

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAMSUNG ELECTRONICS CO., LTD., and  
SAMSUNG ELECTRONICS, AMERICA, INC.,

Petitioners

v.

CERENCE OPERATING COMPANY,

Patent Owner

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Case IPR2024-01267

U.S. Patent No. 9,026,428

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**Petition for *Inter Partes* Review of**

**U.S. Patent No. 9,026,428**

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**PETITIONERS' EXHIBIT LIST**

| <b>Exhibit No.</b> | <b>DESCRIPTION</b>                                                                                                                                                       |
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| 1001               | U.S. Patent 9,026,428 (“’428Pat”)                                                                                                                                        |
| 1002               | Declaration of Jean Renard Ward (“Ward”)                                                                                                                                 |
| 1003               | Curriculum Vitae of Jean Renard Ward                                                                                                                                     |
| 1004               | File History of U.S. Patent 9,026,428                                                                                                                                    |
| 1005               | Certified Translation of JP 2006323502A (“Arai”)                                                                                                                         |
| 1006               | U.S. Patent 5,161,245 (“Fenwick”)                                                                                                                                        |
| 1007               | EP0830668B1 (“Baker”)                                                                                                                                                    |
| 1008               | U.S. Patent 6,636,749 (“Holmes”)                                                                                                                                         |
| 1009               | Excerpts from Microsoft Computer Dictionary (5 <sup>th</sup> ed. 2002) (“Computer Dictionary”)                                                                           |
| 1010               | Excerpts from Merriam-Webster’s Collegiate Dictionary (10 <sup>th</sup> ed. 1996) (“Merriam-Webster’s Collegiate Dictionary”)                                            |
| 1011               | U.S. 5,528,266 (“Arbeitman”)                                                                                                                                             |
| 1012               | U.S. Pub. 2011/0310581 (“Yokote”)                                                                                                                                        |
| 1013               | RAND REVIEW, Vol. 22, No. 1 (Fall 1998) (“Rand Review”)                                                                                                                  |
| 1014               | Tappert, IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, The State of the Art in On-Line Handwriting Recognition, Vol. 12, No. 8 (Aug. 1990) (“Tappert”) |
| 1015               | U.S. 6,005,973 (“Seybold”)                                                                                                                                               |
| 1016               | U.S. 7,158,678 (“Nagel”)                                                                                                                                                 |
| 1017               | U.S. 5,491,495 (“Ward ’495”)                                                                                                                                             |

| Exhibit No. | DESCRIPTION                                                                                                                                                       |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1018        | Cover Pleading of Plaintiff Cerence Operating Company's Disclosure of Asserted Claims and Infringement Contentions, Dated March 11, 2024                          |
| 1019        | Docket Control Order from <i>Cerence Operating Company v. Samsung Electronics Co., LTD, et al.</i> , No. 2:23-cv-0482-JRG-RSP (ECF 029) (E.D. Tex. Apr. 16, 2014) |

## I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (“Samsung” or “Petitioners”) request *inter partes* review (“IPR”) of claims 1-3, 7-9, and 12-13 (“Challenged Claims”) of U.S. Patent No. 9,026,428 (“the ’428 patent”).

## II. GROUNDS FOR STANDING

Petitioners certify that the ’428 patent is available for IPR, and that Petitioners are not barred or estopped from requesting IPR to challenge the claims on the grounds herein.

## III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Petitioners respectfully request review and cancellation under 35 U.S.C. §311 of the Challenged Claims in view of:<sup>1</sup>

| Grounds | Claims          | Basis                               |
|---------|-----------------|-------------------------------------|
| 1       | 1-3, 7-9, 12-13 | §103: <i>Arai + Fenwick</i>         |
| 2       | 9, 12-13        | §103: <i>Arai + Fenwick + Baker</i> |

As shown below, each reference pre-dates the ’428 patent’s earliest purported

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<sup>1</sup> Petitioners do not concede that any Challenged Claims satisfy other requirements for patentability that cannot be raised in IPR, including 35 U.S.C. §§101 and 112.

priority date, October 15, 2012.

