

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner

v.

FERID ALLANI,
Patent Owner

Case No. IPR2025-00857
U.S. Patent No. 10,943,058

DECLARATION OF BENJAMIN B. BEDERSON

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

I. INTRODUCTION

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

2. I have been retained by counsel for the Petitioner Apple Inc. (“Petitioner”) to provide my independent opinions on certain issues requested by Counsel for Petitioner relating to the accompanying Petition for *Inter Partes* Review of U.S. Patent No. 10,943,058 (“the ’058 Patent”). I understand that the Challenged Claims are claims 1-27. Based on the prior art discussed in this declaration, it is my opinion that Claims 1-27 of the ’058 Patent are unpatentable for the reasons provided below.

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

A. Background and Qualifications

4. In this section, I have summarized my educational background, career history, and other qualifications relevant to this matter. I have also included a current version of my curriculum vitae in Appendix A.

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

6. Since 1998, I have been a Professor of Computer Science at the University of Maryland (“UMD”), where I have joint appointments at the Institute for Advanced Computer Studies and the College of Information Studies (Maryland’s “iSchool”), and am currently Professor Emeritus. I was also Associate Provost of Learning Initiatives and Executive Director of the Teaching and Learning Transformation Center from 2014 to 2018. I am a member and previous director of the Human-Computer Interaction Lab (“HCIL”), the oldest and one of the best known Human-Computer Interaction research groups in the country. In 2022, I co-founded the J.S. Bryant School, a therapeutic high school scheduled to open in Fall 2025. I was also co-founder and Chief Scientist of Zumobi, Inc. from 2006 to 2014, a Seattle-based startup that is a publisher of content applications and advertising platforms for smartphones. I am also co-founder and co-director of the International Children’s Digital Library (“ICDL”), a web site launched in 2002 that provides the world’s largest collection of freely available online children’s books from around the world with an interface aimed to make it easy for children and adults to search and read children’s books online. I was also co-founder and prior Chief Technology Officer of Hazel Analytics from 2014–2023, a data analytics company

whose product sends alerts in warranted circumstances. In addition, I have for more than 15 years consulted for numerous companies in the area of web-based information systems, including Logitech, Microsoft, the Palo Alto Research Center, Sony, Lockheed Martin, Hillcrest Labs, and NASA Goddard Space Flight Center.

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

8. At UMD, my research is in the area of Human-Computer Interaction ("HCI"), a field that relates to the development and understanding of computing systems to serve users' needs. Researchers in this field are focused on making universally usable, useful, efficient, and appealing systems to support people in their wide range of activities. My approach is to balance the development of innovative technology that serves people's practical needs. Example systems following this approach that I have built include PhotoMesa (software for end users to browse personal photos), DateLens (2002 software for end users to use their mobile devices to efficiently access their calendar information), LaunchTile (2005 "home screen" software for mobile devices to allow users to navigate

apps in a zoomable environment), SpaceTree (2001 software for end users to efficiently browse very large hierarchies), ICDL (as described above), and StoryKit (a 2009 iPhone app for children to create stories).

9. I have significant experience with web technologies. In 1996, I designed and built a web browser using the HTML standard of the day. As described in a paper from that year, *Zooming Web Browser* (Ex. 1020) , that web browser included the ability to fetch HTML-based web pages from a web server and display them. In 1998, I designed and built a web history tool that worked alongside of Netscape. As described in a paper from that year, *PadPrints: Graphical Multiscale Web Histories* (Ex. 1021) , PadPrints tracked which web pages a user visited in Netscape and built a map with icons that visually showed which pages a user had visited. Clicking on the icons in the map directed Netscape to revisit those pages.

10. LaunchTile led to my creation of Zumobi in 2006, where I was responsible for investigating new software platforms and developing new user interface designs that provide efficient and engaging interfaces to permit end users to access a wide range of content on mobile platforms (including the iPhone and Android-based devices). For example, I designed and implemented software called “Ziibii,” a “river” of news for iPhone, software called “ZoomCanvas,” a zoomable user interface for several iPhone apps, and iPhone apps including “Inside Xbox” for Microsoft and “Snow Report” for

REI. The initial Zumobi app included the ability to download apps (which we called “Tiles”) from our servers and share them with other users of the Zumobi app.

11. 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, (originally at www.icdlbooks.org). In particular, I have been closely involved in designing the user interfaces as well as the software architecture for the web site since its inception in 2002. I developed a mobile version of the ICDL for iPhone in 2007 that was publicly available in Apple’s App Store. This supported users to read downloaded books on the iPhone. I then developed a mobile app called StoryKit that allowed children to create and tell stories using an iPhone and its touch screen. The stories could be uploaded to our servers, a web-based version of the story was created, and that web-based version of the story could be shared with other people. StoryKit was publicly available in Apple’s App Store starting in 2009.

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

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

13. 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 been honored by both professional organizations. I am an “ACM Distinguished Scientist,” which “recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field.” I am a member of the “CHI Academy,” which is described as follows: “The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry,

and led the research and/or innovation in human-computer interaction.” The criteria for election to the CHI Academy are: (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.

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

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

16. Based on my experiences described above, and as indicated in my Curriculum Vitae, I am qualified to provide the following opinions with respect to the patents in this case. Additionally, I was at least a person having ordinary skill in the art as of the priority date of the ’058 Patent as described in Section 1.A.

17. In writing this declaration, I have considered my own knowledge and experience, including my work experience in the fields of computer science and human-computer interaction; my experience in teaching those subjects; my experience in developing companies and products in those subjects; and my experience in working with others involved in those fields, my experience in designing and implementing software systems, and user interfaces. In reaching my opinions in this matter, I have focused on the following references and materials, which I have considered from the viewpoint of a POSITA as of the priority date of the '058 Patent:

- (a) Petition for *Inter Partes* Review of U.S. Patent No. 10,943,058
- (b) U.S. Patent No. 10,943,058 to Allani (Ex. 1001)
- (c) File History of U.S. Patent No. 10,943,058 (Ex. 1002)
- (d) U.S. Patent No. 6,119,155 to Rossmann et al. (Ex. 1004)
- (e) U.S. Patent No. 6,037,934 to Himmel et al. (Ex. 1005)
- (f) U.S. Patent No. 6,353,839 to King et al. (Ex. 1006)
- (g) U.S. Patent No. 6,138,158 to Boyle et al. (Ex. 1007)
- (h) U.S. Patent No. 6,493,702 to Adar (Ex. 1008)
- (i) U.S. Patent App. Pub. No. 2001/0044299 to Sandegren (Ex. 1009)
- (j) David Pogue. *PalmPilot: The Ultimate Guide*. O'Reilly & Associates, Inc. June 1998. (Ex. 1010)
- (k) The Independent (London, Greater London, England). May 8, 1999. Page 82. (Ex. 1011)
- (l) Nokia 7110 User's Guide. Issues 2. 1999. (Ex. 1012)
- (m) U.S. Patent No. 6,363,419 to Martin, Jr. et al. (Ex. 1013)
- (n) HDML 2.0 Specification. April 11, 1997. (Ex. 1014)
- (o) Mark Brown. *Special Edition Using Netscape 2*. Que Corporation. 1995. (Ex. 1015)
- (p) Douglas A. Downing, et al. *Dictionary of Computer and Internet Terms*. Tenth edition. Barron's Educational Series, Inc. 2009. (Ex. 1016)
- (q) Hy Bender, Margret Levine Young. *Dummies 101: The Internet for Windows 98*. IDG Books Worldwide, Inc. 1998. (Ex. 1017)
- (r) U.S. Patent No. 6,718,310 to Fuisz et al. (Ex. 1018)

- (s) U.S. Patent No. 6,338,050 to Conklin et al. (Ex. 1019)
- (t) Benjamin B. Bederson, James D. Hollan, Jason B. Stewart, David Rogers, Allison Druin, and David Vick. *Zooming Web browser*. Proc. SPIE 2667, Multimedia Computing and Networking 1996, 25 March 1996. (Ex. 1020)
- (u) Ron R. Hightower, Laura T. Ring, Jonathan I. Helfman, Benjamin B. Bederson, and James D. Hollan. 1998. *PadPrints: graphical multiscale Web histories*. In Proceedings of the 11th annual ACM symposium on User interface software and technology (UIST '98). Association for Computing Machinery, New York, NY, USA, 121-122. (Ex. 1021)
- (v) Douglas Downing, et al. *Dictionary of Computer and Internet Terms*. Fifth edition. Barron's Educational Series, Inc. 1996. (Ex. 1022)
- (w) Donald Spencer. *Webster's New World Dictionary of Computer Terms*. Fifth edition. Simon & Schuster, Inc. 1993. (Ex. 1023)
- (x) U.S. Patent No. 6,237,080 to Mäkinen (Ex. 1024)
- (y) U.S. Patent No. 5,781,909 to Logan et al. (Ex. 1025)
- (z) U.S. Patent No. 6,546,393 to Khan (Ex. 1026)
- (aa) U.S. Patent No. 6,163,779 to Mantha et al. (Ex. 1027)
- (bb) U.S. Patent No. 6,928,615 to Haitzuka et al. (Ex. 1028)
- (cc) U.S. Patent No. 6,456,303 to Walden (Ex. 1029)
- (dd) U.S. Patent No. 5,809,415 to Rossmann (Ex. 1030)
- (ee) U.S. Patent No. 6,182,010 to Berstis (Ex. 1031)
- (ff) U.S. Patent No. 8,271,877 to Allani (Ex. 1032)
- (gg) File History of U.S. Patent No. 8,271,877 (Ex. 1033)
- (hh) ALLANI v. Apple, Inc., 6:24-cv-00304, No. 1 (W.D.Tex. Jun. 3, 2024) (Ex. 1034)
- (ii) ALLANI v. Apple, Inc., 6:24-cv-00304, No. 1-3 (W.D.Tex. June 3, 2024) (Ex. 1035)
- (jj) ALLANI v. Apple, Inc., 6:24-cv-00304, No. 21 (W.D.Tex. June 3, 2024) (Ex. 1036)
- (kk) ALLANI v. Apple Inc., 6:24-cv-00304, No. 23 (W.D.Tex. June 3, 2024) (Ex. 1040)
- (ll) ALLANI v. Apple Inc., 6:24-cv-00304, No. 24 (W.D.Tex. June 3, 2024) (Ex. 1041)
- (mm) ALLANI v. Apple Inc., 6:24-cv-00304, No. 25 (W.D.Tex. June 3, 2024) (Ex. 1042)
- (nn) Appendix A (attached hereto)

II. LEGAL FRAMEWORK

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

19. I have been informed that the Patent Trial and Appeal Board (“PTAB”) now applies the claim construction standard applied by Article III courts (i.e., the *Phillips* standard) regardless of whether a patent has expired. I have been informed that under the *Phillips* standard, claim terms are to be given the meaning they would have to a person having ordinary skill in the art at the time of the invention, taking into consideration the patent, its file history, and, secondarily, any applicable extrinsic evidence (e.g., dictionary definitions). I understand that, for purposes of this proceeding, Petitioner has proposed the PTAB apply Patent Owner’s constructions advanced in the parallel litigation. I have reviewed these constructions in the petition and apply them to my analyses herein. For any other claim language, I have applied its plain meaning as instructed by *Phillips*.

20. I have also been informed that a person cannot obtain a patent on an invention if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. I have been informed that a conclusion of

obviousness may be founded upon more than a single item of prior art. I have been further informed that obviousness is determined by evaluating the following factors: (1) the scope and content of the prior art, (2) the differences between the prior art and the claim at issue, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations of non-obviousness. In addition, the obviousness inquiry should not be done in hindsight. Instead, the obviousness inquiry should be done through the eyes of a person of ordinary skill in the relevant art at the time the patent was filed.

21. In considering whether certain prior art renders a particular patent claim obvious, counsel has informed me that I can consider the scope and content of the prior art, including the fact that one of skill in the art would regularly look to the disclosures in patents, trade publications, journal articles, industry standards, product literature and documentation, texts describing competitive technologies, requests for comment published by standard setting organizations, and materials from industry conferences, as examples. I have been informed that for a prior art reference to be proper for use in an obviousness analysis, the reference must be “analogous art” to the claimed invention. I have been informed that a reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or (2) the reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention). In order for a reference to be “reasonably pertinent” to the problem, it must logically have

commended itself to an inventor's attention in considering his problem. In determining whether a reference is reasonably pertinent, one should consider the problem faced by the inventor, as reflected either explicitly or implicitly, in the specification. I believe that all of the references that my opinions in this IPR are based upon are well within the range of references a person of ordinary skill in the art would consult to address the type of problems described in the Challenged Claim.

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

incentives or other market forces if the variations are predictable to one of ordinary skill in the art; or (G) identifying an explicit teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine the prior art references to arrive at the claimed invention.

23. I am informed that the existence of an explicit teaching, suggestion, or motivation to combine known elements of the prior art is a sufficient, but not a necessary, condition to a finding of obviousness. This so-called “teaching suggestion-motivation” test is not the exclusive test and is not to be applied rigidly in an obviousness analysis. In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. Instead, the important consideration is the objective reach of the claim. In other words, if the claim extends to what is obvious, then the claim is invalid. I am further informed that the obviousness analysis often necessitates consideration of the interrelated teachings of multiple patents, the effects of demands known to the technological community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art. All of these issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent.

24. I also am informed that in conducting an obviousness analysis, a precise teaching directed to the specific subject matter of the challenged claim need not be sought

out because it is appropriate to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. The prior art considered can be directed to any need or problem known in the field of endeavor at the time of invention and can provide a reason for combining the elements of the prior art in the manner claimed. In other words, the prior art need not be directed towards solving the same specific problem as the problem addressed by the patent. Further, the individual prior art references themselves need not all be directed towards solving the same problem. I am informed that, under the *KSR* obviousness standard, common sense is important and should be considered. Common sense teaches that familiar items may have obvious uses beyond their primary purposes.

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

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

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

28. I am informed that even if a prima facie case of obviousness is established, the final determination of obviousness must also consider “secondary considerations” if presented. In most instances, the patentee raises these secondary considerations of non-obviousness. In that context, the patentee argues an invention would not have been obvious in view of these considerations, which include: (a) commercial success of a product due to the merits of the claimed invention; (b) a long-felt, but unsatisfied need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the invention by others skilled in the art; (g) lack of independent simultaneous invention within a comparatively short space of time; (h) teaching away from the invention in the prior art.

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

III. OPINION

A. The '058 Patent

30. This section provides a brief overview of '058 Patent. It does not represent my full understanding of the patent, nor does it attempt to cover all aspects of the patent's disclosure relevant to my analyses below. Instead, it is provided merely as a high-level overview to provide some context for my more detailed discussions.

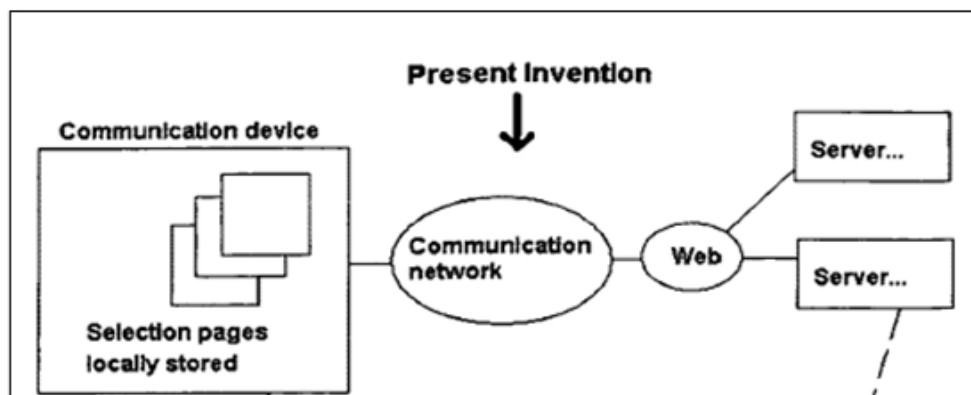
31. I have been informed that the '058 Patent was filed on September 9, 2014 and claims priority back to foreign application FR 99 16704, filed on December 30, 1999.¹ I have been asked to assume that December 30, 1999 is the priority date for the Challenged Claims.

32. The '058 Patent describes a method for accessing information and services on the Web, from a communication device connected via a network to the Internet. *'058 Patent* (Ex. 1001), Abstract. Navigation software like Internet Explorer™ or Navigator™ is widely used to access the Internet and find websites through search engine sites such as Yahoo!™ or Voila™. *Id.*, 1:12-20. The present invention instead localizes part of the search process, where a preliminary search is conducted on the local device rather than over the network. *Id.*, 2:3-15, 2:24-33. The method of said invention

¹ I note that the face of the patent claims priority to PCT/FR00/03759 filed on December 29, 2000. Assuming this is an error and out of an abundance of caution, I have been asked to assume the December 30, 1999, filing date of the FR 99 16704 application is the earliest priority date. '058 File History at 575 (“Applicant’s [] application has priority back to December 30, 1999”).

supposedly reduces delay and discomfort in the information search process, simplifies the request-answer sequence, and is purportedly “quicker and easier” than present methods for accessing information on the Internet. *Id. Patent*, 1:35-42, 1:64-2:2, 4:63-67; *see also*, related patent ‘877 *File History* (Ex. 1033), 244.

33. To realize these goals, the claimed invention generally provides: (1) “one or more steps for displaying a page of selection among a plurality of selection pages organized within a structure of tree menu and beforehand locally stored within said communication device, each page of selection comprising a set of icons[,]” including both a direct access icon (e.g., hyperlink to a website) and a selection icon (e.g., local navigation link), and (2) “a step for emitting on the communication network, in response to a selection of an icon in a page of selection currently displayed, the address of a source of information corresponding to said selected icon.” ‘058 *Patent*, 2:3-24; *see also*, related patent ‘877 *File History*, 362-363. This “invention” is schematically represented below:



‘877 *File History*, 196 (excerpt); ‘058 *Patent*, Figs. 1 and 2.

B. Claim Construction

34. I have been informed by counsel that the first step in an unpatentability analysis involves construing the claims, as necessary, to determine their scope. Second, the construed claim language is then compared to the disclosures of the prior art. I am informed that claims are generally given their ordinary and custom meaning as understood by one of ordinary skill in the art at the time of the invention in light of the patent specification and prosecution history, i.e., the intrinsic record. For purposes of my analysis, I have applied the claim constructions set forth in the Petition.

35. I understand that the parties have disputed a number of claim terms in the parallel litigation. These claim terms and the parties competing proposals are reproduced below:

Claim Term	Allani's Constructions	Apple's Constructions
"web site"	A source of information or services accessible via a network using HTTP or another web protocol	No construction/plain and ordinary meaning which is "a collection of web pages accessible through a web address"
"selection page"	A screen with selectable icons that are displayed together on a graphical user interface	No construction/plain and ordinary meaning
"icon"	Plain and ordinary meaning	A symbol that is a pictorial indication of a command
"direct access icon"	An icon that, when selected, causes an	An icon that, when selected, causes a

	address of at least one website to be transmitted to a network. ('058 patent claim 27) An icon that, when selected, causes an address of at least one remote information or service source to be transmitted to a network. ('058 patent claim 24-26)	URL or Web address to be sent directly to a web server hosting the website indicated by the icon
“said address being locally generated”	Said address being generated on the device	Said address being created on the device
“specifically designed to include”	Used to include. Not indefinite	Indefinite

36. I understand the Petition proposes the Board adopt Patent Owner’s interpretations above. Accordingly, I have also adopted Patent Owner’s interpretations for the purposes of my opinions herein. I take no position as to which is correct. For all other claim language, I have applied the plain and ordinary meaning as defined in the preceding paragraphs.

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

37. I was asked to provide my opinion as to the level of skill of a person having ordinary skill in the art (“POSITA”) of the ’058 Patent at the time of the claimed invention, which counsel has told me to assume is December 30, 1999. In determining the characteristics of a hypothetical person of ordinary skill in the art of the ’058 Patent,

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

38. In my opinion, a POSITA at the time of the claimed invention of the '058 Patent would have had a bachelor's degree in computer engineering, electrical engineering, or a related field, with two to three years of experience with web-based information systems. A person with more direct industry experience could accommodate having a less formal education, and more formal education in the field, such as a master's degree with relevant specialization, can accommodate less direct industry experience. Such a POSITA would have been capable of understanding the '058 Patent and the prior art references discussed herein.

39. Based on my education, training, and professional experience in the field of the claimed invention, including teaching the requisite skills necessary for a POSITA during the relevant time period, I am familiar with the level and abilities of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a person having ordinary skill in the art as of the time of the claimed invention of the '058 Patent.

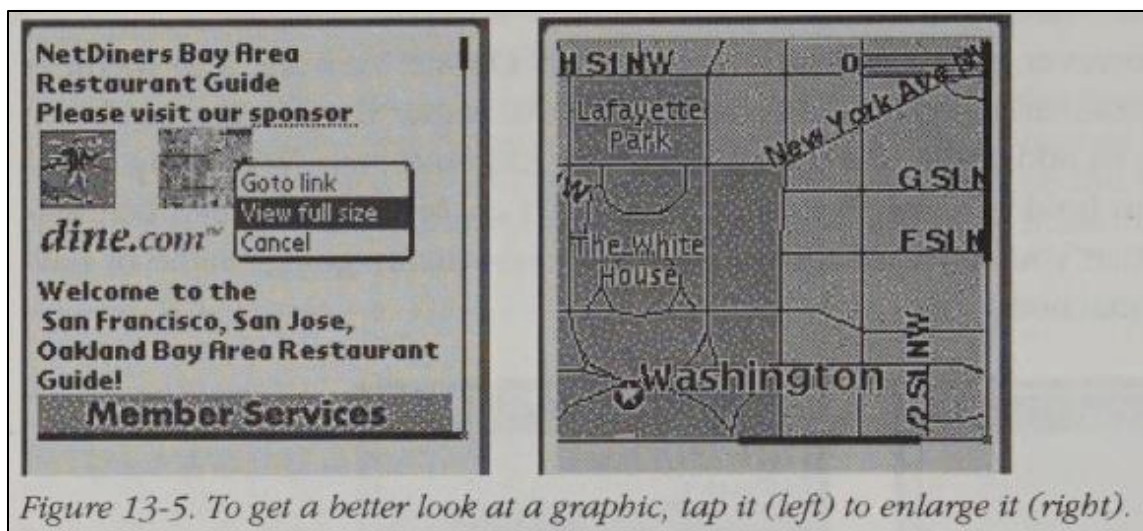
D. Background of the Technology

40. The features described and claimed in the '058 Patent were routine as of December 30, 1999. In the following paragraphs, I briefly summarize the technology background for a few key features relevant to the opinions set forth herein.

1. Mobile Communication Devices

41. Mobile communication devices were well known before the priority date of the '058 Patent. Mobile communication devices providing services such as “paging, e-mail, general data transmission, chat programs and even general purpose browsers” were commonplace and included devices such as “Personal Digital Assistants (PDAs)” and other mobile devices introduced into the market. *Sandegren* (Ex. 1009), [0002].

42. One example of a well-known mobile communication device at the time was the Palm III PDA. The Palm III was introduced in 1998 as the PalmPilot model. This '98 model included a processor running Palm OS, a touch-sensitive LCD screen, and memory. *Pogue* (Ex. 1010), 3, 16. With a snap-on modem and a paid ISP provider, the Palm III could send emails and browse the World Wide Web. *Id.*, 343-344. ProxiWeb was one of many available web browser programs on the Palm III. ProxiWeb showed graphics as well as text. *Id.*, pp. 345-348. An example display on the Palm LCD screen is illustrated below:



Id., 348 (Figure 13-5). One notable feature was that webpages accessed on ProxiWeb could be stored in cache and viewed offline. *Id.*, 348.

43. Another well-known mobile communication device in the market at the time was the Nokia 7110 GSM Media Phone. The Nokia 7110 GSM Media Phone (“Nokia 7110”) was available for purchase as early as September 1999. *The Independent* (Ex. 1011). Apart from being a phone, the Nokia 7110 was able to access text information on the internet, including e-mail and e-commerce. *The Independent*. The Nokia 7110 utilized Wireless Application Protocol (“WAP”) to access and bookmark services on the network such as news, weather reports, flight times, dictionaries, etc.:

Your phone supports services based on the Wireless Application Protocol (WAP). The Services menu allows you to access services supported by your network, such as news, weather reports, flight times, dictionaries, etc. Within the Services menu you can save addresses of such services as bookmarks and then you can use the services via the Bookmarks option.

The Nokia7110 User Guide (“*Nokia*”) (Ex. 1012), 63-66. For example, to bookmark a “homepage address,” the Nokia 7110 provides the following:

Saving a homepage address:

For each connection set you can store a homepage address:

- 1 Press **Menu**, roll to the **Services** and press **Navi Roller**.
- 2 Roll to **Settings** and press **Navi Roller**.
- 3 Press **Navi Roller** when **Connection settings** is displayed.
- 4 Roll to the desired connection set and press **Options**, then roll to **Edit** and press **Navi Roller**.
- 5 Press **Navi Roller** when **Homepage** is displayed.
- 6 Key in the homepage address and press **OK**.



Tip: You can quickly connect to the homepage service of the activated connection set by pressing **Home** when the **Services** menu is displayed.

Nokia, 64. Similarly, to save a “service” as a bookmark, the Nokia 7110 provides:

Saving a service as a bookmark:

- 1 Press **Menu**, roll to the **Services** and press **Navi Roller**.
- 2 Roll to **Bookmarks** and press **Navi Roller**.
- 3 Press **Options**, then roll to **Add bookmark**.
- 4 Enter the address of the desired service and press **OK**. Then enter a title for the service and press **OK**.

Nokia, 64-65. Using these mechanisms, a user is able to store this bookmarked web-access information “in the cache of the phone.” *Nokia*, 65.

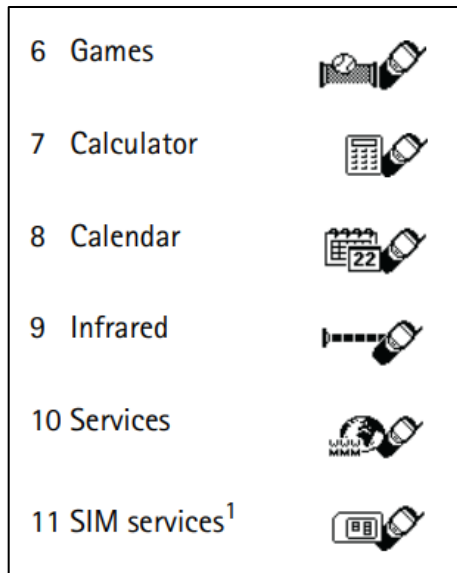
2. *Selectable Icons on Mobile Devices*

44. Selectable icons on mobile devices were well-known before the priority date of the '058 Patent. For instance, the Palm III utilizes a mixture of textual and graphical icons through various screens and menus, as shown in the below images:



Pogue, 6 (Figure 1-2 on the left and Figure 1-3 on the right). Namely, as shown above, a user could select “Address,” “Calc,” “Doc,” etc. and the Palm III would access a service or document associated with that icon. *See also* U.S. Patent No. 6,182,010 to Berstis (Ex. 1031), 4:7-21 (describing using HDML to render images on Palm III), Fig. 1 (depicting same display screen as in Pogue Figure 1-2 above).

45. Similarly, the Nokia 7110 utilizes a mixture of textual and graphical icons through various screens and menus, as shown in the below image:



Nokia, p. 19. A user simply selects the icon and the Nokia 7110 accesses the associated service or application related to that icon. Indeed, the Nokia 7110 main menu functions are represented by the text and graphic symbols illustrated above.

3. Protocols for Accessing Remote Information

46. There were several widely used protocols that provided user access to remote information before the priority date of the '058 Patent. One of the most commonly used was the Hypertext Transport Protocol (HTTP). This protocol was and is still used to transfer information between proxy servers and web servers. *Martin, Jr.* (Ex. 1013), 4:6-13. Different communication protocols could be used to transfer information between proxy servers and wireless computing devices dependent on the wireless network. For instance, a user could rely on the Wireless Session Protocol (WSP) to access remote information. Or, in the case of a thin mobile device, a user could employ

the Handheld Device Transport Protocol (HDTP) described in more detail in the next section. *Martin, Jr.*, 4:14-22.

4. *Displaying Accessed Remote Information*

47. HTTP was used to transport information over a network and display that information on a device using the Hypertext Markup Language (HTML). *Martin, Jr.*, 4:10-13. Namely, HTTP is used to connect an HTML Web browser to a Web server and exchange information therebetween. Like HTTP, HDTP transports information over a network and displays information on a user's device using the Handheld Device Markup Language (HDML). HDML is a markup language supported by wireless computing devices' browser programs. *Martin, Jr.*, 4:22-26. HTML was the standard for how documents were presented in browsers like Netscape, defining text styles, and including links and graphical elements. *Brown* (Ex. 1015), p. 590. Similar to HTML, HDML is a "tag based document language" that comprises statements specifying how information is to be displayed on a small screen of a wireless computing device. *Martin, Jr.*, 4:25-30.

48. Certain mobile phones and other "handheld devices" had limited network bandwidth due to the limitations of network technology or simple economics and benefited from HDML to function as full-fledged web clients. *HDML Spec* (Ex. 1014), 1-2. The basic building block of HDML content is a card. *HDML Spec*, 3. Cards include information that is displayed to the user and is interactable. *Id.* A card may contain text and/or images or a list of selectable options. *Id.* Cards are grouped together into decks.

Id. An HDML deck is like an HTML page, it is identified by a URL, requested from a server, and cached locally on a user device. *HDML Spec*, 3-4.

5. Commercial/Merchant Websites

49. Businesses often had websites to advertise their presence and products, advertise their services, or directly sell their wares. For example, Coca-Cola, IBM, CNN, and the National Football League all had homepage websites featuring their logos and branding. *Brown*, pp. 8-10, Figs. 1.1, 1.2, 1.3, and 1.4. Online store websites gave users access to browse and buy products on the web. *Id.*, p. 258. Amazon.com was the first prominent E-TAIL merchant, selling a wide variety of products around the world. *Barron's 2009* (Ex. 1016), p. 19; *Bender* (Ex. 1017), p. 56. An online commercial system, an “on-line site” or “commercial site,” may include multiple sellers and present product information to purchasers in the form of web pages. *Fuisz* (Ex. 1018), 2:51-53; *Conklin* (Ex. 1019), 28:25-51.

