IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	W. Daniel Hillis, et al.	
U.S. Patent No.:	8,665,239	Attorney Docket No.: 39521-0048IP1
Issue Date:	March 4, 2014	
Appl. Serial No.:	13/686,692	
Filing Date:	November 27, 2012	
Title:	METHOD AND APPARATUS CONTINUING ACTION OF USER GESTURES PERFORMED UPON A TOUCH SENSITIVE INTERACTIVE DISPLAY IN SIMULATION OF INERTIA	

Mail Stop Patent Board
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT NO. 8,665,239 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

TABLE OF CONTENTS

EXHIBITS

APPLE-1001	U.S. Patent No. 8,665,239 to Hillis, et al. ("the '239 Patent")
APPLE-1002	Excerpts from the Prosecution History of the '239 Patent ("the Prosecution History")
APPLE-1003	Declaration of Dr. Brad Myers
APPLE-1004	Curriculum Vitae of Dr. Brad Myers
APPLE-1005	U.S. Patent Application Publication No. 2003/0156145 to Hullender, et al. ("Hullender")
APPLE-1006	P.E. Renaud, Introduction to Client/Server Systems: A Practical Guide for Systems Professionals (1996) ("Renaud")
APPLE-1007	U.S. Patent No. 6,249,606 to Kiraly, et al. ("Kiraly")
APPLE-1008	U.S. Patent No. 5,347,295 to Agulnick, et al. ("Agulnick")
APPLE-1009	Declaration of Edward G. Faeth
APPLE-1010	Declaration of Chad Gilman
APPLE-1011	Dean Rubine, *Specifying Gestures by Example*, 25 Computer Graphics 329-337 (1991).

Apple Inc. ("Petitioner" or "Apple") petitions for Inter Partes Review ("IPR") under 35 U.S.C. §§ 311–319 and 37 C.F.R. § 42 of claims 1-4 ("the Challenged Claims") of U.S. Patent No. 8,665,239 ("the '239 Patent"). As explained in this petition, there exists a reasonable likelihood that Apple will prevail with respect to at least one of the Challenged Claims.

The Challenged Claims are unpatentable based on teachings set forth in at least the references presented in this petition. Apple respectfully submits that an IPR should be instituted, and that the Challenged Claims should be canceled as unpatentable.

I. SUMMARY OF THE '239 PATENT

A. Brief Description

The '239 Patent describes identifying a gesture executed on a touch sensitive display and executing an action associated with that gesture. APPLE-1001, Abstract, 2:23-25. APPLE-1003, ¶14.

The '239 Patent discloses gestures that manipulate an interactive display: "Each user gesture corresponds to at least one predetermined action for updating imagery presented by the display," including gestures for panning and rotation actions. APPLE-1001, 2:23-25, 45-52. Moreover, the '239 Patent claims recite limitations directed to gestural manipulation of an interactive display. *See Id.*, claims 1 and 3.

In the Background, the ’239 Patent acknowledges prior art disclosing gesture control of a display: “[an] interactive display, in which operators manipulate a computer’s display using … gestures such as panning and rotation.” APPLE-1001, 1:65-67. As such, the ’239 Patent acknowledges that its claimed features directed to gestural manipulation of a display were known in the art at the time of invention of the ’239 Patent. *See* APPLE-1001, 1:65-67. This acknowledgement directly refutes the patentability of the Challenged Claims. The non-patentability of the Challenged Claims is discussed further below. APPLE-1003, ¶¶39-98.

The ’239 Patent includes 4 claims, of which claims 1 and 3 are independent.

B. Summary of the Prosecution History of the ’239 Patent

The ’239 Patent issued March 4, 2014, from U.S. Patent Application No. 13/686,692, filed November 27, 2012. *See* APPLE-1002. This application is a divisional of U.S. Patent Application Serial No. 13/458,915, filed April 27, 2012 (now U.S. Patent No. 8,669,958); which is a continuation of U.S. Patent Application No. 12/862,564, filed August 24, 2010 (now U.S. Patent No. 8,188,985); which is a continuation of U.S. Patent Application No. 11/188,186, filed on July 22, 2005 (now U.S. Patent No. 7,907,124); which is a continuation-in-part of U.S. Patent Application No. 10/913,105, filed on August 6, 2004 (now U.S. Patent No. 7,728,821). The earliest priority date of the ’239 Patent is August 6, 2004 (hereinafter the “Critical Date”).

A Notice of Allowance was the first substantive communication, allowing the originally filed claims. The reasons for allowance merely repeated the claim language, noting that: "None of the cited art teaches a computer implemented method or least one non-transitory computer-readable storage medium performed in a system including a processor coupled to digital data storage and a display having a touch-sensitive display surface, the method comprising the tasks of: in the digital data storage, storing a record defining a collection of multiple user gestures, each user gesture executable by touching the display, where the tasks are further performed according to any or both of: (1) the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches; (2) as to the manner in which the subject matter presented by the display is modified according to the identified one or more operations, said manner is further responsive to the determined magnitude of the one or more touches as claim 1 and 3." APPLE-1002, p. 40 (emphasis original).

II. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Apple certifies that the '239 Patent is available for IPR. The present petition is being filed within one year of service of a complaint against Apple in the Southern District of California. Apple is not barred or estopped from requesting this review challenging the Challenged Claims on the below-identified grounds.

B. Challenge Under 37 C.F.R. § 42.104(b) and Relief Requested

Apple requests an IPR of the Challenged Claims on the grounds set forth in the table shown below, and requests that each of the Challenged Claims be found unpatentable. An explanation of how these claims are unpatentable under the statutory grounds identified below is provided in the form of detailed description that follows, indicating where each element can be found in the cited prior art, and the relevance of that prior art. Additional explanation and support for each ground of rejection is set forth in Exhibit APPLE-1003, the Declaration of Dr. Brad Myers, referenced throughout this Petition.

Ground	'239 Patent Claims	Basis for Rejection
Ground 1	**1-4**	§103: Hullender and Renaud
Ground 2	**1-4**	§103: Kiraly and Agulnick

Hullender qualifies as prior art under at least 35 U.S.C §102(a) and §102(e). Hullender (APPLE-1005) is an August 21, 2003, publication of a patent application filed February 8, 2002, both of which dates are before the Critical Date.

Renaud qualifies as prior art under at least 35 U.S.C. §102(b). Renaud (APPLE-1006) is a printed publication publicly available at least by January 4, 1996, more than one year before the Critical Date. *See* APPLE-1009, APPLE-1010.

Kiraly qualifies as prior art under at least 35 U.S.C §102(b). Kiraly (APPLE-1007) is a patent granted June 19, 2001, more than one year before the Critical Date.

Agulnick qualifies as prior art under at least 35 U.S.C §102(b). Agulnick (APPLE-1008) is a patent granted September 13, 1994, more than one year before the Critical Date.

C. Level of Ordinary Skill in the Art

A person of ordinary skill in the art as of the Critical Date (hereinafter a "POSITA") would have had a Bachelor of Science Degree in an academic area emphasizing electrical engineering, computer engineering, computer science, or an equivalent field, and two or more years of experience in touch sensitive computer systems or gesture-based control of computer systems. Additional education in a relevant field or industry experience may compensate for a deficit in one or more of the aspects of these requirements. APPLE-1003, ¶10.

D. Claim Construction under 37 C.F.R. §§ 42.104(b)(3)

Petitioner submits that all terms should be given their plain meaning, but reserves the right to respond to any constructions that may later be offered by the Patent Owner or adopted by the Board. Petitioner is not waiving any arguments concerning indefiniteness or claim scope that may be raised in litigation.

III. MANNER OF APPLYING CITED PRIOR ART TO EVERY CLAIM FOR WHICH AN IPR IS REQUESTED, THUS ESTABLISHING A REASONABLE LIKELIHOOD THAT AT LEAST ONE CLAIM OF THE ’239 PATENT IS UNPATENTABLE

As detailed above (incorporated herein and below), this request shows how combinations involving the above-identified primary references disclose the limitations of the Challenged Claims, thereby invalidating claims 1-4 of the ’239 Patent. As detailed below, this request shows a reasonable likelihood that the Requester will prevail with respect to claims 1-4 of the ’239 patent.

A. Ground 1: Hullender and Renaud render obvious claims 1 to 4

A brief introduction is provided to the Hullender and Renaud references and the proposed combination thereof.

Hullender describes gesture control of a computer[1]

Hullender describes gesture control of a computer. *See* APPLE-1005, Abstract. Gestures input into a touch-sensitive display inspire execution of corresponding actions, e.g., content selection, text deletion, text rendering modifications, and page scrolling. *See Id.,* [0002], [0041], [0047], [0052]. APPLE-1003, ¶51.

Hullender identifies a gesture based on properties of the inputs (e.g., stroke(s)) that make up the gesture. A gesture can be identified by the number of

[1] Petitioner incorporates this discussion into Ground 1.

strokes (e.g., one versus two taps), shape (e.g., chevrons, circles, etc.), or geometric attributes (e.g., windings, aspect ratio, inflection points), among other properties. *See* APPLE-1005, [0044], [0060], [0063], [0071]-[0078]. APPLE-1003, ¶¶47-50.

A gesture invokes one or more corresponding actions. Properties of the stroke(s) of a gesture can affect execution of the corresponding action(s). *See* APPLE-1005, [0053], [0057], [0058]. Stroke size can affect the area impacted by the corresponding action: the height of a bracket gesture affects the extent of the content selected by a corresponding selection action. *See Id.*, [0057], [0058]. Execution of an action also may be informed by other properties, e.g., gesture position, writing speed, stylus pressure, and duration. *See Id.*, [0053]. APPLE-1003, ¶¶53-56.

Hullender enables identification of gestures and corresponding actions by representing gestures in a data structure. *See* APPLE-1005, [0092], Figure 7. Hullender's gestures are defined using entries in its data structure to specify identifiers, shapes, and corresponding actions. *See Id.*, [0092], [0093]. Received stroke(s) are identified based on stored entries, and the corresponding action(s) is/are executed. APPLE-1003, ¶¶58-60.

Hullender's approach to gesture control is implemented in a tablet PC having a local processor and data storage. *See* APPLE-1005, [0030], [0036]. The tablet PC can operate in a networked environment such as a client/server system with connections to remote computers, e.g., networked computers or servers. *See Id.*, [0033]. APPLE-1003, ¶65.

Renaud describes data storage and processing in client/server systems[2]

Renaud discloses that, in client/server systems, it can be advantageous for data to be "*locally owned and managed*," and that data transfer between client and server should sometimes be avoided: "*Minimize data transferred between clients and server*. Communications networks introduce the potential for latency, data loss, errors, or even total failure. … Hence, avoid unnecessary data transfers." APPLE-1006, pp. 466-467. Furthermore, according to Renaud, "[r]educing data movement also conserves precious network bandwidth. There are three ways to *conserve network bandwidth: avoid the need to transfer data at all[,] avoid sending data unnecessarily*[, and] make more efficient use of the communications channel." *Id.*, p. 487. In advancing its goals of minimizing data transfer, Renaud reveals that "*storing unchanging data at the client* is a good way of reducing network traffic" in client/server systems. *Id.*, p. 487. APPLE-1003, ¶62.

[2] Petitioner incorporates this discussion of Renaud into Ground 1.

Heeding the advice of Renaud, a POSITA would have configured Hullender's gesture control technology with a local data structure and corresponding processors.[3]

A POSITA would have combined relevant features of Renaud with Hullender's gesture control technology to arrive at a system in which gesture identification is performed by the local processor on Hullender's tablet PC by accessing a local data structure. APPLE-1003, ¶¶64-69.

Hullender's gesture identification involves processing input data representative of a gesture (i.e., data representing stroke properties) and accessing a stored data structure defining gestures. *See* APPLE-1005, [0044], [0060], [0063], [0071]-[0078], [0092], [0093]. Inasmuch as Hullender's tablet PC can operate in a networked environment with local or remote storage and processing resources (*see Id.*, [0030], [0033]), a POSITA would have looked to Renaud's teachings of data storage and processing in client/server systems for guidance for the implementation of Hullender's technology. Specifically, a POSITA would have relied on Renaud for guidance as to where to store the data structure (e.g., in local storage of the tablet PC or in a remote storage) and where to carry out gesture identification processing (e.g., by the local processor of the tablet PC or by a remote processor). APPLE-1003, ¶¶64-69.

[3] Petitioner incorporates this discussion of Hullender and Renaud into Ground 1.

In light of Renaud's teachings of the advantages of local data storage (*see* APPLE-1006, pp. 466-467, 487-488), a POSITA would have recognized the desirability of storing at least some of Hullender's gesture-related data, e.g., Hullender's data structure, in local tablet PC storage. APPLE-1003, ¶67. A POSITA would have recognized that storing the data structure at a remote computer would sometimes necessitate data transfer between Hullender's tablet PC and that remote computer, e.g., to access the data structure for gesture identification. A POSITA further would have recognized that storing the data structure locally, on Hullender's tablet PC, would render unnecessary that transfer, thereby conserving bandwidth and avoiding latency, data loss, errors, or failure that can be associated with data transfers, objectives that were encouraged by Renaud. *See* APPLE-1006, pp. 466-467, 487. APPLE-1003, ¶¶67-69.