| Reference                                              | Date                          | Pre-AIA Prior Art at Least Under |
|--------------------------------------------------------|-------------------------------|----------------------------------|
| JP 2006323502A (Ex. 1005) <sup>2</sup> ( <i>Arai</i> ) | 11/30/2006 (publication date) | §102(b)                          |
| U.S. 5,161,245 (Ex. 1006) ( <i>Fenwick</i> )           | 11/03/1992 (issue date)       | §102(b)                          |
| EP0830668B1 (“ <i>Baker</i> ”)                         | 10/31/2001 (publication date) | §102(b)                          |

#### IV. OVERVIEW OF THE ’428 PATENT

The ’428 patent is directed to a “system and method for receiving character input from a user,” that “includes a programmed processor” that “disambiguates the inputs,” stores a “first recognized character” in memory, “display[s] to the user for editing,” and “removes the first recognized character from” memory after “subsequent input [of] characters.” ’428*Pat*, Abstract.

The method involves receiving an “input from a user ... through one or a series of strokes or input features (e.g., using a finger and/or a stylus on a touch screen

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<sup>2</sup> Ex. 1005 (*Arai*) is a compilation comprising the English-language translation of *Arai* (Ex. 1005, 2-45), and its Japanese language version (*id.*, 46-73), and an affidavit required by 37 C.F.R. § 42.63(b) (in the form of a declaration as permitted by 37 C.F.R. § 42.2) (*id.*, 1).

interface).” *Id.*, 4:33-38. The method further comprises “perform[ing] character recognition on the input character,” which may “take many forms [including] comparing a best match between” the input and “a database of recognized characters.” *Id.*, 4:39-43. “[A]fter finding a best match,” the method stores the recognized character in a “buffer, which may be presented to the user.” *Id.*, 4:43-46. Then, “based on a sequence of one or more characters in the current buffer,” the method may determine whether at least a portion of the sequence “is a committable sequence.” *Id.*, 4:47-50. The ’428 patent further describes that “one or more characters can be committed,” by using “elaborate linguistic knowledge” to identify, for example, “the end of one word and beginning of the next without the need to detect a space gesture between two words.” *Id.*, 2:54-62. The ’428 patent discloses that this is done “as opposed to requiring a user to input a space gesture, select a commit button, or other user input.” *Id.*, 2:56-58.

Once it is determined that a sequence is committable, it “is sent to the current application and removed from the buffer.” *Id.*, 4:58-61. For characters that remain in the buffer, the display is updated to reflect those characters. *Id.*, 5:1-2. The method continues to repeat these steps so long as a user continues writing (*id.*, 5:12-16), but once no further text is detected, it will “display one or more candidate sequences” to allow a user to select from those choices (*id.*, 5:17-21). Additionally, while sequences may automatically commit, it is also possible that the system will employ

a time-out feature, to automatically select a word in the buffer. *Id.*, 7:33-36. *Ward*

¶57. These steps are shown in figure 2. *Id.*, FIG. 2.