6. Accessing Search Engines

50. Search engines were popular sites often included in users’ bookmarking programs to allow quick and easy access to queried web searches. For instance, US Patent 6,546,393 to Khan (“*Khan*”) (Ex. 1026) shows multiple web search engine sites as bookmarks (outlined in red):

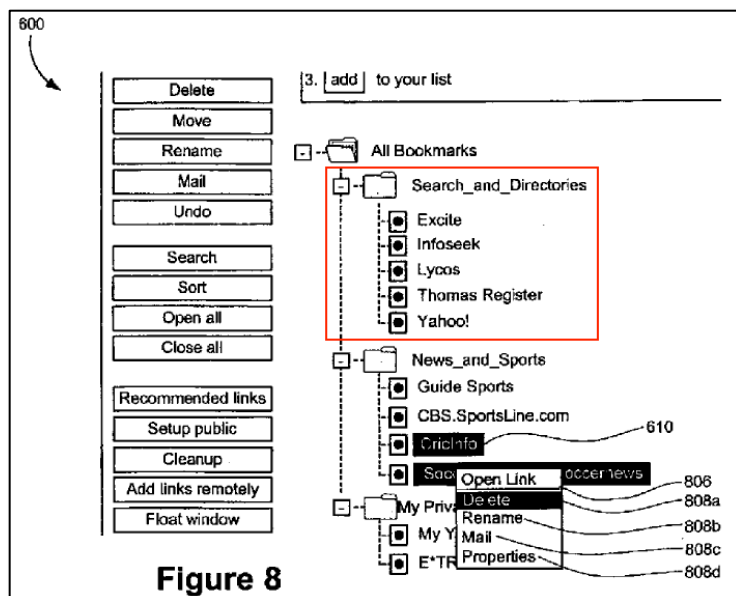


Figure 8

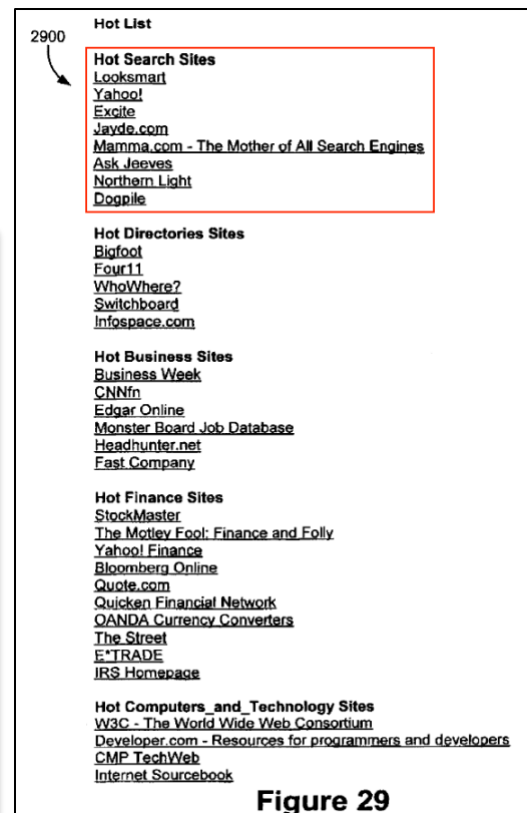
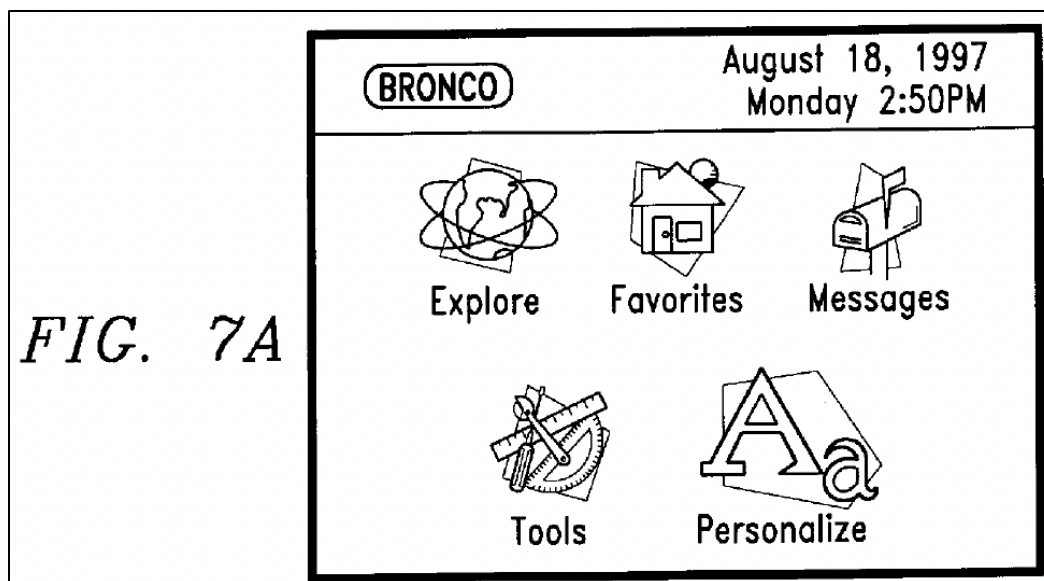


Figure 29

Id., Fig. 8, Fig. 29. Indeed, popular sites, like common search engines, were often recommended to users to add as a bookmark. *Id.*, 22:52-67.

51. It was common for these bookmarked search engine icons to be pictorially represented to a user. For instance, many prior art systems utilized images that visually represented certain functions, such as a search function, a find function, or accessing a web search engine. US Patent 6,163,779 to Mantha (“*Mantha*”) discloses an “Explore” icon that when clicked, causes the browser to navigate to a search engine. *Mantha* (Ex. 1027), 8:33-34. The “Explore” icon, which visually represents the destination search engine, can be seen below:



Id., Fig. 7A. US Patent 6,928,615 to Haitsuka et al. (“*Haitsuka*”) discloses an “icon 275” associated with an online search engine page that, when clicked, the client application causes the browser to load the webpage having the URL associated with the icon. *Haitsuka* (Ex. 1028), 7:17-21. “Icon 275” and similar “button bar icons” provide one-click access to Web pages that might be useful to the user. *Id.*, 7:8-10. “Icon 275”, a button bar icon with the text “Search”, is outlined in red in the below image:

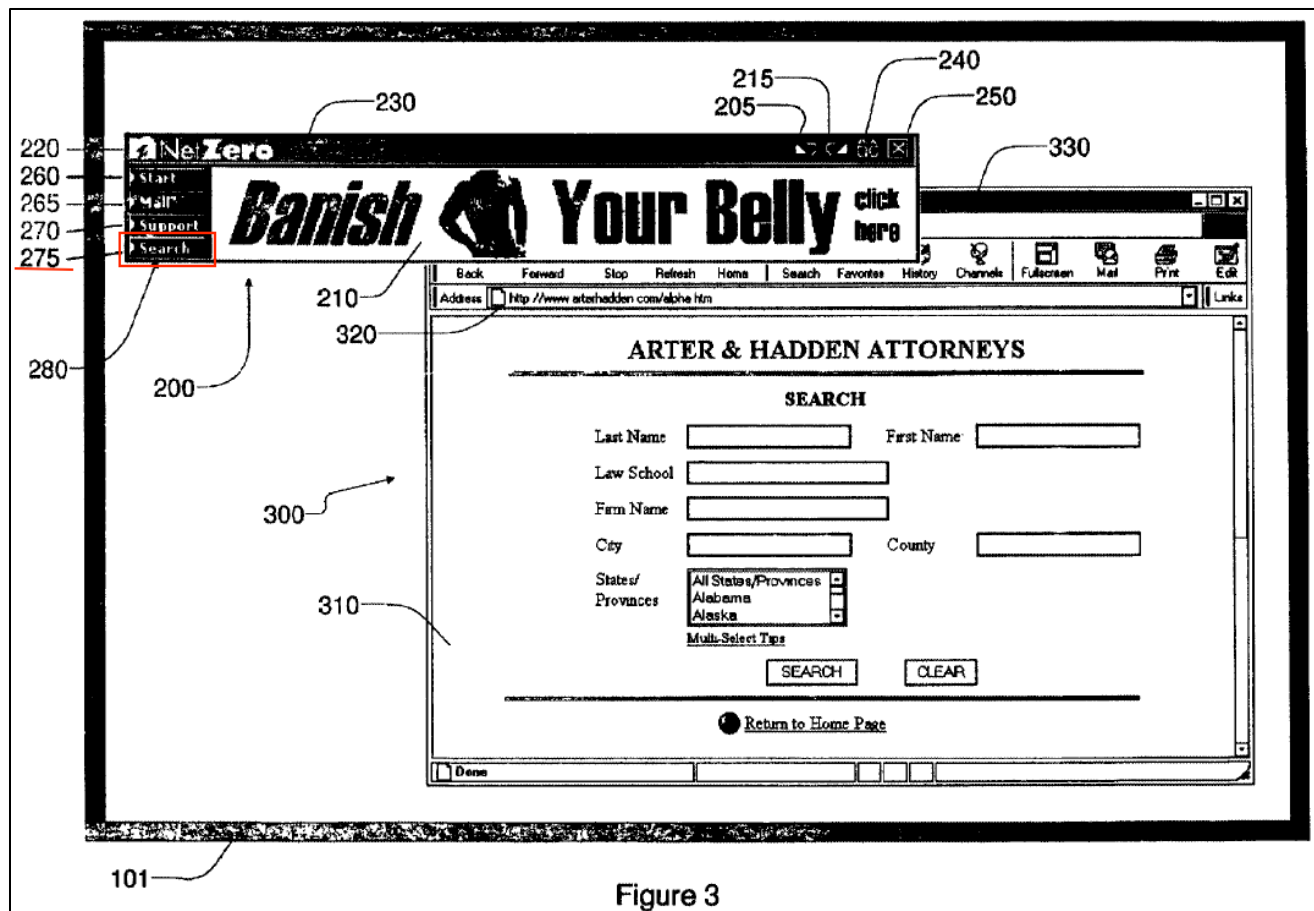


Figure 3

Id., 7:8-10, 7:17-21, and Fig. 3.

52. *Haitsuka* also teaches the browser application displaying the client window, including the “button bar icons,” being run on an appropriately Internet-enabled device such as a portable digital assistant (PDA), mobile phone, etc. *Haitsuka*, 5:1-15, 7:8-10. A user on a PDA or mobile phone would easily be able to access an online search engine page through “icon 275.” *Haitsuka*, 5:1-15, 7:8-10, 7:17-21.

7. Web Browsing Tools

53. Once on a website, there were several known tools that aided web browsing before the priority date of the '058 patent. The web browser Internet Explorer provided

a feature known as favorites, a type of link that is permanently stored on the device's hard disk and takes the user to the corresponding webpage when clicked, allowing users to return to specific webpages easily and repeatedly. *Bender*, 38-40 (Figure 2-1). Netscape's Bookmark feature saves the address of user-specified websites and lists saved websites in a pulldown menu. *Brown*, 209-210. Adding an item to the Bookmark list saves that item's address along with a description that represents the website in the pulldown menu. *Id.*

54. Web browsing programs, such as HandWeb and Palmscape on the Palm III, also included bookmarking features to allow more convenient navigation. HandWeb's homepage features a list of bookmarks that can be viewed as webpage titles or URLs. *Pogue*, 350-351. The user can add new bookmarks using the "New" button. *Id.* A bookmark can be opened, edited, and categorized. *Id.* Palmscape's bookmark page lists user-added bookmarks. *Pogue*, 355-356. The "Open" button triggers the action of connecting to and displaying the corresponding webpage. *Id.* Some bookmarked webpages are saved in cache, while others are retrieved from the network. *Id.* A user can add a webpage as a bookmark and save the page locally for offline viewing. *Pogue*, 356-357.

55. Although web browsers offered hierarchical sets of bookmarks to aid navigation and track interesting sites, users could still feel lost while navigating links and pages. *Bederson* (Ex. 1020), 2. As I described above in the Background and

Qualifications section, I wrote a paper describing a zooming web browser was developed using Pad++ to aid in the visualization of web navigation by providing a sense of context. *Id.*, 2-4. The zooming web browser displays multiple web pages at varying scales, with the focus page being the largest, and surrounding pages being incrementally smaller the further they are from the focus page. *Id.*, 3. When the user selects a focus page, the visible web pages are reorganized to feature the new focus page, displaying all web pages in a hierarchical layout based on a fisheye view. *Id.*, 3. Clicking a link to open a new web page adds the webpage to the visual tree and reorganizes the web pages where the new webpage is the focus page. *Id.*, 3. This process is illustrated below:

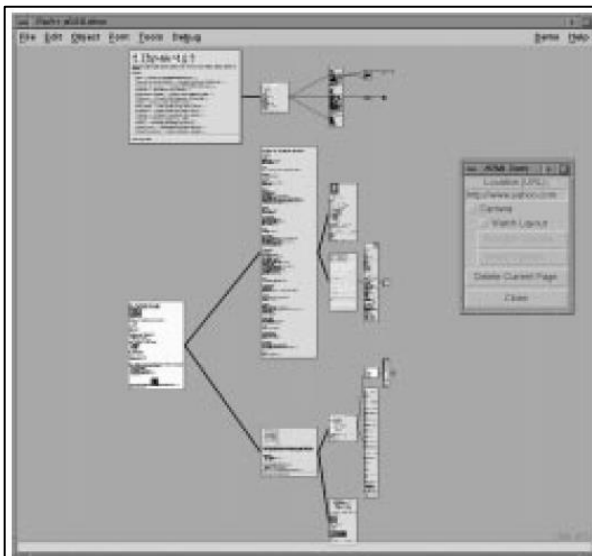


Figure 1: Snapshot of Pad++ Web Browser.

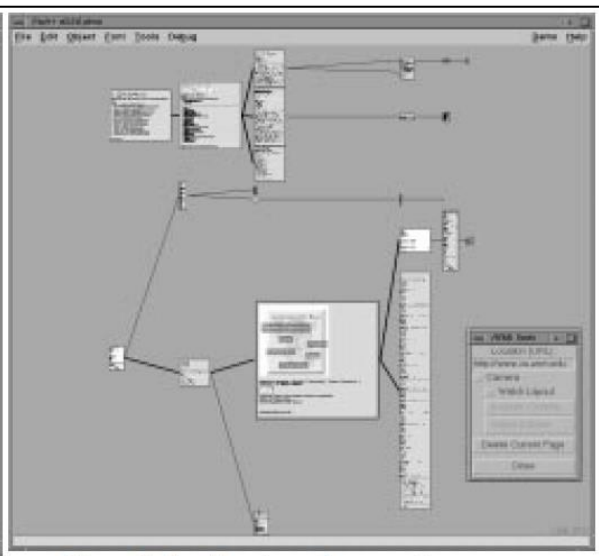


Figure 2: Another view of same web pages.

Bederson, Figures 1-2. Alternatively, a camera mode of navigation was implemented. *Id.*, 4. The focus page is zoomed in and displayed on one side of the browser window, while the tree of all pages is displayed on the other side. *Id.* 4. A camera is depicted on a

webpage in the tree to indicate the focus page. *Id.*, 4. This camera mode view is shown below:

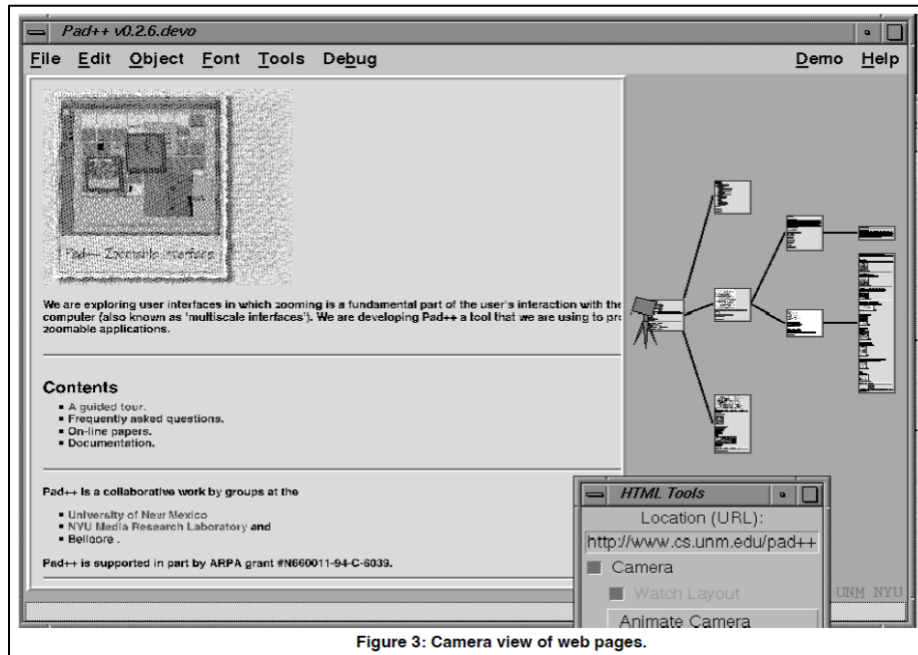


Figure 3: Camera view of web pages.

Id., Figure 3. As I described in that paper, I “extended HTML to support multi-scale layout *within* a page.” *Id.*, 1. By adding “*Multi-Scale Markup Language (MSML)*”, that web browser added support for “variable-sized dynamic objects, graphics, and other interface mechanisms from our underlying Pad++ substrate.” *Id.* MSML further “enables users to include arbitrary Pad++ objects in web pages.” *Id.*, 5. It worked by “using the HTML *<Meta>* tag and thus added features [] invisible to HTML browsers.” *Id.* As illustrated in a code sample, MSML adds an optional “*pad_scale*” key to the HTML *<meta>* tag that scales objects:

```

<html>
Introduction

<meta pad_scale=0.25>
<ul>
<li>Sistine Chapel
<li>Push the interface metaphor
<li>History

<meta pad_scale=0.25>
<ul>
<li>Ivan Sutherland, SketchPad, 1963
<li>William Donelson, MIT, 1978
<li>George Furnas, Fisheye Views - Bellcore, 1986
<li>Ken Perlin, David Fox, PAD - NYU, 1993
</ul>
<meta /pad_scale>

</ul>
<meta /pad_scale>
...

```

Id.

56. Similar to the zooming web browser, I also wrote a paper describing PadPrints, software I wrote that provided a graphical multiscale display to aid in web browsing. *Hightower* (Ex. 1021), 1. PadPrints displayed the web-history of a browsing session in a left-to-right hierarchical tree. *Id.*, 1. Each web page node of the browsing web-history is displayed as a small thumbnail sketch of the web page. *Id.*, 1-2. The figure below shows the PadPrints web-history display on the left and the currently browsed web page on the right:

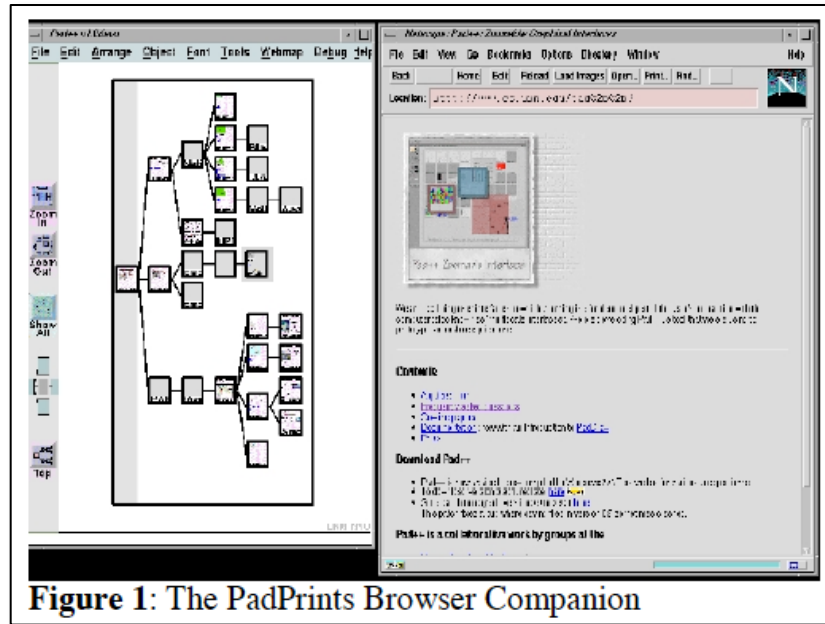


Figure 1: The PadPrints Browser Companion

Id., Figure 1. Each newly accessed webpage is added as a child node to the hierarchy. *Id.*, 2. When a web page node on the hierarchical tree is clicked, PadPrints sends the browser to the corresponding URL. *Id.*, 2. As PadPrints was implemented using Pad++, the user can zoom in and out of the web-history display to focus on particular parts of the web-history. *Id.*, 2. PadPrints allowed users to efficiently browse the web by effectively returning to information previously found and reducing the burden of navigation. *Id.*, 2.

8. Data and Storage

57. Various methods of organizing web-based data were well-known before the priority date of the '058 Patent, including using tables and hierarchical structures. The collection of data in the form of a table is suitable for ready reference, the data is easily written into an array of rows and columns. *Barron's 1996* (Ex. 1022), 569. In a table,

specific pieces of information can be located by an intersection of labeled rows and columns. *Id.*, 569. Different from tables, a hierarchical model is a tree structure where each object is of a particular hierarchy. *Id.*, 274. The above-described zooming web browser and PadPrints program both utilize a hierarchical structure to organize web pages. *Supra*, ¶¶55-56.

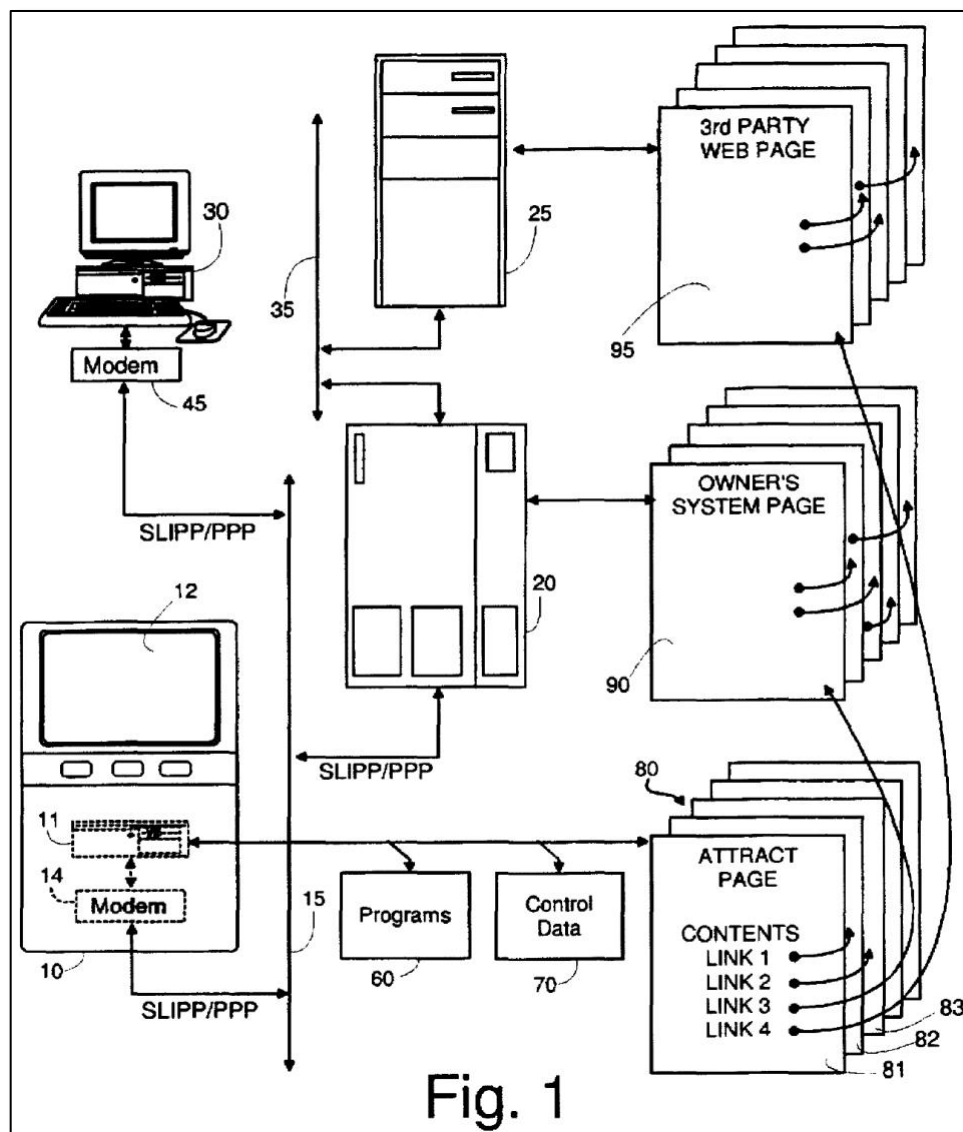
58. Various types of memory were well-known before the priority date of the '058 Patent. Memory refers to the storage facilities of a computing device where information is stored while being actively worked on, including RAM and ROM. *Spencer* (Ex. 1023), 364, 479, and 501; *Barron's 1996*, 230-231. A computing device's main memory to store data is RAM. *Barron's 1996*, 312. RAM is also the working memory of the computing device into which applications programs can be loaded from the outside and then executed. *Spencer*, 479. There are many advantages to using RAM, including saving costs and higher access speed. *Mäkinen* (Ex. 1024), 2:12-14, 2:44-46. Not only is RAM cheaper than ROM, but RAM also typically offers high access speeds compared to the slow ROM memory, giving a significant increase in system performance when used. *Id.*

9. Local and Remote Hyperlinks on One Page

59. Prior art systems included local and remote hyperlinks on the same display page before the priority date of the '058 Patent. For instance, US Patent 5,781, 909 to Logan ("*Logan*"), filed in 1996, describes a kiosk system that utilizes a conventional web

browsing program to retrieve and display hypertext documents. *Logan* (Ex. 1025), 4:5-24. The hypertext documents include embedded links to images and other web pages on remote web servers, which are identified by their URL format. *Id.*, 4:25-43. Locally stored hypertext documents and files are also identified by their URL and can be displayed by the web browsing program. *Id.*, 4:38-43.

60. *Logan* describes an “attract page 81” that is preferably a locally stored hypertext document containing additional hypertext links. *Id.*, 4:55-62. The below figure illustrates the key components used to implement *Logan*’s kiosk system:



Id., Fig. 1. In the above figure, there are 4 links embedded in “attract page 81.” *Id.*, 4:55-67. Among the links embedded in “attract page 81,” “LINK 1” and “LINK2” lead to other locally stored pages, and “LINK3” and “LINK4” lead to remote webpages stored on separate web servers. *Id.* The kiosk user may select a link to access to display the linked information, which includes links to other webpages. *Id.*

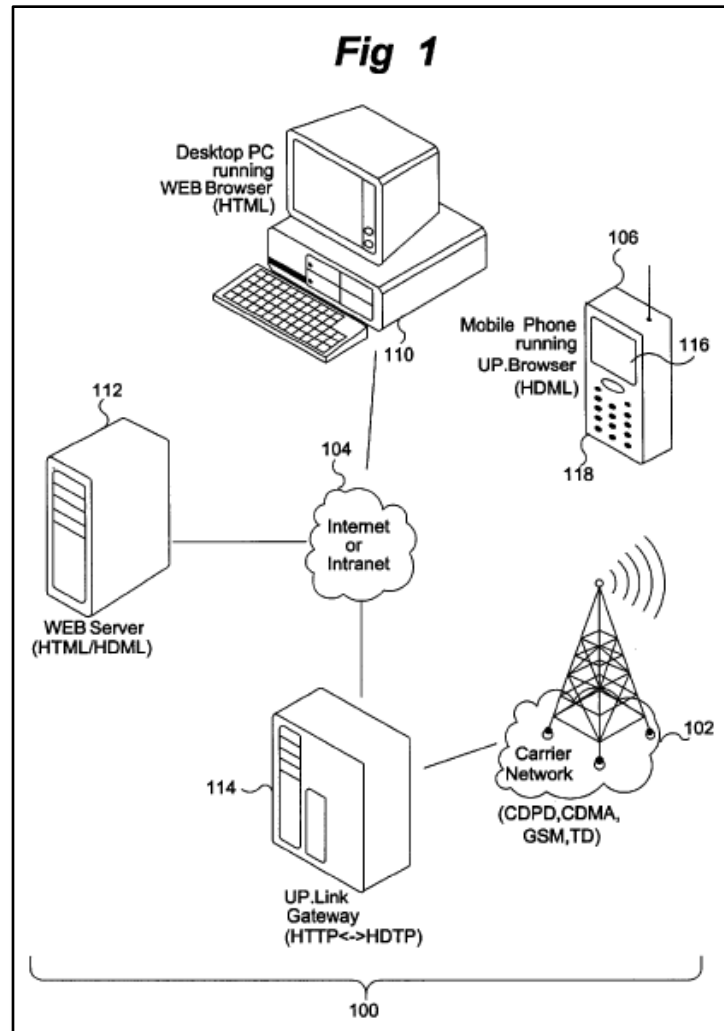
61. By the time of the '058 Patent, a POSITA would have been aware of the state of the art as described by the patents described above.