Similarly, a POSITA would have recognized the desirability of having Hullender's tablet PC processor perform at least some of the gesture identification processing in light of Renaud's teachings of the advantages of local processing. *See* APPLE-1006, p. 466-467, 487-488. APPLE-1003, ¶66. Specifically, a POSITA would have recognized that having a processor of a remote computer perform such processing would sometimes necessitate data transfer between Hullender's tablet PC (which receives gesture input and possesses data indicative of stroke properties) and that remote computer. A POSITA further would have recognized that performing the processing locally, by Hullender's tablet PC processor, would render unnecessary that transfer, avoiding disadvantages that Renaud teaches can be associated with data transfer. *See* APPLE-1006, pp. 466-467, 487. APPLE-1003, ¶¶64-66.

Moreover, a POSITA would also have recognized that having local processing and data storage on Hullender's tablet PC would allow for gesture control even when the tablet was not connected to a network, e.g., when the tablet was offline. The ability to access gesture control functionality even when offline makes this functionality more versatile and readily available, improving user experience. APPLE-1003, ¶¶66, 69.

1. Hullender and Renaud render obvious claim 1

[1pre] "A computer implemented method performed in a system including a processor coupled to digital data storage and a display having a touch-sensitive display surface, the method comprising the tasks of:

Hullender discloses "**[a] computer implemented method**:" "a stylus-based computer processing system (also referred to as a tablet PC)." APPLE-1005, [0036]. APPLE-1003, ¶40.

Hullender discloses "**a system including a processor coupled to digital data storage**." Hullender's tablet is a system including "[a]ny or all of the features, subsystems, and functions in the system of FIG. 1," below. APPLE-1005, [0036].

This system includes a processor coupled to a bus: "computer 100 includes *a processing unit 110*, a system memory 120, and *a system bus 130 that couples various system components* … to the processing unit 110."[4] *Id*., [0030]. The system includes digital data storage: "[t]he computer also includes a hard disk drive 170 for reading from and writing to a *hard disk* (not shown), a magnetic disk drive 180 for reading from or writing to *a removable magnetic disk 190*, and an optical disk drive 191 for reading from or writing to *a removable optical disk 192*." *Id*., [0031]. The digital data storage is also coupled to the bus: "The hard disk drive 170, magnetic disk drive 180, and optical disk drive 191 are connected to the system bus 130." *Id*., [0031]. The processing unit and data storage are coupled via the bus. APPLE-1003, ¶41.

[4] Italics represent emphasis added by Petitioner, unless otherwise specified.

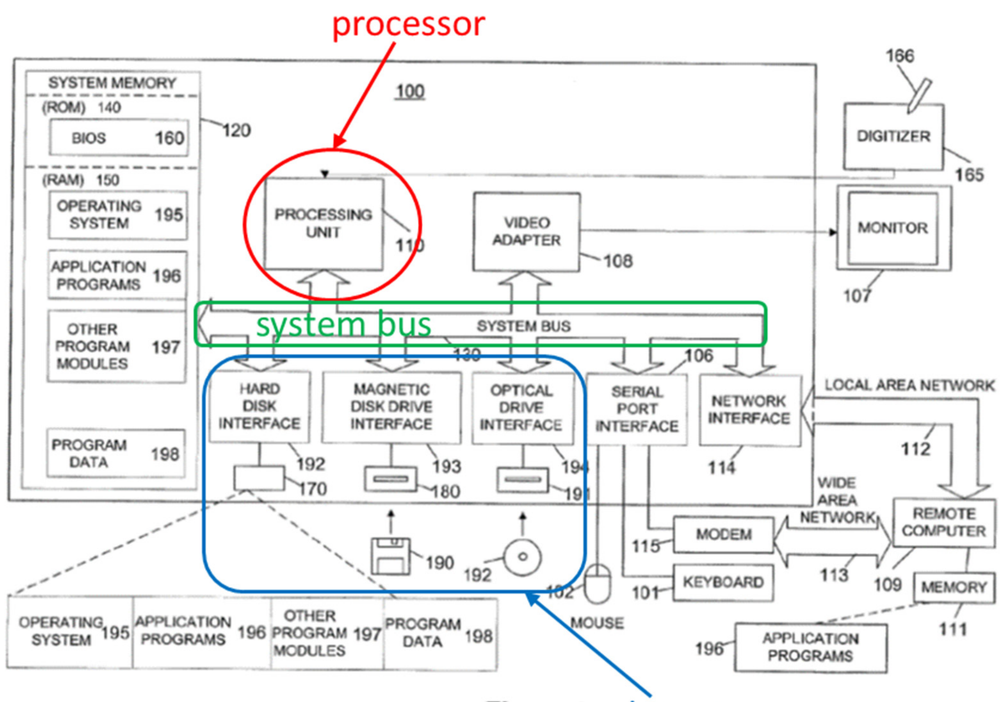
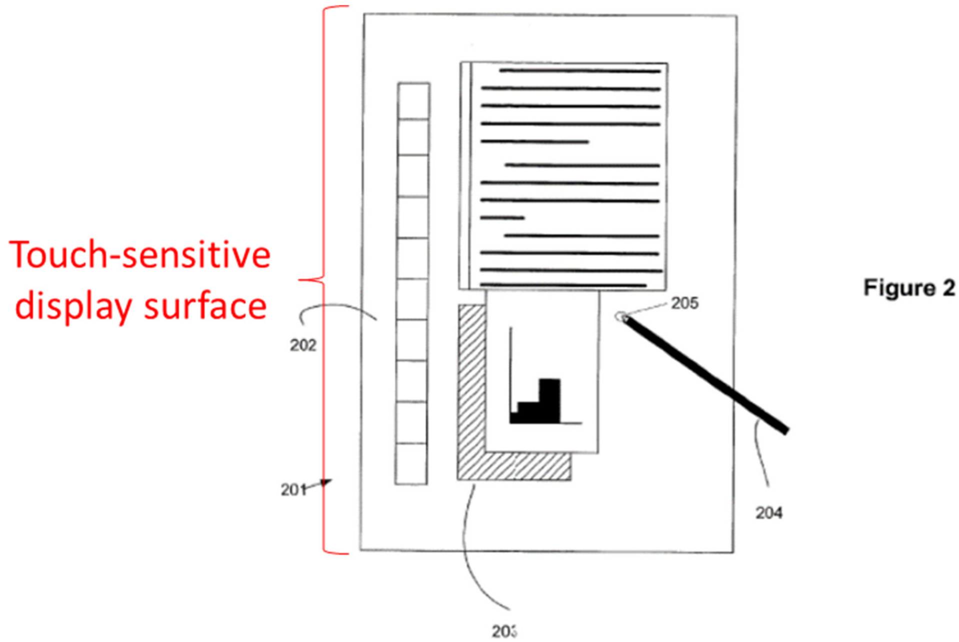


Figure 1

Hullender (APPLE-1005), Figure 1 (annotated)

Hullender's tablet PC includes "**a display having a touch-sensitive display surface**." Referring to Figure 2, below, "[t]ablet PC 201 includes a large display surface 202 …. Using stylus 204, *a user can select, highlight, and write on the digitizing display area*." APPLE-1005, [0036]; *see also* [0037] ("a user's own finger could be used for selecting or indicating portions of the displayed image on a *touch-sensitive or proximity-sensitive display*"), [0038]. APPLE-1003, ¶40



Hullender (APPLE-1005), Figure 2 (annotated)

[1a] "**in the digital data storage, storing a record defining a collection of multiple user gestures, each user gesture executable by touching the display, and further storing for each user gesture an assignment of one or more of multiple prescribed operations of modifying subject matter presented by the display**;"

Hullender discloses "**storing a record defining a collection of multiple user gestures**:" data structure 701 may be used to represent gestures. *See* APPLE-1005, [0092]; Figure 7, below. In the data structure, "[s]ection 702 relates to a generic specification for a gesture. Section 703 relates to a delete gesture. Section 704 relates to a begin selection gesture." *Id.*, [0092]. Within the data structure, multiple gestures are defined by identifier and shape: "*Section 705 includes gesture identification*. The gesture identification may be a Unicode character or may be a

GUID as are known in the art. *Section 706 shows the normalized shape of the gesture*." *Id.*, [0093]. APPLE-1003, ¶58.

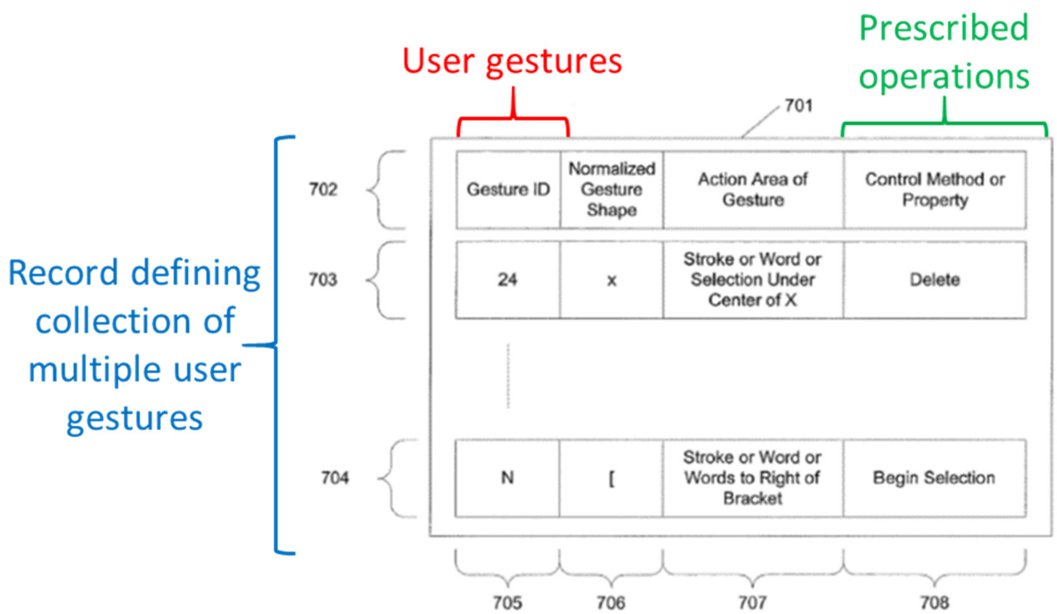


Figure 7

Hullender (APPLE-1005), Figure 7 (annotated)

Hullender discloses "**each user gesture executable by touching the display**." The *"[g]estures may be made on a display surface*." APPLE-1005, [0043]; *see also* [0037] ("a user can select, highlight, and write *on the digitizing display area*"). APPLE-1003, ¶39.

Hullender discloses "**storing for each user gesture an assignment of one or more of multiple prescribed operations ... of modifying subject matter presented by the display.**" The assignment of a prescribed operation for a gesture is stored in section 708 of the data structure: "*Section 708 describes the control method or property associated with the gesture*." APPLE-1005, [0094]. "For gesture 703, the associated control method or property is 'delete.' For gesture 704, the associated control method or property is 'begin selection.'" *Id.*, [0094]. APPLE-1003, ¶59. The associated control method or property for a gesture is the assigned prescribed operation for the gesture: "*Each gesture may have one or more default actions associated with it*. … [T]he default action may be referred to as a control method or control property of a gesture," which is "*what the gesture does or affects when executed*." APPLE-1005, [0047]. 'Begin selection' is the operation assigned to gesture 704. *See Id.*, [0047] ("the method or property of a selection gesture is to *select something on a displayed page*."). 'Delete' is the operation assigned to gesture 703. *See Id.*, [0052] ("an X placed on a single word may have an action associated with the gesture to be to delete the word."). Selecting content and deleting text are operations of modifying subject matter presented by the display. APPLE-1003, ¶51.

Hullender's operations are many. In addition to deletion and selection, the operations can include scrolling: "A user may be … *controlling some aspect of a display* (e.g., reviewing, *scrolling*, and the like)." APPLE-1005, [0041]. The operations can include changing text rendering: "the method or property of a gesture to bold a word or a selection *changes the rendering of the word or selection to have a* *bolder font or representation.*" *Id.*, [0047]. Additional operations assigned to gestures are shown in the table at [0089], below. For instance, "Up-Chevron" gesture 648 is assigned the "Paste" operation. APPLE-1003, ¶51. Many of these operations, including scrolling, changing text rendering, and pasting, are other examples of operations of modifying subject matter presented by the display. APPLE-1003, ¶51.A POSITA would have found it obvious for Hullender's data structure 701 to define additional gestures and assigned prescribed operations, e.g., those shown in the table at [0089], to include a more comprehensive listing of available gestures and assigned operations. *Id.*, [0060].

