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   INC. and SAMSUNG
15 TELECOMMUNICATIONS AMERICA, LLC

16   UNITED STATES DISTRICT COURT

17   NORTHERN DISTRICT OF CALIFORNIA, SAN JOSE DIVISION

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   APPLE INC., a California corporation,   CASE NO. 11-cv-01846-LHK
20
              Plaintiff,   **DECLARATION OF BENJAMIN B.**
21   **BEDERSON**
        vs.
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   SAMSUNG ELECTRONICS CO., LTD., a
23 Korean business entity; SAMSUNG
   ELECTRONICS AMERICA, INC., a New
24 York corporation; SAMSUNG
   TELECOMMUNICATIONS AMERICA,
25 LLC, a Delaware limited liability company,

26   Defendant.

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DECLARATION OF BENJAMIN B. BEDERSON

I, Benjamin B. Bederson, declare:

1.   I have personal knowledge of the facts set forth herein, and am competent to testify to the same.

2.   I am currently a Professor in the Computer Science Department and the Institute of Advanced Computer Studies at the University of Maryland, College Park. From June 2000 to September 2006, I was the Director of the Human-Computer Interaction Lab (HCIL) at the University of Maryland. Before coming to the University of Maryland in 1998, I was an Assistant Professor in the Computer Science Department at the University of New Mexico, where my research included work on user interfaces. I have Doctorate and Master's degrees in computer science from New York University.

3.   While at the HCIL, I created several pieces of software that implemented different user interfaces that allowed humans to interact with mobile devices such as Personal Digital Assistants (PDAs) and cell phones, including those with touch-sensitive screens.

4.   While I was the director of the Human-Computer Interaction Lab, I led the team that created the software known as LaunchTile. I worked on this project along with Amy Karlson, Aaron Clamage, and John SanGiovanni. The majority of the code for LaunchTile was written by Amy Karlson and Aaron Clamage.

5.   The LaunchTile project was an attempt to design a one-handed solution for mobile interaction that would be useful on a stylus-free touch screen mobile device.

6.   We came up with the LaunchTile concept and began writing code for LaunchTile no later than mid-2004. I know this to be the case because we submitted a paper on the LaunchTile project for entry in the April 2005 ACM Conference on Human Factors in Computing Systems (the "CHI Conference"), which was accepted and published. I recall that papers for the April 2005 CHI Conference were due to be submitted in September 2004. I further recall that we were actively working on the LaunchTile paper during mid-2004, and that we had already begun coding before we began to draft this paper. I further recall that we had a working prototype of the

1 LaunchTile system operative before we submitted the paper – that is, we had a working prototype

2 at least as early as September 2004.

3   7.   Attached as Exhibit A is a true and correct copy of the paper we published as part

4 of the CHI Conference. A September 11, 2004 draft of that paper is attached as Exhibit B. We

5 submitted a draft by the September 13, 2004 deadline, which was identical to or substantially

6 similar to our September 11, 2004 draft. Our paper was accepted for publication in December

7 2004, as shown by correspondence with CHI Conference personnel, attached as Exhibit C. At the

8 time we submitted our paper to the CHI Conference, I was not aware of any legally binding

9 confidentiality or nondisclosure agreement that restricted the CHI Conference staff with respect to

10 our submission. I further understood that our submission would be reviewed by peers and

11 evaluated for possible inclusion in the conference. As part of that review process, I was not aware

12 of any legally binding confidentiality or nondisclosure agreement that restricted these reviewers

13 with respect to our submission. As shown in Exhibit C, a number of reviewers did in fact read and

14 comment on our submission.

15   8.   During the CHI Conference we presented our paper and discussed our research

16 freely with conference participants. A video demonstration of LaunchTile, which we included in

17 our presentation at the CHI Conference, is attached as Exhibit D. A set of PowerPoint slides that

18 we displayed during our presentation at the CHI Conference is attached as Exhibit E. Attached as

19 Exhibit F is an executable version of LaunchTile, which is identical or substantially similar to the

20 version of LaunchTile that we demonstrated in our video and discussed in our paper and

21 presentation at the CHI Conference.

22   9.   The LaunchTile program runs on a portable electronic device such as the Compaq

23 ipaq line of handheld devices. Such a device can include a touch screen display, one or more

24 processors, and memory. The LaunchTile program was stored in the memory and configured to

25 be executed by the one or more processors of the portable electronic device.