IV. OPINION - GROUND 1

A. Obvious to Combine Rossmann and Himmel

1. Overview of Rossmann

62. U.S. Patent No. 6,119,155 to Rossmann et al. ("*Rossmann*") was filed on Feb. 19, 1998, and issued September 12, 2000. *Rossmann* (Ex. 1004), (22), (45). In general, *Rossmann* teaches "navigation of Internet web pages using thin devices, [including] a mobile device." *Rossmann*, 3:1-2. *Rossmann* recognized that the limited bandwidth in the then-current wireless data networks, paired with low computing resources, caused "unexpected results" during wireless network navigation. *Id.*, 3:4-8; *see also id.*, 2:11-15. To address these issues, *Rossmann* provides improved methods to navigate hierarchical layers of accessible information. *Id.*, 3:4-10. *Rossmann*'s improved navigation methods operate within a general data network, an example of which is shown below in Figure 1:

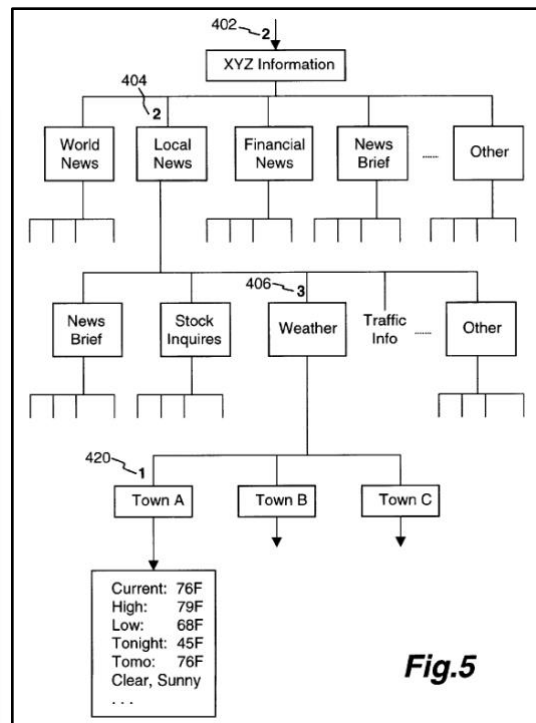
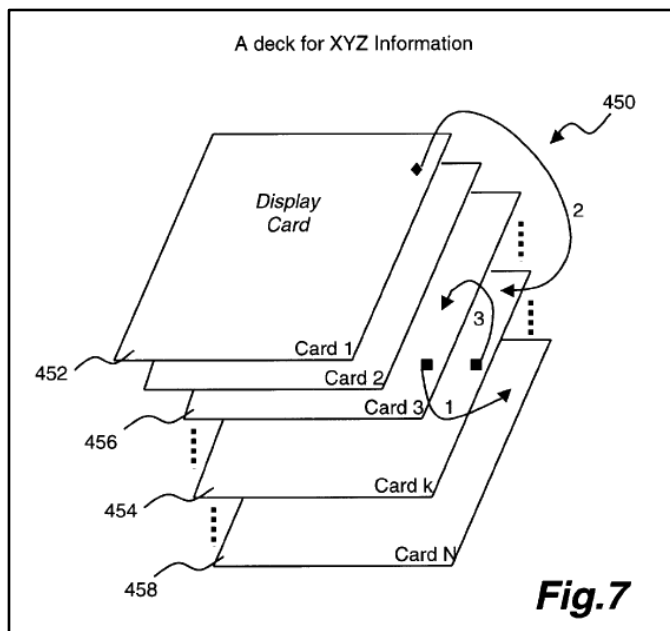


Id., Fig. 1.

63. *Rossmann* teaches embodiments where mobile phone 106 interacts with a server (e.g., link server 114) to download and stored one or more “decks” which each include one or more “cards.” *Id.*, 5:39-51, 6:26-29. These cards include “the information required to generate a screen display on the display screen 116” of the mobile phone. *Id.*, 6:33-36. Since the deck includes one or more cards, a “deck” “is simply a group of screen displays.” *Id.* *Rossmann* teaches that these decks are “normally kept in the work

memory” of the phone. *Id.*, 8:47-49. When the user requests a deck or card, “the client module in the mobile device 142 first consults the work memory 148 therein to determine if the requested deck is available.” *Id.*, 8:49-52. In this way, if the deck or card is stored within the work memory, they may be “accessed without requiring any communication with the server device.” *Id.*, 8:52-55; *see also, generally*, 11:3–12:17. If this deck is not available, a deck containing the requested information is downloaded and stored in the mobile device. *Id.*

64. *Rossmann* teaches an example application of this process involving obtaining access to the web-hosted weather for a town. In this example, a user accesses the xyzinfo.com website and downloads and stores a deck corresponding to the information on that website—the deck and “tree structured” website information shown in Figures 7 (on the left) and 5 (on the right) below:



See, e.g., *id.*, 11:3–12:17, Figs. 4A-4G, 5, 7. In this way, a user of *Rossmann*’s system may browse through the locally stored website information, within the various screen displays, to determine the weather of Town A. See generally, *id.*, 11:3–12:17.

65. Because *Rossmann* and the ’058 Patent are both directed to accessing information sources or services on the web, *Rossmann* is in the same field of endeavor as the ’058 Patent. Compare *Rossmann*, 1:18-23 (teaching “data communications” using “a mobile device” to “permit a user to interface and interact with a server over a data network”), 2:66–3:34, with ’058 Patent, 1:7-9 (describing “a method for accessing information sources and services on the Web” using “a device”). Accordingly, a POSITA would have recognized that *Rossmann* is analogous art to the ’058 Patent.

66. The '058 Patent describes common problems in the art for accessing web-information, including “a delay corresponds to each request-answer step [between a device and a server], with a variable duration conditioned by non-controllable parameters like traffic on the network, jamming and power of servers in the consulted sites or also the memory size of the received pages.” *'058 Patent*, 1:35-39. In an attempt to solve this problem, the '058 Patent describes a purported “quicker and easier” method for accessing information on the Web. *'058 Patent*, 1:64–2:2. For example, the '058 Patent describes that the user is “able to access without difficulty the information source being searched with a single request-answer sequence.” *'058 Patent*, 4:63-67. *Rossmann* similarly addresses the problem of network communications that go through “intermediate pages [thereby] slow[ing] information transmission speed and intensif[ying] the network traffic.” *Rossmann*, 2:47-51. *Rossmann* teaches a solution providing “an efficient mechanism that brings [a user] to the desired page without physically waiting for the delivery of every intermediate page in order to move onto the next page.” *Rossmann*, 2:51-54. *Rossmann*'s method includes initial steps that are “processed internally” such that only the “final request” is transmitted over the network, thereby increasing the delivery speed of the desired information (e.g., final request) while also reducing network traffic. *Rossmann*, Abstract, 2:47-62, 3:11-18, 14:35-41. In this way, just like the '058 Patent, *Rossmann* seeks to reduce steps occurring over a network to access targeted web information by performing the initial steps locally. *Compare Rossmann*,

Abstract, 2:47-62, 3:11-18, 14:35-41 *with* '058 Patent, 1:35-42, 4:63-67. As such, *Rossmann* is in the same field of endeavor and is reasonably pertinent to a problem described by the '058 Patent and is thus analogous art.

2. Overview of *Himmel*

67. U.S. Patent No. 6,037,934 to Himmel et al. ("*Himmel*") was filed on November 21, 1997, and issued on March 14, 2000. Himmel (Ex. 1005), (22), (45). *Himmel* generally teaches methods for "information retrieval in a computer network." *Himmel*, 1:4-5. More specifically, *Himmel* teaches improved methods for utilizing downloadable locally stored "bookmark sets" to navigate to websites over the Internet. *Id.*, 1:5-8, 4:54-57, Figs., 1, 6A, 6B. *Himmel* teaches that a bookmark set "is a finite collection of bookmarks that have static and dynamic characteristics," typically presented as sets of hyperlinked URLs. *Id.*, 7:1-2. *Himmel* further teaches downloadable bookmark sets that include a "consumer hot list" pulldown menu having links to common web actions for a web site. *Id.*, 18:53–20:35.

68. *Himmel* teaches several ways to download bookmark sets locally. For example, a user can use a vendor CD-ROM containing a browser equipped with a bookmark manager and an active bookmark set with the URL addresses the vendor wants to advertise. *Id.*, 9:61-67. Additionally, bookmark sets can be pre-downloaded on a vendor kiosk to access specific vendor addresses. *Id.*, 10:1-8. *Himmel* also teaches that

bookmark sets can be pushed or pulled from a web server. *Id.*, 14:8-40, 15:42-52, 16:12-24.

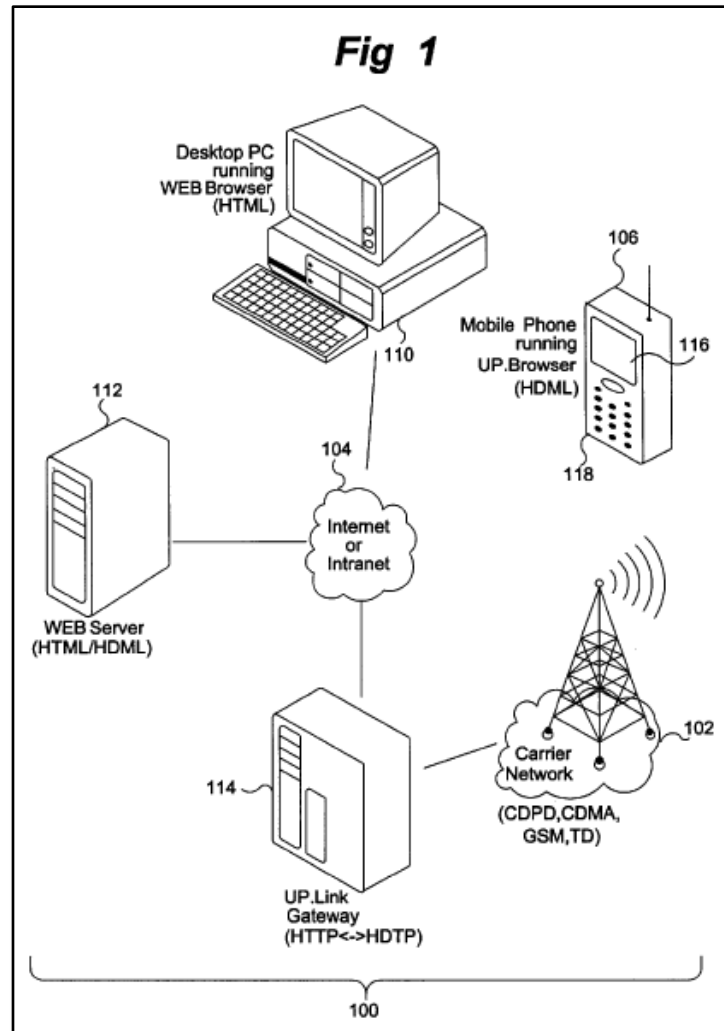
69. Because *Himmel* and the '058 Patent are both directed to accessing information sources or services on the web, *Himmel* is in the same field of endeavor as the '058 Patent. *Compare Himmel*, 1:5-6 (teaching “an improved method for providing a set of bookmarks in a browser for retrieving Web pages in an Internet environment”), 2:63–3:9, *with '058 Patent*, 1:7-9 (describing “a method for accessing information sources and services on the Web” using “a device”). Accordingly, a POSITA would have recognized that *Himmel* is analogous art to the '058 Patent.

70. The '058 Patent describes problems users “poorly accustomed to computer tools and search engines” may have had finding the most pertinent information when browsing. *'058 Patent*, 2:29-33. In an attempt to solve this, the '058 Patent describes “an efficient guiding to most of the useful information sources or to the most frequently consulted information sources.” *Id.* Like the '058 Patent, *Himmel* teaches “a common way to provide the users with the most important site links.” *Himmel*, 15:25-28. In this way, just like the '058 Patent, *Himmel* seeks to provide users simple access to the most relevant information. *Compare Himmel*, 10:1-8, 15:25-28, *with '058 Patent*, 2:24-33. As such, *Himmel* is in the same field of endeavor and is reasonably pertinent to a problem described by the '058 Patent and is thus analogous art.

3. *Claim 24(Pre): A mobile communication device connectable to remote sources of information or services through a*

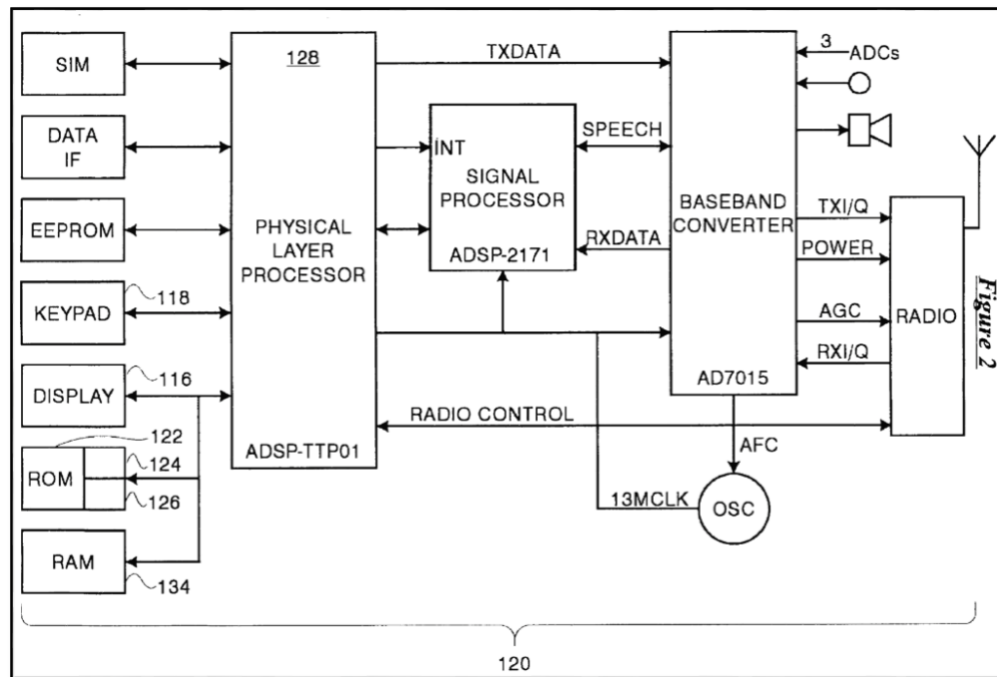
communication network, the communication device comprising a display, data storage, a processor, a controller and a plurality of pages locally stored in said data storage and displayable on said display,

71. *Rossmann* teaches a mobile communication device connectable to remote sources of information or services through a communication network, the communication device comprising a display, data storage, a processor, a controller and a plurality of pages locally stored in said data storage and displayable on said display. More specifically, *Rossmann* describes a system that “has particular applications to the navigation of Internet web pages using thin devices, such as a mobile computing device” or “a mobile device[.]” *Rossmann*, 2:66-3:3 (listing example mobile devices). *Rossmann* teaches “a method for accelerating navigation of hierarchical layers of accessible information hosted in a server device through a two-way interactive communication device over a network.” *Id.*, 3:19-34. *Rossmann* provides an exemplary data network that includes a two-way mobile device 116, shown in Figure 1 below:



Id., Fig. 1. *Rossmann* teaches that mobile device 116 may be a “cellular phone” that operates within the data network 100. *Id.*, 4:48–5:5. *Rossmann* teaches that data network 100 includes both wireless (e.g., “airnet 102”) and wired (e.g., “landnet 104”) communication mediums. *Id.* (noting landnet 104 can be the global Internet, Intranet, or other public or private network).

72. Regarding *Rossmann*’s mobile device, Figure 2 shows a block diagram of a typical digital mobile device that can be used in the data network:

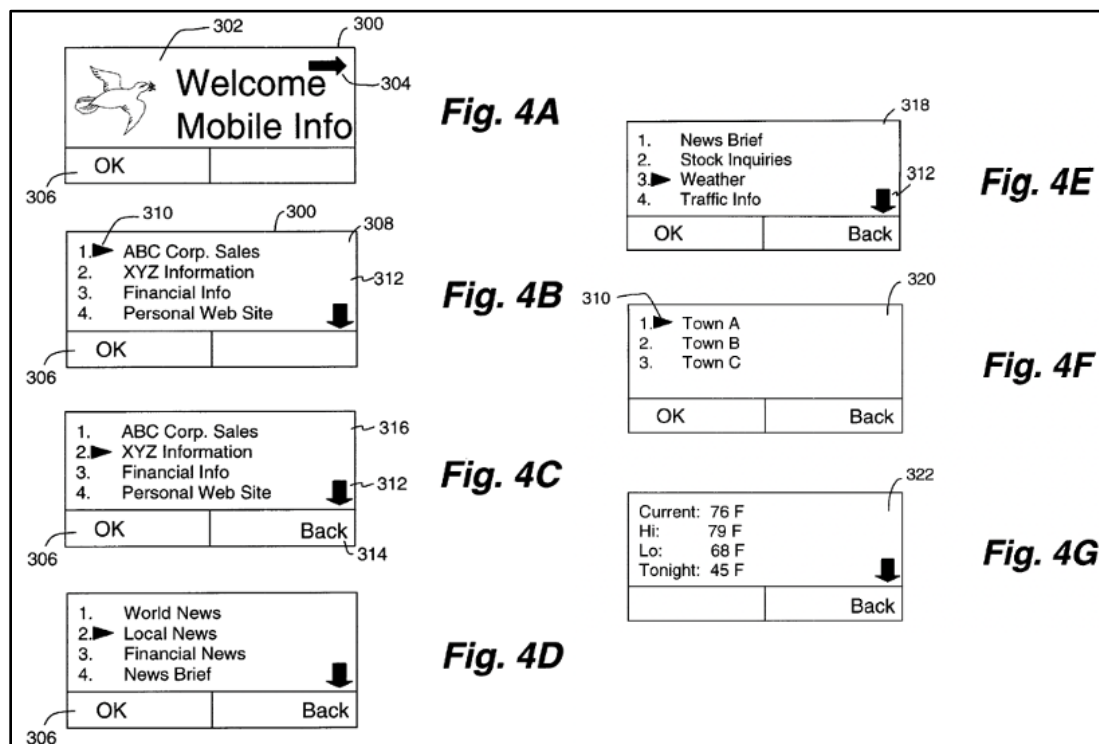


Id., Fig. 2. *Rossmann*'s mobile device 116 includes display 116 ("display"), data storage in EEPROM, ROM, and RAM ("data storage"), and several processors including a signal processor ("a processor"), including a microcontroller 128 ("a controller"). *Rossmann*, 6:11-59, Fig. 2.

73. In order to operate over the described communication channels, *Rossmann* teaches that a user "initiates a communication session request to the server device" to access information on a website. *Id.*, 6:20-29. *Rossmann*'s mobile device can connect to servers using "Handheld Device Transport Protocol (HDTP)" which controls the connection of an HDML web browser to a link server. *Id.*, 5:42-43. *Rossmann* explains that HDTP is similar to HTML, in that it "is a tag based document language and comprises a set of commands or statements specified in a card that specifies how

information is displayed on a small screen of the mobile device. *Id.*, 5:39-43. Using HDTP, a user can download an “HDML deck from the server device and store[] the deck as cached in RAM 134.” *Id.*, 6:20-29. *Rossmann* teaches that the deck “includes one or more cards,” each of which “includes the information required to generate a screen display on the display screen 116.” *Id.*, 6:29-35. Thus, to “provide information service to mobile devices, the server device [] stores a plurality of decks [] containing accessible information.” *Id.*, 7:50-53. In more layman’s terms, *Rossmann* stores screen displays (cards) in a group of one or more screen displays (decks) for local user navigation.

74. *Rossmann* provides an example of this process in Figures 4A-4G which “illustrates the steps of navigating an information service web site that generally provides hierarchic layers of information.” *Id.*, 12:18-34. I have reproduced Figures 4A-4G below:



Id., Figs. 4A-4G; *see also, id.*, 11:3-6 (providing example XYZ Information website addressed at a particular web address).

75. *Rossmann* therefore teaches “a plurality of pages locally stored in said data storage and displayable on said display” by storing HDML decks comprising “cards” that represent screen displays, such decks and cards stored locally in the mobile device in RAM 134. *Rossmann*, 6:20-29, 13:60-63, Fig. 2 (local RAM 134); *see also id.*, 8:47-49 (decks can be kept in “work memory 148 of the phone 142 in Fig. 3”). As noted, this “deck is simply a group of screen displays” called “cards.” *Id.*, 6:33-36.

4. ***Claim 24(a): wherein a first one of said locally stored pages is specifically designed to include at least one direct access icon capable of being selectively activated to connect said mobile communication device to a first predetermined one of said remote sources of information or services and at least one selection icon capable of being selectively activated to display a second one of said locally stored pages on said display,***

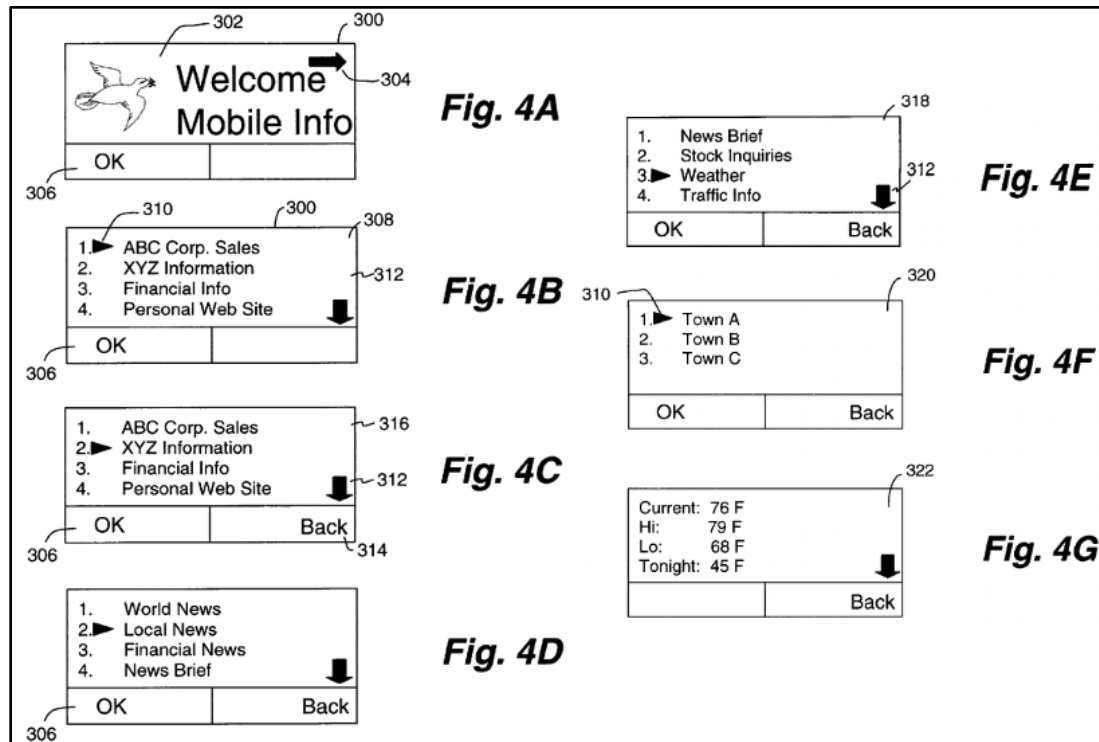
76. I understand that Patent Owner advances the claim term “icon” be given its plain and ordinary meaning and the claim term “direct access icon” be construed to mean “an icon that, when selected, causes an address of at least one remote information or service source to be transmitted to a network.” I have applied these interpretations for the purposes of my Opinions below.

77. As discussed above in the preamble, *Rossmann* teaches a set of locally stored pages stored in memory on a mobile device, i.e., stored cards in an HDML deck in the mobile device RAM. *Supra*, Claim 24(Pre). Specifically, *Rossmann* teaches that a

user “initiates a communication session request to the server device” to access information on a website. *Id.*, 6:20-29. Furthermore, the user can use the “Handheld Device Transport Protocol (HDTP)” which controls the connection of an HDML web browser to a link server. *Id.*, 5:42-43. *Rossmann* explains that HDTP is similar to HTML, in that it “is a tag based document language and comprises a set of commands or statements specified in a card that specifies how information is displayed on a small screen of the mobile device. *Id.*, 5:39-43. Using HDTP, a user can download an “HDML deck from the server device and store[] the deck as cached in RAM 134.” *Id.*, 6:20-29. *Rossmann* teaches that the deck “includes one or more cards,” each of which “includes the information required to generate a screen display on the display screen 116.” *Id.*, 6:29-35, Fig. 2 (illustrating RAM 134); *see also id.*, 8:47-49 (decks can be kept in “work memory 148 of the phone 142 in Fig. 3”). *Rossmann* describes its embodiments involving communication between a client device and a server device using decks as “cache case” embodiments. *Id.*, 13:66-14:1.

78. *Rossmann* teaches that in the “cache-case,” “[u]pon receiving a request from the user, the client module in the mobile device 142 first consults the work memory 148 therein to determine if the requested deck is available.” *Id.*, 8:49-55. For an available deck, the requested card is accessed without any communication with the server. *Id.* Alternatively, if no card meets the request, “a connection initiated by the client module 146 to the server device 144 is made to fetch the new deck.” *Id.*, 8:44-64. Figures 4A-

4G provide an example of the latter scenario in which a user performs a local preliminary search for information within the mobile device after fetching a new deck:



Id., Figs. 4A-4G.

79. In *Rossmann*'s Figure 4 example, a user interested in the weather searches and navigates through locally stored decks and cards to ultimately display the weather in Town A. *See, e.g.*, Figs 4A-4G. Initially, upon activation, the processor "initiates a communication session request to the server device" and establishes a communication session. *Id.*, 6:20-27. After establishing a communication session, "the phone 120 typically receives a single HDML deck from the server device and stores the deck as cached in RAM 134." *Id.*, 6:26-29. In the example shown in Fig. 4A and 4B, this initial deck has two cards for display to the user. *Id.*, 9:37-45, 9:62-10:4. The user navigates

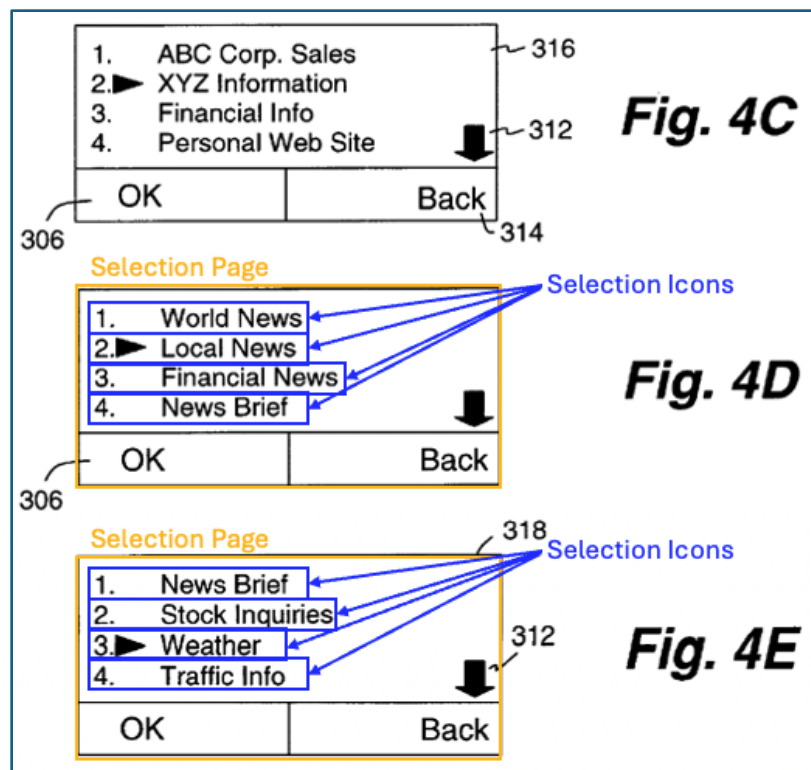
through the Figure 4A welcome page to the Figure 4B menu page; selects the second option in the menu for XYZ Information in Figure 4C; a new card deck is downloaded with the displays for www.xyzinfo.com shown in Figures 4D-4G; and the user performs all subsequent navigation within the deck to arrive at the Figure 4G weather display for Town A. *Id.*, 10:34-11:56.

i. Rossmann teaches a first locally stored page specifically designed to include a selection icon

80. I have reviewed Patent Owner's district court claim construction brief and understand that Patent Owner advances the claim term "specifically designed to include," means "used to include." Ex. 1040 (Responsive Claim Construction Brief), 16-19. Under Patent Owner's construction, the claim requires selection pages that are "used to include" the claimed set of icons. Patent Owner advanced that the "prosecution history of the '058 patent expressly informs a POSITA of what Allani intended the term 'specifically designed to' to mean." *Id.*, 17. Namely, that "[r]equiring an element to be specifically designed' for another element narrows the claim because it requires more than the first element being merely capable of being used with the second element." *Id.* (noting this phrase therefore "clearly sets the scope of [the] claims...by excluding pages that are merely capable of containing selection icons and direct access icons" and that the "patents-in-suit do not disclose any such pages"). I have no opinion on the correctness of Patent Owner's Arguments. I have applied this interpretation for the purposes of my

Opinions below. As detailed below, *Rossmann* teaches a first locally stored page “used to include” a selection icon and therefore meets this claim limitation.

81. *Rossmann*’s HDML cards include selection icons that, when selected, locally access and display another selection page (i.e., a second one of said locally stored pages). For example, *Rossmann*’s Figure 4 shows multiple selection icons within each card that locally access and display another selection page. This at least includes “Local News” (Fig. 4D), and “Weather” (Fig. 4E).