Gestures

Prescribed operations

Glyph	Name	Operation
628	Tap	Select/Place IP
629	Double Tap	Select Word
630	Triple Tap	Select Paragraph
631	Quadruple Tap	Select All
632	Right-flick	Scroll left until action area is at right edge of window
633	Double-Right-Flick	Scroll left to end of document
634	Left-flick	Scroll right until action area is at left edge of window
635	Double-Left-Flick	Scroll right to end of document
636	Up-Flick	Scroll down until action area is at top of screen
637	Double-Up-Flick	Scroll down to bottom of page
638	Triple-Up-Flick	Scroll down to bottom of document
639	Down-Flick	Scroll up until action area is at bottom of screen
640	Double-Down-Flick	Scroll up to top of page
641	Triple-Down-Flick	Scorll up to top of document
642	Latin-Latter-B	Make Target Bold
643	Latin-Letter-I	Make Target Italic
644	Latin-Letter-N	Make Taget "Normal"
645	Latin-Letter-U	Make target Underlined
646	Latin-Letter-X	Delete Target
647	Circle-Cross	Copy Target
648	Up-Chevron	Paste
649	Double-Up-Chevron	Paste Special
650	Left-Bracket	Set left edge of selection
651	Right-Bracket	Set right edge of selection
652	Top-Bracket	Select column
653	Left-Brace	Set left edge of discontinuous selection
654	Right-Brace	Set right edge of discontinuous selection

Hullender (APPLE-1005), Table at [0089]

Hullender discloses that data structures can be stored in a "**digital data storage**" of the tablet: "[t]he drives and their associated computer-readable media provide *nonvolatile storage of … data structures*" APPLE-1005, [0031]. APPLE-

1003, ¶61. A POSITA would have found it obvious to store Hullender's data structure 701 "**in the digital data storage**" of the tablet in view of the combined teachings of Hullender and Renaud. APPLE-1003, ¶67. In particular, a POSITA would have found it obvious to store Hullender's data structure in the digital storage of the tablet, rather than at another, remote computer, in light of Renaud's teachings of the advantages of local storage, and to make the gesture control capability available in both networked and offline environments. *See* III(A); *see also* APPLE-1006, pp. 466-467, 487. APPLE-1003, ¶¶68-69. A POSITA would have had a reasonable expectation of success in storing the data structure 701 in Hullender's local storage given Hullender's teaching that data structures can be stored in data storage of the tablet. *See* APPLE-1005, [0031]. APPLE-1003, ¶¶67-69.

[1b] "for each of one or more touches experienced by the display surface, the processor determining the magnitude of the touch upon the display surface;"

Hullender discloses "**one or more touches experienced by the display surface**." Hullender's gestures are executed by touching the display surface. *See* APPLE-1005, [0043]. Hullender defines a gesture as a set of one or more strokes: "Gesture—A drawing or other ink that may be interpreted as a command," where ink is "[a] sequence or set of one or more strokes." APPLE-1005, [0021], [0028]; *see also* [0069]. A stroke is a "sequence or set of captured points." APPLE-1005, [0022]. That is, a stroke can be a sequence or set of points touched on the display surface while drawing a gesture, i.e., a touch experienced by the display surface. APPLE-1003, ¶42.

A POSITA would have found it obvious to "**determin[e] the magnitude of the touch upon the display surface**" based on Hullender's teachings that the magnitude of a stroke (i.e., touch) affects execution of the corresponding action. Hullender's gesture execution is affected by properties such as gesture size, area, writing speed, stylus pressure, or stylus angle, all of which are gesture magnitudes. APPLE-1005, [0052], [0053], [0057]. APPLE-1003, ¶¶45, 53. At least when a gesture is composed of a single stroke, it would be obvious to those of skill to glean these magnitudes from touch/stroke magnitudes. APPLE-1003, ¶46. Accordingly, at least for a single-stroke gesture, stroke properties affect gesture execution. APPLE-1003, ¶46. As discussed in the following paragraphs, a POSITA would have found it obvious to determine these magnitudes to enable these magnitudes to affect gesture execution.

Gesture size, e.g., stroke length, is defined in claim 2 as a magnitude. Hullender discloses that gesture size affects gesture execution: "A gesture may have another characteristic based on the size of the gesture. This information permits gestures to have varying impact or extent on what they are modifying." APPLE-1005, [0057]. At least for a single-stroke gesture, a POSITA would understand from this that stroke size likewise affects gesture execution. APPLE-1003,

¶54. A POSITA would have found it obvious based on Hullender's teachings to determine stroke size (i.e., the magnitude of the touch) so stroke size could be used to affect gesture execution, as taught by Hullender. *Id.*, ¶57.

Hullender discloses that gesture area, defined in claim 2 as a magnitude, affects gesture execution: "The action area of a gesture … may be based on one or more attributes of the gesture. For instance, an X placed on a single word may have an action associated with the gesture to be to delete the word … [A] large X over a paragraph may expand the scope of the action area to encompass the entire paragraph." APPLE-1005, [0052]. At least for a single-stroke gesture, a POSITA would understand from this that stroke area likewise affects gesture execution. APPLE-1003, ¶55. A POSITA would have found it obvious based on Hullender's teachings to determine stroke area (i.e., the magnitude of the touch) so stroke area could be used to affect gesture execution, as taught by Hullender. *Id.*, ¶57.

The writing speed, stylus pressure, stylus angle, and stroke angle also are magnitudes. For instance, writing speed and stylus pressure are a length history and a force, respectively, defined in claim 2 as magnitudes. Hullender discloses that these properties affect a gesture's action area: "This scaling of action areas may be adjusted by other attributes including … the speed of writing the gesture, the pressure of the stylus on the surface of the digitizer, the angle of the stylus …, the angle of the gesture, and the like." APPLE-1005, [0053]. A property that affects a gesture's action area affects the execution of the gesture. *See Id.*, [0049], [0053]. At least for a single-stroke gesture, the writing speed, stylus pressure, stylus angle, and stroke angle of a stroke likewise affect the action area of the gesture, meaning they affect gesture execution. APPLE-1003, ¶56. A POSITA would have found it obvious based on Hullender's teachings to determine one or more of these stroke magnitudes (i.e., the magnitude of the touch) so they could be used in determining the scaling of the action area, as taught by Hullender. *Id.*, ¶57.

Alternatively or additionally, Hullender discloses "**determining the magnitude of the touch upon the display surface**." Hullender's strokes are touches upon the display surface, and stroke magnitude is a magnitude of a touch upon the display surface. APPLE-1003, ¶¶44-45. Hullender's processing unit 110, which is coupled to the input devices, interprets user commands and determines the magnitude of the touch upon the display surface, as discussed below. *See* APPLE-1005, [0032], [0036], claim 17. APPLE-1003, ¶63.

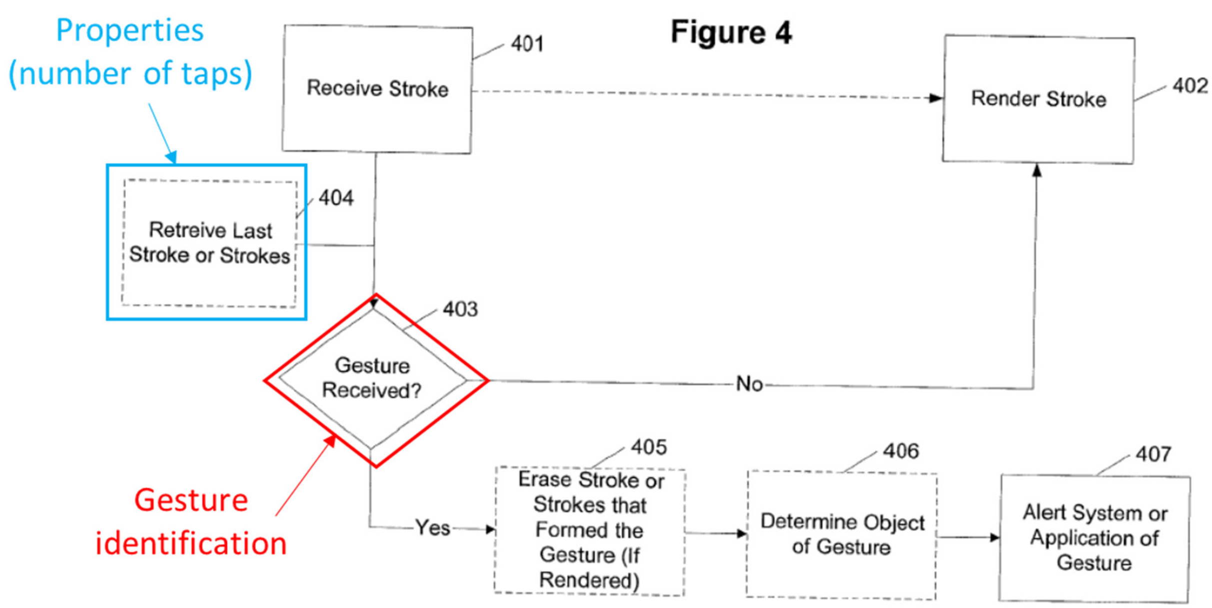
Hullender discloses stroke windings, duration, aspect ratio, distance of a stroke, or points of inflection, any one of which is (or would have rendered obvious) a stroke magnitude. APPLE-1003, ¶44. "In step 801, a stroke is 13 received. In step 802, the stroke is normalized. … Additional items including *stroke windings, duration of the stroke, aspect ratio of the stroke, maximum distance of any* *point from a segment connecting endpoints, points of inflection*, and the like *may be computed*." APPLE-1005, [0071], [0075]. For instance, duration is a force history, defined in claim 2 as a type of magnitude. APPLE-1003, ¶44. These are examples of Hullender's disclosure of determining stroke (i.e., touch) magnitude.

Hullender discloses "**the processor determining the magnitude of the touch**." Hullender describes that "a pen digitizer 165" that has "a direct connection … [to] the processing unit 110." is "provided in order to digitally capture freehand input." APPLE-1005, [0032]. Hullender's processing unit 110, being connected to the digitizer, interprets input entered through the digitizer, including determining touch magnitude. APPLE-1003, ¶63. Moreover, Hullender describes "[a] system comprising … a processor, wherein … *said processor determines whether said stroke includes a gesture*." APPLE-1005, claim 17.

Alternatively or additionally, a POSITA would have found it obvious to have "**the processor determining the magnitude of the touch**" in view of the combination of Hullender and Renaud. APPLE-1003, ¶64. A POSITA would have found it obvious for Hullender's tablet PC processor to determine the magnitude rather than a processor of a remote computer in light of Renaud's teachings that data transfer between client and server should sometimes be avoided. *See* APPLE-1006, p. 467, 487. APPLE-1003, ¶¶65-66. A POSITA would have recognized that having Hullender's tablet PC processor determine the magnitude would render unnecessary a transfer to a remote computer of data representative of received stroke(s), conserving bandwidth and avoiding disadvantages that can be associated with data transfer, as taught by Renaud. *See* Sec. III(A); APPLE-1006, p. 467, 487. APPLE-1003, ¶66.

[1c] "based on one or more prescribed properties of the one or more touches experienced by the display surface, the processor identifying from the collection of user gestures at least one user gesture executed by the one or more touches;"

Hullender discloses "**identifying … at least one user gesture executed by the one or more touches**." Figure 4, below, shows a "process for *recognizing certain strokes as gestures*." APPLE-1005, [0062]. "In step 401, a stroke is received. In step 403, the system determines whether a gesture was received. This determination may include … *operations to determine if a received stroke is a gesture*." *Id.*, [0063]. APPLE-1003, ¶47. Gesture identification is carried out by Hullender's processor 110, discussed below. *See* APPLE-1005, [0032], [0036], claim 17. APPLE-1003, ¶63.

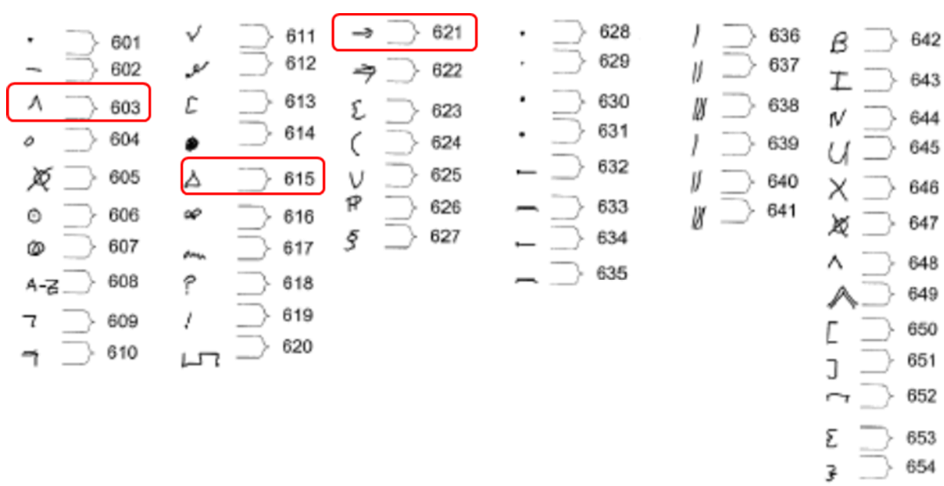


Hullender (APPLE-1005), Figure 4 (annotated)

Hullender discloses "**based on one or more prescribed properties of the one or more touches experienced by the display surface, … identifying … at least one user gesture**." Hullender's gestures are identified based on properties of the stroke(s), such as a number of strokes, stroke shape, stroke coordinates, time scale information, stroke windings, stroke duration, aspect ratio, stroke distance, or points of inflection, as discussed in the following paragraphs. *See* APPLE-1005, [0044], [0060], [0063], [0071]-[0078]. APPLE-1003, ¶¶48-50.

