (2009) How People Read Books Online: Mining and Visualizing Web Logs for Use Information. In *Proceedings of European Conference on Digital Libraries (ECDL 2009)*, Short Paper, 364-369.
24. **Bederson, B. B.**, Rutledge, P., Quinn, A. (2009) Generalizing the International Children's Digital Library. In *Proceedings of the Digital Humanities Conference (DH 09)*, Poster.
25. **Bederson, B. B.**, Quinn, A., Druin, A. (2009) Designing the Reading Experience for Scanned Multi-lingual Picture Books on Mobile Phones. In *Proceedings of the Joint Conference on Digital Libraries (JCDL 2009)*, Short Paper, ACM Press, New York, NY, 305-308.
26. Hu, C., Rose, A., **Bederson, B. B.*** (2009) Locating Text in Scanned Books. In *Proceedings of the Joint Conference on Digital Libraries (JCDL 2009)*, Poster.
27. Druin, A., Cavallo, D., Fabian, C., **Bederson, B. B.**, Revell, G., Rogers, Y. (2009) Mobile Technologies for the World's Children. In *Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2009)*, ACM Press, Panel.
28. **Bederson, B. B.** (2008) "Experiencing the International Children's Digital Library", *Interactions Magazine*, ACM Press, 15 (6), 50-54.
29. Lazar, J., Hochheiser, H., Johnson, J., Karat, C-M., **Bederson, B. B.** (2008) "CHI Policy Issues Around the World", Panel in CHI 2008, ACM Press, 2277-2280.

30. Teevan, J., Jones, W., **Bederson, B. B.**, (2006) "Introduction: Personal Information Management," Communications of the ACM, 49 (1), 40-43. Ranked #3 "Year Rank" in annual downloads among ACM Magazines and Computing Surveys articles (CACM, 50 (12), 92-93).
31. Lee, B., Parr, C.S., Plaisant, C., **Bederson, B. B.**, (2006) "TreePlus: Visualizing Graphs as Trees," Video in InfoVis 2006.
32. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., **Bederson, B. B.**, Conrad, F.G., Traugott, M., (2006) "The Importance of Usability Testing of Voting Systems," in Usenix/Accurate Electronic Voting Workshop.
33. Herrnson, P., Niemi, R., Hanmer, M., **Bederson, B. B.**, Conrad, F., Traugott, M., (2006) "Voter Errors in Electronic voting: Voting Systems, Ballot Type, and Voter Traits," In Midwest Political Science Association annual conference.
34. Herrnson, P., Niemi, R., Hanmer, M., **Bederson, B. B.**, Conrad, F., Traugott, M., (2006) "Voters' Abilities to Cast Write-In Votes Using Electronic Voting Systems," In Midwest Political Science Association annual conference.
35. Conrad, F., Peytcheva, E., Traugott, M., Lewis, B., Herrnson, P., **Bederson, B. B.** (2006) "Usability of Electronic Voting Systems: Field and Laboratory Experiments," In Midwest Political Science Association annual conference.
36. Lee, B., Parr, C. S., Plaisant, C., & **Bederson, B. B.*** (2005) "Visualizing Graphs as Trees: Plant a Seed and Watch it Grow", Proceedings of Graph Drawing 2005, 516-518.
37. Klein, C. & **Bederson, B. B.*** (2005). "Benefits of Animated Scrolling", Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2005) ACM Press, Short Paper, 1965-1968.
38. Lee, B., Czerwinski, M., Robertson, G. G. & **Bederson, B. B.** (2005). "Understanding Research Trends in Conferences using PaperLens", Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2005) ACM Press, Short Paper, 1969-1972.
39. Traugott, M.W., Hanmer, M.J., Park, W.H., Herrnson, P.S., Niemi, R.G., **Bederson, B. B.**, Conrad, F.G.,(2005) "The Impact of Voting Systems on Residual Votes, Incomplete Ballots, and Other Measures of Voting Behavior," In American Political Science Association meeting (APSA 2005).
40. Lee, B., Czerwinski, M., Robertson, G. G. & **Bederson, B. B.** (2004). "Understanding Eight Years of InfoVis Conferences using PaperLens", InfoVis 2004 Symposium Compendium. **Winner of InfoVis Contest.**
41. **Bederson, B. B.** (2004) Interfaces for Staying in the Flow. In Ubiquity, ACM Press, (5) 27.
42. Hourcade, J. P., **Bederson, B. B.**, Druin, A. (2004) Preschool Children's Use of Mouse Buttons. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2004) ACM Press, Short Paper, 1411-1412.
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45. Hourcade, J.P., **Bederson, B. B.**, Druin, A., Rose, A., Farber, A., Takayama, Y. (2002). The International Children's Digital Library: Viewing Digital Books Online. Interaction Design and Children International Workshop, August 28-29, 2002, Eindhoven, The Netherlands 15 (3), 151-167.
46. Herrnson, P., **Bederson, B. B.** (2002) Debugging Maryland Balloting, Washington Post, Outlook Section, p. B08, Sunday May 12th, 2002.
47. Good, L., **Bederson, B. B.**, Stefik, M., Baudisch, P. (2002) Automatic Text Reduction For Changing Size Constraints. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Short Paper, 798-799.

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49. Hourcade, J.P., Bederson, B. B., Druin, A. (2002) SearchKids: A Digital Library Interface for Young Children. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Referred Demo, 512-513.
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51. Browne, H., Bederson, B. B., Druin, A., Sherman, L., & Westerman, W. (September 2000) Designing a Collaborative Finger Painting Application for Children, HCIL-2000-17, CS-TR-4184, UMIACS-TR-2000-66
52. Hourcade, J., Bederson, B. B. (May 1999) Architecture and Implementation of a Java Package for Multiple Input Devices (MID) HCIL-99-08, CS-TR-4018, UMIACS-TR-99-26
53. Hightower, R.R., Ring, L.T., Helfman, J.I., **Bederson, B. B.**, Hollan, J.D. (1998) PadPrints: Graphical Multiscale Web Histories. UIST 1998, ACM Symposium on User Interface Software and Technology. Tech Note, 121-122.
54. Stewart, J., Raybourn, E., Bederson, B. B., & Druin, A. (1998). When Two Hands Are Better Than One: Enhancing Collaboration Using Single Display Groupware. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 98) ACM Press, Short Paper, 287-288.
55. **Bederson, B. B.**, Hollan, J. D., Druin, A., Stewart, J., Rogers, D., & Proft, D. (1996). Local Tools: An Alternative to Tool Palettes. In Proceedings of User Interface and Software Technology (UIST 96) ACM Press, Short Paper, 169-170.
56. **Bederson, B. B.**, Hollan, J. D. (1995) Pad++: A Zoomable Graphical Interface System. In Proceedings of Conference on Human Factors in Computing Systems Conference Companion (CHI 95) ACM Press, Short Paper, 23-24.
57. **Bederson, B. B.**, & Davenport, G., & Druin, A., & Maes, P. (1994). Immersive Environments: A Physical Approach to the Multimedia Experience, In Proceedings of IEEE International Conference on Multimedia Computing and Systems, Boston, Massachusetts, May 17-19, 1994, (Panel).
58. **Bederson, B. B.** (1995). Audio Augmented Reality: A Prototype Automated Tour Guide. In Proceedings of Human Factors in Computing Systems (CHI 95) New York: ACM Press, (Short Paper), 210-211.
59. Stone, L. M., Erickson, T., **Bederson, B. B.**, Rothman, P., Muzzy, R. (1994) Visualizing Data: Is Virtual Reality the Key? IEEE Visualization, IEEE Press, Short Paper, 410-413.
60. **Bederson, B. B.**, Stead, L., & Hollan, J. D. (1994). Pad++: Advances in Multiscale Interfaces. In Proceedings of Human Factors in Computing Systems (CHI 94) New York: ACM Press, Short Paper, 315-316.
61. **Bederson, B. B.** (1992). A Miniature Space-Variant Active Vision System: Cortex-I. Doctoral dissertation, New York University, New York, NY.