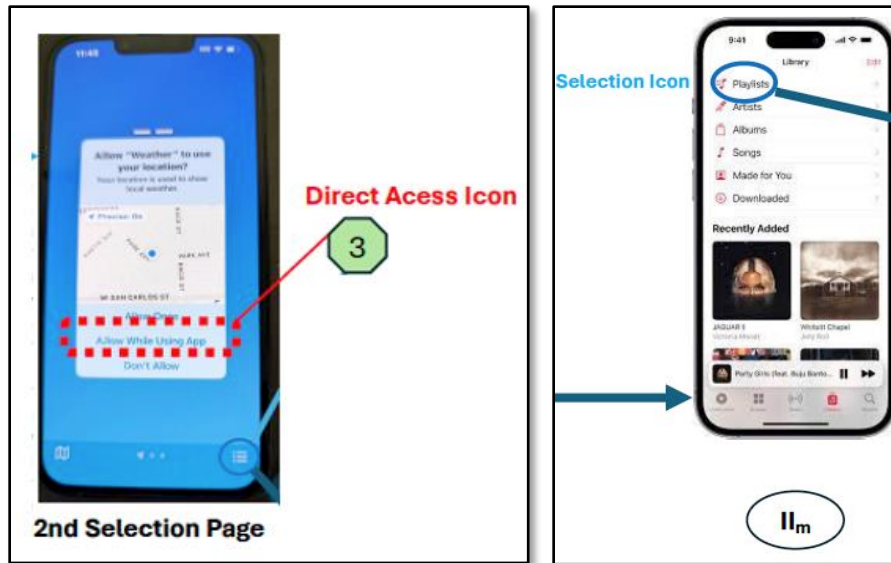


Rossmann, Figs. 4C-4E (annotated). *Rossmann* teaches that a user viewing displayed selection pages can select certain links to move to a separate selection page showing additional selection icons. For example, *Rossmann* teaches that a user may move the

black arrow in Figure 4D to the second item (i.e., Local News) and press a soft key for “OK” or the number “2” on the keypad and the next locally stored page is displayed, as shown in Figure 4E. *Id.*, 6:20-29, 9:54-59, 9:62-65, 11:15-33. *Rossmann*’s first locally stored page, e.g., shown in annotated Figure 4D, is therefore “used to include” a selection icon (e.g., Local News) because it is more than “merely capable of being used” with a selection icon. During use, as illustrated in *Rossmann*’s modified Figure 4 embodiment and as described above, this selection page is programmed to display the set of selection icons for selection by the user. Indeed, *Rossmann* discloses “CHOICE” cards that are specifically designed to include hyperlink icons for selection. *Rossmann*, 9:8-12.

82. I have been informed that in the District Court litigation, Patent Owner argues that “icon” should be given its plain and ordinary meaning. For the reasons below, Patent Owner’s apparent understanding of the plain and ordinary meaning of “icon” must at least include textual icons. I have applied Patent Owner’s interpretation for my opinions herein.

83. I understand that in Patent Owner’s infringement allegations at the District Court, Patent Owner accuses several textual icons as the claimed selection “icon” or direct access “icon.” These are shown in the exemplary figures below:



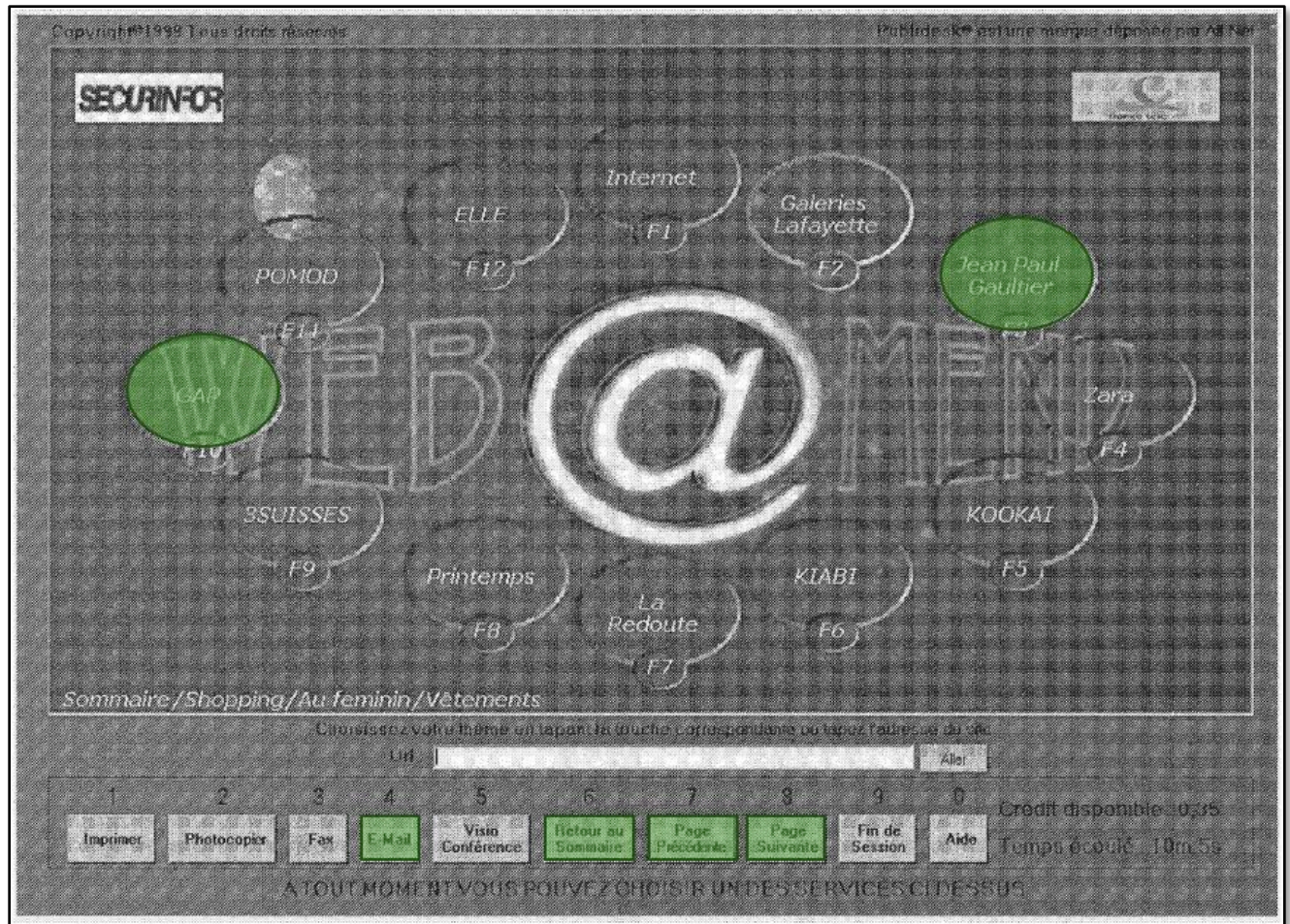
Ex. 1034 (Complaint); Ex. 1035 (Infringement Contentions). Patent Owner points to a purported “2nd Selection Page” that shows a screen display for the “Weather” app on an iPhone. Specifically, Patent Owner accuses “Allow While Using App” as a “Direct Access Icon.” As another example, Patent Owner points to a music library screen display for the “Music” app on an iPhone. Patent Owner accuses “Playlists” as a “Selection Icon.” In both instances, Patent Owner accuses textual icons as the claimed direct access and selection “icons.”

84. Next, I address Patent Owner’s plain and ordinary meaning interpretation of “icon” in light of the intrinsic record. The ’058 Patent provides multiple examples of icons. For example, the ’058 Patent explains “[t]he selection icons preferably include an item or **thematic title** opening an access to a page.” *’058 Patent*, 2:41-44. In its description of Figure 2, the ’058 Patent describes “**an icon AD11 ‘calendar’**,” “**an icon AD12 ‘1st division games’**,” and “**an icon ‘Return’**.” *Id.*, 4:9-27. A POSITA would

have understood from the '058 Patent's description that the claimed "icons" must at least include text-based icons that allow a user open access to a page. Indeed, claim 6 of the related '877 Patent (Ex. 1032) indicates "that an icon for accessing a selection page **includes a thematic title.**" *'877 Patent*, 5:55-57. Furthermore, the '058 Patent claims **"icons compris[ing] textual elements."** *'058 Patent*, 7:6-7 (claim 20).

85. The remaining intrinsic record supports additional examples of icons. For instance, the '058 Patent recites specific narrowed sets of icons in dependent claim 19, including icons that comprise "logotypes, graphic marks or semi-graphic marks." This supports that the icons claimed in the broader independent claims must at least encompass any of these narrower types of icons, including textual icons, graphic icons, semi-graphic icons, etc. Indeed, this also comports with the original disclosures made by the inventor when seeking patent protection for the claimed invention. During prosecution of the '058 Patent, the inventor filed an inventorship affidavit on June 19, 2018. Ex. 1002 (p. 466-79). In this affidavit, the inventor explains that the screen, replicated at the end of this paragraph, "is the 'Clothing' page, the last page, in the successively linked pages identified as 'Summary/Shopping/for Women/Clothing'. This clothing page is navigated to from the previous 'for Women' page, and the 'Shopping' page previous to that, and the 'Clothing' page previous to that." *Id.* at 468. The inventor expressly states that "[t]he screen depicted in the attachment **shows selectable icons** for specific brand name stores that sell women's clothing, in particular '**Gap**', '**Jean Paul**

Gaultier, etc.” *Id.* The inventor further lists additional “**selectable icons** for navigating to **email**, to a printer, to return to the summary page that is the beginning of the tree menu (**‘Return to Summary’**/ **‘Retour au Sommaire’**), to return to the previous page in the tree menu (**‘Previous Page’**/ **‘Page Précédente’**), and to go to the next page in the tree menu (**‘Next Page’**/ **‘Page Suivante’**).” *Id.* at 468-69. As shown in the image below, the “selectable icons” the inventor lists includes those surrounding the “@” in the upper portion as well as those located at the bottom. For purposes of clarity, I have annotated the image to indicate which icons the inventor specifically points to, highlighting those in green:



Id. at 475 (annotated).

86. Based on this information, a POSITA would have understood that the claimed “icons” at least include textual elements, like thematic titles. Accordingly, a POSITA would have understood that *Rossmann*’s teachings, including text-based links “XYZ Information,” “Local News,” “Weather,” and “Town A,” for example, satisfy the claimed “icons.” As do *Himmel*’s teachings of direct links to webpages, e.g., Purchase, On Sale Today, etc.

87. Additionally, a POSITA would have understood that *Rossmann* discloses an arrow next to the text-based link to indicate these links are “icon[s]” as that term is used in the ’058 Patent. For example, a POSITA would have recognized that arrow 310 being next to the textual link (e.g., “Local News”), together, indicate an icon for navigating to other local selection pages (selection icon) or to an external website (direct access icon). In this example, the arrow and “Local News” indicate to a user that this selection will take the user to the next card showing local news. Since the “Local News” link opens the local news card that is stored locally in cache, a POSITA would have understood this to meet the claimed selection icon. Similarly, the arrow next to the text-based link to the server (e.g., “Purchase”) would indicate that “Purchase” is a direct access icon. *See infra*.

88. To be clear, it is not my opinion that the pointer itself is a selection or direct access “icon” as those terms are used in the ’058 Patent. My opinion is that the pointer indicates to the user that the selection or direct access icons are selectable such that they navigate to another local page (selection icon) or to a webpage (direct access icon).

89. In both explanations above, *Rossmann*’s teachings of text-based links are icons under the plain and ordinary meaning for that claim term. A POSITA’s understanding of the plain and ordinary meaning of “icon,” in light of the ’058 Patent’s description, would at least include text-based links, including links that are indicated as selectable with an arrow. Accordingly, *Rossmann-Himmel*’s hyperlinks are “icons”

under the plain and ordinary meaning of that term informed by Patent Owner's infringement allegations at the District Court and the intrinsic record.

ii. *Rossmann and Himmel render obvious a first locally stored page specifically designed to include a direct access icon*

90. As stated above, I understand that Patent Owner's advances the claim term "specifically designed to include," means "used to include." Under Patent Owner's construction, the claim requires selection pages that are "used to include" the claimed set of icons. I have applied this interpretation for the purposes of my Opinions below. As detailed below, *Rossmann* teaches a first locally stored page that is "used to include" a direct access icon and therefore meets this claim limitation.

91. *Rossmann's* "cache case" embodiment does not expressly teach a single selection page comprising both selection icons and direct access icons. While *Rossmann* teaches both local hyperlinks to other stored cards and hyperlinks to a server to download new decks, a user does not have access to remote websites under *Rossmann's* express teachings. For example, *Rossmann* teaches the menu items shown in Figure 4B are each associated with a "resource locator [that] includes an address of the particular object associated with that menu item." *Rossmann*, 10:24-34. This "address can be to another card in the deck stored in the cache or to a remote object on a server computer." *Id.* A POSITA would have understood that *Rossmann* teaches linking to remote servers to, therefore, download a new deck. *Id.*, 10:51–11:14 (describing how a user selection sends

a request to a server device for download of a new deck). Thus, while *Rossmann* does not expressly provide user access to a remote website, a POSITA would have understood that *Himmel* teaches downloading locally stored “bookmark sets” (sets of “direct access icons”) that a user can select to access a specific URL.

92. *Himmel* teaches “bookmark sets” managed by a “bookmark manager” software module, where these “bookmark sets” include hyperlinked URLs used to directly access websites over the Internet. *Himmel*, Abstract, 1:5-8, 5:22-27, Figs. 1, 6A, 6B. *Himmel*’s bookmark sets are locally stored in RAM. *Id.*, 4:54-57, Fig. 1. “Each bookmark entry is comprised of a URL to a favorite page and an associated descriptive text string which describes the web page in such a way to be easily recognized by the user.” *Id.*, 6:19-22. *Himmel* teaches downloading specific types of bookmark sets, such as a “consumer hot list” bookmark set that acts as a pulldown menu for popular web actions. *Id.*, 18:53–21:17. This bookmark set can be downloaded, for example, by a pull operation by the user along with the requested webpage. *Id.*, 14:9-24, 15:42-43, 19:30-31.

93. *Himmel* teaches these consumer hot list pulldowns may be used for different industries. *Id.*, 19:55–20:10. Examples include banking, gaming, and retail. *Id.* Within the retail industry, *Himmel* teaches a pulldown list including Purchase, On-Sale Today, Review Order, Review Shopping Cart, and Consumer Address. *Id.*, 20:3-10. In operation, a user accesses a web server; the web server determines whether there is a

consumer hot list tag in the page and if so, downloads this bookmark set; the consumer hotlist is presented to the user; and if a user selects a bookmark in the hot list, a web page at the URL of the selected item is retrieved. *Id.*, 21:3-17. In this way, these direct links to webpages are “direct access icons”—i.e., they are an icon that, when selected, causes an address of at least one website to be transmitted to a network. This is consistent with the intrinsic record. During prosecution of the parent ’877 Patent, Applicant differentiated U.S. Patent No. 6,456,303 to Walden (“*Walden*”) (Ex. 1029) on the basis that it did not have selection icons and direct access icons on a single selection page. ’877 Parent File History at 360-364. Specifically, Applicant stated that “Walden’s HTML pane consists of information which may include hyperlinks, but fails to include any selection icons...” In other words, Applicant agreed hyperlinks were “direct access icons,” but disputed whether *Walden* disclosed selection icons. Consistently, *Himmel*’s hotlist hyperlinks are “direct access icons” under Patent Owner’s construction and in line with the intrinsic record.

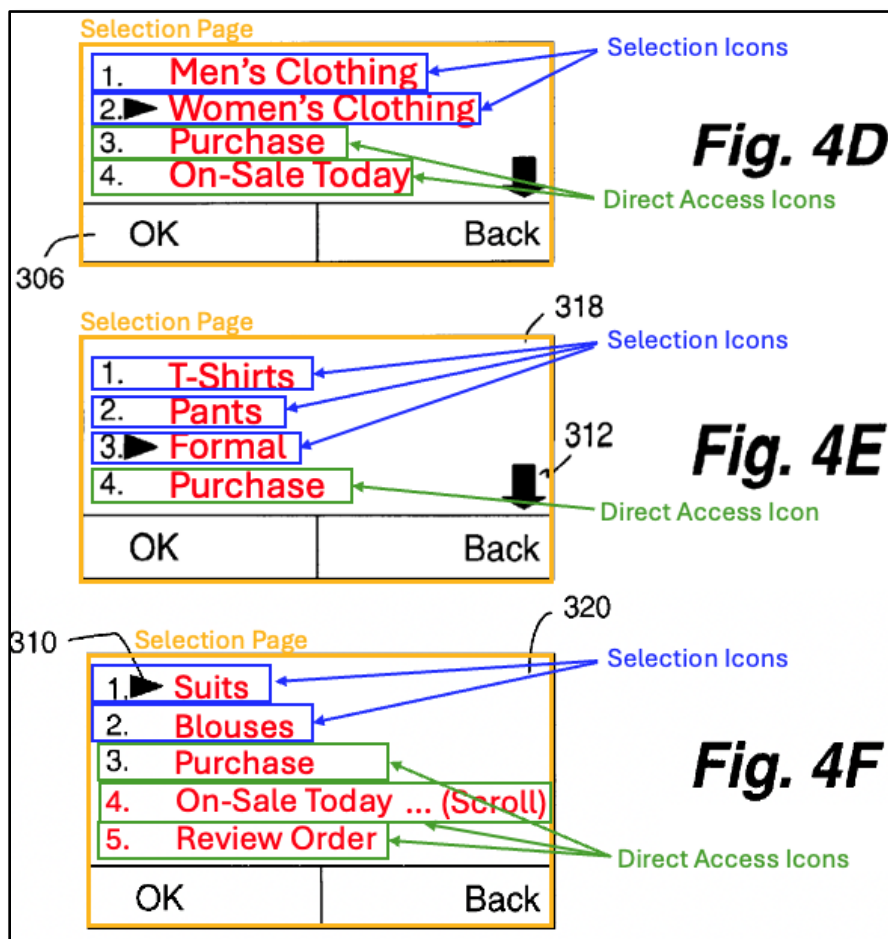
94. A POSITA would have been motivated to modify *Rossmann* to incorporate *Himmel*’s “bookmark manager” software module to download a “consumer hot list” from a web server when *Rossmann*’s mobile device downloads a requested HDML deck from that server. *Himmel* teaches advantages that would improve *Rossmann*’s invention, including providing a user with a “consistent user interface” when accessing a website to make navigation easier, particularly for websites in a particular market segment.

Himmel, 18:63-65, 20:11-16. Incorporating this teaching into *Rossmann* would have facilitated one of *Rossmann*'s stated goals – simplifying navigation for the user by providing an additional navigation aid. *Rossmann*, 2:38-54, 12:24-34. *Rossmann* explicitly states that there is a “need for an efficient mechanism that brings [the user] to the desired page without physically waiting for the delivery of every intermediate page in order to move onto the next page.” *Id.*, 2:51-54. Indeed, *Himmel* recognizes the same navigational aids, such as “Back and Forward toolbar buttons” and “bookmarks.” *Himmel*, 5:37-40. Utilizing *Himmel*'s consumer hot lists in *Rossmann*'s invention would provide more immediate access to commonly used web actions. This would further advance another stated goal of *Rossmann* – allowing “thin devices to reach a desired page without intensifying network traffic.” *Rossmann*, 2:54-56, 14:35-44.

95. Another benefit of this combination would have been increased speed and decreased data usage by the user of the mobile device. During the relevant time period in the late 90's, accessing information locally was, in my experience almost always faster than using the relatively slow network to access information. Additionally, surfing the Internet over a network typically incurred charges and included caps on the total amount of data allotted. Charges typically involved a data usage rate such that a user would be charged a certain dollar value per amount of data used. Charges may also have incurred based on usage over time. Providing direct access to the desired webpage using *Himmel*'s consumer hot list would decrease the data usage and/or time online, thereby decreasing

the cost to the consumer. Furthermore, decreasing data usage through conventional “web surfing” would have reduced the likelihood of reaching any data cap. The above advantages would have been especially true for an unskilled user, who may unnecessarily peruse multiple intermediate pages while attempting to reach the final desired page, all the while incurring costs and using data.

96. For clarity, I provide an exemplary operation of *Rossmann*’s system from Figure 4, as modified by *Himmel*. The annotated figures below illustrate this example operation:



Rossmann, Figs. 4D-4F (annotated).

97. If a user of *Rossmann*'s modified Figure 4C selects ABC Corp. Sales, a new HDML deck would be downloaded and stored in RAM. *Rossmann*, 10:51–11:14. In the modified system, the mobile device would also download, from the server, a consumer hot list to RAM that is associated with ABC Corp. Sales website. Regarding the downloaded ABC Corp. Sales deck, this deck would likewise have a downward tree structure like the deck downloaded from XYZ Information. *Rossmann*, 11:34-64. As such, the first card displayed to the user upon download and processing of the ABC Corp. Sales deck would include options associated with the ABC Corp. Sales, such as Men's Clothing, Women's Clothing, Accessories, Shoes, etc. Additionally, in the modified system, the first card would also show one or more links from the consumer hot list, as taught by *Himmel*, such as On-Sale Today, Purchase, etc.

98. A user may then select, for example, Women's Clothing as shown in annotated Figure 4D. As taught by *Rossmann*, this selection icon would direct the user to a next card in the deck that was internally stored on the RAM (e.g., the card in annotated Figure 4E). With regards to the modification of *Rossmann* with *Himmel*, the user would also have the choice to select the On-Sale Today icon from the customer hot list. In this scenario, the mobile device may establish a connection with the server to show the user the web page hosting ABC Corp. Sales sale specials for the day. In this way, the consumer hot list icons (e.g., "On-Sale Today") are "selectively activated to connect said mobile communication device to a first predetermined one of said remote

sources of information or services,” as claimed. A POSITA would have understood the selection of the “On-Sale Today” hyperlink would connect to the server to display the webpage related to what sales were available that day.

99. Proceeding through the example, the page illustrated in Figure 4E would include sub-themes under the main theme of Women’s Clothing. This may include, for example, T-shirts, Pants, Formal, etc. These selections again would cause the system to display the next internally stored card showing the choices under each of those categories. Additionally, the page shows a choice from the customer hot list (e.g., Purchase). Similar to the description above, a user selection of this choice would cause the mobile device to establish a connection to the server hosting the web page for ABC Corp. Sales to purchase an item. Namely, a POSITA would have understood the selection of the “Purchase” hyperlink would connect to the server to display the webpage that allows the user to make a purchase. A POSITA would have recognized the benefits of modifying *Rossmann* based on the teachings of *Himmel* to provide this functionality for the user. This would greatly decrease the network traffic and allow the user to more efficiently get to the desired web page, which in this case would be sales specials for women’s clothing on that day or to purchase a clothing item. Indeed, these are both stated goals of *Rossmann*. *Rossmann*, 2:54-56 (teaching the “need for a mechanism for thin devices to reach a desired page without intensifying network traffic”), 2:51-55 (teaching the “need for an efficient mechanism that brings [the user] to the desired page without

physically waiting for the delivery of every intermediate page in order to move onto the next page”); *see also, id.*, 12:24-34, 14:35-44.

100. Annotated Figure 4F is similar to the description above regarding exemplary Figure 4E. Briefly, a user may select the selection icon “Formal” in Figure 4E that causes Figure 4F to be displayed, another page stored in RAM on the mobile device and previously downloaded with the deck. Figure 4F similarly shows the user selection icons (e.g., Suits, Blouses, etc.) as well as direct access icons from *Himmel’s* consumer hot list (e.g., Purchase, On-Sale Today, Review Order). A POSITA would have been motivated to incorporate *Himmel’s* consumer hot list on subsequent pages/cards throughout the tree-structured deck for the same reasons stated above regarding Figure 4E. *Rossmann’s* modified first locally stored page, e.g., shown in annotated Figure 4D, is therefore “used to include” a direct access icon (e.g., One Sale Today) because it is more than “merely capable of being used” with a direct access icon. During use, as illustrated in *Rossmann’s* modified Figure 4 embodiment and as described above, this selection page is programmed to display the set of direct access icons for selection by the user. Indeed, *Rossmann* discloses “CHOICE” cards that are specifically designed to include hyperlink icons for selection. *Rossmann*, 9:8-12.

101. A POSITA would have had a reasonable expectation of success modifying *Rossmann* with *Himmel’s* teachings. First, technology for bookmarking websites and web actions was in place well before the earliest priority date of the ’058 Patent. For

example, *Rossmann* discusses an already then-popular “method in Internet navigation in a mobile device [was] to provide a mechanism to predefine a set of URLs of frequently visited Web sites.” *Rossmann*, 2:38-41. Other “bookmarking” technologies are described above in the Background of the Technology. *See above*, Sec. III.E.7. As such, modifying *Rossmann* to utilize known bookmark manager software to store common web actions in RAM using the same location *Rossmann*’s HDML decks are stored in would have been a straightforward modification that would have been accomplished without undue experimentation. This is supported by *Himmel*, which states that its system may be used with HTML, as well as “other markup languages such as dynamic HTML and XML.” *Himmel*, 21:26-35. While *Himmel* does not expressly state HDML, a POSITA at the time of the invention would have known that *Himmel*’s description of other markup languages would have included HDML. *See above*, Sec. III.E.4. (Background of Technology). Furthermore, a POSITA would have known that HDML was a similar, simpler form of HTML and therefore would have had a reasonable likelihood of success in modifying *Rossmann* as taught by *Himmel*. *Id.*

102. Second, *Rossmann* already includes the hardware and programming instructions to access a web server using HDML after a user request. For example, *Rossmann* teaches that the mobile device, in the “cacheless embodiment,” makes “a connection to the server device ... to fetch a card, for example, from the HDML decks 154 in the server device 144” in response to a user request. *Rossmann*, 14:20-26.

Rossmann also teaches establishing a connection between the mobile device and the server device for “transmit[ting] another card deck to the mobile device 144.” *Rossmann*, 10:51-11:14. Furthermore, the parent patent to *Rossmann*, U.S. Patent No. 5,809,415 (Ex. 1030), also discloses accessing a web server using the HDML cards and decks. It teaches that a user may “configure[] cellular telephone 100 to access server computer 121 on” a network, and in response the “server computer 121 transmits a card deck to cellular telephone 100.” Ex. 1030, 12:5–16:10; *see also*, 8:64–9:3. Since *Rossmann* already teaches hardware that connects a mobile device to a server device, modifying *Rossmann* with *Himmel* to use direct access icons would have utilized *Rossmann*’s existing hardware and with simple modifications to *Rossmann*’s software.

103. Third, known prior art methods utilized both selection and direct access icons on a single page. For example, *Logan*, described in the Background of the Technology above, teaches a stored page that displays links to both other internal pages and to webpages over a network. *See above*, Sec. III.E.9. (discussing “attract page 81” comprising various links to local and remote sources of information). Thus, this modification employs known methods of linking to both local and remote sources from a single displayed page and would have been well within the skill of a POSITA at the time of the invention.

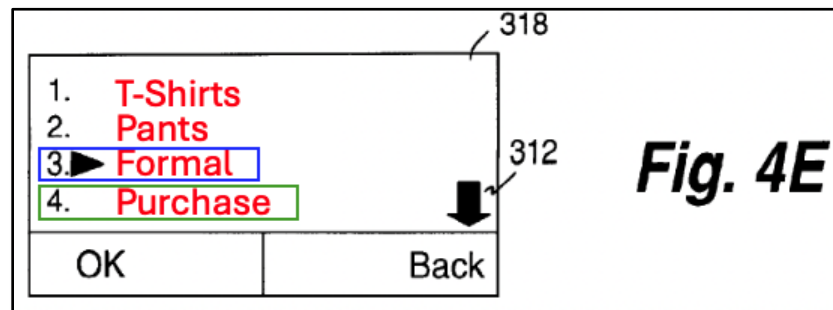
104. This example therefore teaches a first locally stored page specifically designed to include at least one direct access icon (e.g., On-Sale Today, boxed in green)

and a selection icon (e.g., Men's clothing, boxed in blue). Namely, this first locally stored page in the modified *Rossmann-Himmel* system is "used to include" the claimed set of icons during operation by a user.

5. ***Claim 24(a)(1): wherein said second one of said locally stored pages is specifically designed to include at least one second direct access icon capable of being selectively activated to connect said mobile communication device to a second predetermined one of said remote sources of information or services, and at least one second selection icon capable of being selectively activated to display a third one of said locally stored pages on said display,***

105. As explained above in Claim 24(a), *Rossmann* teaches a number of locally stored pages as cards of an HDML deck. *Supra*, Claim 24(a). In the example provided of the modified *Rossmann-Himmel* system, if a user selected ABC Corp. Sales in Figure 4C, a new HDML deck would be downloaded and stored in RAM and the modified system would also download a consumer hot list to RAM associated with the ABC Corp. Sales website. Accordingly, Figure 4D displays the first locally stored page, including selection icons (e.g., "Women's Clothing") that cause display of another card in the locally stored deck, and direct access icons (e.g., "On-Sale Today") that would connect the mobile device to a predetermined remote source of information or services. If a user continues to navigate to other locally stored pages, for example by selecting "Women's Clothing," a second locally stored page (i.e., Figure 4E) would display additional selection icons (e.g., "Formal") as well as consumer hot list icons, including a second direct access icon (e.g., "Purchase"), and so on. As illustrated below, the second locally

stored page includes both selection icons for navigating to other local pages, along with direct access icons to directly navigate to a predetermined website to perform a common web action, illustrated below:

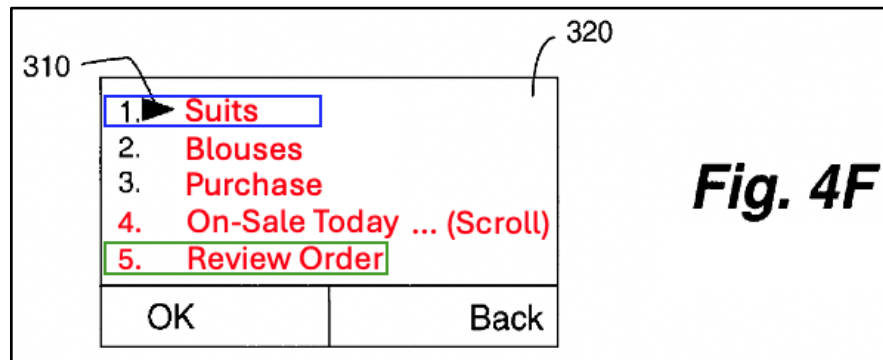


Rossmann, Fig. 4E (annotated). This example therefore teaches a second locally stored page “specifically designed to include” at least one second direct access icon (e.g., Purchase, boxed in green) and a selection icon (e.g., Formal, boxed in blue) to display a third locally stored page for the same reasons stated above. Namely, this second locally stored page in the modified *Rossmann-Himmel* system is “used to include” the claimed set of icons during operation by a user.