Regarding the number of strokes in the gesture, Hullender discloses that "a tap on a paragraph may act as a selection of a word under the tap. Two taps … may select a sentence or paragraph that contains the word under the original tap." APPLE-1005, [0063]. That is, Hullender discloses that a gesture can be identified based on the number of taps (a property of the touches). APPLE-1003, ¶49.

Regarding stroke shape, Hullender discloses that gesture "recognition may include matching shapes to determine if a single gesture (a wavy line) has been repeated" APPLE-1005, [0060]. Hullender also discloses "a variety of different gestures" each composed of stroke(s) forming a particular shape, e.g., chevron, triangle, or arrow, highlighted in Figure 6, below. *Id.*, [0088]; *see also* the table following [0088]. Gesture identity is based on stroke shape. *See Id.*, [0081]-[0088]. That is, Hullender discloses gesture identification based on stroke shape (a property of the touches). APPLE-1003, ¶48.



Hullender (APPLE-1005), Figure 6 (annotated)

Regarding the coordinates, time scale information, windings, stroke duration, aspect ratio, stroke distance, and points of inflection, Hullender discloses processing a stroke in a gesture recognition process. *See* APPLE-1005, [0071]. Stroke processing includes processing stroke coordinates, including "[s]cal[ing] the X and Y coordinates to a predetermined size" and retaining scaling information, and "[c]omput[ing] Chebychev polynomials for each of the x, y, and z coordinates." *Id.*, [0073], [0076]. The processing includes "[s]cal[ing] the time entry of the points" and retaining time scale information. *Id.*, [0074]. The processing includes computing "stroke windings, duration of the stroke, aspect ratio of the stroke, maximum distance of any point from a segment connecting endpoints, points of inflection, and the like." *Id.*, [0075]. These results are used to identify the gesture: "Combine some or all of the Chebychev polynomials, the winding, scaling, duration, and scale and input to one or more Bayes net. … Pass the processed stroke or strokes to each Bayes net and get a score. Any net that exceeds a threshold is recognized" as a gesture. *Id.*, [0077]-[0078]. APPLE-1003, ¶50. The result is a determination of "whether a stroke or strokes is a gesture." APPLE-1005, [0079]. That is, Hullender discloses identifying a gesture based on stroke coordinates, time scale information, windings, duration, aspect ratio, distance, or points of inflection (i.e., properties of a touch). APPLE-1003, ¶50.

A POSITA would have found it obvious to "**identify[] from the collection of user gestures at least one user gesture**." Hullender discloses storing gesture IDs for multiple gestures in the data structure (i.e., a collection of user gestures). APPLE-1005, [0093]; *see* Sec. III(A). When stroke(s) are identified as a gesture, Hullender's "system determines the words or strokes in the action area 805 and *sends the gesture ID* … to the system or application." *Id.*, [0079]. The gesture ID is stored in Hullender's data structure and is obtained from the data structure for sending to the system or application. APPLE-1003, ¶60. A POSITA would have found it obvious to identify the gesture from the data structure (i.e., the collection of gestures) to obtain the gesture ID stored in the data structure for sending to the system or application. APPLE-1003, ¶60.

Hullender discloses "**the processor identifying … at least one user gesture**." Hullender's tablet PC, which includes the processing unit 110, "*interprets marks* made using stylus 204," demonstrating that Hullender's processing unit identifies gestures. APPLE-1005, [0036]; *see also* Sec. (III)(A)(1). APPLE-1003, ¶63.

Alternatively or additionally, a POSITA would have found it obvious to have Hullender's "**processor identifying … at least one user gesture**" in view of the combination of Hullender and Renaud, e.g., in light of Renaud's teachings to avoid data transfer. *See* APPLE-1006, p. 487; Sec. (III)(A). APPLE-1003, ¶¶64-66.

[1d] “**the processor identifying the one or more prescribed operations assigned to the executed user gesture, and causing the display to modify the subject matter presented by the display according to the identified one or more operations; and**”

A POSITA would have found it obvious in view of the combined teachings of Hullender and Renaud to “**identify[] the one or more prescribed operations assigned to the executed user gesture.**” APPLE-1003, ¶52.

Firstly, a POSITA would have found it obvious to identify assigned operations based on Hullender’s teachings that actions (i.e., operations) assigned to a received gesture are executed. Each of Hullender’s gestures “may have one or more *default actions* associated with it.” APPLE-1005, [0046]. “Once a gesture is created (and/or recognized) in 302, *it may be executed*,” i.e., the assigned action is executed. *Id.*, [0041]; *see also* [0047]. A POSITA would have found it obvious that once a gesture is identified, the assigned action would also be identified to enable execution of the action, as taught by Hullender. APPLE-1003, ¶52.

Secondly, a POSITA also would have found it obvious to identify the assigned operations based on Hullender’s teachings that the control method or property (i.e., operation) for a gesture is included as part of an alert sent upon gesture identification. “If a gesture was received in step 403, the system is alerted to the presence of a gesture. *This alert may include … the sending of the gesture as well as additional information (including … the control method or property)*.” APPLE-

1005, [0065]. A POSITA would have found it obvious to identify the control method or property of an identified gesture to allow such an alert to be sent.

Hullender discloses "**causing the display to modify the subject matter presented by the display according to the … one or more operations**." Upon gesture identification, the assigned action (i.e., operation) is executed: "Once a gesture is created (and/or recognized) in 302, *it may be executed*." APPLE-1005, [0041]. Gesture execution includes causing the display to modify subject matter presented by the display according to the assigned action, e.g., scrolling, changing text rendering, selecting content, or deleting text. *See Id.*, [0041], [0047], [0052]; *see* (III)(A). APPLE-1003, ¶51.

Hullender and Renaud disclose "**the processor identifying the one or more prescribed operations … and causing the display to modify the subject matter presented by the display**." Hullender's tablet PC, which includes the processing unit 110, "interprets marks … *in order to manipulate data, enter text, and execute conventional computer application tasks*." APPLE-1005, [0036]. This illustrates one way in which the processing unit 110 of Hullender's tablet PC identifies and carries out actions related to gesture and operation identification and execution. APPLE-1003, ¶63. A POSITA would have found it obvious for the processing unit

110 of Hullender's tablet PC specifically to identify operations and cause the display to modify presented subject matter in light of Renaud's teachings to avoid data transfer. *See* APPLE-1006, p. 487; Sec. (III)(A). APPLE-1003, ¶¶64-66.

[1e] "where the tasks are further performed according to any or both of: (1) the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches;"

Hullender discloses that "**the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches**." Hullender's gesture identification is based on the windings, duration, aspect ratio, distance, or points of inflection of the stroke; or the number of taps (i.e., touches) that make up the gesture. *See* APPLE-1005, [0063], [0071]-[0078]. APPLE-1003, ¶50. These properties are examples of stroke magnitudes. Indeed, at least some of these properties are explicitly defined as stroke magnitudes in claim 2, including duration (force history) and number of taps (intensity history).

In Hullender's gesture recognition process, a received stroke is processed, including computing "stroke windings, duration of the stroke, aspect ratio of the stroke, maximum distance of any point from a segment connecting endpoints, points of inflection," i.e., computing stroke magnitudes. APPLE-1005, [0075]. The results are used to identify the gesture: "Combine some or all of the Chebychev polynomials, the winding, scaling, duration, and scale and input to one or more

Bayes net. … Pass the processed stroke or strokes to each Bayes net and get a score. Any net that exceeds a threshold is recognized" as a gesture. *Id.*, [0077]-[0078]. The process then "determines whether a stroke or strokes is a gesture." APPLE-1005, [0079]. Hullender's gesture identification is based (at least in part) on properties including the determined magnitude (i.e., windings, duration, aspect ratio, distance, or points of inflection) of a stroke. APPLE-1003, ¶50.

[1f] "where the tasks are further performed according to any or both of … (2) as to the manner in which the subject matter presented by the display is modified according to the identified one or more operations, said manner is further responsive to the determined magnitude of the one or more touches."

Hullender and Renaud disclose that "**the subject matter presented by the display is modified according to the identified one or more operations**." *See*, e.g., APPLE-1005, [0041], [0047], [0052]. *See* III(A)(1), [1d]. APPLE-1003, ¶51.

Petitioner asserts that the feature "**the manner in which the subject matter presented by the display is modified … is further responsive to the determined magnitude of the one or more touches**" is a non-limiting feature reciting purely functional language. Nevertheless, it is disclosed by Hullender. The manner in which displayed content is modified in Hullender is responsive to stroke size, writing speed, stylus pressure, stylus angle, and stroke angle. APPLE-1003, ¶53. At least some of these properties are explicitly defined as stroke magnitudes in claim 2, including stroke size (a length), speed of writing (a length history), and stylus pressure (a force).

Regarding stroke size, Hullender discloses that "[a] *gesture may have another characteristic based on the size of the gesture. This information permits gestures to have varying impact or extent on what they are modifying*. For example, a left bracket may be one line tall or may be multiple lines tall. With a three line high left bracket, more area is intended to be selected than a two line high left bracket." APPLE-1005, [0057]. That is, presented subject matter is modified responsive to gesture size, i.e., the selected area depends on the bracket height. For a single-stroke gesture such as the bracket, gesture size is also the stroke size. APPLE-1003, ¶46. This is one example of the manner in which the subject matter presented by the display is modified responsive to stroke size, i.e., stroke magnitude. APPLE-1003, ¶54.

Regarding writing speed and stylus pressure, Hullender discloses that the "*scaling of action areas may be adjusted by other attributes including … the speed of writing the gesture, the pressure of the stylus on the surface of the digitizer, the angle of the stylus …, the angle of the gesture, and the like*." APPLE-1005, [0053]. That is, presented subject matter is modified responsive to writing speed, stylus pressure, stylus angle, or gesture angle, i.e., the size of the area affected by the gesture depends on these properties. For a single-stroke gesture, these properties of the gesture are also stroke properties. APPLE-1003, ¶46. This demonstrates that the subject matter presented by Hullender's display is modified responsive to writing speed, stylus pressure, stylus angle, or stroke angle, i.e., stroke magnitudes. APPLE-1003, ¶56.

2. Hullender and Renaud render obvious claim 2

[2pre] "The method of claim 1,"

[2a] "wherein said magnitude comprises any of: a current length, a current area, a current intensity, a current force, a length history, an area history, an intensity history, and a force history."

Hullender discloses that the magnitude includes "**a current length**:" "a left bracket may be one line tall or may be multiple lines tall. With a three line high left bracket, more area is intended to be selected than a two line high left bracket." APPLE-1005, [0057]. Bracket height (i.e., length) is a current length because it does not take into account past heights. APPLE-1003, ¶46.

Hullender discloses that the magnitude includes "**a current area**:" "an X placed on a single word may have an action associated with the gesture to be to delete the word …. Alternatively, a large X over a paragraph may expand the scope of the action area to encompass the entire paragraph." APPLE-1005, [0052]. Stroke area is a current area because it does not take into account past stroke areas. APPLE-1003, ¶46.

Hullender discloses that the magnitude includes "**a current force**," i.e., stylus pressure. The "scaling of action areas may be adjusted by … the pressure of the stylus." APPLE-1005, [0053]. Stylus pressure is a current force because it does not take into account past stylus pressures. APPLE-1003, ¶46.

Hullender discloses that the magnitude includes "**a length history**," i.e., writing speed. "This scaling of action areas may be adjusted by … the speed of writing the gesture." APPLE-1005, [0053]. Stroke speed (change in position over time) is a length history of a stroke (i.e., touch) because it is dependent on past positions of the touch (i.e., past stroke lengths). APPLE-1003, ¶46.

Hullender discloses that the magnitude includes "**an intensity history**," i.e., a number of taps. Gesture execution is affected by the number of taps that make up the gesture: "a tap on a paragraph may act as a selection of a word under the tap. Two taps … may select a sentence or paragraph." APPLE-1005, [0063]. The number of taps is an intensity history because it is determined by tracking touches over time. APPLE-1003, ¶49.

Hullender discloses that the magnitude includes "**a force history**," i.e., stroke duration. In a gesture recognition process, a "duration of the stroke" is computed for gesture recognition. APPLE-1005, [0075]. Duration is a force history because it is dependent on past contact with the display surface. APPLE-1003, ¶44.