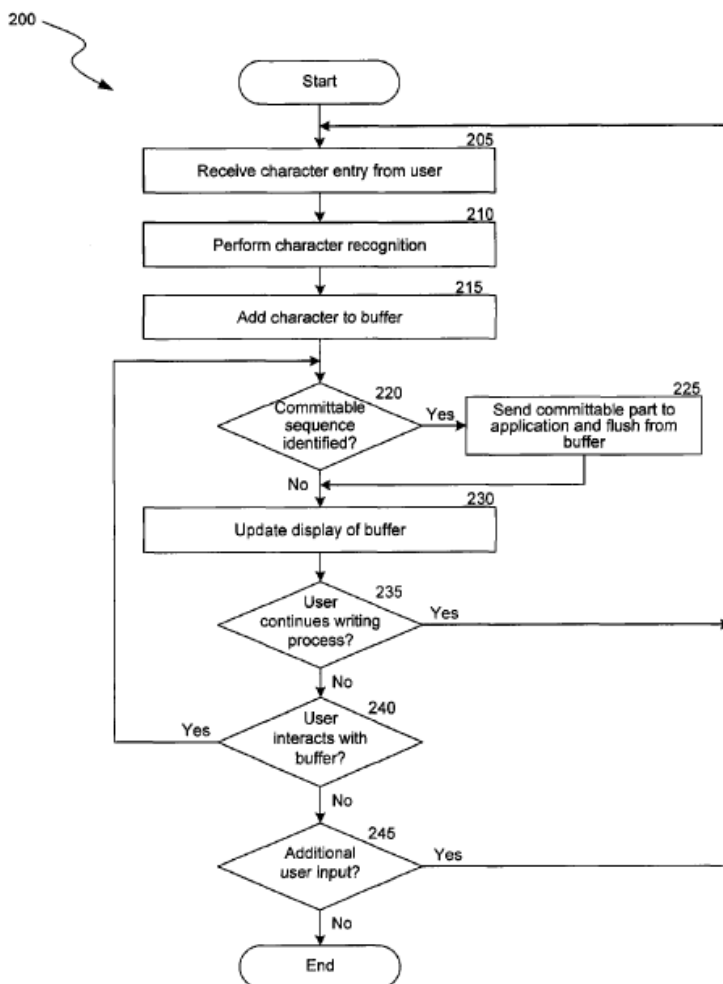


**FIG. 2**

'428Pat, FIG. 2

In addition to English, the '428 patent discloses that it can receive characters “in any number of languages, including Japanese, Chinese, and/or Korean.” *Id.*, 7:49-51. For these non-English languages, “Chinese, Japanese, and/or Korean dictionaries may also be included.” *Id.*, 13:42-43.

## V. OVERVIEW OF THE PRIMARY PRIOR ART

By October 2012, systems and technologies for digitally capturing and recognizing handwriting were well-known. *Ward* ¶¶38-49 (discussing *Arbeitman*, *Yokote*, *Rand Review*, *Tappert*, *Seybold*, *Nagel* and *Ward* '495). *Arai*, *Fenwick*, and *Baker*—discussed further below—are just a few examples of such systems.

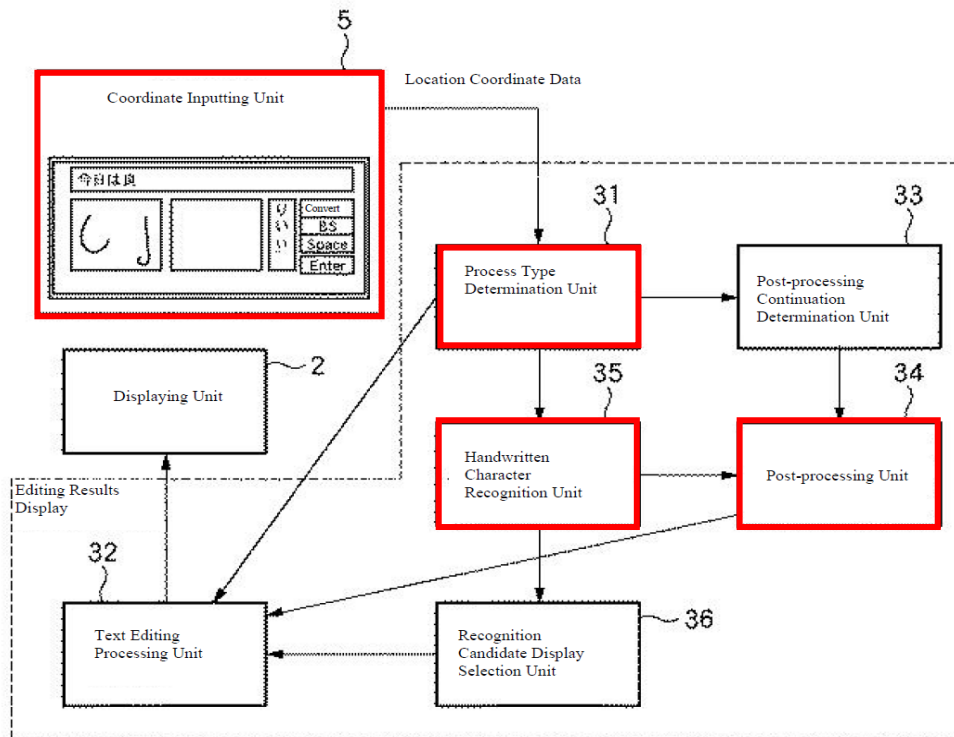
Moreover, the prior art references analyzed in the grounds below are analogous to the '428 patent because they are within the same field of endeavor as the '428 patent and reasonably pertinent to one or more problems addressed by the '428 patent. *Ward* ¶60. For example, like the '428 patent, *Arai* is directed to techniques for handwriting recognition on a mobile device that uses linguistic tools to efficiently and accurately determine best matches for characters and words corresponding to the user's handwritten input. *Id.* ¶61. *Fenwick* is directed to similar pattern recognition techniques for determining possible word candidates based on dictionary data and linguistic tools like those discussed in the '428 patent. *Id.* ¶62. *Fenwick* further provides implementation details of a temporary buffer storage and removal therefrom as disclosed in the '428 patent. *Id.* *Baker* is directed to a conventional character/word recognition system that uses a dictionary stored or implemented in a database to recognize characters or words. *Id.* ¶63.