6. ***Claim 24(b): wherein said third one of said locally stored pages is specifically designed to include at least one third direct access icon capable of being selectively activated to connect said mobile communication device to a third predetermined one of said remote sources of information or services, or² at least one third selection icon capable of being selectively activated to display a fourth one of said locally stored pages on said display,***

² While this claim only requires a third direct access icon “or” a third selection icon, the example operation described in the modified *Rossmann-Himmel* system teaches a page with *both* claimed icons as explained herein.

106. In the same example discussed in Claim 24(a)(1), utilizing *Rossmann-Himmel's* modified system, continuing from Figure 4E, once a user selects “Formal” a third locally stored page is displayed. This is shown in the annotated Figure 4F reproduced below:

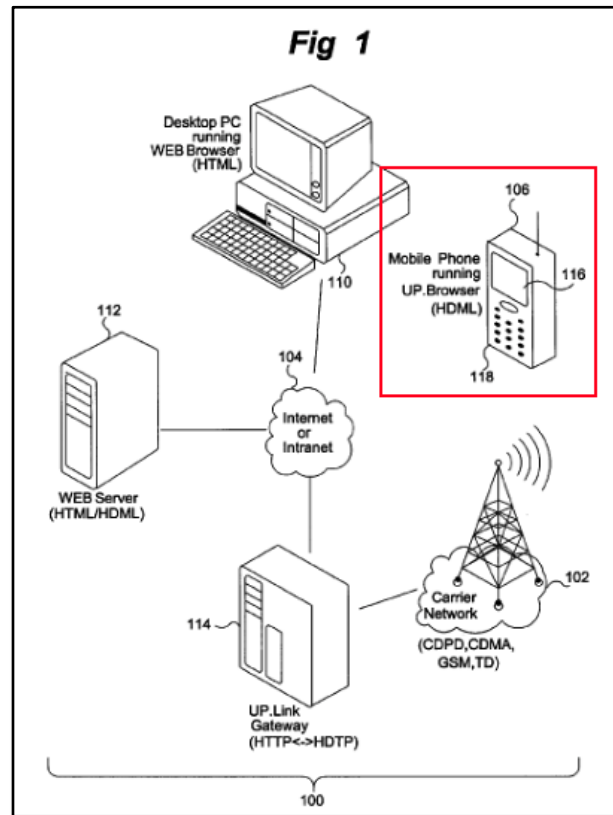


Rossmann, Fig. 4F (annotated). As shown, Figure 4F includes numerous selection icons such as Suits, Blouses, Dresses, which would display a fourth locally stored page, along with the consumer hot list links discussed above, including a third direct access icon such as Review Order. This example therefore teaches a third locally stored page specifically designed to include at least one third direct access icon (e.g., Review Order, boxed in green) or at least a third selection icon (e.g., Suits, boxed in blue). Namely, this third locally stored page in the modified *Rossmann-Himmel* system is “used to include” the claimed set of icons during operation by a user.

7. *Claim 24(c): wherein the mobile communication device is a mobile phone.*

107. *Rossmann* expressly teaches that its two-way communication device can be a “mobile phone.” *Rossmann*, 6:12-14 (“FIG. 2. Illustrates a block diagram of a typical

digital mobile phone 120 that can be used in the arrangement of FIG. 1 to practice the present invention.”); *see also id.*, 2:66-3:3, 4:48-5:5. An example of *Rossmann’s* mobile phone is boxed in red below in Figure 1:



Id., Fig. 1 (annotated); *supra*, Claim 24(Pre).

8. ***Claim 25: The mobile communication device according to claim 24, wherein at least one of the selection pages is further specifically designed to include one or more icons for directly accessing a search engine on the Web.***

108. I understand the Patent Owner advances the claim term “selection page” be construed to mean “a screen with selectable icons that are displayed together on a graphical user interface.” I have applied this interpretation for the purposes of my

Opinions below. I note that claim 24 does not recite “selection pages.” I have been informed to interpret Claim 24’s “pages” consistent with the claimed “selection pages.”

109. As explained above, *Rossmann-Himmel* teaches selection pages with selectable icons displayed on the graphical user interface of a mobile device. *Supra*, Claim 24(a)-(b) (describing HDML cards representing user displays). As further stated above, a POSITA would have understood that *Rossmann*’s HDML cards teach a plurality of “selection pages” under either parties’ claim construction. For example, I understand Patent Owner proposed a “selection page” is a “screen with selectable icons that are displayed together on a graphical user interface.” *Rossmann* teaches that the “card includes the information required to generate a screen display on the display screen.” *Rossmann*, 6:33-35. *Rossmann* further teaches “[a] choice card [that] displays a list of choices for the user.” *Id.*, 9:7-8. *Rossmann*’s Figures 4C-4G also teach screen displays of cards in a deck stored locally on the mobile device that display icons for navigation on the graphical user interface of *Rossmann*’s mobile phone. *Rossmann*, 6:20-29, 9:43-47, 11:3-56. Therefore, based on *Rossmann*’s teachings, a POSITA would have understood that *Rossmann*’s cards meet the claimed “selection pages” under either Patent Owner’s proposed construction.

110. While the example operation of the *Rossmann-Himmel* modified system discussed in Claim 24 above does not discuss a selection page including an icon “for directly accessing a search engine on the Web,” it would have been obvious, based on

Himmel's disclosures, to download a “search engine” icon along with the rest of the hot list icons for display on *Rossmann's* mobile device. As discussed above, in *Rossmann-Himmel's* system, a consumer hot list of common web actions is downloaded when a user requests a deck associated with a specific website. *Supra*, Claim 24(a). Additionally, *Himmel* teaches common web actions such as Purchase, On-Sale Today, Review Order, Review Shopping Cart, and Consumer Address. *Himmel*, 20:3-10. *Himmel* also teaches other “rudimentary common” features such as “‘search’, ‘contact-us’, etc.” *Id.* 18:67-19:1.

111. A POSITA would have been motivated and found it obvious to download a “search” bookmarked web action for a particular website to quickly navigate to the search menu. Including a “search” bookmarked web action for a particular website would enable quick and efficient user navigation to specific information or products directly without sifting through multiple pages. For example, a user may know immediately, without traversing one or more selection pages, a specific item or sub-theme they would like to view. In this case, a POSITA would have understood that allowing the user to directly access the search engine would have saved the user time otherwise spent going through the various selection pages. Additionally, a POSITA would have understood that mobile devices at that time lacked sufficient storage to include all potential options a user may desire in a single downloaded deck. Indeed, *Rossmann* recognizes that mobile devices of that time had a limited “memory capacity...generally less than 250 kilobytes.”

Rossmann, 2:16-17, 2:47-49. As such, a POSITA would have recognized providing a search link would allow the user to efficiently access a relevant search engine if the deck/card lacked their desired choice.

112. A POSITA would have appreciated success downloading this additional hotlink for the same reasons *Rossmann*'s invention accommodates hotlinks for other common web actions. For example, *Rossmann* already teaches upon a user request, establishing a connection between the mobile device and server device for transmission of a new deck to the mobile device. *Rossmann*, 10:51–6:14, Figs. 4A-4F. Accordingly, a POSITA would have understood and found it simple to modify this action to instead transfer the user to a search engine.

113. Moreover, a POSITA would have understood this “search” hotlink is an icon “for directly accessing a search engine on the Web” because it is a search engine for that particular website, enabling a user to navigate to a website’s search bar to type and search for specific information.

9. *Claim 26: The mobile communication device according to claim 24, wherein selective activation of a direct access icon comprises emitting, on the communication network an address of the first, second or third predetermined one of said remote sources.*

114. *Rossmann-Himmel* teaches when a user selects a direct access icon hyperlink on a displayed page, an address is communicated over the Internet to the website the user selected. For example, *Himmel* teaches that “[e]ach hyperlink contains URL location information that serves as **an address of the web site.**” *Himmel*, 5:35-36.

Referring back to the exemplary *Rossmann-Himmel* system regarding ABC Corp. Sales at Claim 1(a)(3), when a user selects one of *Himmel*'s consumer hot links (i.e., direct access icons), such as Purchase, On-Sale Today, etc., the URL address corresponding to that web action would be emitted over the Internet to retrieve that webpage. *Himmel*, 2:4-9 (teaching that "bookmarks offer a means of page retrieval ... [such that] [t]he user can ... select among his bookmarks to go directly to a favorite page. Thus, the user is not forced to enter a lengthy URL nor retrace the original tortuous route through the Internet by which he may have arrived at the Web site."), 5:28–6:28 (describing client-server communication to reach a website), 19:22-31 ("a consumer hot list is composed of a consumer 'request', a text string for display in the user interface which indicates what will happen if the request is selected and a web 'action', a URL to another web page").

115. This concept comports with *Rossmann*'s teachings that "each of the menu items" displayed to a user on a page "corresponds to a resource locator in the card," including "an address of the particular object associated with that menu item" such as its "URL." *Rossmann*, 10:26-34. *Rossmann* teaches that "[t]he address can be ... to a remote object on a server computer." *Id.* Thus, in *Rossmann-Himmel*, when a user selects a displayed menu item from the consumer hot list (e.g., Purchase), the URL address associated with that item is "emitted" over the Internet to the server hosting the desired action (e.g., ABC Corp. Sale's Purchase webpage). A POSITA would have found it

obvious and been motivated to modify *Rossmann* in this way for the same reasons stated above with reference to Claim 24(a). *Supra*, Claim 24(a).

V. OPINION – GROUND 2

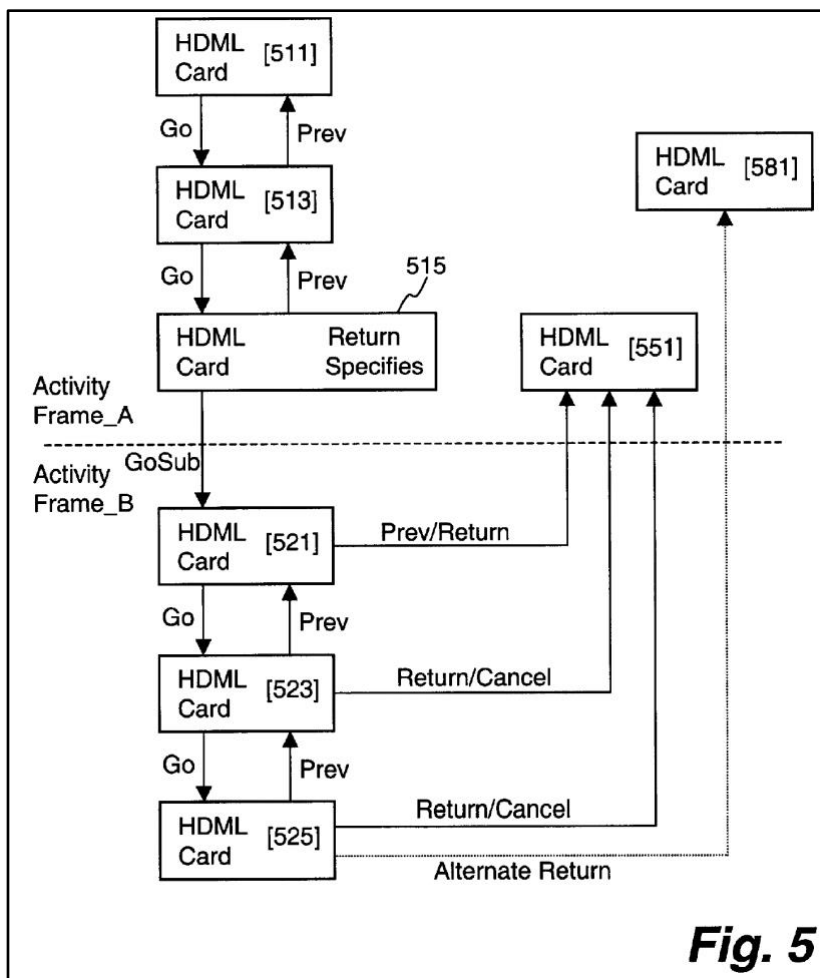
A. Obvious to Combine Rossmann, Himmel, and King

1. Overview of King

116. U.S. Patent No. 6,353,839 to King et al. (“*King*”) was filed on April 30, 1998, and issued March 5, 2002. *King*, (Ex. 1006), (22), (45). In general, *King* teaches “methods for inline variable management into a hypermedia display language.” *King*, 1:6-9, Abstract. *King* is directed to a data network that allows for data transmission to and from a two-way communication device. *King*, 1:37–2:32, Fig. 1. Similar to *Rossmann*, *King* teaches the use of HDML for transmission of a deck containing a number of cards “between the mobile device 106 and the proxy server 114.” *King*, 4:12-31, Fig. 1. *King* teaches that the mobile device “receives a single HDML deck from the server device and stores the deck as cached in RAM 134.” *Id.*, 3:42-45. Also similar to *Rossmann*, *King* teaches that a user may navigate local HDML cards depending on the user’s input. *Id.*, 8:49-63, 13:33–14:17, Fig. 3, Fig. 5.

117. *King* teaches that each HDML deck “has a unique address identifies such as a URL.” *Id.*, 5:44-46. *King* recognizes that URLs are “provided in order to access pertinent information in a server device.” *Id.*, 4:17-27. *King* teaches text substitution during use of the system where variables are inserted into a URL. *Id.*, 9:49–10:27. For example, *King* teaches that “[d]uring the processing and display of the hypertext, the

values of the variables are substituted into the hypertext as indicated by the variable references according to a text substitution method.” *Id.*, 2:39-42. *King* provides an example of this URL generation process, where the user, by inputting “Ted Miller” into the system, causes replacement of URL text with “Ted+Miller” at the DEST parameter. *Id.*, 10:13-27. *King* further teaches that when a user selects a “GO” task in an HDML card (e.g., HDML card 511) to follow a link to a second HDML card (e.g., HDML card 513), “then the URL for HDML card 513 is pushed onto the navigation history stack and HDML card 513 is displayed.” *Id.*, 13:33-45, Fig. 5. *King*’s Figure 5 shows this card navigation method:



Id., Fig. 5.

118. Because *King* and the '058 Patent are both directed to accessing information sources or services on the web, *King* is in the same field of endeavor as the '058 Patent. *Compare King*, 1:13-35 (teaching “wireless data networks” using “mobile devices” to allow “people, as they travel or move about, are able to perform, through the wireless computing devices, exactly the same tasks they could do with computers on the Internet”), with '058 Patent, 1:7-9 (describing “a method for accessing information sources and services on the Web” using “a device”).

119. The '058 Patent describes common problems in the art for accessing web-information, including “a delay corresponds to each request-answer step [between a device and a server], with a variable duration conditioned by non-controllable parameters like traffic on the network, jamming and power of servers in the consulted sites or also the memory size of the received pages.” *'058 Patent*, 1:35-39. In an attempt to solve this problem, the '058 Patent describes a purported “quicker and easier” method for accessing information on the Web. *'058 Patent*, 1:64–2:2. For example, the '058 Patent describes that the user is “able to access without difficulty the information source being searched with a single request-answer sequence.” *'058 Patent*, 4:63-67. *King* similarly addresses the problem of network communications that require “network round-trip” communications between mobile devices and a server, which “introduces additional latency and causes unnecessary network traffic.” *King*, 2:3-5. *King* teaches a method of “inline variable management in a hypermedia display language” in the HDML deck and card system that gets rid of “the necessity of the server round-trip” and reduces “memory and processing requirements of a full scripting language.” *Id.*, 2:26-30. In this way, just like the '058 Patent, *King* seeks to reduce steps occurring over a network to access targeted web information by performing the initial steps locally. *Compare King*, 4:59–5:4 with *'058 Patent*, 1:35-42, 4:63-67. As such, *King* is in the same field of endeavor and is reasonably pertinent to the problem described by the '058 Patent and is thus analogous art.

2. *Claim 1(Pre): Apparatus for accessing information- or service-providing Web sites, comprising a communication device connectable through a communication network to the Internet, control and processing device or devices, data storage device or devices, and a display, said storage device or devices containing a plurality of selection pages within a tree menu structure, said selection pages being beforehand locally stored in said data storage device or devices and each being specifically designed for containing a set of icons including at least one of a direct access icon for directly accessing remote sources of information and a selection icon for locally accessing another selection page within said tree menu structure, wherein said plurality of selection pages includes:*

120. I understand that Patent Owner advances the claim term “website” be construed to mean “a source of information or services accessible via a network using HTTP or another web protocol.” I have applied this interpretation for the purposes of my Opinions below.

- i. *Apparatus for accessing information- or service-providing Web sites, comprising a communication device connectable through a communication network to the Internet, control and processing device or devices, data storage device or devices, and a display,*

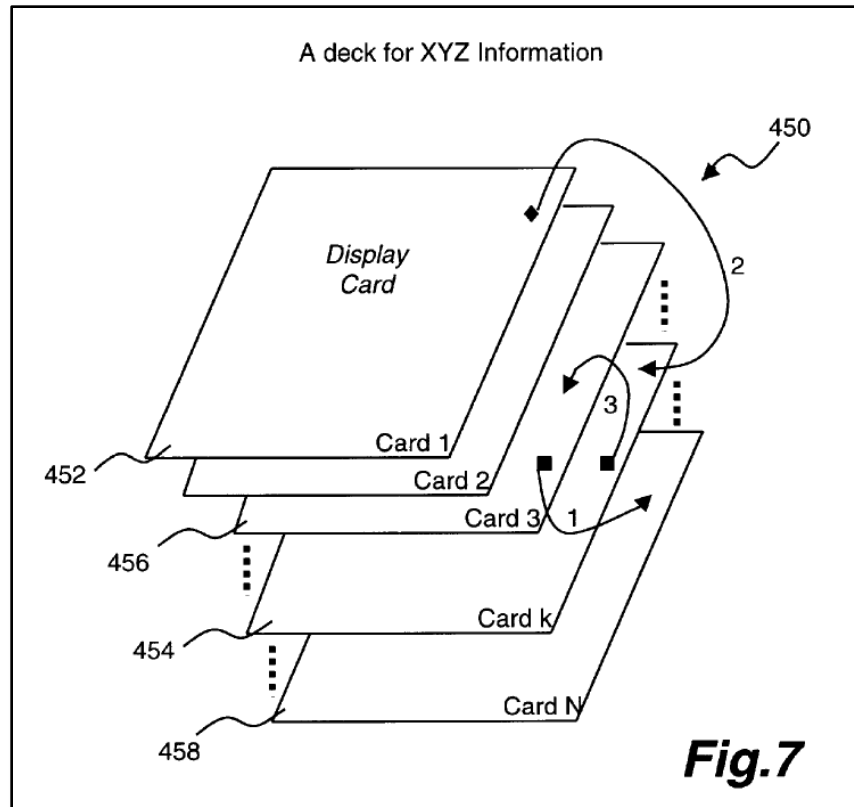
121. As discussed above in Claim 24, *Rossmann* teaches a mobile communication device that teaches this limitation. *Supra*, Claim 24(Pre). *Rossmann* also teaches accessing “information- or service-providing Websites.” *Rossmann* teaches accessing example website www.xyzinfo.com using known web protocols such as HDTP, downloading a deck with cards identified in Figures 4A through 4G, and locally

navigating those cards to ultimately obtain weather information for Town A. *See generally id.*, 9:37-11:56.

- ii. *said storage device or devices containing a plurality of selection pages within a tree menu structure, said selection pages being beforehand locally stored in said data storage device or devices*

122. As discussed in Claims 24 and 25 above, *Rossmann* teaches “said storage device or devices containing a plurality of selection pages” by storing “HDML decks” comprising cards that represent screen displays, such decks stored locally in the mobile device in RAM 134. *Supra*, Claim 24(a), Claim 25; *Rossmann*, 6:20-29, Fig. 2 (local RAM 134).

123. *Rossmann* teaches that the HDML cards (i.e., selection pages) are locally stored within RAM on the mobile device as a deck. For example, *Rossmann* teaches the phone receives an “HDML deck from the server device and stores the deck as cached in RAM 134.” *Rossmann*, 6:20-37; *see also*, 7:50-53, 8:35-42, 12:18-34. Like the “preliminary search” above in limitation 1(a)(1), these HDML cards are stored “before” the final target information is obtained and therefore are “beforehand locally stored” as claimed. Specifically, *Rossmann* teaches “the user **retrieves an HDML deck stored in the memory 148 of the mobile device 142 after receipt from the server device 144.**” *Id.*, 8:35-39. Since the deck is “stored in the memory” “after receipt from the server device,” the deck is “beforehand locally stored.” *Rossmann* depicts an exemplary deck associated with the XYZ Information described in the previous limitation in Figure 7:



Rossmann, Fig. 7.

124. *Rossmann* teaches that its HDML cards are hypertext that link to other cards in the deck and represent website information “configured to have a **downward tree structure 400** of information services.” *Id.*, 11:34-55, 13:53-54. *Rossmann* illustrates this tree structure in Figure 5:

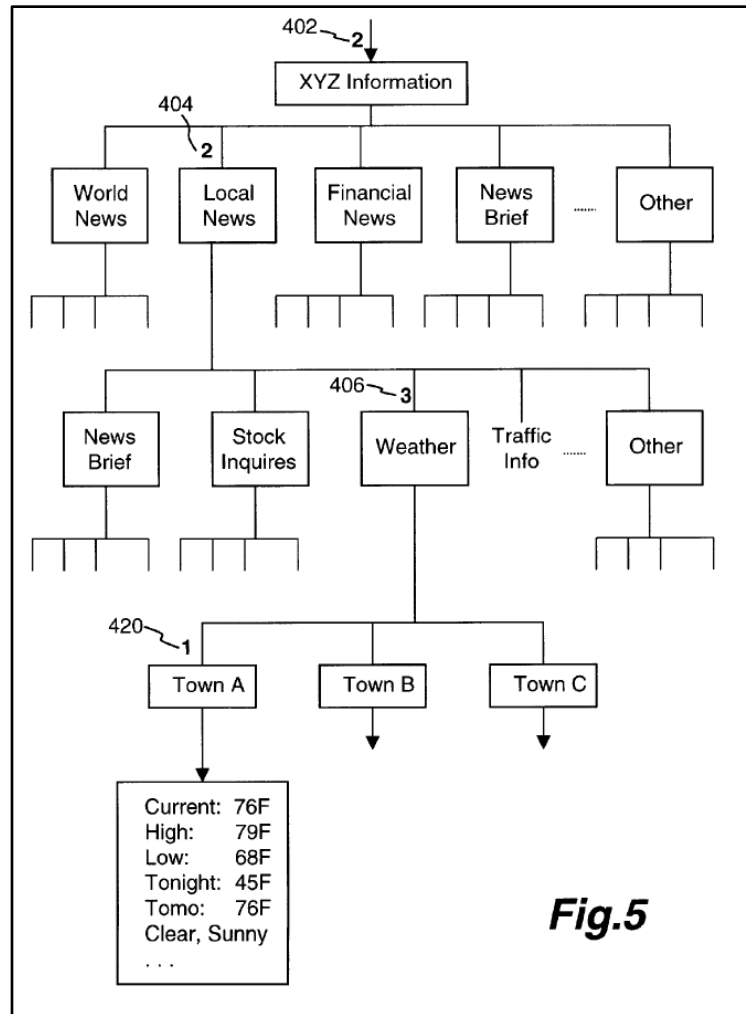


Fig.5

Id., Fig. 5. *Rossmann* teaches that this “entry 402 contains a number of hyperlinkable nodes linking to other text pages that further contains a number [of] hyperlinkable nodes.” *Id.*, 11:43-46. *Rossmann* provides numerous examples of how this information is stored in a tree menu structure. For example, *Rossmann* teaches that “like tree branches, the structure 400 ends with leaves that are text pages or display cards.” *Id.*, 11:46-48. Similar to its description in Figure 4A-4G, “[o]ne of the final leaves along the node ‘Weather’ 406 is a page 420 that provides weather information in Town A.” *Id.*, 11:53-54. *Rossmann*’s HDML cards are therefore “within a tree menu structure” such

that they are hierarchically linked hypertext pages that are the nodes of tree structure websites. As shown in Figure 5 above, node Local News leads to a new page showing nodes News Brief, Stock Inquiries, Weather, and Traffic Info. *Id.*, Fig. 5. Furthermore, selection of node Weather leads to another page that shows nodes Town A, Town B, and Town C.

125. *Rossmann*'s HDML cards and associated screen displays of webpages are consistent with the "tree menu" structure described by the inventor. During the '058 Patent's prosecution, Applicant filed an inventor declaration that discussed an example tree menu structure. '058 Patent File History (Ex. 1002), 466-470. The inventor described an example operation of a webphone accessing a women's clothing webpage by locally navigating through locally stores pages "Summary/Shopping/for Women/Clothing." *Id.* The "Clothing" page was the "last page" "in the successively linked pages" such that the "screen of the attachment refers to a tree structure of pages with [] reference to...Summary/Shopping/for Women/Clothing." *Id.* This description is consistent with *Rossmann*'s teachings. For example, the locally stored pages of "Summary/Shopping/for Women/Clothing" are similar to *Rossmann*'s stored pages of News Brief, Stock Inquiries, Weather, Traffic Info. *Rossmann*, Figs. 4A-4G, 5. As such, *Rossmann*'s HDML cards are "within a tree menu structure" as described by the inventor of the '058 Patent.

iii. *And each being specifically designed for containing a set of icons including at least one of a direct access*

icon for directly accessing remote sources of information and a selection icon for locally accessing another selection page within said tree menu structure, wherein said plurality of selection pages includes:

126. As stated above, I understand that Patent Owner’s advances the claim term “specifically designed to include,” means “used to include.” Under Patent Owner’s construction, the claim requires selection pages that are “used to include” the claimed set of icons. I have applied this interpretation for the purposes of my Opinions below. I note that the language in claim 1 recites “specifically designed for containing” rather than “specifically designed to include.” I have been informed to apply the same construction to these claim terms.

127. In *Rossmann*’s modified system according to the teachings of *Himmel*, these selection pages contain “a set of icons including at least one of a direct access icon for directly accessing remote sources of information and a selection icon for locally accessing another selection page within said tree menu structure.” *Supra*, Claim 24 (describing both direct access icons and selection icons on selection pages in the modified system); *supra*, Claim 1(Pre) (describing selection pages “within said tree menu structure”).

3. ***Claim 1(a): a first selection page, a second selection page and a third selection page,***

128. As above in Claim 24, *Rossmann* teaches HDML cards (“selection pages”) locally stored within RAM in the mobile device. *Rossmann*, 6:20-37. *Rossmann* teaches at least a first, second, and third selection page. *Supra*, Claim 24(a)-(b).

4. ***Claim 1(a)(1): said first selection page being specifically designed for containing a selection icon for locally accessing said second selection page,***

129. As stated above, I understand that Patent Owner advances the claim term “specifically designed to include,” means “used to include.” For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(a).

5. ***Claim 1(a)(2): said second selection page being specifically designed for containing a selection icon for locally accessing said third selection page,***

130. For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(a)(1).

6. ***Claim 1(a)(3): said third selection page being specifically designed for containing one or more direct access icons for directly accessing an information- or service-providing Web site, and***

131. For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(b).

7. ***Claim 1(b): at least one selection page being specifically designed for containing one or more icons for directly accessing a search engine on the Web,***

132. For the same reasons in Claim 25, *Rossmann* teaches this limitation. *Supra*, Claim 25.

8. ***Claim 1(c): wherein the control and processing device or devices are programmed for: enabling a preliminary search locally performed within said communication device in different themes and sub themes within said plurality of selection pages, and***

133. *Rossmann* teaches a user can perform a preliminary search for information or service, locally within the mobile device in different themes and sub-themes within a plurality of displayed selection pages, i.e., by locally navigating through a downloaded HDML deck.

- i. *preliminary search locally performed within said communication device*

134. *Rossmann* teaches that a user “initiates a communication session request to the server device” and downloads an “HDML deck from the server device” to be cached locally in the mobile device in RAM 134. *Supra*, Claim 24. This “deck is simply a group of screen displays” called “cards.” *Id.* As described above, a user performs a local preliminary search for information within the mobile device by navigating through the display cards in an HDML deck. *Id.* (describing a user interested in the weather navigating through locally stored decks and cards to ultimately display the weather in Town A and a similar example for ABC Sales Corp).

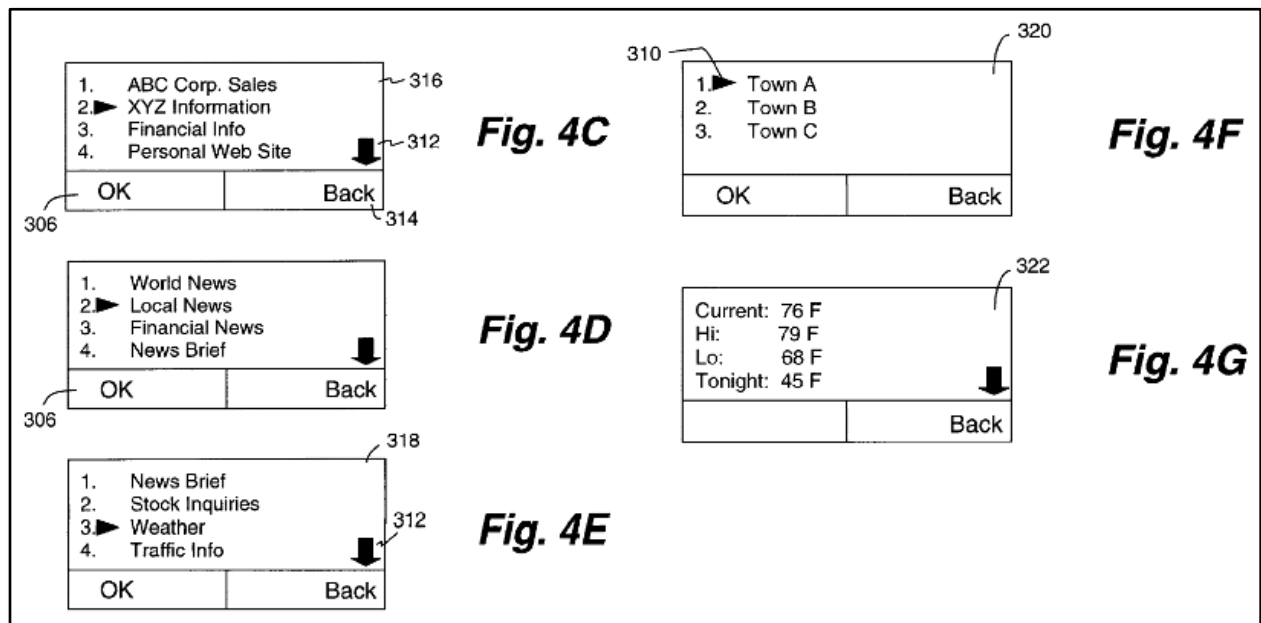
135. Since these decks are cached locally on the mobile device and searched before the final target information is obtained, a POSITA would have understood this to be a “preliminary” search performed locally within *Rossmann*’s mobile device under the plain and ordinary meaning of that claim language. This is consistent with how the ’058

Patent describes a “preliminary search.” Namely, the ’058 Patent describes implementing **“preliminary selection steps”** in pages organized in a tree manner and operating as rolling menus, and **by finally emitting on the Internet only a complete address for accessing a well-targeting information source.”** ’058 Patent, 2:24-33, 2:64–3:4 (describing how a “user can thus locally achieve...a preliminary search” by searching local pages). This means that a preliminary search of local pages is performed by the user locally before the final target information is obtained—i.e., before the address of whatever webpage the user wants to travel to is emitted over the network. *Rossmann’s* disclosures are consistent. In *Rossmann*, a user preliminarily searches through the locally stored pages before displaying the target information in Figure 4G. *Rossmann*, 10:34-11:56. Additionally, *Rossmann’s* local preliminary search serves the same goal as the “preliminary search” in the ’058 Patent. That is, to reduce network traffic and simplify browsing. ’058 Patent, 1:35-42, 2:24-33, 4:63-67; *Rossmann*, 2:48-51, 12:24-34.

ii. *in different themes and sub-themes within a plurality of successively displayed selection pages*

136. I understand that Patent Owner advances the claim term “selection page” be construed to mean “a screen with selectable icons that are displayed together on a graphical user interface.” I have applied this interpretation for the purposes of my Opinions below.