E. TALKS, ABSTRACTS, AND OTHER PROFESSIONAL PAPERS PRESENTED

i. Keynote Talks

1. April 2017 **CHIuXiD - The International Conference in Human-Computer Interaction & User Experience**, Jakarta, Indonesia
“From Human-Computer Interaction to Strategic Leadership for Change”
2. March 2017 **Maryland College Learning Center Association**, Shady Grove, MD
“Fishing for Faculty: Teaching & Learning Engagement at UMD”
3. April 2014 **Innovations in Teaching and Learning Conference**, College Park, MD
“An Introduction to the Teaching and Learning Transformation Center”

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

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

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

12. January 29, 2015 **University of Wisconsin, Madison**, Madison, WI
 “Reflections on 20 Years Doing HCI Systems Research”
 Department of Computer Science, Distinguished Lecture Series
13. Sheil, M., Rock, E., O’Brien, L., **Bederson, B. B.**, & Xiaoming, L. (2014) “Future Trajectories of MOOCs in Higher Ed”, Panel at Coursera Partners’ Conference.
14. February 12, 2014 **Patuxent Partnership**, Lexington Park, MD
 “UMD MOOCs and What the Future Holds For Them”
15. January 29, 2014 **Carnegie Mellon University**, Pittsburgh, PA
 “Power to the People: Approaches to Crowdsourcing”
16. January 14, 2014 **Microsoft**, Friendship Heights, MD
 “Cracking the Code: Improving Computer Science Education Outcomes in the State of Maryland”
 Panel participant on Microsoft public series “Conversations on Education”
17. November 20, 2013 **University of Maryland**, College Park, MD
 “Mobile, Online, Flipped, Active: New Uses of Educational Technologies”
 College of Education
18. October 11, 2013 **Huawei**, Hong Kong, China
 “When Crowds Come Together”
19. October 8, 2013 **National Institute of Information and Communications Technology**, Osaka, Japan
 “Crowdsourced Monolingual Translation”
 in 2nd Workshop on Future Directions in Translation Research
20. February 1, 2013 **Google**, Mountain View, CA
 “Social + MOOCs + Hcomp = SMOOCH: Computing Comes to Education”
21. January 29, 2013 **Google**, Mountain View, CA
 “The Promise of Zoomable User Interfaces: Reflections on Design of Simple UX”
22. December 6, 2012 **Sunlight Foundation**, Washington, DC
 “Digital Disclosure of a Nationally Standardized Database of Restaurant Food Safety Inspections” (with Ginger Jin)
23. November 19, 2012 **University of Maryland**, College Park, MD
 “Innovation, Iteration & Creation: A Discussion about the Development of New Ideas in the Modern World”
24. November 6, 2012 **World Usability Day**, Minsk, Belarus
 “The Promise of Zoomable User Interfaces”
25. November 2, 2012 **Central & Eastern European Software Engineering Conference in Russia** Moscow, Russia
 “Learning to Code in an Online World”
26. November 2, 2012 **Central & Eastern European Software Engineering Conference in Russia** Moscow, Russia
 Panelist in “Peopleware: what skills and qualifications we need to build a dream team of software engineers”
27. October 4, 2012 **UNISA – University of South Africa**, Johannesburg, South Africa
 “Innovation, Iteration & Creation: A Discussion about the Development of New Ideas in the Modern World”
28. June 20, 2012 **University of Haifa**, Haifa, Israel
 “Books that are Blue: What Children Can Teach Us About Creating New Technologies” (with Allison Druin)
29. June 19, 2012 **Interdisciplinary Center**, Herzilya, Israel
 “Books that are Blue: What Children Can Teach Us About Creating New Technologies” (with Allison Druin)

30. Nov 17, 2011 **Future of Information Alliance**, College Park, MD
“Anonymity and Privacy While Learning”
31. Sept 21, 2011 **U.S. Senate and Congress Briefings**, Washington, DC
Panel participant in “Deconstructing the iPad: How Federally Supported Research Leads to Game-Changing Innovation” run by the Task Force on American Innovation and the CRA
32. Aug 24, 2011 **Summer Social Webshop** College Park, MD
“Translation by Collaboration Among Monolingual Users”
33. May, 2011 **National Science Foundation**, Arlington, VA
Distinguished Lecture Series
“Translation by Collaboration among Monolingual Users” (with Philip Resnik)
34. September, 2010 **Microsoft Research Asia**, Beijing, China
“Collaborative Monolingual Translation”
35. September, 2010 **Tsinghua University**, Beijing, China
“Collaborative Monolingual Translation”
36. April, 2010 **CHI 2010**, Atlanta, GA
Social Impact Award talk
37. October, 2009 **Google**, Mountain View, CA
Panel participant in “Breakthrough Learning in a Digital Age” invitation only conference
38. September, 2009 **Google Tech Talk**, Mountain View, CA
“Translation by Iterative Collaboration between Monolingual Users”
39. April, 2009 **University of Illinois (CS Dept.)**, Champaign-Urbana, IL
“Zoomable User Interfaces from Sun Sparcstations to iPhones”
40. April, 2009 **University of Illinois (iSchool)**, Champaign-Urbana, IL
“From Ulaan Baatar to iPhone: A Digital Library for the World’s Children”
41. February, 2009 **Tufts University**, Medford, MA
“From iPhone to Ulaan Baatar: A Digital Library for the World’s Children”
42. February, 2009 **Microsoft Internal “UX Canvas Camp”**, Redmond, WA
“A Short History of Zoomable User Interfaces”
43. September, 2008, **Carnegie Mellon University**, Pittsburgh, PA
“Black Ears to Blonde Cats: Paths for Designing Change”
44. May, 2008, **Manchester Public Library** Manchester by the Sea, MA
“No Road, Drive: The ICDL Travels to Mongolia”
45. April, 2008 **Web 2.0 Expo**, San Francisco, CA
“Next Generation Mobile UI” (with John SanGiovanni)
46. February, 2008 **USACM Executive Council**, Washington, DC
“Voting Technology: The Not-So-Simple Act of Casting a Ballot”
47. October, 2007 **Widget Summit**, San Francisco, CA
“Mobile Widget Design”
48. September, 2007 **Knight Center for Specialized Journalism**, College Park, MD
“Mobile Technology Trends”
49. June, 2007 **Mobile Marketing Association**, New York, NY
“Designing for Usability”
50. May, 2007 **MIT Enterprise Forum**, Arlington, VA
“Co-present Mobile Collaboration”
51. December, 2006 **Human Factors and Ergonomics Society Potomac Chapter**, Bethesda, MD
“A Library for the World’s Children”

52. June, 2006 **Open Society Forum**, Ulaan Baatar, Mongolia
"A Library for the World's Children"
53. February, 2006 **Dingman Center for Entrepreneurship, R.H. Smith School of Business, UMD**
"Web 2.0 UI"
54. December, 2005 **World Bank**, Washington, DC
"The International Children's Digital Library"
55. December, 2005 **IBM T.J. Watson Research Center**, Hawthorne, NY
"Making Visualization Work"
56. November, 2005 **NSA**, Laurel, MD
"Making Visualization Work"
57. October, 2005 **IBM Research**, Cambridge, MA
"Making Visualization Work"
58. October, 2005 **Johns Hopkins University – Computer Science Dept.**, Baltimore, MD
"Making Visualization Work"
59. September, 2005 **InfoToday Conference on 'Innovations in Search'**, New York, NY
"Zooming Into Visual Search"
60. March, 2005 **NFAIS**, Philadelphia, PA
"Making Sense of Search Results"
61. February, 2005 **American Association for the Advancement of Science (AAAS)** Washington, DC
Panel in annual conference,
"Designing Interfaces for Voting Machines"
62. February, 2005 **National Association of State Election Directors (NASED)** Washington, DC
Invited talk at annual conference.
"Designing Interfaces for Voting Machines"
63. January, 2005 **Microsoft**, Seattle, WA
"Interfaces for Staying in the Flow"
64. January, 2005 **Google**, Mountain View, CA
"The International Children's Digital Library"
65. December, 2004 **National Library of New Zealand**, Wellington, New Zealand
"The International Children's Digital Library"
66. December, 2004 **University of Waikato**, Hamilton, New Zealand
"Interfaces for Staying in the Flow"
67. December, 2004 **Victoria University Wellington**, Wellington, New Zealand
"Interfaces for Staying in the Flow"
68. December, 2004 **University of Canterbury**, Christchurch, New Zealand
"Interfaces for Staying in the Flow"
69. November, 2004 **National Archives and Records Administration (NARA)**, College Park, MD
in Conference "Partnerships in Innovation: Serving a Networked Nation"
"International Children's Digital Library"
70. April, 2004 **Johns Hopkins University Applied Physics Lab**, Laurel, MD
"Interfaces for Staying in the Flow"
71. October, 2003 **University of Maryland, Robert H. Smith School of Business**, College Park, MD
on InForum 2003 panel on "Does IT Matter?"
72. September, 2003 **University of Maryland**, College Park, MD
"Making Visualization Work"
73. September, 2003 **University of Victoria**, Victoria, Canada
"Interfaces for Staying in the Flow"