**A. Arai**

*Arai* is titled “Information Processing Device and Controlling Method and Program Thereof.” *Arai*, (54). *Arai* discloses a “mobile information device, such as a PDA (Personal Digital Assistant), mobile telephone, digital camera, notebook PC (personal computer), or the like” for handwritten character recognition. *Id.* ¶[0022]; *see also id.*, Abstract, ¶[0017]. *Arai*’s Figure 3 (below) is illustrative of *Arai*’s device and method.

Initially, handwritten inputs are received through the “touch panel” on the device’s “coordinate input unit 5.” *Id.* ¶[0032], FIG. 3.

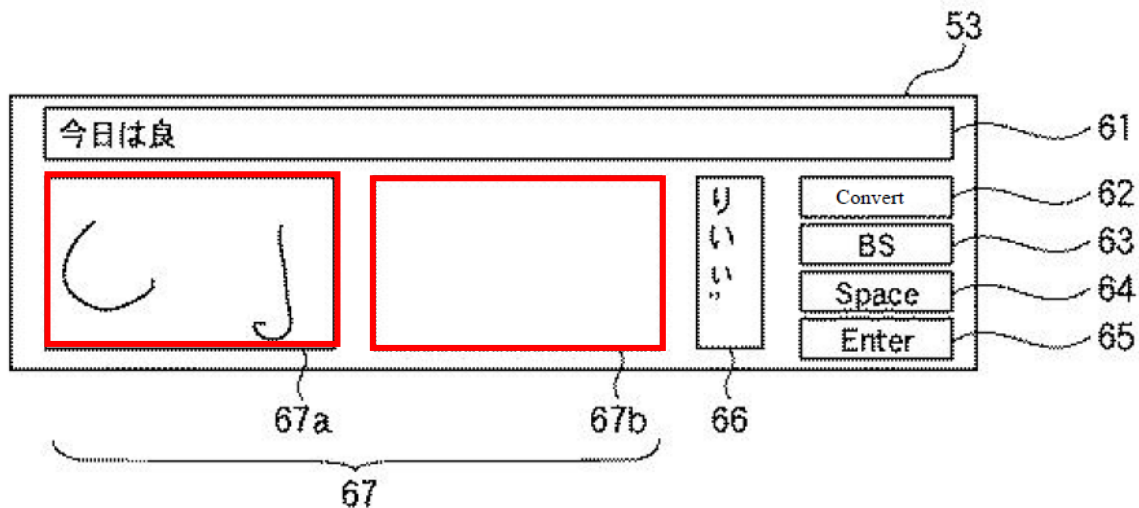
[FIG. 3]



*Arai*, FIG. 3 (annotated)

The user inputs handwriting by entering strokes into regions 67a and 67b of area 67, whereby switching from one region to the next indicates the input stroke relates to a new character. *Id.* ¶¶[0096]-[0099] (discussing characters being entered alternately between regions 67a and 67b), [0140], FIG. 6. Upon receiving the input, *Arai*'s "handwritten character recognition unit 35" compares the handwritten input to a "reference character dictionary data within the recognition dictionary." *Id.* ¶¶[0050], [0055]. This process of inputting and recognizing characters is repeated for each handwritten input. *See, e.g., id.* ¶¶[0096]-[0099]; *Ward* ¶¶70-73.