3. Hullender and Renaud render obvious claim 3

[3pre] "At least one non-transitory computer-readable storage medium containing a program of machine-readable instructions executed by a digital data processing machine to perform tasks for operating an interactive display system including a processor coupled to digital data storage and a display having a touch-sensitive display surface,"

Hullender discloses a "**non-transitory computer-readable storage medium containing a program of machine-readable instructions executed by a digital data processing machine to perform tasks for operating … [a] system**." "The drives and their associated computer readable media provide *nonvolatile storage of computer readable instructions*, data structures, program modules and other data for the personal computer 100." APPLE-1005, [0031]. "A number of program modules can be stored on the hard disk drive 170, magnetic disk 190, optical disk 192, ROM 140 or RAM 150, including an operating system 195, one or more application programs 196, other program modules 197, and program data 198." *Id.*, [0032].

Hullender discloses "**an interactive display system**." "FIG. 2 illustrates a stylus-based computer processing system (also referred to as a tablet PCT) 201 … [that] includes a large display surface 202 … Using stylus 204, a user can select, highlight, and write on the digitizing display area. … Tablet PC 201 interprets marks made using stylus 24 in order to manipulate data, enter text, and execute conventional computer application tasks such as spreadsheets, word processing programs, and the like." APPLE-1005, [0036]. APPLE-1003, ¶40.

Hullender's interactive display system includes "**a processor coupled to digital data storage and a display having a touch-sensitive display surface**," for at least similar reasons as those discussed *supra* for with limitation [1pre] of claim 1.

[3a] "where the digital data storage contains a record defining a collection of one or more user gestures, each user gesture executable by touching the display, and where the digital data storage further contains for each user gesture an assignment of one or more prescribed operations of modifying subject matter presented by the display, where the tasks comprise:"

Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1a] of claim 1.

[3b] "**for each of one or more touches experienced by the display surface, the processor determining the magnitude of the touch upon the display surface;**"

Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1b] of claim 1.

[3c] "**based on one or more prescribed properties of the one or more touches experienced by the display surface, the processor identifying from the collection of user gestures at least one user gesture executed by the one or more touches**;"

Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1c] of claim 1.

[3d] "**the processor identifying the one or more prescribed operations assigned to the executed user gesture, and causing the display to modify the subject matter presented by the display according to the identified one or more operations**;"

Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1d] of claim 1.

[3e] "**where the tasks are further performed according to any or both of: (1) the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches**;"

Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1e] of claim 1.

[3f] "where the tasks are further performed according to any or both of … (2) as to the manner in which the subject matter presented by the display is modified according to the identified one or more operations, said manner is further responsive to the determined magnitude of the one or more touches,"

Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1f] of claim 1.

4. Hullender and Renaud render obvious claim 4

[4pre] "**The method of claim 3,**"

[4a] "wherein said magnitude comprises any of: a current length, a current area, a current intensity, a current force, a length history, an area history, an intensity history, and a force history,"

Claim 4 is non-limiting, at least in reciting "The *method* of claim 3" although claim 3 is not a method claim. If claim 4 is determined to be limiting, Hullender and Renaud disclose this limitation for at least similar reasons as those discussed *supra* for limitation [2a] of claim 2.

B. Ground 2: Kiraly and Agulnick render obvious claims 1 to 4

A brief introduction is provided to the Kiraly and Agulnick references and the proposed combination thereof.

Kiraly describes control of a computer by gestures received on a touch sensitive surface[5]

Kiraly describes gesture control of a computer. A user inputs a gesture onto a touch sensitive surface, e.g., drawing the gesture onto a touchpad with his finger. Receipt of the gesture causes execution of a corresponding command. *See* APPLE-1007, Abstract, 7:28-32. APPLE-1003, ¶70.

Kiraly's gestures are identified based on properties of stroke(s) of the gesture, such as stroke direction, number of strokes, relationship between strokes, and stroke speed. *See* APPLE-1007, 9:19-22, 10:7-9, 13:38-47. APPLE-1003, ¶76-78.

Kiraly's gestures are defined in records stored in a computer memory. *See* APPLE-1007, 6:65-7:1. To identify a received gesture, data representative of stroke properties are processed to generate a feature vector characterizing the gesture. *See, e.g., Id.*, 6:45-50. The records defining gestures are accessed to identify the record defining a gesture having properties that most closely match the properties of the received gesture as characterized by the feature vector. *See, e.g., Id.*, 6:45-50. APPLE-1003, ¶80.

[5] Petitioner incorporates this discussion of Kiraly into Ground 2.

Agulnick describes control of a computer by gestures received on a touch sensitive display surface[6]

Agulnick also describes gesture control of a computer. A gesture is executed by inputting stroke(s) onto the display screen of a notebook computer. *See, e.g.,* APPLE-1008, 8:54-58. Agulnick's gestures can invoke commands such as page-turning, scrolling, zooming, shrinking, or selection. *See* APPLE-1008, 3:35-40. APPLE-1003, ¶¶82, 87.

The execution of a command corresponding to a received gesture in Agulnick's system can be affected by properties of the stroke(s) that make up the gesture. For instance, stroke size for a gesture that invokes a delete action impacts the scope of the deleted content; larger strokes cause deletion of more content than smaller strokes. *See, e.g.,* APPLE-1008, 12:21-25, 14:49-56. APPLE-1003, ¶¶88-91.

A POSITA would have combined relevant features of Agulnick with Kiraly's approach to gesture control of a computer[7]

A POSITA would have combined relevant features of Agulnick with Kiraly's computer that is controllable by gestures input on a touch pad to arrive at

---

[6] Petitioner incorporates this discussion of Agulnick into Ground 2.

[7] Petitioner incorporates this discussion of Kiraly and Agulnick into Ground 2.

a computer controllable by gestures input directly on a display surface. For instance, a POSITA would have implemented Kiraly's computer system to be more specifically responsive to gestures input on Kiraly's display device, e.g., to enable greater granularity of control by users through inputs corresponding to gestures. *See* APPLE-1007, 5:24-38; APPLE-1008, 7:4-6. APPLE-1003, ¶¶93-94.

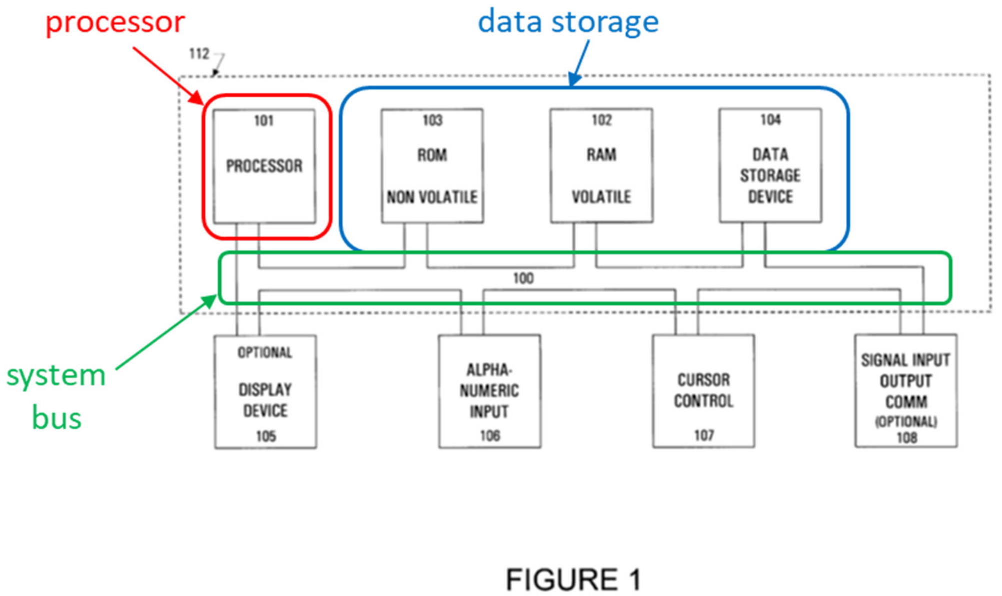
A POSITA would have been motivated to make Kiraly's computer system responsive to gestures input on the display device in light of Agulnick's teachings of the advantages of inputting a gesture directly onto a display and of incorporating stroke magnitude as a factor in gesture execution. Agulnick describes that "[b]y sensing both the proximity of the stylus tip to the display surface and the contact with the display surface, the user-interface software can more accurately discern the vertical movement of the stylus, provide a richer vocabulary of stylus movements for control of the computer, and offer better feedback to the user." APPLE-1008, 3:43-48. APPLE-1003, ¶95. A POSITA would have recognized that modifying Kiraly's system to allow a user to draw a gesture directly on the display device, directly over displayed content, would improve the user experience, e.g., by providing one or more of the advantages described by Agulnick. *Id.*, ¶95. Moreover, a POSITA would have recognized that having stroke magnitude as a factor in gesture execution would enable a more granular control through gestural inputs.

1. Kiraly and Agulnick render obvious claim 1

[1pre] "A computer implemented method performed in a system including a processor coupled to digital data storage and a display having a touch-sensitive display surface, the method comprising the tasks of:

Kiraly discloses "**[a] computer implemented method**." "FIG. 1 illustrates a general purpose *computer system* in which embodiments of the neural network based gesture category recognition process of present invention can be implemented." APPLE-1007, 3:25-28. APPLE-1003, ¶71.

Kiraly discloses "**a system including a processor coupled to digital data storage**." Kiraly's computer system includes a processor coupled to a bus: "an address/data bus 100 for communicating information, *a central processor 101 coupled with the bus* for processing information and instructions." APPLE-1007, 5:4-8; *see also* Figure 1, below. Kiraly's computer system includes digital data storage coupled to the bus: "*a volatile memory 102 (e.g., random access memory) coupled with the bus 100* for storing information and instructions for the central processor and *a non-volatile memory 103 (e.g. read only memory) coupled with the bus 100* for storing static information and instructions for the processor 101. Computer system 112 also includes *a data storage device 104 ('disk subsystem') such as a magnetic or optical disk and disk drive coupled with the bus 100* for storing information and instructions." *Id.*, 5:8-16, Figure 1. The processor is coupled to the data storage via the bus. APPLE-1003, ¶71.



Kiraly (APPLE-1007), Figure 1 (annotated)

Kiraly discloses "**a display**:" "*a display device 105* coupled to the bus 100 for displaying information to the computer user." APPLE-1007, 5:16-18. APPLE-1003, ¶71.

Kiraly discloses "**a touch-sensitive … surface**": Kiraly's "*cursor control or directing device 107* … for communicating user input information and command selections to the central processor 101. … [T]he cursor directing device 107 can include a number of implementations including … *a finger pad (track pad)* … or any other device having a primary purpose of moving a displayed cursor across a display screen based on user displacements." APPLE-1007*,* 5:24-38. A track pad is a device that has a touch-sensitive surface. APPLE-1003, ¶72.

Moreover, a POSITA would have found it obvious to implement the combination of Kiraly and Agulnick by leveraging Kiraly's "**display having a touch-sensitive display surface**" given the teachings of Agulnick. APPLE-1003, ¶¶93-95. In addition to being generally obvious, a POSITA would recognize this as a design choice given the broad adoption of touch screen technology by the Critical Date. APPLE -1003, ¶93.

Agulnick discloses a computer having "**a display having a touch-sensitive display surface**" through which a user can input a gesture. "A notebook computer which is controlled by *a stylus executing gestures on the computer screen*." APPLE-1008, Abstract; *see also* 7:4-6 ("The notebook computer is completely controllable through *gestures and printed characters drawn on the display*."). APPLE-1003, ¶84.

Agulnick's notebook computer (shown in Figure 2, below) has a "liquid crystal display 10 [that] is mounted as the front surface of the unit" and a pen position digitizer 20, mounted behind the display 10, that "senses when the stylus is in proximity to or in contact with the front surface of the computer." APPLE-1008, 6:20-22, 61-63. APPLE-1003, ¶¶83-84.