137. *Rossmann*'s user performs the preliminary search described above through different themes and sub-themes within successively displayed selection pages as shown in Figures 4C-4G below:



Rossmann, Figs. 4C-4G.

138. *Rossmann* teaches different themes and sub-themes similar to the '058 Patent. The '058 Patent describes various examples of “themes,” including “sport televisions, weather forecast or stock exchange” and “sub-themes” like “collective sports,” “training,” or “transfers.” '058 Patent, 4:1-51. *Rossmann* similarly teaches themes and sub-themes. For example, as shown in Figure 4C, *Rossmann* teaches themes including ABC Corp. Sales, XYZ Information, Financial Info, and Personal website. *Rossmann*, Fig. 4C. Furthermore, *Rossmann*'s themes include sub-themes such as World

News, Local News, Financial News, and News Brief, Stock Inquiries, Weather, and Traffic Info. *Id.*, Figs. 4D-4F.

139. As I described above, *Rossmann* teaches how a user searches through the themes and sub-themes by navigating through the locally stored display pages, which are cards of the HDML deck. *Supra*, IV.A.4.ii (describing navigation through the successively displayed pages shown in Figures 4C-4G). As taught by *Rossmann*, the pages shown in Figure 4 are displayed successively in response to sequential user requests or can be displayed in response to a compound request. *Id.*, 11:57-64, 12:60–13:2 (teaching that “a compound request ‘2231’” corresponds to the line items shown on display screens on different pages that “leads to the final page showing pertinent information in interest.”). In both of these scenarios, the request “is executed as if individually and **successively** entered.” *Id.*, 13:29-32, 13:38-54.

140. As stated above, I understand that Patent Owner has proposed a “selection page” is a “screen with selectable icons that are displayed together on a graphical user interface.” It is my opinion that *Rossmann*’s “HDML cards” teach this. For example, the ’058 Patent describes “selection pages” as locally stored pages displaying certain icons. ’058 Patent, Abstract, 3:61–4:3, 4:9-27, Fig. 1. *Rossmann* teaches the same in Figures 4C-4G. Figures 4C-4G are screen displays of cards in a deck stored locally on the mobile device that display icons for navigation on the graphical user interface of *Rossmann*’s mobile phone. *Rossmann*, 6:20-29, 9:43-47, 11:3-56; *see also, supra* IV.B.4.i.

9. ***Claim 1(c)(1): emitting on the communication network, in response to selection of a direct access icon in a selection page being currently displayed, an address of an information- or service-providing Web site corresponding to said selected direct access icon,***

141. *Rossmann-Himmel* teaches when a user selects a direct access icon hyperlink on a displayed page, an address is communicated over the Internet to the website the user selected. For example, *Himmel* teaches that “[e]ach hyperlink contains URL location information that serves as an address of the web site.” *Himmel*, 5:35-36. Referring back to the exemplary *Rossmann-Himmel* system regarding ABC Corp. Sales at Claim 24(a), when a user selects one of *Himmel*’s consumer hot links (i.e., direct access icons), such as Purchase, On-Sale Today, etc., the URL address corresponding to that web action would be emitted over the Internet to retrieve that webpage. *Himmel*, 2:4-9 (teaching that “bookmarks offer a means of page retrieval ... [such that] [t]he user can ... select among his bookmarks to go directly to a favorite page. Thus, the user is not forced to enter a lengthy URL nor retrace the original tortuous route through the Internet by which he may have arrived at the Web site.”), 5:28–6:28 (describing client-server communication to reach a website), 19:22-31 (“a consumer hot list is composed of a consumer ‘request’, a text string for display in the user interface which indicates what will happen if the request is selected and a web ‘action’, a URL to another web page”).

142. This concept comports with *Rossmann*’s teachings that “each of the menu items” displayed to a user on a page “corresponds to a resource locator in the card,”

including “an address of the particular object associated with that menu item” such as its “URL.” *Rossmann*, 10:26-34. *Rossmann* teaches that “[t]he address can be ... to a remote object on a server computer.” *Id.* Thus, in *Rossmann-Himmel*, when a user selects a displayed menu item from the consumer hot list (e.g., Purchase), the URL address associated with that item is “emitted” over the Internet to the server hosting the desired action (e.g., ABC Corp. Sale’s Purchase webpage). A POSITA would have found it obvious and been motivated to modify *Rossmann* in this way for the same reasons stated above with reference to Claim 24(a). *Supra*, Claim 24(a).

10. Claim 1(c)(2): said address being locally generated during the preliminary search and selection,

143. I understand that Patent Owner advances the claim term “said address being locally generated” mean “said address being generated on the device.” I have applied this interpretation for the purposes of my Opinions below.

144. *Rossmann-Himmel* teaches a user-display with selectable menu items that generate URL addresses to access a desired webpage. *Supra*, Claim 24(a) (describing selection icons and direct access icons on a display and motivation for the modification) and 1(c)(1) (describing URLs associated with selectable items). In *Rossmann-Himmel*, both the HDML decks and consumer hot list bookmark sets are stored locally in RAM in the mobile device. *Rossmann*, 6:20-29 (teaching “the phone 120 typically receives a single HDML deck from the server device and stored the deck as cached in RAM 134); *Himmel*, 5:35-36 (teaching “[e]ach hyperlink contains URL location information that

serves as an address of the web site”), Fig. 1. When a user selects one of the exemplary direct access icons (e.g., Purchase) in the *Rossmann-Himmel* system, the address associated with that web action is generated on the phone and sent to the web server supporting that web action. This address is sent over a network, for example from *Rossmann*’s phone 120 to web server 112. See *Rossmann*, Fig. 1. The desired web page is then retrieved such that the user directly accesses the information- or service-providing website (e.g., user accesses the webpage associated with ABC Corp. Sales Purchase information).

145. While a POSITA would have understood that the modified *Rossmann* system locally generates a URL address associated with a selected direct access icon during the “preliminary search and selection,” *Rossmann* does not go into detail surrounding how a URL is generated using its HDML browser. Namely, *Rossmann* runs an HDML browser that accesses the Internet and obtains information from a web server using either HTTP or HDTP. *Rossmann*, 5:6-65 (describing obtaining decks comprising cards which are screen displays). In the example operation described above regarding modified Figure 4, when a user selects a direct access icon displayed on the screen during the “preliminary search” (e.g., Purchase), the modified *Rossmann-Himmel* system travels to the website that hosts the selected “Purchase” webpage during the “selection step.” Under the HDML tag based document language, *Rossmann-Himmel* “generates” a URL locally on the device by applying a destination variable to the original URL to access a

desired webpage. Because *Rossmann* does not describe how to variably change a URL, a POSITA would have looked to other HDML literature to explain this well-known process. *King* is an example reference that describes how URLs can be locally generated and modified with variables to reach a webpage using a HDML browser.

146. In more detail, *King* overviews this well-known HDML URL generation process, describing how a URL is generated locally on a device to access a webpage using an HDML browser, like the HDML browser disclosed in *Rossmann*. For example, *King* discusses applying certain variables to modify a URL as a user navigates through the selection pages. *King* describes “variable” usage within the URL destination parameter of the HDML ACTION tag, as well as variable state management. *King*, 8:65-14:17. Variables are identified by a “key” and contain a text “value”. *King*, 2:34-35, 9:4-6; *see also King*, 4:55-58 (incorporating HDML 2.0 specification by reference in its entirety); *HDML Spec*, 20-21. Variables can be statically set or dynamically set by user input by using the CHOICE tag. *King*, 2:37-39, 7:45-49. When the user selects a particular choice entry, the values of the variables bound to the CHOICE tag are updated to reflect the new information. *King*, 8:7-13. The values of variables are substituted into the hypertext during the processing and display of the hypertext. *King*, 2:39-42, 8:66-9:2. The value of a variable may be inserted into a URL. *King*, 9:51-54. The value may also be properly URL escaped by the client process during text substitution, which is done automatically in the DEST option as the DEST parameter always refers to a URL

parameter. *King*, 9:49-10:28. *King* describes the process in an example HDML ACTION tag where the DEST URL parameter contains a variable value. *King*, 10:18-28. In *King's* example, the variable key is "\$user" and "Ted Miller" is the currently assigned value. *King*, 9:11-18, 10:18-28. The URL is converted from this:

```
<ACTION TASK=GO DEST="foo.cgi?user=$user">
```

to this:

```
<ACTION TASK=GO DEST="foo.cgi?user=Ted+Miller">
```

King, 10:18-28. In the above example, *King* teaches the use of variables in the destination parameter. A POSITA would have understood that variables in the destination parameter can be applied in other contexts of the destination parameter, such as in choice card entries. The HDML 2.0 Specification, incorporated by reference in both *Rossmann* (see *Rossmann*, 5:48-51) and *King* (see *King*, 4:55-58) gives an example of choice entries with task options:

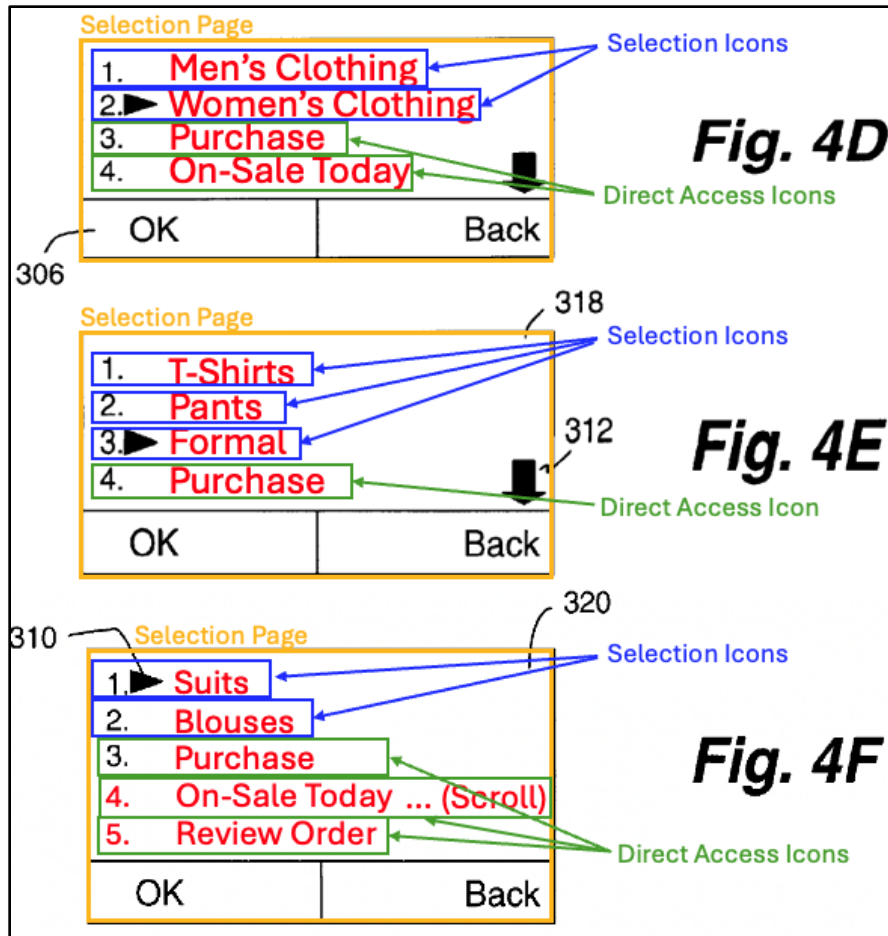
```
<CHOICE>
<CE TASK=GOSUB DEST="email.cgi">Email
<CE TASK=GOSUB DEST="fax.cgi">Faxes
<CE TASK=GOSUB DEST="weather.cgi">Weather Reports
</CHOICE>
```

HDML Spec, 14.

147. A POSITA would have been motivated to apply *King's* teachings in the *Rossmann-Himmel* system to successfully travel to a remote webpage using HDML and for the benefits discussed in *King*. For example, *King* explains its inline variable management technique "solves the problem of using client state in displays without the

necessity of the server round-trip and without incurring all the memory and processing requirements of a full scripting language.” *King*, 2:26-30. *Rossmann-Himmel* would therefore appreciate these same benefits by employing *King’s* inline variable management processes. A POSITA would have appreciated a reasonable expectation of success modifying *Rossmann-Himmel* with *King’s* teachings for several reasons. Both *Rossmann* and *King* share an assignee and describe a similar HDML architecture supported by the HDML 2.0 Specification incorporated expressly by reference into both references. Each therefore share an underlying architectural foundation, including a consistent markup language. A POSITA would have understood that *King* fills in the missing details not described expressly in *Rossmann* but utilized by *Rossmann’s* HDML processing. Indeed, *King* elucidates processes already described in the HDML 2.0 specification and incorporated by reference into *Rossmann*.

148. In the exemplary *Rossmann-Himmel-King* Figure 4, the URL corresponding with direct access icons would be generated by the variables associated with the user’s selections. For example, once the ABC Corp. Sale deck is downloaded onto the user’s device, the first card (i.e., selection page) of the deck is displayed:



Rossmann, Figs. 4D-4F (annotated). The first card (Fig. 4D annotated) can be realized with the below markup language:

```
<CHOICE NAME=abcsalescorp>
<CE VALUE="Mens Clothing" TASK=GO VARS="theme=Mens Clothing"
  DEST=#mensclothing>Men's Clothing
<CE VALUE="Womens Clothing" TASK=GO VARS="theme=Womens Clothing"
  DEST=#womensclothing>Women's Clothing
<CE TASK=GO DEST="purchase.cgi?THEME=$theme">Purchase
<CE TASK=GO DEST="onsaletoday.cgi?THEME=$theme">On-Sale Today
</CHOICE>
```

149. The use of the "\$theme" variable within the URLs specifies the URL corresponding with the currently displayed card's theme. The "\$theme" variable would

be set by the previous user selection of the ABC Corp. Sales icon, and using a named variable scope system, different decks can share the same variable scope. *King*, 10:44-53. In this example, the “\$theme” variable may be set as the value “all” on the first card of the deck, as it displays all products within the ABC Corp. Sale site. Following the exemplary operation of *Rossmann-Himmel*, a user may then select Women’s Clothing. The GO task within the Women’s Clothing choice entry sets the variable to “Womens Clothing” during forward navigation. Below is example markup language of the Women’s Clothing card that has been navigated to, where the key “\$theme” is set and converted to “Womens+Clothing”, thus generating a URL for the purchase direct access icon:

```
<CHOICE NAME=womensclothing>
<CE VALUE=tshirts TASK=GO VARS="theme=Tshirts" DEST=#tshirts>T-Shirts
<CE VALUE=pants TASK=GO VARS="theme=Pants" DEST=#pants>Pants
<CE VALUE=formal TASK=GO VARS="theme=Formal" DEST=#formal>Formal
<CE TASK=GO DEST="purchase.cgi?THEME=$theme">Purchase
</CHOICE>
```

If the user were to now select “Purchase”, the generated destination parameter would be “purchase.cgi?THEME=Womens+Clothing” to access the relevant purchase web page.

150. Based on the above, a POSITA would have understood that *Rossmann-Himmel-King’s* system teaches generating a URL of a direct access icon locally by variably modifying that URL to access the appropriate webpage selected by the user and therefore meets Patent Owner’s construction of “locally generating” an address. This process is well documented in the art, including in both the *King* reference described

above, and in the HDML 2.0 specification that is expressly incorporated by reference in *Rossmann*'s disclosures. *See Rossmann*, 5:48-51 (“The specifications of HDTP, entitled ‘HDTP Specification’ and HDML, entitled ‘HDML 2.0 Language Reference’ are enclosed and incorporated herein by reference in its entirety”).

11. Claim 1(d): wherein the apparatus is implemented in a mobile phone.

151. For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(c).

12. Claim 2: The apparatus according to claim 1, characterized in that the direct access icons comprise icons for accessing commercial sites.

152. *Rossmann-Himmel* teaches direct access icons in a “consumer hot list” that access “a retail site like www.sears.com.” *Himmel*, 20:63-64, Fig. 15. The modified system includes the bookmarked icons from the consumer hot list that function as direct links to common retail actions, “such as Purchase 552, On-Sale Today 553, Review Order 554, Review Shopping Cart 555 and Consumer Address 556.” *Id.*, 20:64-67. *Himmel* teaches that selection of these bookmarks “result[s] in the retrieval of a web page which would provide the listed action.” *Id.*, 20:67–21:2. A POSITA would have been motivated and had a reasonable expectation of success in modifying *Rossmann* to implement *Himmel*'s consumer hot lists for the reasons stated above. *Supra*, Claim 1(a)(3). A POSITA would have understood that www.sears.com is a commercial site. The '058 Patent does not expressly characterize “commercial sites.” Regardless, a

POSITA would have known that and a commercial site refers to selling goods from various retailers or offering additional services. *See above*, Sec. III.E.5. (Background of Technology) (describing a “commercial site” as a site that includes multiple sellers). A POSITA would have known that Sears is a “commercial site” (selling goods from other retailers).

153. Furthermore, a POSITA would have understood that www.abc.com, as described by *Rossmann* as the site associated with ABC Corp. Sales, was a commercial site as well. *Rossmann*’s parent patent provides express examples of a Corp. Sales website for purchasing goods. *See* U.S. Patent No. 5,809,415 (Ex. 1030), 12:13-41, Figs. 2A-2C. As described in detail above, a user of the modified system would be able to select direct access icons, such as Purchase, On-Sale Today, etc., as disclosed by *Himmel*, to arrive at the specific webpage on the website to purchase a product or see what is on-sale that day, respectively. *Supra*, Claim 24(a).

154. Alternatively, *Himmel* teaches that the bookmark sets may be used in a “kiosk or point of sale environment.” *Himmel*, 10:1-8. A POSITA would have found it obvious to apply this alternative application of *Himmel*’s bookmark sets in *Rossmann*’s invention, in addition to the consumer hotlist bookmark sets discussed above. In an example of this modification, *Rossmann*’s mobile device would be a “mobile computing device” or an “internet appliance controller.” *Rossmann*, 6:60-65. In this scenario, the mobile device would download a preset deck with a choice card listing sponsored

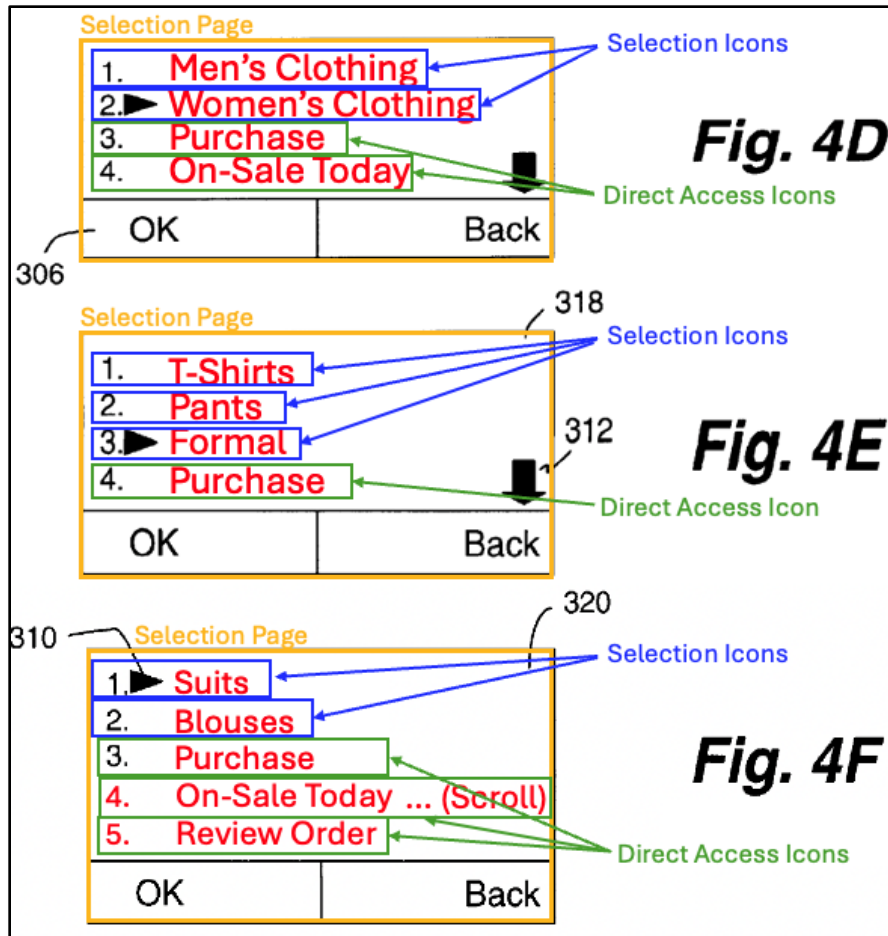
websites approved by the vendor. *Himmel* provides an example of a Sears commercial site. In the modified system, it would have been obvious (*infra*, claim 19) that the initial downloaded deck would include a Sears icon for directly accessing the www.sears.com homepage, and would include additional icons to navigate affiliated websites or webpages, e.g., ABC Corp. Sales discussed above. Similar to the “direct access icon” description above, a user would be directed straight to the homepage advertised by the host vendor rather than traversing local cards for different screen displays for Sears. The user would also be able to navigate the local HDML cards for the affiliated ABC Corp. Sales, utilizing consumer hot list URL links for specific advertised webpages, such as Purchase or On-Sale Today. In this way, internet navigation is further simplified for the user in this example by limiting the universe of accessible URLs to the narrow list provided by the vendor.

155. A POSITA would have been motivated to implement *Rossmann*’s invention in the vendor kiosk environment of *Himmel* for multiple reasons. First, a POSITA would have understood that *Rossmann*’s methods are applicable to a wide range of applications, including vendor-specific applications. In the kiosk environment, *Rossmann*’s methods for local navigation would appreciate the same benefits noted above, including limiting network traffic and simplifying user navigation. This would reduce network charges for the vendors hosting the devices. Indeed, *Himmel* recognizes that the kiosk method “prevents the user from accessing unrelated URLs, [which would] wast[e] the vendor’s

resources.” *Himmel*, 10:1-8. These modifications would also provide streamlined navigation for users unfamiliar with web surfing, which would further the goal of a vendor hosting a kiosk since they would seek to “prevent[] the user from accessing unrelated URLs.” *Id.* By doing this, it ensures the user is browsing the vendor’s website and other pre-approved websites and webpages. For the same reasons above, a POSITA would have appreciated a reasonable expectation of success modifying *Rossmann* pursuant *Himmel*, including in various applications and environments. *Supra*, Claim 24(a).

13. *Claim 4: The apparatus according to claim 1, wherein said at least one selection page comprising two or more direct access icons comprises direct access icons corresponding to distinct sources of information or services.*

156. *Rossmann-Himmel* teaches a selection page comprising two or more direct access icons. *Supra*, Claim 24(a). As discussed in those limitations above, in the ABC Sales Corp. example used in the modified system, the HDML cards (“selection pages”) in Figures 4D and 4E would further display a consumer hot list with selectable linked icons to common web actions (“direct access icons”). *Rossmann*, Figs. 4D and 4E; *Himmel*, 18:53-21:17. As illustrated in the annotated Figures, this would at least include *Himmel*’s consumer hot list links, such as Purchase, On-Sale Today, Review Order, etc. *Id.*



Rossmann, Figs. 4D-4F (annotated). A POSITA would have understood that these consumer hot links, e.g., Purchase and On-Sale Today, corresponded with distinct services. For example, Purchase would have taken a user to a purchase page for purchasing items from the merchant. Whereas, On-Sale Today would have taken the user to a page displaying items that the merchant had on-sale that day.

157. Should Patent Owner or its expert argue that the claimed “distinct sources of information or services” require information or services that come from different websites altogether, a POSITA would have found it obvious to include a selection page with two or more direct access icons corresponding to different websites in *Rossmann*-

Himmel in the kiosk environment described above. *Supra* Claim 2. For example, a POSITA would have found it obvious to provide, on a selection page, a link to Sears' homepage and a link to Kmart's homepage on the same mobile device being used at the kiosk. In this example, the vendor would still be restricting the user's access to unrelated URLs, but providing access to relevant websites (Kmart was a subsidiary of Sears). Therefore, the vendor would advantageously still provide the user at the kiosk the ability to access all relevant merchant websites while decreasing overall network traffic. A POSITA would have had success in implementing two or more direct links to different websites for the same reasons as including a single link. This would have simply required adding an additional direct access icon to a selection page that already included one direct access icon. Such a modification would have additionally been an obvious matter of design choice to one of skill in the art. As I explained above in my Background of the Technology, it was well known to include various different icons in a display page of a mobile device. *See above*, Sec. III.E.2. Including known in the art icons to different websites would have been well within the skill of a POSITA as a predictable design choice.

14. Claim 5: The apparatus according to claim 1, wherein a page from a Web site is displayed on said display in response to selecting a direct access icon.

158. As explained above in Claim 1, *Rossmann-Himmel* teaches retrieving and displaying a page from a website after the user selects a direct access icon. *Supra*, Claim

24(Pre)-24(a). Specifically, in the modified system, once a user selects a bookmark in the downloaded hot list, the system “retrieves a web page at the URL of the selected item” for presentation to the user. *Himmel*, 21:3-17. If a user selects the “Purchase” direct access icon, then a “purchase” webpage associated with the website the user is navigating is displayed on the display of *Rossmann*’s mobile device.

15. Claim 6: The apparatus according to claim 1, wherein at least one of the selection pages is specifically designed to include both at least one direct access icon and at least one selection icon.

159. *Rossmann*’s modified system teaches a selection page specifically designed to include both a direct access icon and a selection icon. *Supra*, Claim 1(a)(1) (citing Claim 24(a) discussion of a single selection page used to include both claimed icons, e.g., “Men’s Clothing” and “Purchase”).

16. Claim 10: The apparatus according to claim 1, wherein the second selection page displays information corresponding to a sub-category of the first selection page.

160. For the same reasons *Rossmann* teaches a second selection page displaying sub-theme information of a first, *Rossmann* teaches displaying information that is a “sub-category” of the first page. *Supra*, Claim 1(c) (describing accessing a second selection page displaying information as a sub-theme of the first selection page). A POSITA would have understood “sub-themes” like “News Brief” or “Weather” in Figure 4E are “sub-categories” of “Local News” in Figure 4D—these themes and sub-themes are hierarchically layered such that the lower layers are “sub-categories” of the higher layers.

- 17. Claim 11: The apparatus according to claim 1, wherein said control and processing device or devices are configured to receive information from the information- or service-providing Web site corresponding to said selected direct access icon via the communication network.**

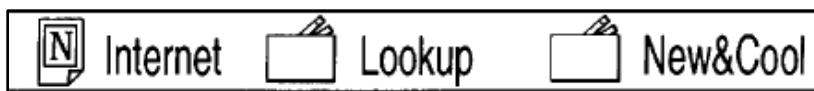
161. *Rossmann* teaches displaying a webpage from a Web site corresponding to the selected direct access icon via the Internet. *Supra*, Claim 5 (describing displaying a webpage from a Web site corresponding to the selected direct access icon via the Internet). A POSITA would have understood the control and processing devices in *Rossmann* are “configured to receive” a webpage for display to a user. Indeed, the control and processing devices interoperate to send information over a communication network to a remote server hosting a website and to receive information from the website over this network, including information required to display a webpage.

- 18. Claim 12: The apparatus according to claim 1, wherein the selection icons present graphic features that are distinctive from those of the direct access icons.**

162. *Rossmann-Himmel* teaches the selection icons and direct access icons of claim 1. *Supra*, Claim 1. *Rossmann-Himmel* further renders obvious selection icons that present distinct graphic features from direct access icons such that the selection icons present thematic graphic features for categories of information and the direct access icons present graphic features for a network-based action link. *Id.* Viewing *Rossmann*’s Figure 4, and as discussed above, there are multiple selection icons (e.g., World News, Local News, Financial News, News Brief, Weather, etc.). *Rossmann*, Figs. 4D-4E.