[FIG. 6]



*Arai* FIG. 6 (annotated)

After the initial recognition, a "post-processing unit 34" receives a string of characters for further evaluation. *Arai* ¶¶[0113]-[0114]. *Arai* discloses that the post-processing unit 34 uses "post-processing dictionary data (dictionary data for chain

probability calculation).” *Id.* ¶[0027]. *Arai* discloses that the post-processing unit determines a character string “through considering the probability that the characters in the candidate character string ... are linked together, and considering the degree of match with reference character dictionary data within the recognition dictionary.” *Id.* ¶[0053]. The post-processing unit 34 selects the candidate with the highest probability of being correct and display the resulting text to the user. *Id.* ¶[0114] (determining “the combinations that have the highest chain probabilities between the character strings, to change the display within the input character buffer area 61 to display the combination with the highest value as the first candidate”); *Ward* ¶76.

*Arai* further discloses “a text editing processing unit” that allows modifying character strings, “such as deletion, kana-kanji conversion, insertion into a character input area of an application, and the like.” *Arai* ¶[0051]. To insert a character into an application, *Arai* discloses, for example, “a handwritten character input utility program” for “an electronic mail application that runs on the mobile information device” (*id.* ¶[0068]), but also discloses that the invention could equally apply to “other application programs” (*id.* ¶[0069]). *See also id.* ¶¶[0070]-[0071] (describing the insertion of characters into the header or body of an electronic mail using a handwritten character input utility program), [0072] (using a handwritten character input utility program to “input text into an arbitrary application program”). *Arai* also teaches that the “Enter Key button” can be used to send character strings to

applications. *Id.* ¶[0091] (“If a character string is displayed in the input character buffer area 61 and this button 65 is pressed using the stylus 3, this character string is confirmed and the character string is inserted to the right side of the cursor that is displayed in the application.”).

**B. *Fenwick***

*Fenwick* is titled “Pattern Recognition System Having Inter-Pattern Spacing Correction.” *Fenwick*, (54). *Fenwick* discloses a system of pattern recognition that determines where to place spaces between inputted individual characters to create words. *Fenwick*’s system comprises receiving characters and storing each inputted character in “one or more buffers in memory.” *Fenwick*, 2:48-49. As the system receives additional characters, it evaluates “each buffer against a dictionary of known words.” *Id.*, 2:49-50. If a buffer contains an actual word, it is copied to a new buffer and the system places a space after it. *Id.*, 2:50-52. If the buffer does not match the beginning of a known word, then that buffer is deleted. *Id.*, 2:54-55. The preceding steps are continued until all the buffers are deleted or until an end character is entered, like a carriage return. *Id.*, 2:55-58. Anytime during this process, if the same word appears in all the buffers, the system determines the word to have “been positively identified” (*id.*, 2:63-65), and it “delete[s] from each of the buffers [and] output[s] to the output device” (*id.*, 6:26-30, FIG. 4 (blocks 88, 90)). In this

way, *Fenwick*'s system determines final words, sends them to an output device, and removes them from the buffer once sent. *Ward* ¶84.