74. March, 2003 **National Archives and Records Administration**, College Park, MD
"Visualizations for Archivists"
75. March, 2003 **Microsoft Research**, Redmond, WA
"DateLens: A Scalable Fisheye Calendar Interface"
76. January, 2003 **Sun Microsystems**, Menlo Park, CA
"Zoomable User Interfaces for Searching and Browsing"
77. September, 2002 **Microsoft Research Limited**, Cambridge, England
"Information Visualization for Mobile Devices"
78. July, 2002 **Microsoft Research**, Redmond, WA
Demo of DateLens with Bill Gates at Microsoft Faculty Summit
79. July, 2002 **Microsoft Research**, Redmond, WA
"Scalable Interfaces for Mobile Devices"
80. June, 2002, **WebShop**, Dept. of Sociology, UMD, College Park, MD
"Access and Usability: The Importance of Internet Applications"
81. January, 2002 **Workshop on Election Standards and Technology**, Washington, DC
"Visualization Techniques for Electronic Voting"
82. October, 2001 **Microsoft Research**, Redmond, WA
"Zoomable User Interfaces for Searching and Browsing: SearchKids & PhotoMesa"
83. October, 2001 **Xerox PARC**, Palo Alto, CA
"Zoomable User Interfaces for Searching and Browsing: SearchKids & PhotoMesa"
84. November, 2000 **Census Bureau, Dept. of Commerce**, Suitland, MD
"Zoomable User Interfaces"
85. May, 2000 **Bowie State University**, Bowie, MD
"Zoomable User Interfaces and Single Display Groupware"
86. April, 2000 **University of Delaware**, DE
"Zoomable User Interfaces and Single Display Groupware"
87. August, 1999 **Xerox PARC**, Palo Alto, CA
"Zoomable User Interfaces and Single Display Groupware"
88. August, 1999 **University of California, Berkeley**, Berkeley, CA
"Zoomable User Interfaces and Single Display Groupware"
89. August, 1999 **Sun Microsystems, Inc. (Java Group)**, Palo Alto, CA
"Zoomable User Interfaces and Single Display Groupware"
90. July, 1999 **Nokia**, Linköping Sweden
"Zoomable Information Retrieval Systems and Single Display Groupware"
91. June, 1998 **IBM**, Yorktown, NY
"Zoomable User Interfaces"
92. May, 1998 **Washington DC Linux User's Group**, Alexandria, VA
"Zoomable User Interfaces"
93. April, 1998 **National Institute of Standards and Technology (NIST)**, Gaithersburg, MD
"Zoomable User Interfaces"
94. March, 1998 **Microsoft Research**, Redmond, WA
"Zoomable User Interfaces"
95. October, 1997 **Netherlands Design Institute**, Amsterdam, Holland
"Pad++: Zoomable User Interfaces"
96. October, 1997 **Philips Labs**, Eindhoven, Holland
"Pad++: Zoomable User Interfaces"

97. October, 1997 **CID, Royal Institute of Technology (KTY)**, Stockholm, Sweden
"Pad++: Zoomable User Interfaces"
98. September, 1997 **Swedish Institute of Computer Science (SICS)**, Stockholm, Sweden
"Pad++: Zoomable User Interfaces"
99. October, 1996 **ART3000, A French society for the development of Art & Technology**, Paris, France
"Pad++: A Zoomable Graphical Interface"
100. October, 1996 **University of Michigan, Department of Information Sciences**, Ann Arbor, MI
"Pad++: A Zoomable Graphical Interface"
101. July, 1996 **AT&T Bell Labs**, NJ
"Pad++: A Zoomable Graphical Interface"
102. January, 1996 **Stanford University, Cognitive Psychology Group**, CA
"Pad++: A Zoomable Graphical Interface"
103. October, 1995 **Cornell University, Computer Science Department**, Ithaca, NY
"Pad++: A Zoomable Graphical Interface"
104. June, 1995 **Sandia National Labs**, Los Alamos, NM
"Pad++: A Zoomable Graphical Interface"
105. April, 1995 **Los Alamos National Labs**, Los Alamos, NM
"Pad++: A Zoomable Graphical Interface"
106. November, 1993 **Digital Equipment Corporation, Stanford Research Center**, CA
"Pad++: A Multiscale Hierarchical Sketchpad"
107. October, 1993 **Brown University, Computer Science Department**, Providence, RI
"Pad++: A Multiscale Hierarchical Sketchpad"
108. April, 1993 **University of Chicago, Computer Science Department**, |
"PA3D: A Multiscale Hierarchical Sketchpad"
109. October, 1992 **Rensselaer Polytechnic Institute, Computer Science Department**, Troy, NY
"Cortex-I: A Miniature Active Vision System"

H. ORIGINAL DESIGNS, PLANS, INVENTIONS, AND PATENTS

i. Patents

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

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

ii. University Disclosures

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

I. CONTRACTS AND GRANTS

Total Funding: \$18,036,144

UMD Portion: \$10,329,299

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

7. **Google, June 2011, PI**
Search Party: Web-Based Classroom Learning to Search
\$15,000
8. **Google, June 2011, co-PI**
Translate the World: A Unified Framework for Crowdsourcing Translation
\$150,000
9. **Nokia Research, July 2010, PI**
Mobile Learning
\$36,000
10. **NSF, CDI Type I: Translation as a Collaborative Process, Sep 2009, PI**
\$630,000
11. **Google, July 2009, PI**
Translation as a Collaborative Process
\$70,000
12. **Sesame Workshop, January 2009, co-PI**
Literacy 360 Alliance
\$22,500
13. **Eliassen Foundation, Nov 2008, co-PI**
ICDL Elias Project
\$50,000
14. **Intel, Nov 2008, co-PI**
ICDL ClassmatePC Project
\$50,000
15. **NSF, Designing and Understanding Intergenerational Mobile Learning Communities, Sep 2008, co-PI**
\$100,000
16. **Government of Mongolia Ministry of Education, Culture and Science – Nov2008, PI**
International Children’s Digital Library Phase 2
\$230,000
\$190,000 (for UMD)
17. **NSF, Usability Study of Independent Voter Verification Systems – July 2006, co-PI**
PI – Paul Herrnson (Gov’t & Politics)
\$68,000
18. **Government of Mongolia Ministry of Education, Culture and Science – May 2006, PI**
Creating Digital Libraries in Mongolia
\$75,000
19. **IBM Faculty Award – December 2005, PI**
Award to support my research on the open source Piccolo graphics toolkit.
\$30,000
20. **Maryland State Board of Elections, September 2005 – January 2006, co-PI**
PI – Paul Herrnson (Gov’t & Politics)
\$70,000
21. **(Agency not disclosed), April 2005 – March 2006, co-PI**
Joint Institute for Knowledge Discovery
\$224,000 (my part of larger \$2,000,000 effort led by VS Subrahmanian)
22. **Booz Allen (subcontract from ARDA), March 2005 – April 2006**
Human-Information Interaction Research
\$325,000

23. **Toshiba, July 2004 – December 2006, PI**
Automatic Thumbnail Cropping
\$20,000
24. **Microsoft, January 2004 – December 2006, PI**
Interaction Design and Visualization
\$1,000,000
25. **DARPA, February, 2003 – January 2006, PI**
Zoomable User Interfaces for the Semantic Web
\$230,000
26. **NSF, September, 2003 – August 2006, co-PI**
**PI – Paul Herrnson (Gov't & Politics), co-PI, Richard Niemi (Univ. of Rochester),
Michael Traugott (Univ. of Michigan)**
An Assessment of Voting Technology and Ballot Design
\$900,000 – approx \$540K for UMD research
27. **Chevron, Oct 2002 – Oct 2003, co-PI**
PI – Catherine Plaisant (UMIACS)
Information Visualization for the Oilfield of the Future
\$75,000
28. **IBM, September, 2002, PI**
T221 high-resolution display
\$9,000 in kind
29. **IMLS, September, 2002 – August, 2005, co-PI**
PI – Allison Druin (CLIS)
The Children's International Digital Library
\$397,162
30. **NSF, September, 2002 – August 2005, PI**
Search Interfaces for Biodiversity Informatics
\$380,000
31. **NSF, September 2002 – August 2007, co-PI**
PI – Allison Druin (CLIS), co-PI, Anne Weeks
Developing a Children's International Digital Library
\$3,000,000 (\$2,125,000 to UMD)
32. **NSF, September 2002 – August 2005, co-PI**
co-PI – Allison Druin (CLIS), PI - Nancy Kaplan (Univ. of Baltimore), Stuart Malthrop (U. of Balt.)
An HCI Partnership Serving Under represented Groups
\$420,000 (\$133,000 to UMD)
33. **Microsoft Research, May 2002 – April 2001, PI**
Mobile Interfaces and .NET
\$100,000
34. **Microsoft Research, September 2001 – August 2002, PI**
Mobile Interfaces
\$50,000
35. **DARPA, May 2001 – August 2003, PI**
Zoomable User Interfaces for the Semantic Web
\$320,000
36. **European Union – Esprit, The Disappearing Computer, Jan 2001 – December 2003, co-PI**
co-PI – Allison Druin (CLIS), Several PIs in Europe
With Royal Institute of Technology (KTH – Sweden), Univ. of Paris Sud, France.
InterLiving: Designing Interactive, Intergenerational Interfaces for Living Together
~\$1,500,000 - approx \$400K for UMD research