26   10.   The LaunchTile Program included instructions for displaying an interactive

27 information space called the "zoomspace," consisting of 36 Application "tiles" at the outermost

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level of zoom ("World" view). At the World view, this zoomspace is divided into 9 areas of 4

tiles each, each of which we refer to as a "Zone."

World View

11.   The purpose of LaunchTile is to permit a user to navigate through a group of embedded electronic elements (Application tiles) contained in the single interactive zoomspace. Accessing the embedded tiles within the zoomspace is accomplished by using a combination of zooming and panning techniques to transition from the World view (outermost level of the zoomspace) to an enlarged Zone view, and from Zone view to an Application view.

Zone View   Application View
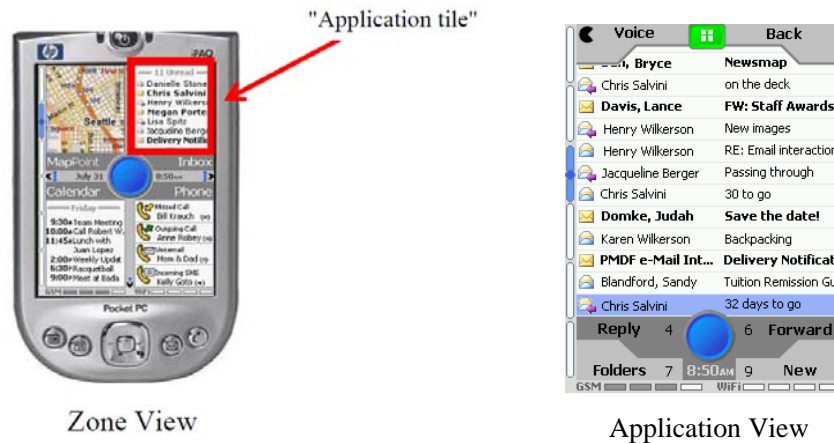
12.   Throughout the navigation process, animation and consistent visual metaphors are used to reinforce to the user that it is a unitary information space that is being traversed and viewed. For instance, a large, blue onscreen button ("Blue") within the region of interest is displayed prominently at each of the World, Zone, and Application view levels.

13.   When running on a portable electronic device, LaunchTile consists of a single object oriented data structure. The data structure is hierarchical in nature, allowing the embedded elements within the zoomspace to be rendered in further detail as the zoomspace itself is displayed at increasing levels of "zoom." The single hierarchical data structure underlying LaunchTile contains both the content supplied to the embedded elements, as well as the information dictating how these elements are to be arranged in the information space for a given zoom level (*i.e.*, the zoomspace "structure"). To display the zoomspace to the user, the LaunchTile Program contains instructions for creating this single, hierarchical object oriented data structure that is then translated into the visual representation displayed to the user. This is similar to the process that occurs when a typical web browser application interprets and transforms the elements of a standard HTML document into what is known as a data object model that can then be visually presented to the user as a single, unified web page.

14.   In our prototype implementation, the individual tiles in LaunchTile were typically represented by one or more image files (.png files). To render a tile, the LaunchTile program executed instructions for selecting the appropriate image depending on the level of zoom. Therefore, while the zoomspace did consist of a collection of embedded tiles that were distinct areas of interest (and various groupings of embedded tiles that were larger areas of interest), those embedded tiles were always part of one unified zooomspace that was dependent on a single object-oriented data structure for its content during the rendering process.[1]

15.   This design is further evident from the manner in which we intended the tiles to be depicted within the zoomspace. At World view, rather than merely displaying symbolic or iconic images, each tile was designed to support at least some "live" data derived from the Application level of the hierarchy. For instance, as the videos and images of our prototype suggest, the Email

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[1]   As I explain further below, the design of LaunchTile is hierarchical. Thus, each Application tile within the zoomspace can be thought of as an individual structured region within the larger region that is the World. A Zone, which is a 4x4 collection of Application tiles, can be thought of as its own structured region of content. And, any combination of contiguous Zones can be thought of as their own structured region of content.

tile at the World view was intended to display more than merely an image of an envelope, it was intended to also display the number of unread messages derived from the Email application itself.

16. From the World view in LaunchTile, the user can select a particular Zone for viewing. LaunchTile contains instructions for detecting the user input, instructions for determining the Zone corresponding to the location of the user input, and instructions for displaying an animated panning and zooming operation, wherein the zoomspace is enlarged and translated so that the four tiles associated with the selected Zone fill the touch-screen display.

17. As the user is "zoomed" into the selected Zone, LaunchTile does execute instructions for rendering each of the tiles in the selected Zone in further detail, but at the conclusion of the zooming step, it is still fundamentally the same hierarchical object oriented data structure that is visually displayed to the user. The four tiles that happen to be displayed in Zone view are the same embedded Application tiles (albeit rendered in further detail) that were present at World view.