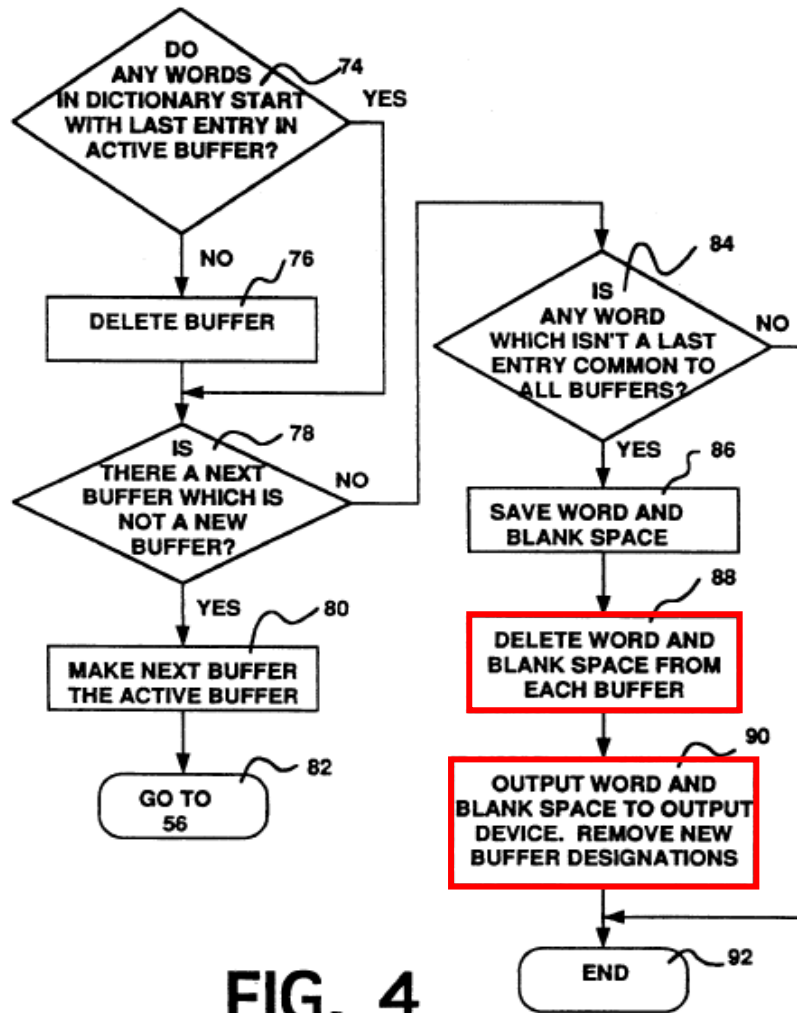


**FIG. 4**

*Fenwick*, FIG. 4 (annotated)

## VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") at the time of the '428 patent's purported priority date would have had at least a Bachelor's of Science

Degree (or equivalent) in electrical engineering, computer science, or computer engineering, or a related technical field and two years of experience working with handwriting recognition, user interfaces incorporating on-line recognition technologies, or related technical fields. *Ward* ¶26. A greater amount of professional education could compensate for fewer years of work experience, and vice versa. *Id.*

## VII. CLAIM CONSTRUCTION

Petitioners are unaware of any “prior claim construction determination” related to the ’428 patent. *See* 37 C.F.R. §42.100(b). Given the close correlation and substantial identity between the prior art references and the Challenged Claims, Petitioners believe that no express constructions of the claims are necessary to assess whether the prior art reads on the Challenged Claims. Thus, the claims should be given their plain and ordinary meaning.<sup>3</sup> *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

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<sup>3</sup> Petitioners reserve all rights to raise claim construction arguments and other arguments in any parallel or future litigation concerning the ’428 patent. For example, comparing the claims to the accused products in the litigation may raise controversies that require construction of certain claim terms.

## VIII. DETAILED EXPLANATION OF GROUNDS

The below, as supported by the Declaration of Jean Renard Ward, demonstrates how the Challenged Claims are unpatentable. *See* 37 C.F.R. §42.104(b)(4)-(5).

### A. GROUND 1: *ARAI* IN COMBINATION WITH *FENWICK* RENDERS OBVIOUS CLAIMS 1-3, 7-9, 12-13

#### 1. Claim 1

##### a. 1[pre]: “A method for data input on a touchscreen of a mobile device, the method comprising:”

To the extent the preamble is limiting, *Arai* discloses or suggests this feature. *Ward* ¶¶87-95. For example, *Arai* discloses that its “invention relates to an information processing device and controlling method and program thereof for **inputting stroke data** of a handwritten character and performing character recognition, and executing post-processing in relation to the character recognition result.”<sup>4</sup> *Arai* ¶[0001]; *see also id.* Claim 9 (disclosing a “controlling method ... comprising: an input step for inputting the stroke data”). More particularly, *Arai* discloses “**a mobile information device, such as a PDA (Personal Digital Assistant), mobile telephone**, digital camera, notebook PC (personal computer), or the like” for performing the method of the invention. *Id.* ¶[0022]; *see also id.*

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<sup>4</sup> All emphases/annotations/color are added unless noted otherwise.