37. **Chevron, Nov 2000 – May, 2002, PI**
co-PI – Catherine Plaisant (UMIACS)
Information Visualization
\$141,000
38. **DARPA, May 1998 – June 2002, PI**
Zoomable User Interfaces for InImEx and Command Post of the Future (CPOF)
\$1,000,000
39. **Lockheed Martin Corp. sub-contract from DARPA, June 1999 - June 2000, PI**
Unified Zoomable Environment (UZE) for Command Post of the Future
\$40,000
40. **European Union – Esprit, Intelligent Information Interfaces, Sept. 1998 – August 2001, co-PI**
co-PI – Allison Druin (CLIS), Several PIs in Europe
With Swedish Institute of Computer Science, Royal Institute of Technology (KTH – Sweden)
University of Nottingham, England.
KidStory
~\$1,500,000 - approx \$300K for UMD research
41. **Sun Microsystems, May 1999, PI**
Zoomable User Interfaces
\$30,000 in equipment
42. **UNM sub-contract from DARPA, February 1998 – March 1999, PI**
Pad++: Zoomable User Interfaces
\$200,000
43. **Microsoft, April, 1998, PI**
Productivity and development software
\$5,000 in software and tech support
44. **Trivista, PI January 1998 - January 1999, PI**
Graphical User Interfaces based on Zooming
\$50,000

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45. **Sony Research Corporation, PI**
co-PI – Jim Hollan (Univ. of New Mexico), co-PI – Ken Perlin (New York University)
Licensing of Pad++ software from UNM and NYU
\$500,000 plus royalties
46. **Intel Donation, January, 1997, co-PI**
PI – Jim Hollan (Univ. of New Mexico)
200 MHz PC Computer
\$4,000 in-kind
47. **DARPA, July'94 - June'97, Worked on grant with Jim Hollan**
Beyond Imitation: A Strategy For Building A New Generation of HCI Design Environments
\$3,000,000 over 3 years with subcontracts to New York University and the Univ. of Michigan
48. **Sandia LDRD (Sandia internal research project) Oct'95 - Oct'96, PI**
Data Zooming - A New Physics for Information Navigation
\$64,000
49. **Sandia SURP (Sandia University Research Program) Oct'95 - Oct'96, PI**
Pad++: A Zoomable Interface to the World-Wide Web
\$40,000
50. **Sony Research Corporation, Jan'96, PI**
co-PI – Allison Druin (University of New Mexico)
Help plan Sony's efforts to develop a Zooming User Interface system
\$3,674

51. **Sandia LDRD (Sandia internal research project) Oct'94 - Oct'95, Worked on grant with Jim Hollan**
\$40,000
52. **Bellcore Donation, July'93, PI**
SGI Indigo Workstation computer
\$30,000 in-kind

J. FELLOWSHIPS, PRIZES, AWARDS

1. **2022 – IEEE VIS Test of Time Award.** Joint with Catherine Plaisant and Jesse Grosjean – for my 2002 paper: SpaceTree: Supporting Exploration in Large Node Link Tree, Design Evolution and Empirical Evaluation. *IEEE Symposium on Information Visualization, 2002. INFOVIS 2002.*, 2002, pp. 57-64, doi: 10.1109/INFVIS.2002.1173148. <https://ieevis.org/year/2022/info/awards/test-of-time-awards>
2. **2021 – IEEE VIS Test of Time Award.** Joint with Ben Shneiderman and Martin Wattenberg – for my 2001 and 2002 papers: Ordered and Quantum Treemaps: Making effective use of 2D space to display hierarchies. Benjamin B. Bederson, Ben Shneiderman, Martin Wattenberg. *ACM TOG* 21(4):833-854 200
DOI: 10.1145/571647.571649. <https://ieevis.org/year/2021/info/awards/test-of-time-awards>
3. **2016 – Winner of Best Historical Paper Award.** Joint with Pekka Parhi and Amy K. Karlson
MobileHCI 2016 – 18th International Conference on Human-Computer Interaction With Mobile Devices and Services for “Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices”, MobileHCI 2006.
4. **2012 – Elected to the CHI Academy**
<http://www.sigchi.org/about/awards/>

The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry, and led the research and/or innovation in human-computer interaction. The criteria for election to the CHI Academy are:

- Cumulative contributions to the field.
- Impact on the field through development of new research directions and/or innovations.
- Influence on the work of others.

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

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

6. **2010 – ICDL received the American Library Association President’s Award for International Library Innovation.** Joint with Allison Druin and Ann Weeks.
7. **2010 – Winner of SIGCHI Social Impact Award**
<http://www.sigchi.org/about/awards/2010-sigchi-awards>
8. **2009 – Winner of Digital Education Achievement Award from the Center for Digital Education and Converge magazine**
For joint work on the International Children’s Digital Library with Allison Druin and Ann Weeks.
9. **2007 – Winner of Brian Shackel Award for
“outstanding contribution with international impact in the field of HCI”**
Karlson, A., & Bederson, B. B. (2007) ThumbSpace: Generalized One-Handed Input for Touchscreen-Based Mobile Devices, *Proceedings of INTERACT 2007*, 324-338.
10. **2005 – IBM Faculty Award**
\$30,000 gift to support my work on open source Piccolo graphics toolkit

11. **2005 – The International Children’s Digital Library (www.icdlbooks.org)** website was selected for inclusion by the National Endowment for the Humanities on their EDSITEMent website (<http://edsitement.neh.gov>) as one of the best online resources for education in the humanities.
12. **2004 – Winner of InfoVis Contest**
Lee, B., Czerwinski, M., Robertson, G. G. &, Bederson, B. B. (2004). “Understanding Eight Years of InfoVis Conferences using PaperLens”, InfoVis 2004, IEEE, 216-217.
13. **2003 – Winner of Best Student Paper Award**
Suh, B., Ling, H., Bederson, B. B., & Jacobs, J. W. (2003). “Automatic Thumbnail Cropping and Its Effectiveness”. UIST 2003, ACM Symposium on User Interface Software and Technology, CHI Letters, 5(2), 95-104.
14. **1992 – Janet Fabri Memorial Award for Outstanding Doctoral Dissertation,**
Department of Computer Science, Courant Institute, New York University