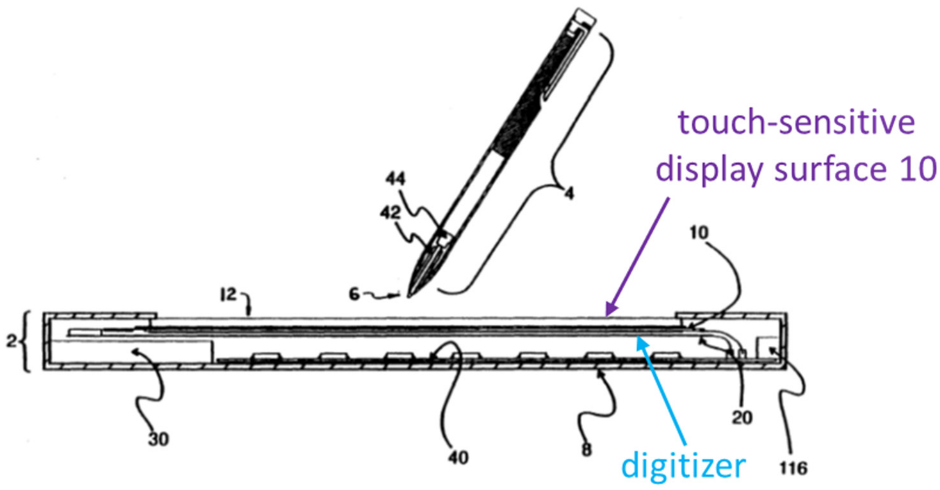


Fig. 2

Agulnick (APPLE-1008), Figure 2 (annotated)

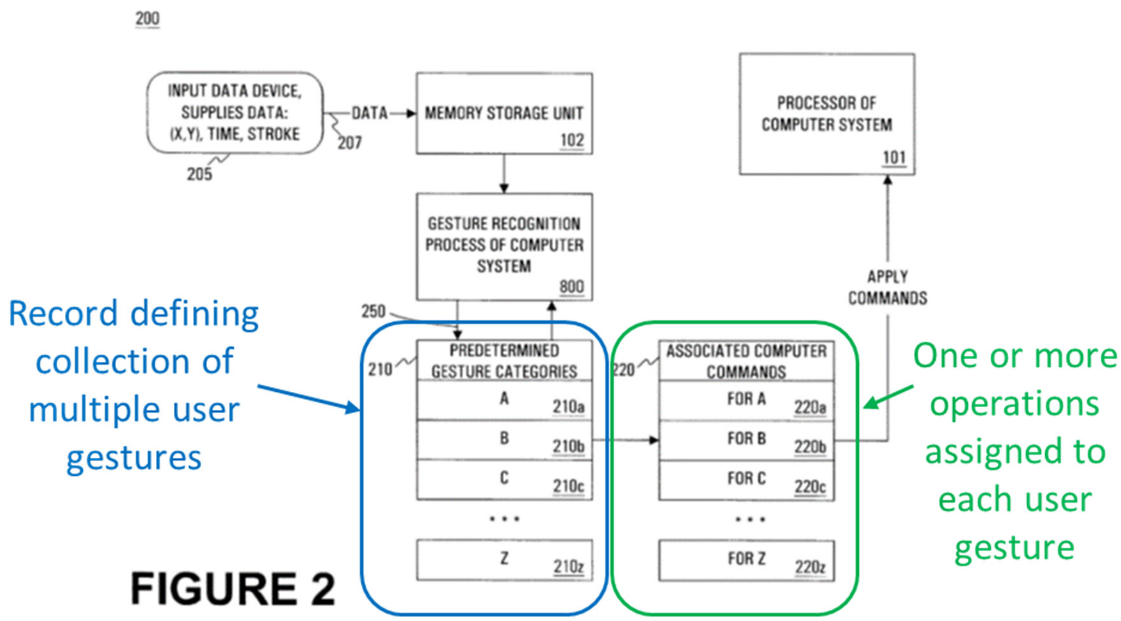
A POSITA would have implemented Kiraly's computer system with a touch-sensitive display surface responsive to inputted gestures, as taught by Agulnick, such that gestures could be input directly onto the display device, as taught by Agulnick. APPLE-1003, ¶93.

Alternatively or additionally, a POSITA would have been led to implement Kiraly's liquid crystal display (LCD) device 105 as a touch sensitive display surface including a position digitizer in light of Agulnick's teachings that gestures can be executed on an LCD surface with a position digitizer. *See* APPLE-1008, Abstract, 7:4-6. A POSITA would have mounted a position digitizer such as that taught by Agulnick behind Kiraly's LCD to provide Kiraly's display device with the ability to sense contact with the display. *See* APPLE-1008, 6:20-22, 61-63. APPLE-1003, ¶94. A POSITA would have had a reasonable expectation of success in mounting a position digitizer behind Kiraly's LCD given that both Kiraly and Agulnick disclose LCD devices, and in light of Agulnick's teaching that a position digitizer mounted behind an LCD can detect contact with the LCD. *See* APPLE-1007, 5:54-55; APPLE-1008, 6:61-63. APPLE-1003, ¶94.

A POSITA would have been motivated to pursue this implementation because both Kiraly and Agulnick are directed generally to gesture control of computers, and because Agulnick discloses that there are advantages to executing gestures directly on a display surface: "[b]y sensing both the proximity of the stylus tip to the display surface and the contact with the display surface, the user-interface software can more accurately discern the vertical movement of the stylus, provide a richer vocabulary of stylus movements for control of the computer, and offer better feedback to the user." APPLE-1008, 3:43-48. APPLE-1003, ¶95.

[1a] "**in the digital data storage, storing a record defining a collection of multiple user gestures, each user gesture executable by touching the display, and further storing for each user gesture an assignment of one or more of multiple prescribed operations of modifying subject matter presented by the display**;"

Kiraly and Agulnick disclose "**in the digital storage, storing a record defining a collection of multiple user gestures**." Kiraly discloses that "a number of *predefined gesture categories 210 are stored in a computer readable memory unit* *(e.g., unit 102)*." APPLE-1007, 6:50-52, Fig. 2 (below). A gesture category "corresponds to a predetermined category or 'name' defined by a user" and "can have multiple different gestures defined within as samples (e.g., examples)." *Id.*, 6:16-19; *see also Id.*, 6:44-50 ("determining which of a number of predefined gesture categories best represents the gesture data 205"). *See also* III(B)(1), [1c]. APPLE-1003, ¶74.



Kiraly (APPLE-1007), Figure 2 (annotated)

Kiraly and Agulnick disclose "**each user gesture executable by touching the display**." As discussed above for limitation [1a], Kiraly and Agulnick disclose a touch-sensitive display surface. Kiraly's gestures are executable by touching a touch-sensitive surface, e.g., a track pad. *See* APPLE-1007, 5:24-38. APPLE-1003,

¶72. Agulnick's gestures are executable by touching the display. "The notebook computer is completely controllable through *gestures and printed characters drawn on the display* with the electronic stylus." APPLE-1008, 7:4-6; *see also Id.*, 8:54-58. APPLE-1003, ¶93.

A POSITA, recognizing the touch-sensitive display provided by the combination of Kiraly and Agulnick, would have found it obvious for the gestures to be executable by touching the touch-sensitive display. . *See* [1pre]; *see also* APPLE-1008, 3:43-48. APPLE-1003, ¶¶93, 95. A POSITA would have had a reasonable expectation of success in integrating aspects of Agulnick with Kiraly's gesture execution given that both Kiraly and Agulnick relate generally to gestures executable on a touch-sensitive surface. APPLE-1003, ¶94.

Kiraly and Agulnick also disclose "**storing for each user gesture an assignment of one or more of multiple prescribed operations**." Kiraly discloses storing a list of gesture categories and corresponding commands: "List 220, maintained in computer readable memory 102, includes a separate entry, e.g., 220a-220z, for each of the predefined gesture categories of list 210. *Each entry within database 220 represents a set of computer commands*, e.g., instructions and/or commands of a macro, *that are to be applied to computer system 112 when the user inputs the gesture that corresponds to that set of commands*." APPLE-1007, 6:65-7:5. APPLE-1003, ¶75.

The commands in the combined system of Kiraly and Agulnick are "**operations of modifying subject matter presented by the display**." APPLE-1003, ¶¶96-97.

In an example of operations of modifying the presented subject matter, Kiraly discloses that "each time a user wants to read electronic mail, a different predetermined gesture is traced out … causing computer system 112 to interface with an external system … which then downloads the required mail." APPLE-1007, 7:28-32. The downloading of mail for a user to read means that subject matter presented by the display is modified to display the mail. APPLE-1003, ¶75.

In another example of operations of modifying the presented subject matter, Agulnick discloses that "[g]estures are used to initiate the insertion of hand-written text, the editing of existing text, *page-turning, scrolling within a window, zooming or shrinking of entire pages, selection*, summoning of windows containing operator guidance, or the creation of links ('goto' buttons) to other pages." APPLE-1008, 3:35-40. These operations modify subject matter presented by the display. APPLE-1003, ¶87.

A POSITA with access to Agulnick would have assigned operations of modifying subject matter presented by the display, such as Agulnick's operations, to the gestures of the combined system of Kiraly and Agulnick. For instance, a

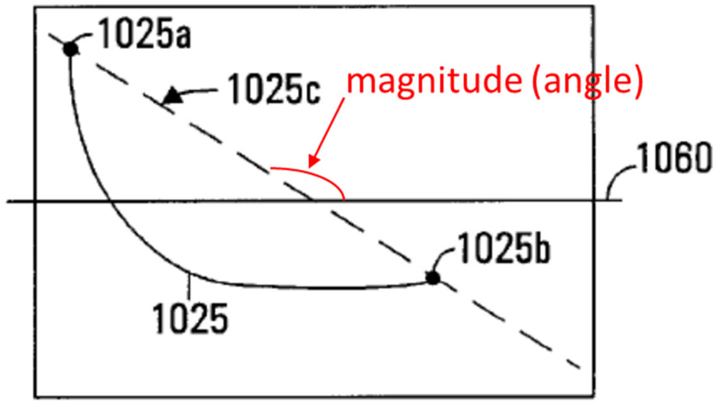
POSITA would have included within Kiraly's database entries representing commands that modify subject matter presented by the display (e.g., Agulnick's page-turning, scrolling, zooming, shrinking, or selection, as taught by Agulnick) that are to be applied to the combined computer system when the user inputs a corresponding gesture. *See* APPLE-1007, 6:65-7:5; APPLE-1008, 3:35-40. APPLE-1003, ¶96. A POSITA would have been motivated to assign such operations to the gestures to expand the actions accessible via gestural control in the combined system. *See* APPLE-1007, 2:52-55. APPLE-1003, ¶97.

[1b] "for each of one or more touches experienced by the display surface, the processor determining the magnitude of the touch upon the display surface;"

In the combined system of Kiraly and Agulnick, strokes of a gesture, i.e., touches, are "**touches experienced by the display surface**." APPLE-1003, ¶93. Kiraly's gestures are executable by touching a surface; Agulnick's gestures, are executable by touching the display. *See* APPLE-1007, 5:24-38; APPLE-1008, 7:4-6, 8:54-58. Both Kiraly's and Agulnick's gestures are composed of strokes. *See* APPLE-1007, 6:10-11 ("Continuous parts of the gesture, disconnected form [sic] each other, are referred to as strokes"); *see also Id.*, 9:53-57, 10:1-4; APPLE-1008, 8:14-15 ("a gesture 165 comprising a horizontal stroke"); 8:26-28 ("When the user actually makes one of the gestures on the screen, an image of the actual strokes made by the tip of the stylus appears on screen."). APPLE-1003, ¶86. As discussed above, the combination of Kiraly and Agulnick renders obvious the implementation of gestures executable by touching the display. *See* III(B)(1), [1a]. APPLE-1003, ¶¶72, 93-95. These gestures executable by touching the display would be composed of strokes (i.e., touches) experienced by the display surface, as taught by Agulnick.

A POSITA would have found it obvious to "**determin[e] the magnitude of the touch upon the display surface**" in view of the combined teachings of Kiraly and Agulnick. APPLE-1003, ¶98.

Kiraly discloses "determining the magnitude of the touch," i.e., the angle between segments of a stroke, which is a stroke magnitude. APPLE-1003, ¶¶78-79. In Kiraly's gesture recognition process, "*[f]eature elements for the stroke segments are now computed*. … The two feature elements, F1(s, u) and F2(s, u), belonging to a segment [of a stroke] are *the sine and cosine values of the directed angle* between the segment 1025 (e.g., straight line 1025c) and the horizontal reference direction 1060)." APPLE-1007, 13:7-20; *see also* Figure 10B, below. That is, Kiraly's gesture recognition process includes computing angles between stroke segments and a reference, i.e., determining a stroke magnitude. APPLE-1003, ¶78.



Kiraly (APPLE-1007), Figure 10B (annotated)

Alternatively or additionally, Kiraly and Agulnick make obvious determining a stroke speed, which is a length history, defined in claim 2 as a type of magnitude. *See* III(B)(2). Kiraly's "gestures can be differentiated based on speeds in which different sections of the gesture are made." APPLE-1007, 10:4-6. Kiraly also discloses storing data from which the stroke speed can be determined: "[t]he manner in which gestures are decomposed to form a feature vector … preserves information regarding the relative times in which the start and end points of a stroke of a gesture are made. Therefore, gestures can be differentiated based on speeds." *Id.*, 10:1-5. A POSITA would have found it obvious to use this stored information to determine stroke speed so that stroke speed could be used for gesture differentiation. *See* APPLE-1007, 10:4-6. APPLE-1003, ¶77.