18. This technique, of dynamically rendering content within an information space, is a topic I have described in written publications since the mid-1990s. For instance, Exhibit G is a publication titled *Pad++: A Zooming Graphical Interface for Exploring Alternate Interface Physics*, which I authored for the 1994 ACM Symposium on User Interface Software and Technology ("UIST Symposium"). In Exhibit G, I describe a method of "semantic zooming" aimed at "provid[ing] effective access to a large structure of information on a much smaller display." Exhibit G at 2. As I described in Exhibit G:

> It is natural to see the details of an object when zoomed in and viewing it up close. When zoomed out, however, instead of simply seeing a scaled down version of the object, it is potentially more effective to see a different representation of it. . . . There are two ways to describe this type of object. The first is to have different objects, each of which is visible at different, non-overlapping, zooms. . . . ***The second, and preferred method, is to describe a procedural object that renders itself differently depending on its viewing size***.

Exhibit G at 2 (emphasis added). LaunchTile exemplifies this second, "preferred" method, of "semantic zooming" that I have previously described.

19. From the Zone view in LaunchTile, the user can select a particular Application tile. Upon this user input, LaunchTile executes instructions for causing an animation to occur where

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1   the zoomspace is once again enlarged and translated such that the embedded Application tile fills

2   the display of the touch-screen device. Again, while the LaunchTile program contains instructions

3   for rendering the embedded tile in further detail, the user is ultimately presented with a more

4   detailed visual representation of the same underlying data structure that is used throughout the

5   entire navigation process.

6   20.   At the CHI Conference in April 2005, in Portland Oregon, which was open to the

7   public, I freely discussed my LaunchTile work with conference attendees without any

8   confidentiality or nondisclosure agreements.

9   21.   During our presentation at the CHI Conference, members of my team presented the

10   paper that we had authored on LaunchTile, using PowerPoint slides and a video that demonstrated

11   the LaunchTile software. The paper, the PowerPoint slides, and the video are attached hereto as

12   Exhibits A, D, and E.

13   22.   In May 2005, HCIL hosted a symposium ("HCIL Symposium") where members of

14   my team again presented our work, which included LaunchTile and its user interface features.

15   This HCIL Symposium was open to the public and I freely discussed my work with symposium

16   attendees without any confidentiality or nondisclosure agreements.

17   23.   During the HCIL Symposium, members of my team presented the same paper that

18   had been presented at the CHI Conference, including a public viewing of the same video used in

19   our presentation at the 2005 CHI Conference. A set of PowerPoint slides that my team used for

20   this HCIL Symposium presentation are attached as Exhibit H. In addition, I spent the afternoon

21   session of the HCIL Symposium performing live demonstrations of a mobile touch-screen device

22   running LaunchTile.

23   24.   Attached hereto as Exhibit I is a photograph of several members of the University

24   of Maryland Human-Computer Interaction Lab at the May 2005 HCIL Symposium. This

25   photograph memorializes our demonstration of the LaunchTile project at the conference in several

26   ways: (a) our poster displaying the LaunchTile project can be seen in the upper right-hand corner;

27   visible on the poster is an attribution to both myself and "Amy Karlson," as well as the words

28   "[Des]igns for One-Handed"; (b) Amy Karlson, the primary coder for the LaunchTile project, is

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standing on the far right, with her name tag visible; (c) Amy Karlson is holding a mobile touch-screen device that ran LaunchTile in her hand; (d) several other gentlemen in the picture are wearing HCIL Symposium T-shirts and HCIL Symposium name-tags.

25.   No later than March 31, 2005, my team placed a video on a public website, http://www.cs.umd.edu/hcil/mobile/, demonstrating the use of LaunchTile. The video illustrates LaunchTile running on a Compaq ipaq device. This device includes a touch-screen display and responded to movements of a finger on that touch-screen display, as shown in the video. This video is attached as Exhibit J. This video was available at the URL http://www.cs.umd.edu/hcil/mobile/launchtile.mov. I have reviewed web server logs for this website; according to these logs, this video was accessible to the public no later than May 2005. Relevant log information is contained in Exhibit K.

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DECLARATION OF BENJAMIN B. BEDERSON

1   I declare under penalty of perjury under the laws of the United States that the foregoing is

2   true and correct. Executed on May 17th, 2012, in College Park, MD .

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5   Benjamin B. Bederson

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