¶¶[0021], [0023]-[0025] (disclosing the hardware configuration of a “mobile information device”). A POSITA would have understood that PDAs were mobile devices that generally employed touch screens. *Ward* ¶90 (citing *Computer Dictionary*).<sup>5</sup>

A POSITA would have understood a touchscreen as discussed in the ’428 patent and recited in claim 1 referred to a computer screen designed or modified to recognize the location of a touch input on its surface. *Ward* ¶91 (citing *Computer Dictionary*); *see also* ’428Pat, 4:35-38 (“[T]he user can create the single character input through one or a series of strokes or input features (e.g., using a finger and/or a stylus on a touch screen interface).”), 12:4-30.

*Arai*’s disclosure is consistent with a POSITA’s understanding of touchscreen. *Ward* ¶¶92-94. *Arai* discloses that a user of the mobile information device can “input stroke data through **pressing, with a stylus 3**, on the coordinate input surface of the coordinate input unit 5 (the display screen of the display unit 2),” because the coordinate input surface includes a “transparent resistance film digitizer (known as a ‘**touch panel**’).” *Arai* ¶[0032]; *see also id.* ¶¶[0023] (disclosing

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<sup>5</sup> The *Computer Dictionary* is cited in this Petition merely to demonstrate a POSITA’s knowledge and/or the state of the art. It is not part of the unpatentability grounds.

a “mobile information device” that is equipped with “a stylus 3” and “a coordinate input unit 5”), [0036] (describing “a stylus [that is] used for inputting handwriting stroke data . . . on the display screen”), [0070] (“pressing an arbitrary position within the area 51 [of electronic mail] using the stylus 3”), [0209] (listing “Stylus” in figures), FIGs. 1-2 (showing a stylus that is used for inputting through the display unit). When “the stylus 3” presses “on the coordinate input surface of the coordinate input unit 5, the CPU 6 is notified of position coordinate data for a position that is pressed.” *Id.* ¶[0033].

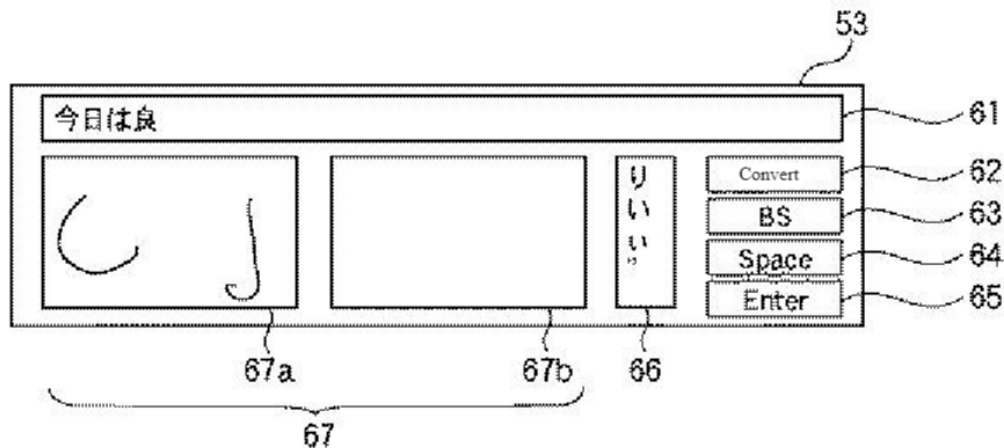
Accordingly, a POSITA would have understood *Arai* to disclose or suggest a method for inputting data with a stylus on a touch panel of a display screen (“method for data input on a touchscreen”) of a mobile information device (“of a mobile device”). *Ward* ¶95.