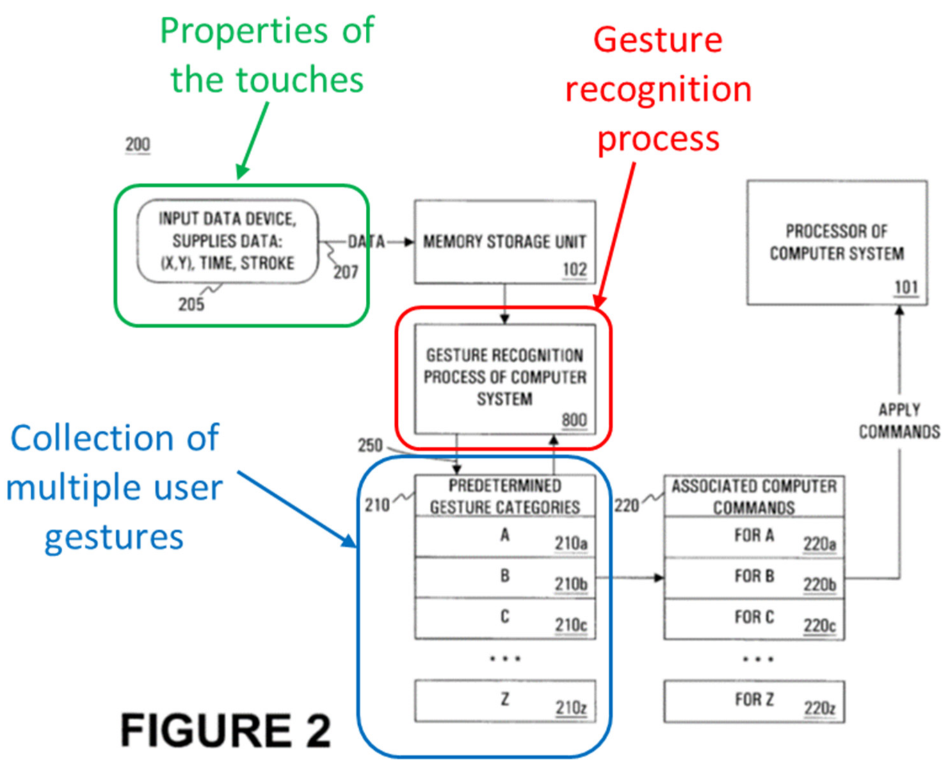
As discussed above, a POSITA would have found it obvious for the gestures to be composed of strokes (i.e., touches) experienced by the display surface. *See* III(B)(1), [1b]; *see also* APPLE-1008, 7:4-6, 8:54-58. APPLE-1003, ¶93. Kiraly's determination of stroke magnitude (e.g., stroke angle or speed) would then be a determination of the magnitude of the stroke (i.e., touch) upon the display surface. APPLE-1003, ¶¶77-79.

Alternatively or additionally, the combination of Kiraly and Agulnick would be implemented in a manner that leverages Agulnick's disclosure of execution of an operation associated with a gesture being affected by the size of a stroke (i.e., touch) upon the display surface. APPLE-1003, ¶¶88-89. Stroke size is a length, defined in claim 2 as a magnitude. *See* III(B)(2), *infra*. APPLE-1003, ¶88. "Within a body of text, a 'scratch-out' gesture … can be used to delete many letters at once. … The targeted letters are those which are bracketed by the extreme ends of the strokes and hence, *the size and location of the gesture … are both attributes affecting the target of the gesture*." APPLE-1008, 12:21-25. *See also Id.*, claims 18 and 21 ("wherein said predetermined action is performed on a target object, *said target object being determined by at least one attribute of said gestu. [sic]. … wherein said attribute comprises the size of the gesture* on the screen."). Kiraly's gesture recognition process includes executing a command associated with a gesture: "the set of computer commands … associated with the output gesture category" is applied. APPLE-1007, 14:28-31. A POSITA would have modified Kiraly's gesture recognition process to include a determination of stroke size, as taught by Agulnick, in light of Agulnick's teaching that stroke size affects execution of the corresponding operation. APPLE-1003, ¶98.

Kiraly and Agulnick disclose that it is "**the processor**" that determines the magnitude of the touch. Kiraly's gesture recognition process is executed on the computer system 112 by the processor 101: "steps executed on a computer system (e.g., process 800 …)" such as "computer system 112," which includes central processor 101. APPLE-1007, 4:65-5:16. Kiraly's central processor 101 performs the gesture recognition process, including determining stroke magnitude.

[1c] "based on one or more prescribed properties of the one or more touches experienced by the display surface, the processor identifying from the collection of user gestures at least one user gesture executed by the one or more touches;"

Kiraly discloses "**identifying from the collection of user gestures at least one user gesture executed by the one or more touches**." With reference to Figure 2, below, Kiraly discloses that "a computer implemented gesture category recognition process 800 of FIG. 2 receives the gesture data 205, transforms the gesture data 205 into a feature vector and *uses the feature vector for determining which of a number of predefined gesture categories best represents the gesture* *data 205*." APPLE-1007, 6:44-50. Kiraly's "predefined gesture categories 210 are stored in a computer readable memory unit (e.g., unit 102)." *Id.*, 6:50-52. That is, Kiraly identifies a user gesture from the categories stored in the memory unit (i.e., from the collection of gestures). *See also Id.*, 2:63-3:7: "b) generating a … feature vector based on the gesture data; c) *providing the multi-dimensional feature vector to a … neural network for recognition*, the … neural network *associating the multi-dimensional feature vector with a gesture category from a predefined plurality of gesture categories* and *supplying the gesture category as an output value*." APPLE-1003, ¶¶73-74, 80. *See* III(B)(1), [1a].



Kiraly (APPLE-1007), Figure 2 (annotated)

Kiraly discloses "**the processor identifying from the collection of user gestures at least one user gesture**." Kiraly's gesture recognition process is executed on the computer system 112, which includes the central processor 101 that executes instructions, such as recognizing a selected gesture, as also discussed above. *See* APPLE-1007, 4:65-5:3. *See* III(B)(1), [1a]..

Kiraly also discloses identifying a gesture "**based on one or more prescribed properties of the one or more touches**." Kiraly's gesture is identified based on properties such as stroke direction, the number and type of strokes, or the relationship between strokes. "[G]estures can be differentiated based on the displacement direction by which they are traced." APPLE-1007, 9:19-22. "[G]estures can also be differentiated based on the number and type of strokes that are used to make up the gesture." *Id.*, 10:7-9. Furthermore, Kiraly's feature vector, which "is used to recognize the input gesture data as one of the preset gesture categories," includes properties including the number of strokes and the relationship between strokes. *Id.*, 13:38-39. The feature vector includes "feature element 315a that indicates the number of strokes of the input gesture" and "[f]eature element 315b [that] includes the global features G1(s) and G2(s)," where the global features "code the relations between successive strokes." *Id.*, 12:56-57, 13:38-47. That is, Kiraly discloses identifying gestures based on the feature vector, which includes properties of strokes, including the number of strokes and the relations between successive strokes). APPLE-1003, ¶76.

A POSITA would have found it obvious for the strokes of the combined system to be "**one or more touches experienced by the display surface**" given Agulnick's teachings of gestures executable by touching a display surface, as discussed above. *See* III(B)(1), [1b]. APPLE-1003, ¶93.

[1d] "**the processor identifying the one or more prescribed operations assigned to the executed user gesture, and causing the display to modify the subject matter presented by the display according to the identified one or more operations; and**"

Kiraly and Agulnick disclose "**the processor identifying the one or more prescribed operations assigned to the executed user gesture**." Referring to Figure 8C, below, in Kiraly's gesture category recognition process, "[a]t step 910 of FIG. 8C, the present invention *locates the set of computer commands* from memory list 220 (FIG. 2) *that are associated with the output gesture category*. These commands are retrieved from memory unit 102." APPLE-1007, 14:18-21. That is, commands (i.e., operations) assigned to an output gesture category (i.e., an executed user gesture) are identified. *See Id.*, 14:18-21. Moreover, the gesture category recognition process 800 is executed on the computer system 112 by the central processor 101, as discussed above. *See* III(B)(1), [1c]; APPLE-1007, 4:65-5:3. The central processor 101 of Kiraly's computer system 112 performs the gesture category recognition process, including identifying the prescribed operations. APPLE-1003, ¶81.

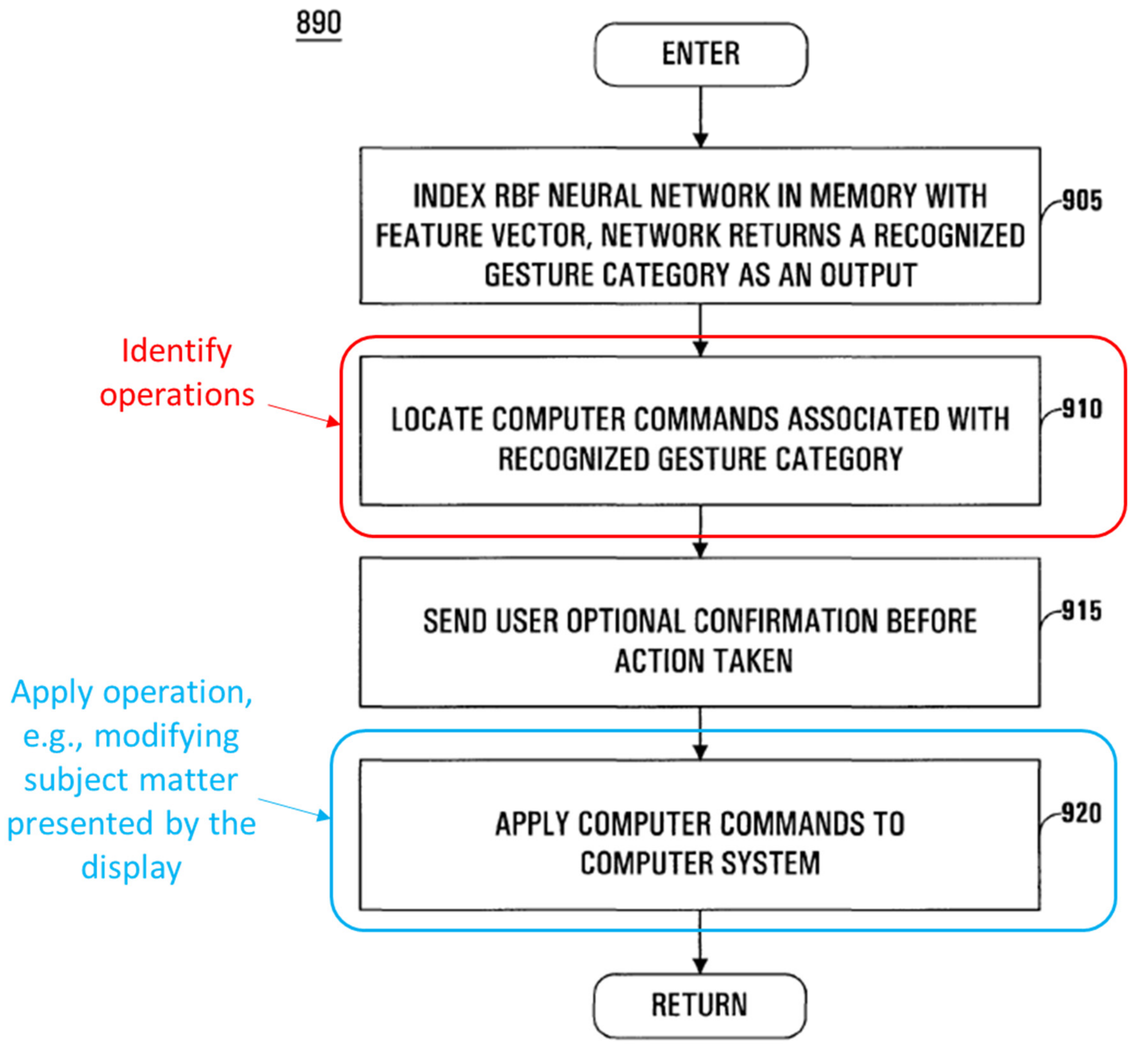


FIGURE 8C

Kiraly (APPLE-1007), Figure 8C (annotated)

Kiraly and Agulnick disclose "the processor … **causing the display to modify the subject matter presented by the display according to the identified one or more operations**." Kiraly discloses that the processor 101 applies the identified computer commands: "At step 920, the present invention applies the set of computer commands identified at step 910, and associated with the output gesture category, to the computer system 112." APPLE-1007, 14:28-33. The commands are executed by the processor 101. *See*, e.g., *Id.*, 7:17-32. One example of Kiraly's commands is the downloading of mail for a user to read, which causes the display to modify the subject matter presented by the display according to that command, i.e., to display the mail. *See Id.*, 7:28-32. APPLE-1003, ¶81.

Alternatively or additionally, a POSITA would have found it obvious to "**caus[e] the display to modify the subject matter presented by the display according to the identified one or more operations**" in light of the combined teachings of Kiraly and Agulnick. As discussed above, a POSITA would have assigned operations including page-turning, scrolling, zooming, shrinking, or selection, as taught by Agulnick (*see* APPLE-1008, 3:35-40) to the gestures of the combined system of Kiraly and Agulnick. *See* III(B)(1), [1a]. APPLE-1003, ¶96-97. In this combination, application of a command (e.g., one of Agulnick's operations) would cause the display to modify the subject matter presented by the display according to that command, e.g., by page-turning, scrolling, zooming, shrinking, or selecting. APPLE-1003, ¶¶87, 96-97.