Furthermore, *Himmel* teaches direct access icons (e.g., Purchase, On Sale Today, Review Order, Review Shopping Cart, etc.). *Himmel*, 19:55–20:10. A POSITA would have been motivated and would have found it obvious to provide distinct graphical features for the selection icons and the direct access icons. For example, a POSITA would have recognized, as did *Rossmann*, that a user of the mobile device would be conscious of their network usage as this could incur additional costs and/or be capped. *Supra*, Claim 24(a). As such, a user would have benefitted from distinguishing the different icons as the direct access icon would cause the mobile device to access the Internet and use network data. Moreover, by selecting selection icons, the mobile device would access locally stored pages which a POSITA would understand would be faster than accessing network-based pages and would prevent use of network data. *Supra*, Claim 24(a). As such, a POSITA would have been motivated to visually distinguish the selection icons from the direct access icons via distinct graphical features to allow the user to consciously choose when to access the Internet. Moreover, graphics associated with selection icons would benefit user navigation, resulting in faster and more intuitive recognition, better visual appeal, and the ability to overcome language barriers.

163. A POSITA would have recognized that *Himmel* teaches different types of graphic features to be applied in the modified *Rossmann-Himmel* system to distinguish selection icons and direct access icons. For example, *Himmel* teaches icons with graphic or semi-graphic marks:



Himmel, Fig. 15 (excerpt). A POSITA would have understood that addition of one of *Himmel*'s graphic features to the selection icons (e.g., folder next to "Lookup") and another graphic feature to the direct access icons (e.g., the Netscape icon next to "Internet") would have distinguished the selection icons from the direct access icons.

164. A POSITA would have had a reasonable expectation of success modifying *Rossmann-Himmel* in this way. *Rossmann-Himmel* already provides selection icons and direct access icons that each perform distinct actions. Furthermore, *Himmel* teaches graphical features next to icons, a concept that was well known in the art at the time. Indeed, as I discussed above in my Background of the Technology, commercial mobile devices were already available that displayed graphics associated with icons. *See above* Sec. III.E.2. For example, both the Palm III and the Nokia 7110 utilize a mixture of textual and graphical icons, reproduced below:

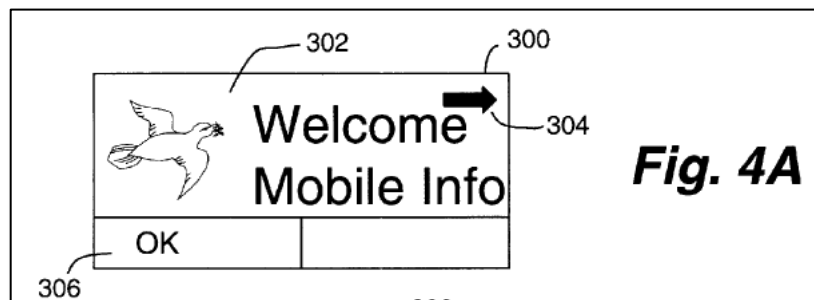


6 Games	
7 Calculator	
8 Calendar	
9 Infrared	
10 Services	
11 SIM services ¹	

Id. As such, a POSITA would have understood that it would have been a simple design choice (e.g., labeling the direct access icons, such as placing *Himmel*'s Netscape graphical feature next to "Purchase" and labeling News or Weather with the appropriate

news/weather graphics) to provide distinct graphical features distinguishing direct access icons from selection icons. Given that this would have been a simple modification of the graphical representations already used in *Rossmann-Himmel*, a POSITA would have had a reasonable likelihood of success modifying *Rossmann-Himmel* in this way.

165. In fact, the HDML specification supports that images are displayable on the user display. Ex. 1014 (HDML 2.0 Specification, Chapter 3). The HDML specification describes an “SRC option” that “will download the image from the specific URL, and render it when the text is being displayed.” *Id.* Separately, a user can have “an internal set of generic images, (e.g., smile, sun, cloud, etc.)” *Id.* *Rossmann* itself displays a graphic on an HDML card:



Rossmann, Fig. 4A. In fact, *Rossmann* expressly explains that “[r]egardless of the types, a card can contain text and images.” *Rossmann*, 8:67-9:1. Therefore, it would have been well within the skill of a POSITA at the time to modify *Rossmann-Himmel* to implement graphics next to certain icons to indicate an icon will access a network and potentially incur charges and data usage or to simplify and improve local navigation based on themes.

19. Claim 13: The apparatus according to claim 1, wherein selection of a direct access icon in a selection page being displayed comprises clicking on said icon.

166. *Rossmann* teaches moving an arrow to an icon and pressing a predetermined button such as a soft key or the numbered button to select an option listed on the graphical user interface of the mobile communication device. *Rossmann*, 10:51-60, 11:15-21. A POSITA would have understood that in the *Rossmann-Himmel* system, a direct access icon would have been selected in the same way. For example, a user would move the arrow and press a predetermined button for a direct access icon, such as Purchase, which constitutes “clicking on said icon.”

20. Claim 14: The apparatus according to claim 1, wherein said selection pages stored in said data storage device or devices are downloaded thereto.

167. *Rossmann* teaches downloading HDML decks comprising cards (“selection pages”) in RAM. *Supra*, Claim 1(Pre) (citing Claim 24(a)).

21. Claim 15: The apparatus according to claim 1, wherein said selection pages stored in said data storage device or devices are downloaded thereto over a mobile connection.

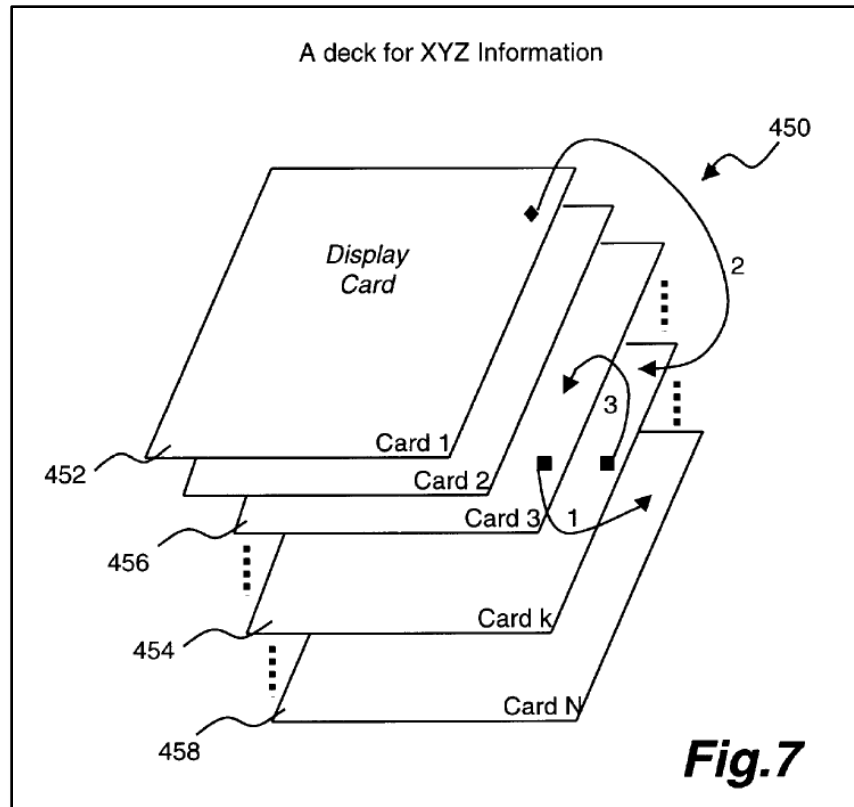
168. *Rossmann* teaches downloading HDML decks comprising cards (“selection pages”) in RAM in *Rossmann*’s mobile communication device using airnet 102 and the Internet. *Supra*, Claim 1(Pre) (citing Claim 24(a)); *Rossmann*, 4:48-64 (airnet 102 is a mobile carrier network such as “AT&T or GTE”).

22. Claim 16: The apparatus according to claim 1, wherein said selection pages operate as rolling menus.

169. *Rossmann* teaches its HDML cards present a screen display with “menu 308 as shown in FIG. 4B” to a user. *Rossmann*, 9:62-67. Menu 308 includes “a number of items that can be accessed by the user.” *Id.* *Rossmann* teaches that a “screen display can be larger than the number of lines available on the display screen 300 and so the user must scroll the screen display to view the complete screen.” *Id.*, 10:4-7. “[T]o view the additional items, the user presses the downward arrow key corresponding to the multi-display screen card indicator 312” such that “when the downward arrow key is pressed, each line of the display is rolled up one line.” *Id.*, 10:7-11. Based on *Rossmann*’s teachings, a POSITA would have recognized that *Rossmann* discloses selection pages that operate as rolling menus by allowing the user to roll up or down to different choices on the selection page.

23. *Claim 17: The apparatus according to claim 1, wherein at least one of the selection pages is a trunk of the tree menu structure.*

170. As discussed above in Claim 1(Pre), *Rossmann* teaches HDML cards (“selection pages”) as part of a downloaded deck. *Supra*, Claim 1(Pre). *Rossmann*’s HDML cards are hypertext that link to other cards in the deck and represent website information “configured to have a downward tree structure 400 of information services[.]” *Rossmann*, 11:34-55, 13:53-54. The deck associated with the XYZ Information example is depicted below in Figure 7:



Rossmann, Fig. 7. This tree structure is illustrated below in Figure 5:

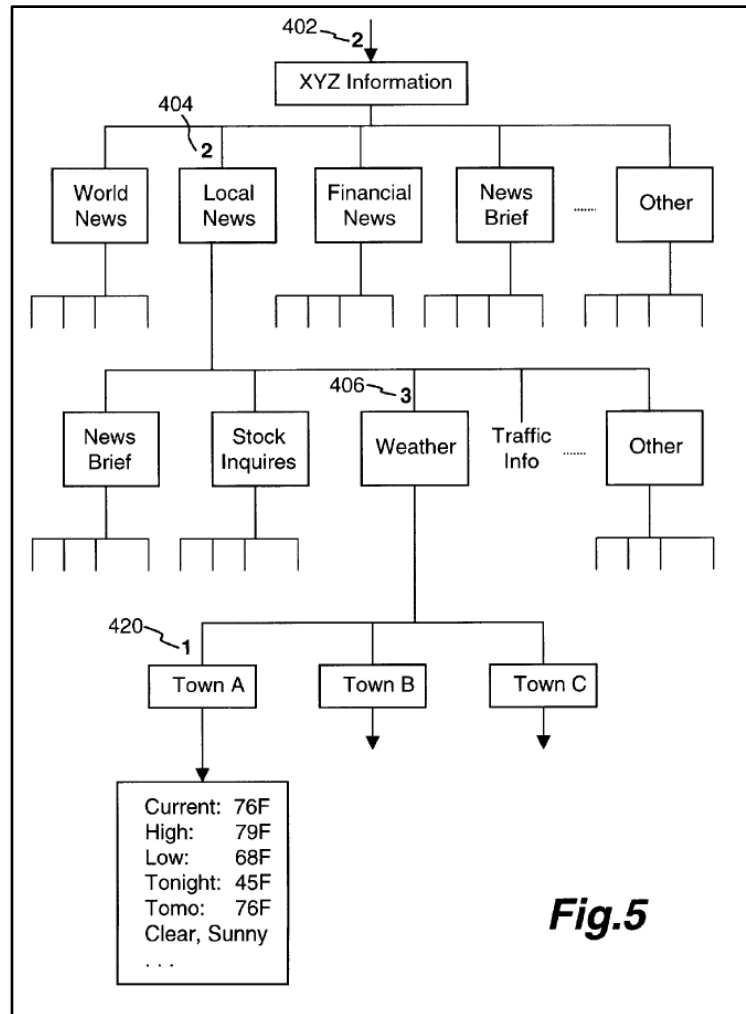


Fig.5

Id., Fig. 5. In this example, “entry 402 contains a number of hyperlinkable nodes linking to other text pages that further contains a number [of] hyperlinkable nodes.” *Id.*, 11:43-46. “Like tree branches, the structure 400 ends with leaves that are text pages or display cards.” *Id.*, 11:46-48. A POSITA would have understood that the selection page illustrated in Figure 4C in *Rossmann* is the “trunk” of the tree menu structure above in Figures 5 and 7 such that the remaining branches flow from that initial trunk. Just as the ’058 Patent describes the “first page Po constitutes the trunk of a tree structure,” a POSITA would have understood *Rossmann*’s Figure 4C is an example of the trunk of a

tree structure that has branches represented by Figures 4D-4G. '058 Patent, 4:4-7 (describing “first page Po constitutes the trunk of a tree structure schematically represented in FIG. 2”); *Rossmann*, Figures 4C-4G.

24. Claim 18: The apparatus according to claim 1, wherein the control and processing device or devices are configured to command a request-answer sequence characterized in that the request comprises the address of the information- or service-providing Web site, and wherein the request-answer sequence is preceded by a locally implemented selection of themes and sub-themes.

171. *Rossmann-Himmel* teaches when a user selects a direct access icon hyperlink on a displayed page, *Rossmann*'s control and processing devices communicate an address over the Internet to the website the user selected. *Supra*, Claim 1(c)(1). In the modified system, selection of the direct access icon generates a request including the locally generated address to the server hosting the webpage (i.e., “request”). In turn, a response is generated by the server such that the mobile device may display the requested webpage (i.e., “answer”). Accordingly, a POSITA would have understood that *Rossmann-Himmel* teaches a “request-answer” sequence.

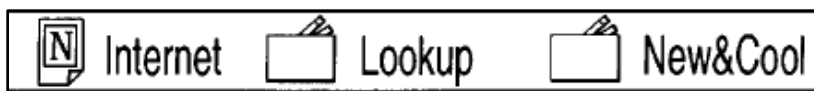
172. This request-answer sequence occurs after the user locally searches through themes and sub-themes. *Supra*, Claim 1(c). Namely, *Rossmann* teaches that a user can search through themes and sub-themes by navigating through the locally stored display pages, which are cards of the HDML deck and select a particular theme or sub-theme. The user may eventually select a direct access icon which, as stated above, commences the “request-answer sequence.”

25. Claim 19: The apparatus according to claim 1, wherein the icons comprise logotypes, graphic marks or semi-graphic marks.

173. As explained in Claim 2, in the kiosk environment, *Rossmann-Himmel* teaches accessing a vendor's hosted homepage on *Rossmann's* "mobile computing device" or an "internet appliance controller" by selecting the icon associated with that homepage on the display screen. *Id.* This would have included, for example, adding a "Sears" icon to an initially downloaded deck to access the Sears website.

174. It would have been obvious to use a logotype to represent the "Sears" homepage in the *Rossmann-Himmel* system for several reasons. This "Sears" logotype icon would provide easy and clear instructions for user-friendly navigation to the Sear's website hosted by the vendor. A POSITA would have recognized that a logotype includes a text logo of a company's name or initials. Utilizing a "logotype" icon provides clear and intuitive means to access a website, which is imperative to reduce data usage and network traffic and provide increased visibility for inexperienced users. The "logotype" would also benefit the vendor, boosting brand recognition and recall. A POSITA would have appreciated success adding the "Sears" logotype to an initial downloaded HDML deck choice card for the same reasons above in Claim 2.

175. It similarly would have been obvious and a POSITA would have been motivated to add further graphic or semi-graphic marks to each of the icons in this example to improve user navigation. Indeed, *Himmel* teaches icons with graphic or semi-graphic marks:



Himmel, Fig. 15 (excerpt). A POSITA would have appreciated success because this is a simple programming change to the display characteristics of the icons present in the *Rossmann-Himmel* system. *See also, supra* Claim 12 (citing *Rossmann*, 8:67–9:1).

26. Claim 20: The apparatus according to claim 1, wherein the icons comprise textual elements.

176. *Rossmann* teaches its icons include local or remote text-based hyperlinks and therefore comprise “textual elements.” *Supra*, Claim 24(a)-(b) (describing each selection and direct access icon including textual elements for a local hyperlink or hyperlink to a webpage).

27. Claim 21(Pre): A communication device connectable to remote sources of information or services through a communication network, the communication device comprising a display, data storage, a processor, a controller and a plurality of pages locally stored in said data storage and displayable on said display,

177. *Rossmann* teaches a mobile phone (“communication device”) that connects to websites over a communication network and that includes the claimed list of components. *Supra*, Claim 24(Pre) (claiming these same components).

28. Claim 21(a): wherein a first one of said locally stored pages is specifically designed to include at least one selection icon capable of being selectively activated to display a second one of said locally stored pages on said display,

178. For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(a).

29. Claim 21(b): wherein said second one of said locally stored pages is specifically designed to include at least one direct access icon capable of being selectively activated to connect said communication device to a predetermined one of said remote sources of information or services, and at least one second selection icon capable of being selectively activated to display a third one of said locally stored pages on said display,

179. For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(a)(1).

30. Claim 21(c): wherein at least one of said first, second and third locally stored pages is further specifically designed to include at least one icon for directly accessing a search engine for permitting a user to control searches on the Web,

180. For the same reasons in Claim 25, *Rossmann* teaches this limitation. *Supra*, Claim 25 (describing how it would have been obvious to download a “search engine” icon along with the rest of the hot list icons for display on *Rossmann*’s mobile device such that a user would navigate to a search menu to control searches on the Web).

31. Claim 21(d): wherein at least one of said first, second and third locally stored pages is further specifically designed to include at least one icon for directly accessing a portal of Web site and one icon for directly accessing a document provided by said Web site, and

181. *Rossmann-Himmel* teaches a plurality of locally stored pages comprising various sets of icons. *Supra*, Claim 1, Claim 25. As explained in Claims 2 and 19, in the kiosk environment, *Rossmann-Himmel* teaches accessing a vendor’s hosted homepage on *Rossmann*’s “mobile computing device” or an “internet appliance controller” by selecting the icon associated with that homepage on the display screen. *Supra*, Claim 2,

19. In the example of the modified system, a user clicking or otherwise selecting “Sears” or a logotype of Sears would be taken to the Sears homepage at www.sears.com. *Id.* A POSITA would have understood this homepage is a “portal of [a] Web site” as claimed consistent with the intrinsic record. For example, the Examiner during prosecution of the ’058 Patent explained that a “portal to a website is merely a website combining content from different sources on a single interface” and found a prior art webpage combining links on a single interface to teach this limitation. ’058 *File History*, at 483. The modified *Rossmann-Himmel* system is consistent with the Examiner’s description. *Rossmann-Himmel*’s “Sears” icon links to the Sears homepage as shown in *Himmel* Figure 15 that combines content from different sources on a single interface such as “products & services,” “what’s new at Sears,” “store locator,” etc. *Himmel*, Fig. 15. Since the Sears home website combines different sources on a single interface, a POSITA, in light of the intrinsic record, would have understood that *Rossmann-Himmel* teaches a “portal of [a] Web site.”

182. Moreover, it would have been obvious for the same reasons explained above to download a “Purchase” hotlink associated with the Sears website to link to a web document. Indeed, *Himmel* teaches certain “[e]xamples of consumer requests are generic actions such as ‘purchase’” and that “[a]s a result of selection of the request, the applicable web action is performed by the web server, i.e., typically redirection to another web document. *Himmel*, 19:27-30. Based on this teaching, a POSITA would

have recognized that the “Purchase” icon of *Himmel* directly accesses a document provided by the Sears website, such as the Purchase webpage.

32. Claim 21(e): wherein the communication device is a mobile phone.

183. For the same reasons in Claim 24, *Rossmann* teaches this limitation. *Supra*, Claim 24(c).

33. Claim 22: The communication device according to claim 21, characterized in that said selection pages are locally stored in the data storage beforehand.

184. *Supra*, Claim 1(Pre) (describing HDML cards stored “before” the final target information is obtained and therefore are “beforehand locally stored” as claimed).

34. Claim 23: The communication device according to claim 21 wherein said selection pages stored in said data storage are organized in a tree menu structure.

185. *Supra*, Claim 1(Pre) (describing how *Rossmann*’s HDML cards are organized in a “tree menu structure” such that they are hierarchically linked hypertext pages that are the nodes of tree structure websites).

35. Claim 27(Pre): A method for accessing information- or service-providing Web sites, from a mobile communication device connected through a communication network and provided with a display, comprising:

186. As above in Claims 1 and 24, *Rossmann* teaches methods for accessing a website over a network from its mobile phone that includes a display. *Supra*, Claim 24(Pre), Claim 1(Pre).

36. Claim 27(a): a preliminary search for information or service, locally performed within said communication device in different

themes and sub-themes within a plurality of successively displayed selection pages,

187. As above in Claim 1, *Rossmann* teaches performing a preliminary search through displays that include different themes and sub-themes. *Supra*, Claim 1(c) (describing *Rossmann*'s Figure 4 embodiment). *Rossmann* teaches its display pages can be successively displayed in response to sequential user requests, or can be displayed in response to a compound request—e.g., a keypad input of “2231” corresponding to the line item in each display. *Rossmann*, 11:57-64, 12:60-13:2. In either case, each request “is executed as if individually and *successively* entered[.]” *Id.*, 13:29-32, 13:38-54.

37. *Claim 27(a)(1): said selection pages being organized in a tree menu structure and beforehand locally stored within said communication device, each said selection page being specifically designed to include a set of icons,*

188. *Supra*, Claim 1(Pre) (claiming substantively identical requirement).

38. *Claim 27(a)(2): said selection pages further comprising a first selection page, a second selection page and a third selection page,*

189. *Supra*, Claim 1(a) (claiming substantively identical requirement).

39. *Claim 27(a)(3): said first selection page being specifically designed to include a selection icon for locally accessing said second selection page,*

190. *Supra*, Claim 1(a)(1) (claiming substantively identical requirement).

40. *Claim 27(a)(4): and said second selection page being specifically designed to include a selection icon for locally accessing said third selection page,*

191. *Supra*, Claim 1(a)(2) (claiming substantively identical requirement).

41. Claim 27(a)(5): said third selection page being specifically designed to include one or more direct access icons for directly accessing an information- or service-providing Web site, and

192. I understand that Patent Owner advances the claim term “direct access icon” be construed to mean “[a]n icon that, when selected, causes an address of at least one website to be transmitted to a network.” I have applied these interpretations for the purposes of my Opinions here. Regardless of the proposed differences applied by Patent Owner in the meaning of “direct access icon,” *Rossmann-Himmel / Rossmann-Himmel-King* teaches this claim for the same reasons stated above. *Supra*, Claim 24(b).

42. Claim 27(b): emitting on the communication network, in response to a selection of a direct access icon in a selection page being currently displayed, an address of an information- or service-providing web site corresponding to said selected icon,

193. *Supra*, Claim 1(c)(1) (claiming substantively identical requirement).

43. Claim 27(b)(1): said address being locally generated during said displaying and selection and for directly accessing said information- or service-providing Web site,

194. *Supra*, Claim 1(c)(2). As stated above, a POSITA would have understood that *Rossmann-Himmel-King* teaches the address is locally generated during the preliminary search, which included the display of the selection pages. Therefore, *Rossmann-Himmel-King* teaches “said address being locally generated during said displaying and selection and for directly accessing said information- or service-providing Web site” as claimed.

44. *Claim 27(c): wherein: at least one of said selection pages further being specifically designed to include one or more icons for directly accessing a search engine on the Web, and*

195. *Supra*, Claim 1(b) (claiming substantively identical requirement).

45. *Claim 27(c)(1): the mobile communication device is a mobile phone.*

196. *Supra*, Claim 1(d) (claiming substantively identical requirement).

VI. OPINION - GROUND 3

A. Obvious to Combine Rossmann, Himmel, King, and Adar

1. *Overview of Adar*

197. U.S. Patent No. 6,493,702 to Adar et al. (“*Adar*”) was filed on May 5, 1999, and issued December 10, 2002. *Adar*, (Ex. 1008), (22), (45). In general, *Adar* teaches means for “facilitating searching and recommending resources” for Internet searches. *Adar*, 4:18-28. More specifically, *Adar* teaches “a bookmark system” where a user can access and manage their bookmarks including popular bookmarks like “Yahoo!.” *Adar*, 5:38-67, 6:1-19, 8:41-65, 10:47-53. The system can generate recommendations of popular bookmarks for the user based on metrics of all user bookmarks within a database. *Id.*, 14:18-54.

198. Because *Adar* and the ’058 Patent are both directed to accessing information sources or services on the web, *Adar* is in the same field of endeavor as the ’058 Patent. *Compare Adar*, 1:8-12 (teaching “a system and method for enhancing searches and recommending documents in a collection through the use of bookmarks shared among a

community of users”) with *’058 Patent*, 1:7-9 (describing “a method for accessing information sources and services on the Web” using “a device”). Accordingly, a POSITA would have recognized that *Adar* is analogous art to the *’058 Patent*.

199. The *’058 Patent* describes that users “poorly accustomed to computer tools and search engines” may have issues finding the most pertinent information when browsing. *’058 Patent*, 2:24-40. In an attempt to solve this, the *’058 Patent* describes “an efficient guiding to most of the useful information sources or to the most frequently consulted information sources.” *Id.* Like the *’058 Patent*, *Adar* teaches tracking popularity metrics such as frequency and recency of access to “enhance[] searching and recommendation operations.” *Adar*, 12:21-47; *see also, id.* 14:37-54. Therefore, *Adar* is in the same field of endeavor and is reasonably pertinent to a problem described by the *’058 Patent* and is thus analogous art.

2. Claims 1, 2, 4-6, 10-23, 25, 27.

200. Claims 1, 2, 4-6, 10-23, 25, and 27 are obvious over *Rossmann-Himmel-King* for the reasons above. Petitioner advances Ground 2, and specifically the *Adar* prior art reference to the extent Patent Owner argues or the Board finds that *Rossmann-Himmel-King’s* “search” icon to access a search menu within a webpage is not a conventional “search engine” as that term is used in the *’058 Patent*. Petitioner provides an invalidity mapping analyzing *Adar’s* teachings to the relevant claim language reciting a selection page used to include an icon to a “search engine.” Petitioner incorporates by

reference the remaining analysis for *Rossmann-Himmel-King* for all other claims and limitations.

3. ***Claim 1(b): at least one selection page being specifically designed for containing one or more icons for directly accessing a search engine on the Web,***³

201. *Rossmann*'s modified system teaches selection pages with selectable icons displayed on the graphical user interface of a mobile device. *Supra*, Ground 1, Claim 24(a)-(b) (describing HDML cards representing user displays). As mentioned above, a POSITA would have understood that *Rossmann*'s HDML cards meet the claimed plurality of "selection pages" as construed by Patent Owner. *Supra*, Claim 24(a)-(b).

202. In the event that Patent Owner argues, or the Board finds, that *Rossmann-Himmel-King*'s modified system does not teach a "selection page specifically designed for containing one or more icons for directly accessing a search engine on the Web," it would have been obvious, based on *Adar*'s disclosures, to download a "search engine" icon for display on *Rossmann*'s mobile device for the reasons explained below.

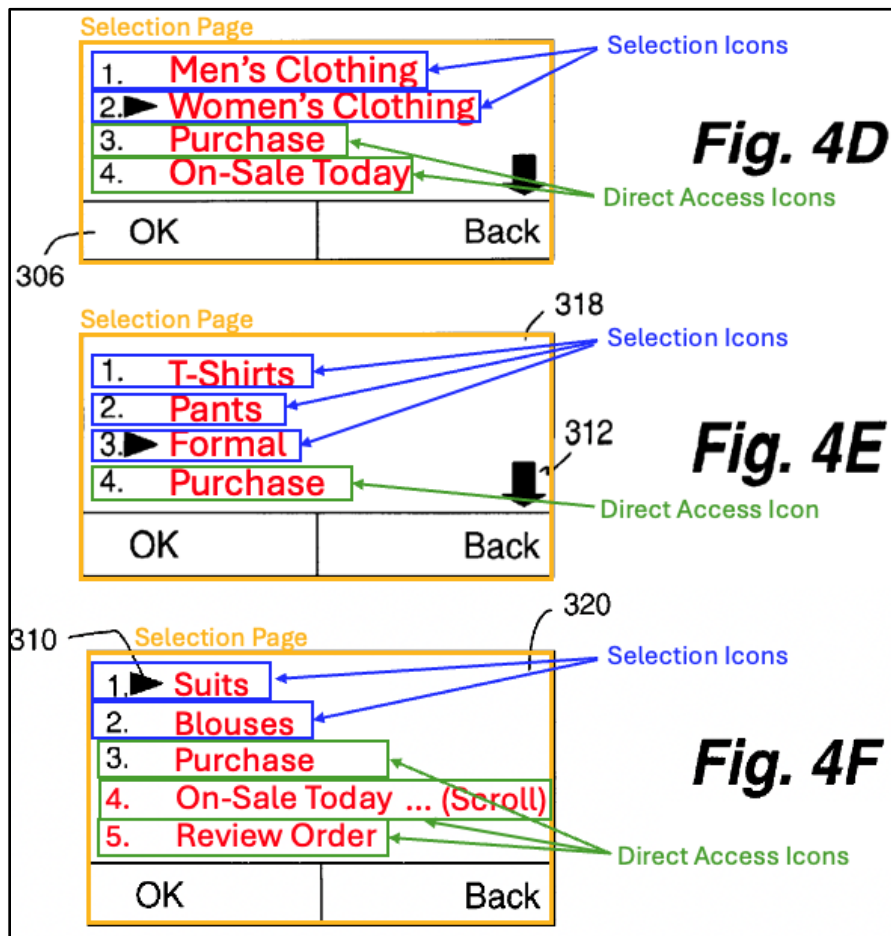
203. *Adar* teaches a "bookmark database" that "maintains a set of bookmarks" for a user. *Adar*, 5:58-65. In operation, a user "receives bookmark data and a shared bookmarks ('SBM') computer program [] from the database 1022 at the beginning of a

³ As mapped in Ground 1, the following limitations are immaterially different from Claim 1(b): Claim 21(c); Claim 27(c). Accordingly, independent claims 1, 21, and 27 and their associated dependents are obvious over *Rossmann*, *Himmel*, *King*, and *Adar* for the reasons above. Further, dependent claim 25 also recites materially the same limitation and is obvious for the same reasons.

session of use.” *Id.*, 10:41-53, Fig. 10. “[A] user’s bookmark collection can be maintained and modified locally at the user’s system 1010” such that “many operations performed by the shared bookmark system can be executed at the user’s system 1010 without any further communication with the database 1022.” *Id.*, 10:54-57, 11:4-14. *Adar* teaches specific popular bookmarks that can be sent to a user, including the “Yahoo!” search engine. *Adar*, 7:12-13 (“For example, it is likely that many (or even all) of the user of the system will have a bookmark for ‘Yahoo!’”); *see also id.*, 2:59-65 (“categories of search engines...include...e.g., Yahoo”).