K. REVIEWING ACTIVITIES

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

L. OTHER

i. Software

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

ii. Media

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

2. August 29, 2016 **The Diamondback** by Andrew Dunn
 “University System of Maryland to offer an online course for free”
<http://www.dbknews.com/2016/08/30/mooc-umb-umuc-online-usm/>
3. February 15, 2016 **The Diamondback** by Samantha Reilly
 “SGA passes resolution to revive 2012 syllabus bill”
<http://www.dbknews.com/2016/02/16/umd-sga-passes-syllabus-resolution-to-revive-university-senate-bill/>
4. September 24, 2015 **The Diamondback** by Taylor Swaak
 “Active-Learning Courses Gain Traction at the University of Maryland”
http://www.diamondbackonline.com/news/active-learning-courses-gain-traction-at-the-university-of-maryland/article_435098ca-6247-11e5-a8e2-df59d97181a5.html
5. September 14, 2015 **Washington Post Express** by Beth Luberecki
 “Massive open online courses (MOOCs) can help you achieve the next step in your career”
<https://www.washingtonpost.com/express/wp/2015/09/14/massive-open-online-courses-moocs-can-help-you-achieve-the-next-step-in-your-career/>
6. April 30, 2015 **The Diamondback** by Talia Richman
 “USM Center for Academic Innovation to be renamed to honor Brit Kirwan”
http://www.diamondbackonline.com/news/article_51cbc02c-eeb7-11e4-a838-6b9857ba8e37.html
7. April 13, 2015 **The Diamondback** by Rokia Hassanein
 “UMD Team Creates Nation’s Largest Food Safety Inspection Database”
http://www.diamondbackonline.com/news/article_553da506-e181-11e4-b6c9-0f23d720b7cc.html#.VS1VV_HbNqc.twitter
8. April 6, 2015 **Quality Assurance & Food Safety Magazine**
 “Database of Food Safety Inspection Information Created”
<http://www.qualityassurancemag.com/food-safety-inspection-information.aspx>
9. February 23, 2015 **Diamondback, UMD Student Newspaper** by Taylor Swaak
 “New UMD website offers alternative ways to save money on textbooks”
http://www.diamondbackonline.com/news/article_0d910a34-baf5-11e4-826a-dfbc9e8b5f8.html
10. January 13, 2015 **WAMU Kojo Nnamdi Show**
 “The Rise of Mobile Apps”
http://thekojoannamdishow.org/shows/2015-01-13/tt_the_rise_of_mobile_apps
11. October 1, 2014 **The Chronicle of Higher Education**
 “Optimism About MOOCs Fades in Campus IT Offices”
<http://chronicle.com/blogs/wiredcampus/optimism-about-moocs-fades-in-campus-it-offices-survey-finds/54705>
12. September 8, 2014 **WAMU Kojo Nnamdi Show**
 “Beefing Up Photo, Cloud and Online Security”
<http://thekojoannamdishow.org/shows/2014-09-09/beefing-photo-cloud-and-online-security>
13. April 29, 2014 **Diamondback, UMD Student Newspaper** by James Levin
 “Learning to ask for help”
http://www.diamondbackonline.com/news/article_632cbbb8-cf5b-11e3-b8b4-0017a43b2370.html
14. April 18, 2014 **CNN.com** by Emanuella Grinberg
 “Removing ‘barriers’ to education through free college textbooks”
<http://www.cnn.com/2014/04/18/living/open-textbooks-online-education-resources/>
15. January 27, 2014 **DiamondBack, UMD Student Newspaper** by Ellie Silverman
 “University expanding online class sequences through Vanderbilt partnership”
http://www.diamondbackonline.com/news/campus/article_dff739f4-86ed-11e3-9a18-001a4bcf6878.html
16. September 27, 2013 **Baltimore Business Journal** by Sarah Gantz
 “Maryland Schools use Online Model to Tout Brand, Attract Students”
<http://www.bizjournals.com/baltimore/print-edition/2013/09/27/maryland-schools-use-online-model-to.html?page=all>

17. July 16, 2013 **HuffingtonPost.com**
 “Blended Learning: College Classrooms of the Future”
http://www.huffingtonpost.com/uloop/blended-learning-college-_b_3598718.html
18. December 5, 2012 **Diamondback, UMD Student Newspaper** by Allison Gray
 “University members hoping to see ‘massive open online courses’ integrated”
http://www.diamondbackonline.com/news/article_4873330c-3ef1-11e2-9a16-0019bb30f31a.html
19. September 21, 2012 **SmartMoney.com** by Quentin Fottrell
 In Apple’s Maps War vs. Google, Consumers Lose
http://blogs.smartmoney.com/advice/2012/09/21/in-apples-maps-war-vs-google-consumers-lose/?link=SM_hp_ls4e
20. September 18, 2012 **WAMU Kojo Nnamdi Show**
 “Creativity and the Patent Wars” (guest on one-hour show)
<http://thekojoannamdishow.org/shows/2012-09-18/creativity-and-patent-wars>
21. September 7, 2012 **New York Magazine** by Matthew Shaer
 “The Digital Elite: Smartphones are getting huge. Can the average-size thumb keep up?” (discusses my study on thumb size and mobile touch screens.
22. Aug 13, 2012 **Fact Witness in Apple v. Samsung trial covered broadly**
<http://blogs.wsj.com/digits/2012/08/13/samsungs-first-witnesses-push-prior-art-after-minor-victory/>
http://news.cnet.com/8301-13579_3-57492486-37/samsung-goes-on-offense-aims-to-bust-apple-patents/
<http://arstechnica.com/tech-policy/2012/08/apple-rests-patent-case-as-judge-tosses-three-samsung-phones-from-trial/>
<http://www.forbes.com/sites/connieguglielmo/2012/08/13/apple-says-it-complained-about-samsung-copying-in-2010-live-blog/>
<http://allthingsd.com/20120813/judge-refuses-to-toss-most-of-apples-suit-against-samsung/>
<http://www.theverge.com/2012/8/13/3240686/samsung-apple-patents-launchtile-diamonddtouch-table>
<http://www.eweek.com/c/a/Mobile-and-Wireless/Samsung-Begins-Presenting-Case-in-Apple-Patent-Infringement-Trial-162894/>
23. May 7, 2012 **WAMU Kojo Nnamdi Show**
 “Free Online Courses - Higher Ed of the Future?” (guest on hour show)
<http://thekojoannamdishow.org/shows/2012-05-07/free-online-courses-higher-ed-future>
24. January 24, 2012 **Washington Post** by Bonnie Berkowitz and Alberto Cuadra
 “Touchscreens: How they work”, I am the primary source
http://www.washingtonpost.com/national/health-science/touchscreens-how-they-work/2012/01/23/gIQAZHIAMQ_graphic.html
25. June 28, 2011 **New Scientist** by Jim Giles
 “The man-machine: Harnessing humans in a hive mind”, discussed MonoTrans.
<http://www.newscientist.com/article/mg21028181.900-the-manmachine-harnessing-humans-in-a-hive-mind.html>
26. June 14, 2011 **WAMU Kojo Nnamdi Show**
 “A Shift in Cloud Computing” (guest on hour show)
<http://thekojoannamdishow.org/shows/2011-06-14/shift-cloud-computing>
27. May 13, 2011 **Discovery News** by Alyssa Danigelis
 “Tech Turns Air into a Multi-touch screen”, quoted.
<http://news.discovery.com/tech/touch-screen-technology-zero-touch-110513.html>
28. April 28, 2011 **Converge Magazine** by Tanya Roscorla
 “Music Apps Take Top Prizes in U of Maryland Contest”, discusses mobile app from the University of Maryland mobile app contest that I ran.

29. April 26, 2011 **Voice of America** by Do Noghte Seft (in Persian)
 “Mobility Initiative ابتكار تحرک”
<http://www.youtube.com/donoghteseft>
30. April 24, 2011 **Washington Post**
 “Business Rx: A jukebox democracy in search of voters”, discusses mobile app from the University of Maryland mobile app contest that I ran.
31. February 25, 2011 **New Scientist** by Jim Giles and Jacob Aron
 “Crowdsourced translations get the word out from Libya”, discusses my MonoTrans project
<http://www.newscientist.com/article/dn20174-crowdsourced-translations-get-the-word-out-from-libya.html>
32. February 9, 2011 **DiamondBack, UMD Student Newspaper**
 “Creativity at her fingertips” by Erin Egan
http://www.diamondbackonline.com/news/article_f7143841-131c-5695-a310-42596336345d.html
33. February 8, 2011 **WAMU Kojo Nnamdi Show**
 “A Revolution in Tech Jobs? The Murky World of Online Labor” (hour show with me as only guest)
<http://thekojoannamdishow.org/shows/2011-02-08/revolution-tech-jobs-murky-world-online-labor>
34. November 23, 2010 **WAMU Kojo Nnamdi Show**
 “The End of Email and other Tech Prognostications”
 (hour show with me and one other guest)
<http://thekojoannamdishow.org/shows/2010-11-23/end-email-and-other-tech-prognostications>
35. November 9, 2010 **MIT Technology Review** by Erica Naone
 “Gesturing at Your TV Isn’t Ready for Prime Time” quotes me discussing Microsoft Kinect
<http://www.technologyreview.com/computing/26691/>
36. October 27, 2010 **MIT News** by Larry Hardesty
 “Programming crowds” quotes me in analyzing Rob Miller’s work
<http://web.mit.edu/newsoffice/2010/programming-crowds-1027.html>
37. October 2, 2010 **News 8 TV Austin**
 “App Wrap: eReading for Kids” discussing StoryKit app for iPhone
<http://www.news8austin.com/content/headlines/274426/app-wrap--ereading-for-kids>
38. August 24, 2010 **WAMU Kojo Nnamdi Show**
 “Automating Language Translation: The Future of a Unified Internet?” discussing my research and the general topic of crowdsourcing and translation.
<http://thekojoannamdishow.org/shows/2010-08-24/automating-language-translation-future-unified-internet>
39. May 4, 2010 **Technology Review**
 “Redesigning the Web for Touch Screens”
http://www.technologyreview.com/printer_friendly_article.aspx?id=25236&channel=computing&section=
40. April 2010 **FutureGov Magazine** by Kelly Ng, Singapore
 Description of ICDL for iPad application
41. April 17, 2010 **ABC 7 News, WLS-TV Chicago**
 “Chicago Students Face Off in Battle of Books”
<http://abclocal.go.com/wls/story?section=news/local&id=7392055>
42. April 8, 2010 **Publisher’s Weekly**
 “The iPad Meets the Children’s Book”
http://www.publishersweekly.com/article/455914-The_iPad_Meets_the_Children_s_Book.php?nid=2788&source=link&rid=16811925
43. April 3, 2010 **The Independent**, London
 “Children’s book iPad apps offer multilingual tales, long-distance bedtime stories”
<http://www.independent.co.uk/arts-entertainment/books/childrens-book-ipad-apps-offer-multilingual-tales-longdistance-bedtime-stories-1934847.html>