[1e] "**where the tasks are further performed according to any or both of: (1) the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches**;"

Kiraly and Agulnick disclose "**the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches**." As discussed above, Kiraly discloses determining the angle of segments of a stroke, which is a stroke magnitude in that it quantifies a feature of the stroke. *See* III(B)(1), [1b]; *see also* APPLE-1007, 13:7-20. APPLE-1003, ¶¶78-79. Kiraly also discloses that gesture identification can be based on stroke angle: the feature vector, which "is used to recognize the input gesture data as one of the present gesture categories," includes elements that "are the sine and cosine values of the directed angle between the segment" of a stroke and "the horizontal reference direction." APPLE-1007, 13:17-20, 38-39. That is, a gesture is recognized based on the feature vector, which includes a stroke angle, i.e., a stroke magnitude. APPLE-1003, ¶¶78-79.

As also discussed above, Kiraly and Agulnick make obvious that stroke speed is determined. Gesture identification is based on stroke speed, which is a magnitude in that it quantifies a feature of the stroke: "*gestures can be differentiated based on speeds* in which different sections of the gesture are made." APPLE-1007, 10:4-6. *See* III(B)(1), [1b]. APPLE-1003, ¶77.

[1f] "where the tasks are further performed according to any or both of … (2) as to the manner in which the subject matter presented by the display is modified according to the identified one or more operations, said manner is further responsive to the determined magnitude of the one or more touches."

Kiraly and Agulnick disclose that "**the subject matter presented by the display is modified according to the identified one or more operations**." *See* III(B)(1), [1d]. *See* APPLE-1008, 3:35-40. APPLE-1003, ¶¶87, 96-97.

Petitioner asserts that the feature "**the manner in which the subject matter presented by the display is modified … is further responsive to the determined magnitude of the one or more touches**" is a non-limiting feature reciting solely functional language. Nevertheless, it is disclosed by Kiraly and Agulnick. APPLE-1003, ¶¶88-89, 96-98.

As discussed above, a POSITA would have assigned Agulnick's operations including page-turning, scrolling, zooming, shrinking, or selection to Kiraly's user gestures. See III(B)(1), [1a]. APPLE-1003, ¶96-97. A POSITA would then have found it obvious for the manner in which subject matter presented by the display is modified according to one of these operations to be responsive to stroke magnitude. APPLE-1003, ¶¶88-89, 96-98. Agulnick discloses that the manner in which subject matter is presented is modified is responsive to stroke size: "a 'scratch-out' gesture … can be used to delete many letters at once. … The targeted letters are those which are bracketed by the extreme ends of the strokes and hence, *the size and location of the gesture (in this case, the bracketing gesture) are both attributes affecting the target of the gesture*." APPLE-1008, 12:21-25; *see also* claims 18 and 21. APPLE-1003, ¶¶88-89. A POSITA would have implemented the commands of the combination of Kiraly and Agulnick in a manner in which the subject matter presented by the display according to these operations is modified is responsive to stroke magnitude, enabling greater granularity of control over the modification of the displayed subject matter. APPLE-1003, ¶¶96-98. *See* APPLE-1008, 12:21-25.

2. Kiraly and Agulnick render obvious claim 2

[2pre] "**The method of claim 1,**"

[2a] "wherein said magnitude comprises any of: a current length, a current area, a current intensity, a current force, a length history, an area history, an intensity history, and a force history."

Kiraly and Agulnick disclose that the magnitude includes **a current length**: "a 'scratch-out' gesture … can be used to delete many letters at once. … The targeted letters are those which are bracketed by the extreme ends of the strokes and hence, the size and location of the gesture (in this case, the bracketing gesture) are both attributes affecting the target of the gesture." APPLE-1008, 12:21-25. APPLE-1003, ¶89. Bracket size (i.e., length) is a current length because it is not based on previous sizes. APPLE-1003, ¶88.

Kiraly and Agulnick disclose that the magnitude includes **a force history**, i.e., a duration that the tip of the stylus is held down: "An object is moved by touching the stylus to it and holding the tip down. After a short delay (less than some predetermined minimum period of time, such as, preferably, a second), an animated 'marquee' 740 will appear around the selection … [and] [t]he selection can now be dragged to its new location." APPLE-1008, 14:49-56. APPLE-1003, ¶90. Duration is a force history because it is dependent on past force (i.e., past contact with the display surface). APPLE-1003, ¶88.

Kiraly and Agulnick disclose that the magnitude includes "**an intensity history**," i.e., a number of strokes. *See* III.A.2. For instance, Agulnick's "Tap" gesture corresponds to a "Select" command, and the number of taps controls the selected content: a "Double-Tap" invokes the "Select Word" action, a "Triple-Tap" invokes the "Select Sentence" action, and a "Quad-Tap" invokes the "Select Paragraph" action. APPLE-1008, Figure 45; APPLE-1003, ¶91. The number of strokes is an intensity history because it is determined based on past intensity, e.g., past initiation of contact with the display surface. APPLE-1003, ¶88.

In the combined system of Kiraly and Agulnick, Agulnick's operations, such as page-turning, scrolling, zooming, shrinking, or selection, are assigned to corresponding gestures. *See* III(B)(1), [1a]. APPLE-1003, ¶¶96-97. A POSITA would have found it obvious for one or more of the stroke length (a current length), the stroke duration (a force history), and the number of strokes (an intensity history) to be a factor in gesture identification or in execution of the operation in this combined system to enable granularity of control over the operations available by gesture control and the results of the gesture execution. For instance, stroke length can affect the extent of the content selected in the combined system. Duration and number of strokes can play a role in identifying a gesture received into the combined system. APPLE-1003, ¶¶88,96.

3. Kiraly and Agulnick render obvious claim 3

[3pre] "At least one non-transitory computer-readable storage medium containing a program of machine-readable instructions executed by a digital data processing machine to perform tasks for operating an interactive display system including a processor coupled to digital data storage and a display having a touch-sensitive display surface,"

Kiraly discloses a "**non-transitory computer-readable storage medium containing a program of machine-readable instructions executed by a digital data processing machine to perform tasks for operating … a system**." Kiraly discloses "a non-volatile *memory* 103 (e.g., read only memory) coupled with the bus 100 for *storing static information and instructions for the processor 101*," i.e., a non-transitory computer-readable storage medium containing a program of machine-readable instructions. Kiraly at 5:8-18. The processor 101 (i.e., a digital data processing machine) executes the instructions. Computer system 112 also includes a data storage device 104 ('disk subsystem') such as a magnetic or optical disk and disk drive coupled with the bus 100 for storing information and instructions."

Kiraly discloses "**an interactive display system**." Kiraly's computer system includes a display device controllable by user interaction with "cursor control or directing device 107," e.g., by the user inputting gestures into the cursor control or directing device, demonstrating that Kiraly's computer system is an interactive display system. APPLE-1007, 5:16-18, 5:24-38. APPLE-1003, ¶72.

Alternatively or additionally, Kiraly and Agulnick disclose "**an interactive display system**." Agulnick discloses a "notebook computer which is controlled by a stylus executing gestures on the computer screen." APPLE-1008, Abstract. Agulnick's notebook computer is an interactive display system in which, a user interacts directly with the screen, e.g., by executing gestures on the screen. APPLE-1003, ¶¶84-85. A POSITA would have found it obvious to modify Kiraly's computer system to be an interactive display system such as Agulnick's in light of Agulnick's teachings of the advantages of executing gestures directly on a screen. *See* APPLE-1008, 3:43-48. APPLE-1003, ¶¶93-95. *See* (III)(B)(1), [1a].

Kiraly and Agulnick disclose a "**system including a processor coupled to digital data storage and a display having a touch-sensitive display surface**," for at least similar reasons as those discussed *supra* for [1a] of claim 1.

[3a] "where the digital data storage contains a record defining a collection of one or more user gestures, each user gesture executable by touching the display, and where the digital data storage further contains for each user gesture an assignment of one or more prescribed operations of modifying subject matter presented by the display, where the tasks comprise:"

Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1a] of claim 1.

[3b] "**for each of one or more touches experienced by the display surface, the processor determining the magnitude of the touch upon the display surface;**"

Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1b] of claim 1.

[3c] "**based on one or more prescribed properties of the one or more touches experienced by the display surface, the processor identifying from the collection of user gestures at least one user gesture executed by the one or more touches**;"

Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1c] of claim 1.

[3d] "**the processor identifying the one or more prescribed operations assigned to the executed user gesture, and causing the display to modify the subject matter presented by the display according to the identified one or more operations**;"

Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1d] of claim 1.

[3e] "**where the tasks are further performed according to any or both of: (1) the identification of the executed user gesture is performed based on properties including the determined magnitude of the one or more touches**;"

Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1e] of claim 1.

[3f] "where the tasks are further performed according to any or both of … (2) as to the manner in which the subject matter presented by the display is modified according to the identified one or more operations, said manner is further responsive to the determined magnitude of the one or more touches,"

Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [1f] of claim 1.

4. Kiraly and Agulnick render obvious claim 4

[4pre] "**The method of claim 3,"**

[4a] "wherein said magnitude comprises any of: a current length, a current area, a current intensity, a current force, a length history, an area history, an intensity history, and a force history,"

Claim 4 is non-limiting, at least in reciting "The *method* of claim 3" although claim 3 is not a method claim. If claim 4 is determined to be limiting, Kiraly and Agulnick disclose this limitation for at least similar reasons as those discussed *supra* for limitation [2a] of claim 2.

IV. PAYMENT OF FEES – 37 C.F.R. § 42.103

Apple authorizes the Patent and Trademark Office to charge Deposit Account No. 06-1050 for the fee set in 37 C.F.R. § 42.15(a) for this Petition and further authorizes payment for any additional fees to be charged to this Deposit Account.

V. CONCLUSION

The cited prior art references identified in this Petition contain pertinent technological teachings (both cited and uncited), either explicitly or inherently disclosed, which were not previously considered in the manner presented herein, or relied upon on the record during original examination of the ’239 patent. In sum, these references provide new, non-cumulative technological teachings which indicate a reasonable likelihood of success as to Petitioner’s assertion that the Challenged Claims of the ’239 patent are not patentable pursuant to the grounds presented in this Petition. Accordingly, Petitioner respectfully requests institution of an IPR for those claims of the ‘239 patent for each of the grounds presented herein.

VI. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Petitioner, Apple Inc., is the real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

Petitioner is not aware of any disclaimers, reexamination certificates or petitions for inter partes review for the ’239 Patent. The ’239 patent is the subject of the following civil action:

Qualcomm Incorporated v. Apple Inc. CASD-3-17-cv-02403.

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Apple provides the following designation of counsel.

Lead Counsel	Backup counsel
W. Karl Renner, Reg. No. 41,265 Fish & Richardson P.C. 3200 RBC Plaza 60 South Sixth Street Minneapolis, MN 55402 Tel: 202-626-5070 Fax: 877-769-7945 Email: IPR39521-0048IP1@fr.com	Timothy W. Riffe, Reg. No. 43,881 Fish & Richardson P.C. 3200 RBC Plaza 60 South Sixth Street Minneapolis, MN 55402 Tel: 202-626-5070 Fax: 877-769-7945 PTABInbound@fr.com Thomas A. Rozylowicz, Reg. No. 50,620 Fish & Richardson P.C. 3200 RBC Plaza 60 South Sixth Street Minneapolis, MN 55402 Tel: 202-626-5070 Fax: 877-769-7945 PTABInbound@fr.com

D. Service Information

Please address all correspondence and service to the address listed above. Petitioner consents to electronic service by email at IPR39521-0048IP1@fr.com (referencing No. 39521-0048IP1 and cc'ing PTABInbound@fr.com, axf-ptab@fr.com, rozylowicz@fr.com and riffe@fr.com.

Respectfully submitted,

Dated June 18, 2018 /W. Karl Renner/
W. Karl Renner, Reg. No. 41,265

Dated June 18, 2018 /Timothy W. Riffe/
Timothy W. Riffe, Reg. No. 43,881

Fish & Richardson P.C.
3200 RBC Plaza, 60 South Sixth Street
Minneapolis, MN 55402
T: 202-626-5070
F: 877-769-7945

(Control No. IPR2018-01245) Attorneys for Petitioner

CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 13,936 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated June 18, 2018

/Thomas A. Rozylowicz/

W. Karl Renner, Reg. No. 41,265
Timothy W. Riffe, Reg. No. 43,881
Thomas A. Rozylowicz, Reg. No. 50,620
Fish & Richardson P.C.
3200 RBC Plaza, 60 South Sixth Street
Minneapolis, MN 55402
T: 202-626-5070
F: 877-769-7945

Attorneys for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on June 18, 2018, a complete and entire copy of this Petition for *Inter partes* Review and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO CA 92121

/Diana Bradley/

Diana Bradley
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
(858) 678-5667