204. A POSITA would have been motivated to modify the resident “bookmark manager” software in *Rossmann-Himmel-King* with the functionality of the “SBM” bookmarks computer program to download popular bookmarks from a bookmark database at the start of a user session, including a “Yahoo!” search engine bookmark to obtain immediate access to popular web search engines. As *Adar* teaches, a user who is unable to find information they are looking for (e.g., in the case of *Adar*, within their bookmark collection), “the user will frequently turn to a ‘search engine’ to locate the information.” *Adar*, 2:52-57. A POSITA would have recognized that a user of *Rossmann-Himmel* would similarly benefit from easy access to a search engine when the information the user is seeking is not found on the locally stored deck. For example, a user of *Rossmann-Himmel-King* may be traversing the modified selection pages exemplified in *Rossmann*’s annotated Figure 4. *Supra*, Claim 24(a). In this example, the

user may reach annotated Figure 4F and realize that the category of formal women's clothing (e.g., dresses) is not shown on the selection page as either a selection icon or a direct access icon.



Rossmann, Figs. 4D-4F (annotated). Accordingly, a POSITA would have recognized that providing a graphic icon for directly accessing a search engine on the Web would have benefitted the user who may then easily and efficiently obtain Web access to search the search engine for dresses.

205. Providing an additional icon directing the user to a search engine would have simply required the addition of another icon similar to the existing selection icons

and direct access icons. For example, in operation with *Rossmann-Himmel-King*, when a user initiates a request for an HDML deck, *Rossmann's* deck, *Himmel's* hotlist of bookmarked web actions, and *Adar's* popular bookmarks would all be downloaded locally to the user's phone to simplify user navigation. In this way, the user would have instant navigation to a search engine as discussed above should they not find the information in the downloaded HDML deck.

206. A POSITA would have had a reasonable expectation of success making this modification because it would have only required simple programming changes to *Rossmann-Himmel-King's* bookmark manager software with known bookmarking functionality, along with additional database storage in *Rossmann-Himmel-King's* communication architecture. A POSITA would have understood that the web action directing a user to the search engine hosted on the Internet would have involved similar steps as providing the direct access icons as taught by *Himmel*. Such a modification would involve including information about the address of the search engine in the downloaded HDML deck and providing an icon for the user to select to reach the search engine. This is a simple programming change, and as such, a POSITA would have appreciated success in making such a modification.

VII. OPINION - GROUND 4

A. Obvious to Combine Rossmann, Himmel, King, and Boyle or Alternatively, to Combine Rossmann, Himmel, King, Adar, and Boyle

1. *Overview of Boyle*

207. U.S. Patent No. 6,138,158 to Boyle et al. (“*Boyle*”) was filed on April 30, 1998, and issued on October 24, 2000. *Boyle*, (Ex. 1007), (22), (45). *Boyle* generally teaches techniques to provide updated Web information to a user in an HDML compatible mobile device. *Boyle*, Abstract, 2:9-28, 7:12-29. *Boyle* teaches an update notification method, where if “one or more pages of information are updated, users of those client devices subscribing to the updated pages of information receive a notification from one of the server devices that stores the updated information.” *Id.*, 2:16-20. *Boyle* teaches that this notification then allows “the client devices to fetch the updated information from the server device.” *Id.*, 2:27-28. *Boyle* further teaches that this update notification method is relevant for devices that “may have cached a local copy of the outdated content.” *Id.*, 5:23-36.

208. Because *Boyle* and the ’058 Patent are both directed to accessing information sources or services on the web, *Boyle* is in the same field of endeavor as the ’058 Patent. Compare, *Boyle* 2:3-16 (teaching a distributed network, including the Internet, that allows client devices to “access hypermedia information ... stored in server devices on the Internet”) with ’058 Patent, 1:7-9 (“describing “a method for accessing information sources and services on the Web” using “a device”). Accordingly, a POSITA would have recognized that *Boyle* is analogous art to the ’058 Patent.

209. The ’058 Patent is concerned with “updating [] the plurality of selection pages locally stored...by downloading from a management server programmed for

achieving this operation on a plurality of access devices.” ’058 Patent, 2:51-57, 5:14-19. *Boyle* similarly teaches a solution for updating a cached local copy on a mobile device of desired information from the Internet. *Boyle*, Abstract, 1:50–2:28, 5:23-36. As such, *Boyle* is reasonably pertinent to a problem described by the ’058 Patent and is analogous art.

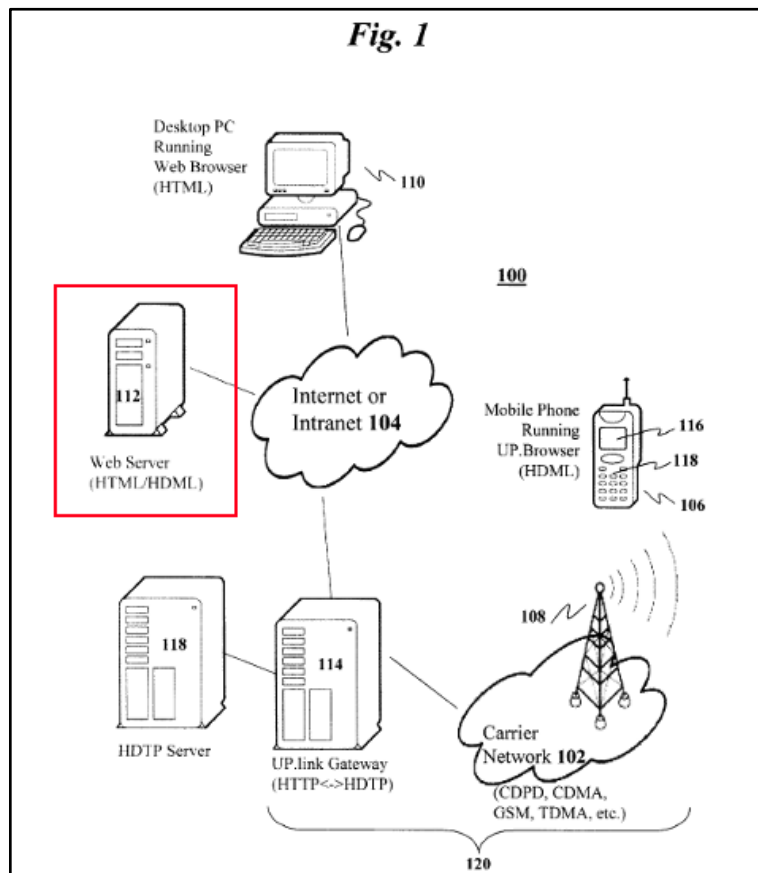
2. ***Claim 3: The apparatus according to claim 1, characterized in that the control and processing device or devices are arranged for receiving, by downloading from a management server, data for updating selection pages, and for processing said updating data so that new selection pages are stored in the data storage device or devices.***

210. *Rossmann-Himmel-King* or alternatively *Rossmann-Himmel-King-Adar* teaches the method of claim 1, which includes locally storing HDML decks made up of cards in RAM, such cards representing web screen displays for a user (locally stored “selection pages”). *Supra*, Claim 24. However, none of *Rossmann*, *Himmel*, *King*, nor *Adar* expressly discuss a process to update these HDML decks when new web information is available. *Boyle* teaches this process.

211. *Boyle* teaches “[w]hen any content in one of the web servers get updated, the mobile devices that subscribe to the updated content must be made aware of the update as many of the mobile devices may have cached a local copy of the outdated content.” *Boyle*, 5:24-28. To accomplish this, *Boyle* teaches that a “web server that has the updated content [will] send a notification...to the mobile devices so as to make users

thereof aware that and update to the local copy in the mobile devices has occurred at the web server. The users can then make a decision to fetch the update.” *Id.*, 5:31-36.

212. Below is the web server depicted in *Boyle*:



Id., Fig. 1 (annotated); *see also id.*, 9:39-41 (noting “web server device 202” discussed in *Boyle*’s disclosure “is one of Web servers 112”). *Boyle* teaches that “[m]obile device 106 accesses the information in web server device 202 via link server device 114 that is coupled to Internet 104.” *Id.*, 6:68-62. “Web server device 202 pushes a notification or a piece of electronic message to link server device 114 when there is a change or update to the information subscribed by mobile device 106.” *Id.*, 7:12-15. “Accessible

information is generally presented in hierarchical pages of hyperlinked HDML pages.” *Id.*, 7:15-27 (describing receiving a new deck with updated HDML pages). *Boyle* teaches that “[u]pon receiving the notification, mobile device 106 reacts according to the action type as to how to make a user of the mobile device 106 aware of the update at web server device 202” such that “[w]hen the updated information is desired, the updated information can be accessed through a pull agent 210 via wideband channel 206 using the address embedded in the notification.” *Id.*, 7:40-51, 8:10-13; *see also id.*, 17:8-13 (describing the mobile device receiving the updated information). The mobile device then stores this updated HDML deck. *Id.*, 6:48-51, 17:5-13.

213. A POSITA would have been motivated to incorporate *Boyle*’s functionality to update outdated HDML decks in the modified *Rossmann-Himmel-King / Rossmann-Himmel-King-Adar* system at least because of the express benefits taught in *Boyle* discussed below. *Boyle* recognizes that there was “a great need for a solution for informing users of any updates to their desired information and allowing the users to retrieve the updated information when needed.” *Boyle*, 1:56-59; *see also id.*, 5:23-36 (describing how constantly updating the local copy on the mobile device causes heavy traffic in the networks). *Boyle* provides the solution it describes “without incurring uncontrollable costs and increasing unnecessary network traffic.” *Id.*, Abstract, 3:33-39. To achieve this solution, *Boyle* teaches notifying the user when updated web information is available, optionally using a narrowband channel provided by a phone carrier, while

allowing the user to decide whether to fetch the update. *Id.*, 5:35-36, 7:13-29, 7:59-65. This method, as taught by *Boyle*, saves costs by giving the user the choice to access this information and thereby incur any network charges; reduces unnecessary network traffic; and provides efficient means to update outdated content. *Id.*, 1:56-67, 5:24-36, 8:10-13. Given these substantial benefits, a POSITA would have been motivated to implement *Boyle*'s method of updating locally stored information (e.g., modified *Rossmann*'s decks) within modified *Rossmann*'s system as this would have provided the same described benefits to *Rossmann*'s modified system.

214. A POSITA would have had a reasonable expectation of success incorporating *Boyle*'s HDML deck functionality into the modified *Rossmann-Himmel-King / Rossmann-Himmel-King-Adar* system for several reasons. *Rossmann* and *Boyle* share a common inventor and are assigned to the same company, suggesting a common level of understanding and aptitude. *Rossmann* and *Boyle* also share a common HDML infrastructure. Compare, e.g., *Rossmann* Fig. 1, 5:32-51 (incorporating the HDML 2.0 specification by reference in its entirety), with *Boyle* Fig. 1, 5:65–6:16 (incorporating the HDML 2.0 specification by reference in its entirety). Furthermore, *Rossmann* and *Boyle* describe overlapping mobile devices operating in similar networks with similar network hardware. This includes a similar mobile device 106 in communication with a common web server 112. *Rossmann*, Fig. 1; *Boyle*, Fig. 1. Based on these shared teachings, a POSITA would have understood that *Rossmann-Himmel-King / Rossmann-Himmel-*

King-Adar would seamlessly adopt *Boyle*'s methods to update software stored in *Rossmann*'s mobile device using the common web server in both references. This would have required adding known software functionality to the same network hardware in an infrastructure compatible with *Boyle*'s process, which would have been well within the skill of a POSITA.

215. Additionally, a POSITA would have understood that the “web server” disclosed in *Boyle* is a “management server” as that term is used in the '058 Patent. For example, the '058 Patent describes the claimed process for updating information, stating “[t]his updating can be achieved by downloading from a management server programmed for achieving this operation on a plurality of access devices or terminals implementing this method.” '058 Patent, 2:53-57. The '058 Patent further describes that “it is easy to conceive a process for downloading, periodically or on demand, an updating of a set of pages used in the method according to the invention, from a management server.” *Id.*, 5:14-19. A POSITA would have understood that the '058 Patent is describing a “management server” as a server that manages updates for a plurality of mobile devices, and which can send updates (i.e., downloads) to the mobile devices on demand. *Boyle* teaches its web server manages updates for several mobile devices in that it sends a notification to the user when information is updated and then provides the updated information upon the user's request. *Boyle*, 5:24-36. As such, *Boyle*'s web server is a “management server,” as claimed.

216. Finally, a POSITA would have understood that *Rossmann's* control and processing devices are arranged for receiving this updated data from the web server, and for processing this updated data to store it for display to the user. For example, *Rossmann's* system is configured to receive a deck from a server and store the deck as cached in RAM. *Rossmann*, 6:26-29. *Rossmann's* system is further configured to receive and interpret information from the deck in the RAM and cause the screen to display the information accordingly. *Id.*, 6:38-41. As such, *Rossmann's* control and processing device is arranged for receiving by downloading from a management server data for selection pages, and for processing said data so as that new selection pages are stored to be displayed.

3. *Claim 7: The apparatus according to claim 1, wherein said control and processing device or devices are configured to receive, from a server, data for updating information associated with at least one of a selection page, a direct access icon and a selection icon.*

217. *Rossmann's* modified system in view of *Boyle* teaches control and processing devices configured to receive data from a management server to update *Rossmann's* HDML cards ("selection page"). *Supra*, Claim 3; *see also Boyle*, 5:24-36, 7:12-8:13, 17:5-13. A POSITA would have further understood or found obvious that the associated icons on these pages are likewise updated upon a page update. Namely, the selection icons to link to other local pages would have been updated with the updated HDML deck/cards and new hotlinks would be downloaded with the deck update. As

such, both the selection icons and the direct access icons of the modified *Rossmann* system, in view of *Boyle*, are updated.

4. Claim 8: The apparatus according to claim 7, wherein said updating information is received periodically.

218. *Rossmann's* modified system in view of *Boyle* teaches the apparatus of claim 7. *Supra*, Claim 7. *Boyle* teaches “one way” “[t]o be timely and periodically informed” of updated information, “is to electronically communicate the information requests into a mobile device that is connected to a wireless data network.” *Boyle*, 1:42-49. As discussed in Claim 3, *Boyle* teaches a web server that notifies a user of an updated HDML deck at the web server. *Supra*, Claim 3; *Boyle*, 5:31-36, 7:12-28. The users are then able to “make a decision to fetch the update.” *Id.* It would have been obvious to a POSITA for a user to “periodically” check for updated information in response to web server notifications at regular intervals. For example, a POSITA would have understood that users would not always respond to a notification that is received at regular intervals. Rather, the user, when available or interested (i.e., periodically), would check for updated information in response to the web server notifications that are received at regular intervals. Thus, a user would have been motivated to check either on demand upon receiving an update (*infra*, Claim 9), or periodically based on user preferences.

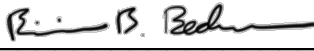
5. Claim 9: The apparatus according to claim 8, wherein said updating information is received on demand.

219. *Rossmann's* modified system in view of *Boyle* teaches the apparatus of claim 8. *Supra*, Claim 8. As discussed in Claim 3, *Boyle* teaches a web server that notifies a user of an updated HDML deck at the web server that allows “[t]he users [to] then make a decision to fetch the update.” *Supra*, Claim 3; *Boyle*, 5:31-36, 7:12-28. Since the user is making a decision and causing the system to fetch the update, the updated information is received “on demand” as claimed.

VIII. CONCLUSION

220. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: April 21, 2025

By: 
Dr. Benjamin B. Bederson

Appendix A

Dr. Benjamin B. Bederson

University of Maryland, College Park
Professor Emeritus, Computer Science

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I have read the following and certify that it is a current and accurate statement of my professional record as of April 21, 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*.

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iii. Book Chapters

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2. Herrnson, P.S., Niemi, R.G., Hanmer, M.J., **Bederson, B. B.**, Conrad, F.G., Traugott, M.W. (2008) The Current State of Electronic Voting in the United States. Chen, H., Brandt, L., Dawes, S., Gregg, V., Hovy, E., Macintosh, A., Traunmüller, R., Larson, C. (Eds.) *Digital Government: Advanced Research and Case Studies*, Springer, 157-180.
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B. REFEREED ARTICLES

i. Journals

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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., Revelle, 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.
35. Hornbæk, K., **Bederson, B. B.**, & Plaisant, C. (2002) Navigation Patterns and Usability of Zoomable User Interfaces With and Without an Overview, *ACM Transactions on Computer-Human Interaction*, 9 (4), 362-389.
36. **Bederson, B. B.**, Shneiderman, B., & Wattenberg, M. (2002) Ordered and Quantum Treemaps: Making Effective Use of 2D Space to Display Hierarchies, *ACM Transactions on Graphics*, 21 (4), 833-854, ACM Press. – **Won 2021 IEEE Vis Test of Time Award in InfoVis**, <http://ieevis.org/year/2021/info/awards/test-of-time-awards>.
37. Good, L., & **Bederson, B. B.*** (2002) Zoomable User Interfaces as a Medium for Slide Show Presentations, *Information Visualization*, Palgrave Macmillan, 35-49.
38. Revelle, G., Druin, A., Platner, M., **Bederson, B. B.**, Hourcade, J.P., & Sherman, L. (2002) A Visual Search Tool for Early Elementary Science Students, *Journal of Science Education and Technology*, 11(1), 49-57.
39. **Bederson, B. B.**, & Meyer, J. (1998). Implementing a Zooming User Interface: Experience Building Pad++. *Software: Practice and Experience*, 28(10), 1101-1135.
40. **Bederson, B. B.**, Hollan, J. D., Perlin, K., Meyer, J., Bacon, D., & Furnas, G. W. (1996). Pad++: A Zoomable Graphical Sketchpad for Exploring Alternate Interface Physics. *Journal of Visual Languages and Computing*, 7, 3-31.
41. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1995). A Miniaturized Space-Variant Active Vision System: Cortex-I. *Machine Vision and Applications*, 8 (2), 101-109.
42. **Bederson, B. B.**, Wallace, R. S., & Schwartz, E. L. (1994). A Miniature Pan-Tilt Actuator: the Spherical Pointing Motor. *IEEE Transactions on Robotics and Automation*, 10(3), 298-308.
43. Wallace, R. S., Ong, P.-W., **Bederson, B. B.**, & Schwartz, E. L. (1994). Space-Variant Image Processing. *International Journal of Computer Vision*, 13(1), 71-90.

ii. Peer-Reviewed Published Full-Length Conference Papers

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

7. Dearman, D., Karlson, A., Meyers, B., & **Bederson, B. B.** (2010) Multi-Modal Text Entry and Selection on Mobile Devices, *Proceedings of Graphics Interface (GI 2010)*, 19-26.
8. Quinn, A., Hu, C., Arisaka, T., & **Bederson, B. B.*** (2008) Readability of Scanned Books in Digital Libraries, *Proceedings of ACM CHI (CHI 2008)*, ACM Press, 705-714. [22% acceptance rate]
9. Karlson, A., & **Bederson, B. B.*** (2008) One-Handed Touchscreen Input for Legacy Applications, *Proceedings of ACM CHI (CHI 2008)*, ACM Press 1399-1408. [22% acceptance rate]
10. **Bederson, B. B.**, Clamage, A., Plaisant, C., (2008) Enhancing In-Car Navigation Systems with Personal Experience, in *Proc. of the Transportation Research Board 87th annual meeting*, The National Academies, Washington, DC (2008) 1-11.
11. Karlson, A., & **Bederson, B. B.*** (2007) ThumbSpace: Generalized One-Handed Input for Touchscreen-Based Mobile Devices, *Proceedings of INTERACT 2007*, 324-338 – **Winner of Brian Shackel Award for making an “outstanding contribution with international impact in the field of HCI”.**
12. Druin, A., Weeks, A., Massey, S., & **Bederson, B. B.** (2007) Children’s Interests and Concerns When Using the International Children’s Digital Library: A four country case study, *Proceedings of the Joint Conference on Digital Libraries (JCDL 2007)*, 167-176. – **Nominated for Best Paper Award, came in #2.** [36% acceptance rate].
13. Parhi, P., Karlson, A., & **Bederson, B. B.*** (2006). “Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices”, *Proceedings of MobileHCI 2006*, ACM Press, 203-210. – **Winner of Best Historical Paper Award, September 2016.**
14. Hutchinson, H. B., **Bederson, B. B.**, & Druin, A. (2006). “The Evolution of the International Children’s Digital Library Searching and Browsing Interface”, *Proceedings of 5th International Conference for Interaction Design and Children (IDC 2006)*, ACM Press, 105-112. [38% acceptance rate]
15. Hutchinson, H., Druin, A., **Bederson, B. B.**, Reuter, K., Rose, A., Weeks, A. (2005) How do I Find Blue Books About Dogs? The Errors and Frustrations of Young Digital Library Users, *Proceedings of HCI 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-spice/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 Revealr". *Paper presented at the annual meeting of the Eastern Communication Association, Philadelphia, PA, June 2015*.
8. Hara, K., Hajiaghayi, M., & **Bederson, B. B.** (2015). FluTCHA: Using Fluency to Distinguish Humans from Computers, short paper and poster, WWW2015, Florence, Italy, May 18-22, 2015.
9. Teasley, S., & **Bederson, B. B.** (2015). Learning Analytics and iSchools: What, Why & Worries, at *iConference*, Session for Interaction and Engagement, March 24-27, 2015, Newport Beach, CA.

10. Xu, Z., Goldwasser, D., **Bederson, B. B.**, Lin, J. (2014) Visual Analytics of MOOCs at Maryland, *Poster at Learning @ Scale Conference (L@S '14)*.
11. **Bederson, B. B.**, Jin, G., Leslie, P., Quinn, A.J., & Zhou, B. (alphabetical order), (2014) "Incomplete Disclosure: Insights from Maricopa", International Industrial Organization Conference, April 11-13, 2014, Chicago.
12. Lee, T.Y., Mauriello, M.L., Ingraham, J., Sopan, A., Ahn, J., & **Bederson, B. B.*** (2012) "CTArcade: Learning Computational Thinking while Training Virtual Characters Through Game Play", WiP at CHI 2012, ACM Press, 2309-2314.
13. Cranor, L., **Bederson, B. B.**, & Quesenberry, W. (2012) "Occupy CHI! Engaging U.S. Policymakers", Panel in CHI 2012, ACM Press, 1139-1142.
14. **Bederson, B. B.**, Quinn, A. J., & Rose, A. (2012) SearchParty: Learning to Search in a Web-based Classroom, Workshop paper at CHI 2012.
15. Hu, C., Resnik, P., Kronrod, Y., & **Bederson, B. B.*** (2012) Deploying MonoTrans Widgets in the Wild. Note at CHI 2012, ACM Press, 2935-2938.
16. Hu, C., Resnik, P., Kronrod, Y., Eidelman, V., Buzek, O., & **Bederson, B. B.*** (2011) The Value of Monolingual Crowdsourcing in a Real-World Translation Scenario: Simulation using Haitian Creole Emergency SMS Messages. In *Proceedings of EMNLP 2011 Sixth Workshop on Statistical Machine Translation*, 399-404.
17. Kronrad, Y., Hu, C., Buzek, O., & Quinn, A.J. (2011) Using Monolingual Crowd to Improve Translation. Student poster at AAAS 2011. **Winner of poster in Math, Technology and Engineering category.**
18. **Bederson, B. B.**, & Quinn, A.J. (2011) Web Workers Unite! Addressing Challenges of Online Laborers. Alt.CHI paper at CHI 2011, ACM Press, 97-106.
19. Hu, C., **Bederson, B. B.**, & Resnik, P. (2011) MonoTrans2: A New Human Computation System to Support Monolingual Translation. Short paper at CHI 2011, ACM Press, 1133-1136.
20. Kronrod, Y., Buzek, O., Hu, C., Quinn, A., Resnik, P., & **Bederson, B. B.*** (2010) Using Crowdsourcing to Translate Without Bilinguals. Poster at CrowdConf 2010.
21. Hu, C., **Bederson, B. B.**, and Resnik, P. (2010) Translation by Iterative Collaboration Between Monolingual Users. Abstract and demo at the Human Computation Workshop (HCOMP 2010), 54-55.
22. Buzek, O., Resnik, P., & **Bederson, B. B.*** (2010) Error Driven Paraphrase Annotation using Mechanical Turk, In *Creating Speech and Language Data With Amazon's Mechanical Turk*, NAACL 2010 Workshop, 2010.
23. Chen, R., Rose, A., & **Bederson, B. B.*** (2009) How People Read Books Online: Mining and Visualizing Web Logs for Use Information. In *Proceedings of European Conference on Digital Libraries (ECDL 2009)*, Short Paper, 364-369.
24. **Bederson, B. B.**, Rutledge, P., Quinn, A. (2009) Generalizing the International Children's Digital Library. In *Proceedings of the Digital Humanities Conference (DH 09)*, Poster.
25. **Bederson, B. B.**, Quinn, A., Druin, A. (2009) Designing the Reading Experience for Scanned Multi-lingual Picture Books on Mobile Phones. In *Proceedings of the Joint Conference on Digital Libraries (JCDL 2009)*, Short Paper, ACM Press, New York, NY, 305-308.
26. Hu, C., Rose, A., **Bederson, B. B.*** (2009) Locating Text in Scanned Books. In *Proceedings of the Joint Conference on Digital Libraries (JCDL 2009)*, Poster.
27. Druin, A., Cavallo, D., Fabian, C., **Bederson, B. B.**, 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.
43. Selker, T., Fischer, E. A., **Bederson, B. B.**, McCormack, C., Nass, C. (2003) Voting: User Experience, Technology and Practice. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2003) ACM Press, Panel, 700-701.
44. **Bederson, B. B.**, Clamage, A., Czerwinski, M. P., Robertson, G. G. (2003) A Fisheye Calendar Interface for PDAs: Providing Overviews in Small Displays. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2003) ACM Press, Demonstration, 618-619.
45. Hourcade, J.P., **Bederson, B. B.**, Druin, A., Rose, A., Farber, A., Takayama, Y. (2002). The International Children's Digital Library: Viewing Digital Books Online. Interaction Design and Children International Workshop, August 28-29, 2002, Eindhoven, The Netherlands 15 (3), 151-167.
46. Herrnson, P., **Bederson, B. B.** (2002) Debugging Maryland Balloting, Washington Post, Outlook Section, p. B08, Sunday May 12th, 2002.
47. Good, L., **Bederson, B. B.**, Stefik, M., Baudisch, P. (2002) Automatic Text Reduction For Changing Size Constraints. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Short Paper, 798-799.

48. Hourcade, J.P., Bederson, B. B., Druin, A., Taxén, G. (2002) KidPad: A Collaborative Storytelling Tool for Children. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Referred Demo, 500-501.
49. Hourcade, J.P., Bederson, B. B., Druin, A. (2002) SearchKids: A Digital Library Interface for Young Children. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 2002) ACM Press, Referred Demo, 512-513.
50. **Bederson, B. B.** (2001). PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps. UIST 2001, ACM Symposium on User Interface Software and Technology. Refereed demo.
51. Browne, H., Bederson, B. B., Druin, A., Sherman, L., & Westerman, W. (September 2000) Designing a Collaborative Finger Painting Application for Children, HCIL-2000-17, CS-TR-4184, UMIACS-TR-2000-66
52. Hourcade, J., Bederson, B. B. (May 1999) Architecture and Implementation of a Java Package for Multiple Input Devices (MID) HCIL-99-08, CS-TR-4018, UMIACS-TR-99-26
53. Hightower, R.R., Ring, L.T., Helfman, J.I., **Bederson, B. B.,** Hollan, J.D. (1998) PadPrints: Graphical Multiscale Web Histories. UIST 1998, ACM Symposium on User Interface Software and Technology. Tech Note, 121-122.
54. Stewart, J., Raybourn, E., Bederson, B. B., & Druin, A. (1998). When Two Hands Are Better Than One: Enhancing Collaboration Using Single Display Groupware. In Proceedings of Extended Abstracts of Human Factors in Computing Systems (CHI 98) ACM Press, Short Paper, 287-288.
55. **Bederson, B. B.,** Hollan, J. D., Druin, A., Stewart, J., Rogers, D., & Proft, D. (1996). Local Tools: An Alternative to Tool Palettes. In Proceedings of User Interface and Software Technology (UIST 96) ACM Press, Short Paper, 169-170.
56. **Bederson, B. B.,** Hollan, J. D. (1995) Pad++: A Zoomable Graphical Interface System. In Proceedings of Conference on Human Factors in Computing Systems Conference Companion (CHI 95) ACM Press, Short Paper, 23-24.
57. **Bederson, B. B., &** Davenport, G., & Druin, A., & Maes, P. (1994). Immersive Environments: A Physical Approach to the Multimedia Experience, In Proceedings of IEEE International Conference on Multimedia Computing and Systems, Boston, Massachusetts, May 17-19, 1994, (Panel).
58. **Bederson, B. B.** (1995). Audio Augmented Reality: A Prototype Automated Tour Guide. In Proceedings of Human Factors in Computing Systems (CHI 95) New York: ACM Press, (Short Paper), 210-211.
59. Stone, L. M., Erickson, T., **Bederson, B. B.,** Rothman, P., Muzzy, R. (1994) Visualizing Data: Is Virtual Reality the Key? IEEE Visualization, IEEE Press, Short Paper, 410-413.
60. **Bederson, B. B.,** Stead, L., & Hollan, J. D. (1994). Pad++: Advances in Multiscale Interfaces. In Proceedings of Human Factors in Computing Systems (CHI 94) New York: ACM Press, Short Paper, 315-316.
61. **Bederson, B. B.** (1992). A Miniature Space-Variant Active Vision System: Cortex-I. Doctoral dissertation, New York University, New York, NY.

E. TALKS, ABSTRACTS, AND OTHER PROFESSIONAL PAPERS PRESENTED

i. Keynote Talks

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

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

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

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

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

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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/gIQAZHIAHQ_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 Sefer (in Persian)
 “Mobility Initiative ابتکار تحرک”
<http://www.youtube.com/donoghtesefer>
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/news/office/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