44. January 28, 2010 **Baltimore Sun**, Baltimore, MD
 “Apple unveils tablet computer” by Gus G. Sentementes
<http://www.baltimoresun.com/business/technology/bal-bz.ipad28jan28,0,5120135.story>
45. December 2009 **FutureGov Magazine** by Kelly Ng, Singapore
 “Inside the Teacher’s Lounge” covered Ben’s keynote UNESCO talk in Hangzhou, China
46. November 20, 2009 **World Bank Blog**
<http://blogs.worldbank.org/edutech/icdl-1>
47. November 2, 2009 **Technology Review.com**
 “First Test for Election Cryptography”
<http://www.technologyreview.com/web/23836/>
48. December 23, 2008 **WAMU Kojo Nnamdi Show**, Washington, DC
 “Computer Guy”
49. September 18, 2008 **America.gov**
 “Kids Help Design International Children’s Digital Library” by Jeffrey Thomas
<http://www.america.gov/st/educ-english/2008/September/200809181459141CJsamohT0.2946283.html>
 Also published in **gulf-times.com** in Qatar
http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=245520&version=1&template_id=46&parent_id=26
50. April 25, 2008 **C|Net News.com**
 “The Six Secrets of Mobile Computing Success” by Tom Krazit
51. February 8, 2008 **WYPR Maryland Morning**, Baltimore, MD
 10 minute radio interview about usability of voting systems
52. January 30, 2008 **KCSN News** by Jessica Caldera
 Short radio interview about usability of voting systems
53. January 29, 2008 **Technology Review.com** by Erica Naone
 “Voting with (Little) Confidence”
<http://www.technologyreview.com/Infotech/20122/>
54. January 28, 2008 **ScienceDaily.com**
 “Touch Screen Voting A Hit; Critics Miss Mark on Security, Study Says”
<http://www.sciencedaily.com/releases/2008/01/080123170954.htm>
55. January 26, 2008 **Newsweek** by Barrett Sheridan
 “Like a Super Hero: Humans weren’t made for scrolling and searching. We were made for zooming.”
<http://www.newsweek.com/id/105532/output/print>
56. January 25, 2008 **Government Executive.com** by Gautham Nagesh
 “Voters confused by e-voting machines, study finds”
<http://www.govexec.com/dailyfed/0108/012508n1.htm>
57. January 22, 2008 **WAMU Kojo Nnamdi Show**, Washington, DC
 Thirty minute segment on “Technology User Frustrations – Spotlight on Cellphones”
<http://wamu.org/programs/kn/08/01/22.php#19083>
58. January 16, 2008 **KUOW, The Conversation**, Seattle, WA
 The guest on an hour-long call-in talk show on the future of cellphones.
<http://www.kuow.org/defaultProgram.asp?ID=14159>
59. October 30, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
 “Computer Guy”, talking about software reliability
60. August 7, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
 “Computer Guy”, current tech events, iPhone, Tivo, and listeners email and calls
<http://wamu.org/programs/kn/07/08/07.php>

61. June 13, 2007 **New York Times** by John Markoff
"That iPhone has a keyboard, but it's not mechanical"
<http://www.nytimes.com/2007/06/13/technology/13phone.ready.html>
62. June 5, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", Microsoft Surface, cell phone problems, and listeners email and calls
<http://wamu.org/programs/kn/computerguys/07/cg070605.php>
63. April 3, 2007 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", Physical and virtual convergence, and listeners email and calls
<http://wamu.org/programs/kn/computerguys/07/cg070403.php>
64. March 17, 2007 **Science News** weekly magazine, by Ivars Peterson
"Games Theory", several quotes by me on article about von Ahn's games.
<http://www.sciencenews.org/articles/20070317/bob9.asp>
65. January 18, 2007 **Wall Street Journal**, by Jeremy Wagstaff
"The March of Time", covering DateLens
66. December 31, 2006 **Associated Press**, by Brian Bergstein
"Low-Cost Laptop Could Transform Learning"
<http://www.washingtonpost.com/wp-dyn/content/article/2006/12/31/AR2006123100380.html>
AP story picked up in 175 locations, including:
 - Washington Post
 - BusinessWeek
 - Chicago Tribune
 - Boston Globe
 - ABC News
 - CNN
 - FOX News
 - Eyewitness News
 - Forbes
 - BBC News, UK
 - Sydney Morning Herald, Australia
 - The Age, Australia
 - Economic Times, India
67. December 5, 2006 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy", Vista, holiday tech gifts, and listeners email and calls
<http://www.wamu.org/programs/kn/06/12/05.php#12452>
68. September 22, 2006 **Salon.com** by Katharine Mieszkowski
"Written out of the story", discussing write-in votes using the Hart eSlate system
http://www.salon.com/news/feature/2006/09/22/delay_write_in/index_np.html
69. May 2, 2006 **WAMU Kojo Nnamdi Show**, Washington, DC
"Computer Guy – life in the fast lane", discussing broadband at home
<http://www.wamu.org/programs/kn/06/05/02.php#10686>
70. April 23, 2006 **Pittsburgh Post-Gazette** by Mark Roth
"Experts see computers getting bigger and smaller at the same time"
<http://www.post-gazette.com/pg/06113/684425-96.stm>
71. March 9, 2006 **Baltimore Sun** by Mike Himowitz
"PhotoMesa a nifty way to organize photographs"
<http://www.baltimoresun.com/technology/bal-bz.himowitz09mar09,0,3518441.column>
72. February 21, 2006 **WAMU Kojo Nnamdi Show**, Washington, DC
"Wiki Sites"
<http://www.wamu.org/programs/kn/06/02/21.php#10383>

73. February 3, 2006 **Baltimore Sun** by Frank D. Roylance
 "Spreading the e-word" (quoted about Sony's new ebook reader e-paper)
<http://www.baltimoresun.com/news/health/bal-hs.eink03feb03,1,3010066.story>
74. January 13, 2006 **Washington Business Journal** by Jennifer Nycz-Conner
 "What was I doing, again?"
<http://www.bizjournals.com/washington/stories/2006/01/16/focus1.html>
75. November 18, 2005 **c|net News.com** by Stefanie Olsen
 "The 'millennials' usher in a new era" (about ICDL)
http://news.com.com/The+millennials+usher+in+a+new+era/2009-1025_3-5944666.html?tag=nefd.lede
76. September, 2005 **Chicago Parent** by Jane Huth
 "Screen time=reading time"
<http://www.chicagoparent.com/main.asp?SectionID=10&SubSectionID=32&ArticleID=529&TM=67415.63>
77. September 22, 2005 **Delphos Herald**
 "Site Seeing"
<http://www.delphosherald.com/page2.php?story=8655&archive=>
78. April, 2005 **Chicago Parent** by Judy Belanger
 "Explore the world by turning pages"
<http://www.chicagoparent.com/main.asp?SectionID=10&SubSectionID=33&ArticleID=306&TM=67012.6>
79. April 5, 2005 **EE Times** by Nicolas Mokhoff
 "Microsoft touts 'thumb-as-stylus' interface progress"
<http://www.eetimes.com/showArticle.jhtml;jsessionid=NHVZOY3L1AQWUQSNDBGCKH0CJUMKJVN?articleID=160500234>
 Also picked up by **Information Week**
80. March 10, 2005 **folha equilibrio (Brazil)** by Sérgio Rizzo
 "Cibertentações" (article about computer-based distraction, describing some of my work.)
81. March, 2005 **Radio City (Ecuador) / BBC Affiliate**
 5 minute radio interview (performed in English, translated into Spanish)
82. March 1, 2005 **The Statesman (India)** by Stanley Theodore
 "Webcrawler: All About E-Attention Deficit Disorder"
<http://www.thestatesman.net/page.news.php?clid=24&theme=&usrsess=1&id=70119>
83. February 28, 2005 **Washington Times** by Ann Geracimos
 "New Chapter in Online Books"
<http://washingtontimes.com/metro/20050227-101610-1015r.htm>
84. February 18, 2005 **North Carolina State Technician** by Danny Frye
 "Research targets computer distraction such as AIM"
<http://technicianonline.com/story.php?id=011167>
85. February 13, 2005 **Bloomberg Radio, "Simply Put"** by Michael Goldman & Tom Moroney
 9 minute interview discussing attention and interruptions on the computer
86. February 10, 2005 **New York Times** by Katie Hafner
 "You There, at the Computer: Pay Attention"
<http://www.nytimes.com/2005/02/10/technology/circuits/10info.html>
 Also picked up by
 - a. **International Herald Tribune (France)**
 - b. **ABS CBN News (Philippines)**
 - c. **CNET News.com**
 - d. **Spartanburg Herald (SC)**
 - e. **Wilmington Morning Star (NC)**
 - f. **Minneapolis Star Tribune (MN)**
87. Nov 11, 2004 **Maryland Public Television** by Frank Batavick
 "Message in a Bottle", Bob the vid-tech guy 30 minute special including 5 minute segment of Allison Druin and me explaining email and instant messaging to children.

88. May 7, 2004 **Baltimore Sun** by Elizabeth Schuman
"Research Lab Crosses Cultures"
89. October 20, 2003 **The Feature** by Jeff Goldman
"A View Into Your Phone"
<http://www.thefeature.com/article?articleid=100146>
90. October 10, 2003 **The Independent** by Charles Arthur
"Treemap Offers a New Way of Visualizing Complex Data. Nothing Beats it for Simplicity and the "wow!" effect when you first use it."
<http://news.independent.co.uk/digital/features/story.jsp?story=451099>
91. July, 2003 **Higher Learning – Technology Serving Education**
"Web Sites: The International Children's Digital Library"
92. July 7, 2003 **Pittsburgh Post-Gazette** by Karen MacPherson
"Web Site Invites Children to Read Online: International Children's Digital Library Caters to Young Around the Globe"
93. June 15, 2003 **San Antonio News 9** by Michael Garfield
"Website a Fun Way to Encourage Kids to Read"
94. April 11, 2003 **San Jose Mercury News** by Dan Gillmor
"Designing New Handhelds to Improve Interactions Between Humans, Computers"
Also picked up by **New Jersey Star Ledger (NJ)**
95. February 12, 2003 **Tech TV Live** by Peter Barnes
Also on **abcnews.com**
"Easy Online Reader: An International Online Nook for Children's Books"
96. January 17, 2003 **Voice of America TV** by Larry Clamage
4.5 minute video of children's design team focusing on ICDL
97. December, 2002 **Sun's Java Website**
ICDL Linked to from <http://java.sun.com/industry/>
98. December 17, 2002 **Associated Press**
Picture of Ben Bederson w/ Bill Gates at Microsoft about DateLens project
 - a. **Seattle Post Intelligencer (WA)**
 - b. **Times Daily (AL)**
 - c. **Sarasota Herald-Tribute (FL)**
 - d. **Naples Daily (FL)**
99. December 16, 2002 **Baltimore Sun** by Alex MacGillis
"Two Study Intricacies of Voting Machines"
Also picked up by AP, excerpts in:
 - a. **USA Today**
 - b. **WMAR (MD)**
 - c. **WBAL-TV (MD)**
 - d. **News Channel 8.net**
100. December 12, 2002 **Philadelphia Inquirer** by Joyce Kasman Valenza
"tech.life @ school | New virtual library offers children much"
101. December 10, 2002 **Le Monde (France)** by Chantal Dussuel
"Livres en ligne pour internautes on herbe"
102. December 10, 2002 **Christian Science Monitor**
News in Brief – ICDL
103. December 5, 2002 **New York Times** by Lisa Guernsey
"Online Library Project Plans a Digital and Cultural Trove for Children"
104. December 1, 2002 **Die Burger (South Africa)**
"Paragrawe"

105. November 30, 2002 **The Vancouver Sun (Canada)**
"Book Endz: Free Kid's Books"
106. November 30, 2002 **La Vanguardia (Spain)**
"Nuevos Proyectos: TalentMatch.com, International Children's Digital Library SoapCity"
107. November 27, 2002 **USA Today** by Karen Thomas
"World Books, Children Click"
108. November 27, 2002 **The Ohama World-Herald**
"TechBytes: Digital Library Links Kids to Other Cultures"
109. November 27, 2002 **Education Week**
"Internet Library for Children Invites the World to Read"
110. November 26, 2002 **The Gold Coast Bulletin (Australia)**
"The Net: News Bytes"
111. November 25, 2002 **intern.de (Germany)**
"Kinderbibliothek"
112. November 25, 2002 **Seattle Post-Intelligencer**
"Kids Books Now Online"
113. November 21, 2002 **AP Wire** by Sam Hannel
"Web Site to Give Free Access to Children's Books"
 - a. **ABCNews.com**
 - b. **The Age (Australia)**
 - c. **Ananova.com (UK)**
 - d. **Asia Pacific Media Network**
 - e. **The Baltimore Sun**
 - f. **Globetechnology.com (Canada)**
 - g. **KTVU 2 News (Bay Area)**
 - h. **Indiana Gazette**
 - i. **MSNBC.com**
 - j. **Newsday.com**
 - k. **Rapid City Journal**
 - l. **San Jose Mercury News**
 - m. **Sarasota Herald-Tribune (Florida)**
 - n. **Santa Fe New Mexican**
 - o. **Seattle Post-Intelligencer**
 - p. **Sydney Morning Herald (Australia)**
 - q. **Waterloo/Cedar Falls**
 - r. **WFTV (Florida)**
114. November 21, 2002 **24ur.com (Slovenia)**
"Knjige brezplačno na internetu"
115. November 21, 2002 **Courier Mail (Australia)**
116. November 21, 2002 **United Press International (UPI)**
"New Online Library for Kids Launched"
117. November 21, 2002 **Washington Post (.COM Column)** by Leslie Walker
"A Library for Young Browsers"
 - a. **International Herald Tribune**
 - b. **SFGate.com (San Francisco)**
118. November 21, 2002 **Internet Magazine**
"Site Offers Free Access to Kids Books"
119. November 20, 2002 **Magasinet (Norway)**
"Lager verdensbarnebibliotek"
120. November 20, 2002 **Fox 5 TV News** by John Henrehan
Live 1.5 minutes on 5:00pm news

121. November 18, 2002 **All Things Considered on NPR** by David Kestenbaum
"Library for Kids Goes Online" (11 minutes)
122. October, 2002 **Digital Computer Magazine**
Review of PhotoMesa
123. September 23, 2002 **ComputerSweden** by Anders Lotsson
"Square Zoom in the Hand"
124. August 19, 2002 **Ohio Repository** by Joan Renner
"Ensuring validity is a big concern in electronic voting"
125. August 18, 2002 **Ohio Repository** by Joan Renner
"Voting test shows pros, cons"
126. August 12, 2002 **eWeek**, by Anne Chen
"DateLens Stays Organized in C#"
127. August 5, 2002 **Grid Today**
"Bill Gates Highlights Academic Collaboration Key to Future"
128. July 29, 2002 **eWeek**, by Anne Chen
"Gates: .NET Won't Happen Overnight"
129. July 29, 2002 **InfoWorld**, by Matt Berger
"Gates, academics joins on security, shared source"
130. July 29, 2002 **NetworkWorldFusion**, by Matt Berger
"Gates, academics joins on security, shared source"
131. May 9, 2002 **Washington Post (.COM Column)**, by Leslie Walker
"A Visual Rather Than Verbal Future"
132. May 9, 2002 **Washington Post Website**, by Eleanor Hong
"Human-Computer Interaction Lab at the University of Maryland" – Interview with me, Allison Druin, and Ben Shneiderman.
133. August 1, 2001 **Sun Microsystems Java Website**, by Jon Byous
"View With a Zoom: Browse and Zoom Digital Images in One Application" describes PhotoMesa and my treemap algorithms.
134. July 2, 2001 **ComputerWorld** by Sami Lais
"Treemaps Bloom" describes my photo browser application PhotoMesa which uses Jazz
135. June 4, 2001 **ComputerWorld** by Sami Lais
"Software for the 4th Dimension" describes TimeSearcher which uses Jazz
136. August 12, 2000 **New Scientist Magazine**
"Maximizing Minimalism", an article Zoomable User Interfaces, KidPad, and Fisheye Menus
137. Fall, 2000 **College Park**, by Tom Ventsias
"Zooming Ahead", an article about Zoomable User Interfaces
138. June 26, 2000 **ComputerWorld**, by Sami Lais
"Zoomin' Ahead", an article about Zoomable User Interfaces and Fisheye Menus
139. September, 1999 **Sun Microsystems Java Website**, by Jon Byous
An interview with me under their face-to-face column.
140. December 21, 1998 **Baltimore Sun**
Reprinted in New York Newsday, Dec. 30, 1998
"Children first: In designing toys, one lab turns to the experts in the field."
141. April 4, 1997 **The Chronicle of Higher Education** by Jeffrey R. Young
"New Ways of Organizing Data Could Change Nature of Computers"
142. February, 1997 **Nov'Art**
a French Magazine sponsored by Art3000, a society devoted to integration of technology and art.

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

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

3. TEACHING AND ADVISING

A. COURSES TAUGHT

i. General

Fall 2015	<i>Paths to CS</i> (CMSC198C/D/E) – 96 Students
Fall 2013	<i>Paths to CS</i> (CMSC198C/D/E, 1-3 credits) – 36 Students CMSC198C Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.6 (College comparison: 2.8) Effective teacher: 3.9 (College comparison: 2.9) CMSC198D Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.8 (College comparison: 2.8) Effective teacher: 4.0 (College comparison: 2.9)
Fall 2012	<i>Tech for CS Startups – Team taught</i> (CMSC 498E, 1 credit) – 19 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.0 (College comparison: 3.2) Effective teacher: 3.7 (College comparison: 2.9)
Spring 2012	<i>Reading Seminar: Future of HCI – Team taught</i> (CMSC 838B, 1 credit) – 13 Students
Fall 2011	<i>Social Computing Seminar</i> (CMSC 838B, 3 credits) – 20 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.7 (College comparison: 3.2) Effective teacher: 3.8 (College comparison: 3.2)
Fall 2011	<i>Intro to Human-Computer Interaction</i> (CMSC 434) – 37 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.5 (College comparison: 3.2) Effective teacher: 3.5 (College comparison: 3.0)
Spring 2011	<i>Intro to Human-Computer Interaction</i> (CMSC 434) – 42 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 2.9 (College comparison: 3.2) Effective teacher: 3.0 (College comparison: 3.0)
Fall 2010	<i>Reading Seminar in Human Computation</i> (CMSC 838B, 1 credit) – 9 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.8 (College comparison: 3.2) Effective teacher: 3.9 (College comparison: 3.5)
Fall 2010	<i>Digital Cultures and Creativity</i> (HDCC 105, co-taught) – 56 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 2.4 (College comparison: 2.5) Effective teacher: 3.2 (College comparison: 3.4)
Spring 2010	<i>Object-Oriented Programming I</i> (CMSC 131H) – 10 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.8 (College comparison: 2.9) Effective teacher: 4.0 (College comparison: 3.0)
Fall 2009	<i>Intro to Human-Computer Interaction</i> (CMSC 434) – 39 Students Student Evaluations (Scale: 0 Poor – 4 Excellent) Students “learned a lot”: 3.3 (College comparison: 3.2) Effective teacher: 3.5 (College comparison: 3.0)

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

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

ii. Specialized

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

F. ADVISING RESEARCH DIRECTION

i. Undergraduate

Independent Study Advisor:

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

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

ii. Master's

Thesis Committee:

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

Independent Study Advisor:

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

iii. Doctorate

Dissertation Advisor:

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

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

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

- 1999 Ismail Haritaoglu, Ph.D. (1999) in Computer Science. Advisor is Larry Davis. Research on real-time computer vision for tracking people.
- 1999 Zhijun Zhang, Ph.D. (1999) in Computer Science. Advisors are Vic Basili and Ben Shneiderman. Research on perspective-based usability inspection techniques.
- 1998 Elaine Raybourne, Ph.D. (1998) in Communication and Journalism at the University of New Mexico. Advisor is Ed Rogers. Dissertation is on the use of MUDs for anonymous role-playing to teach about issues of culture, identity, and power.
- 1998 Fan-Tao Pu, Ph.D. (1998) in Computer Science, Advisor is David Mount. Research on data structures for view-independent 3D object visibility detection.
- 1998 Eser Kandogan, Ph.D. (1998) in Computer Science, Advisor is Ben Shneiderman. Research on a technique for window management – elastic windows.
- 1996 Eric Freeman, Ph.D. (1996) in Computer Science at Yale University. Advisor is David Gelernter. “Lifestreams”, a computer interface that eliminates the need for filenames by indexing all files and connecting applications to a database.

Proposal Committee:

- 2019 Maddalena Romano in Geographic Information Systems (City College of New York) Advisor is Carsten Kessler. “Distributed WiFi for Distributed GIS”
- 2018 Virginia Leigh Byrne in Education. Advisor is Diane Jass Ketelhut. “The Chilling Effect of Cyberbullying on Women’s Social Presence in Online Discussions”
- 2017 Zhenpeng Zhao in HCI. Advisor is Niklas Elmqvist. “A Framework of Media Types for Data-Driven Storytelling”
- 2012 Irene Eleta in iSchool. Advisor is Jen Golbeck. “Multilingual Use of Twitter: Language Choice and Language Bridges in a Social Network”
- 2012 John Alexis Guerra Gómez in Computer Science. Advisor is Ben Shneiderman. “Exploring Differences in Trees by Comparing Structure and Node Value Changes: An Interactive Information Visualization Approach”
- 2011 Alex Quinn in Computer Science. Advisor is me. “Crowdsourcing Decision Support: Frugal Human Computation for Efficient Decision Input Acquisition”
- 2011 Sureyya Tarkan in Computer Science. Advisor is Ben Shneiderman. “Enhancing Timely Management of Workflow with Interactive Visual Displays and Actions for Situation Awareness Processing”
- 2010 Chris Hayden in Computer Science. Advisors are Mike Hicks and Jeff Foster. “Clear and Correct Runtime Upgrades”
- 2010 Chang Hu in Computer Science. Advisor is me. “Translation by Collaboration Between Monolinguals”
- 2008 Walky Rivadeneira in Psychology. Advisor is Kent Norman. “Tag Clouds: How Format and Categorical Structure Affect Categorization Judgement”
- 2007 Jerry Fails in Computer Science. Advisor is Allison Druin. Research on children’s collaborative mobile interfaces.
- 2005 Haibin Ling in Computer Science. Advisor is David Jacobs. Research on invariance in computer vision.
- 2001 Jaime Montemayor in Computer Science. Advisor is Allison Druin. Research on physical programming for children.
- 2001 Harry Hochheiser in Computer Science. Advisor is Ben Shneiderman. Research on interfaces for time-series data.

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

iv. Post-doc

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

A. PROFESSIONAL

i. Office and Committee Memberships

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

ii. Editorial Boards

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

iii. Advisory Boards

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

2003	Microsoft Research , Redmond, WA University Relations Faculty Advisory Board
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iv. Other non-University committees, commissions, panels, etc.

2012	Judge for Joan Ganz Cooney, National STEM Video Game Challenge
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vi. Paid Consultancies

2022 – 2024	IT Park University Honorary Rector to help lead new tech educational institution	Tashkent, Uzbekistan
2022 – present	EPAM Chief Academic Advisor - help with corporate educational programs and creation of new universities	Newtown, PA
2020 – 2022	Logitech Consultant to help with new product development	Seattle, WA
2009 – present	Consulting as an expert witness largely for patent infringement cases for a range of clients	Windsor, MA
2006 – 2014	Zumobi, Inc. Founder of startup company to create mobile information services software	Seattle, WA
2008 – 2009	Microsoft Research Consultant to help with products related to my research	Seattle, WA
2005 – 2009	Hillcrest Laboratories, Inc. Advisor to help this start-up develop novel in-home entertainment system	Rockville, MD
2003 – 2008	Windsor Interfaces, Inc. President and CEO of start-up company to commercialize some HCIL projects	Chevy Chase, MD
2005	ScholarOne, Inc. Consultant to help them with visualization in their scholarly publication and conference management software	Charlottesville, VA
2004 – 2005	ATTAP, Inc. Consultant to help this start-up develop novel mobile device interfaces for personal information management	New York, NY
2003	Microsoft Research Corp On University Relations Faculty Advisory Board	Redmond, WA
2001 – 2003	PARC Advised on project to support brainstorming	Palo Alto, CA
2000	NASA Goddard Space Flight Center Designed prototype visualizations for satellite constellation control	Greenbelt, MD
1999 – 2001	Swedish Institute of Computer Science (SICS) Worked on European Union KidStory project	Stockholm, Sweden
1998 – 1999	Lockheed Martin Astronautics Advised on use of Pad++ for image analyst application	Denver, CO
1996 – 1997	Sony Research Corporation Advised on use of Pad++ for product development	New York, NY

B. UNIVERSITY

i. Departmental

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

iii. University

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

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