**b. 1[a]: “receiving a first user input, wherein the first user input is handwritten input received on the touchscreen of the mobile device;”**

*Arai* discloses or suggests this feature. *Ward* ¶¶96-103. For example, *Arai* discloses that a “**user** is able to input stroke data through pressing, with a stylus 3” on a “touch panel.” *Arai* ¶[0032]; *see also id.* ¶[0036] (describing the stylus as being “used for inputting **handwriting** stroke data ... on the display screen”). *Arai* discloses a handwritten character input area 67 comprised of two regions 67a and 67b for detecting handwritten character input, whereby distinct handwritten

characters are inputted by alternating input between region 67a and 67b—e.g., entering a first character in region 67a, entering a second character in region 67b, entering a next character in region 67a, and so forth. *Arai* ¶[0095] (“The area 67 is a handwritten character input area. Character input can be carried out through alternately filling in handwritten character into the two regions 67a and 67b.”); *see also id.* ¶¶[0096]-[0099] (discussing characters being entered alternately between regions 67a and 67b), [0140] (“For the position coordinate data for the strokes for a single character that is to be recognized, stroke data that is inputted into the respective areas, through areas 67a and 67b in the handwritten character input area 67 of FIG. 6, are inputted as stroke data for a single character.”), FIG. 6; *Ward* ¶¶98-99.

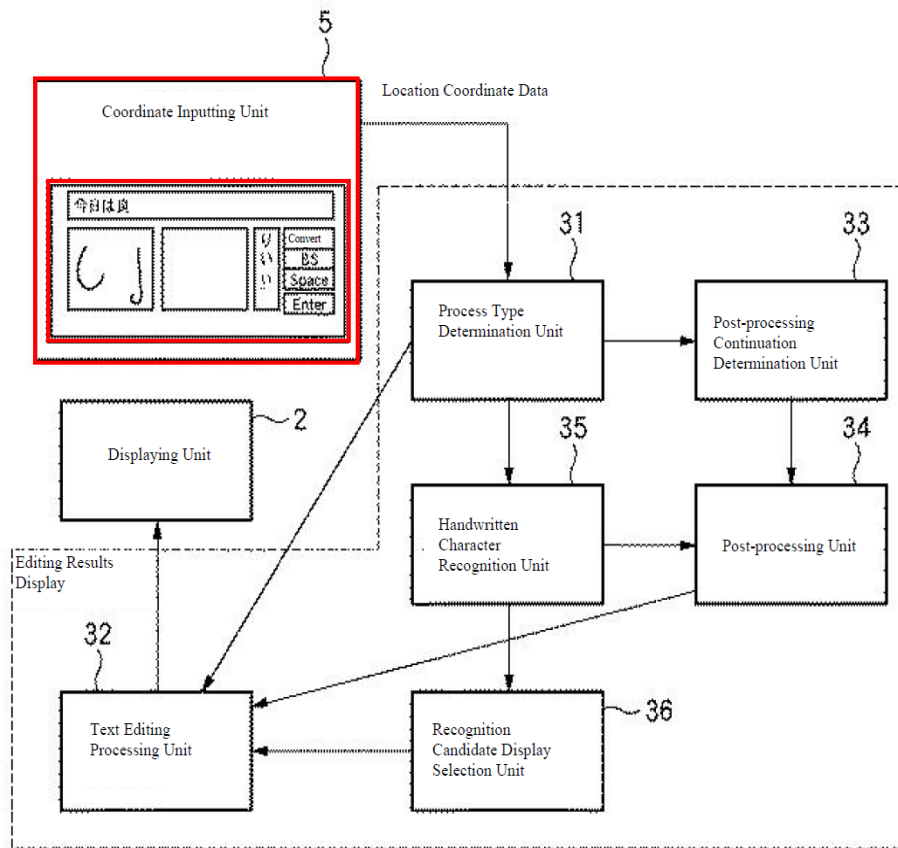
[FIG. 6]



*Arai*, FIG. 6

A POSITA would have understood handwritten character input area 67 to be a portion of *Arai*'s coordinate input surface 5 (i.e., "touchscreen"). *Ward* ¶100. For example, *Arai*'s figure 3 shows *Arai*'s figure 6 inside the coordinate inputting unit 5. *Ward* ¶100.

[FIG. 3]



*Arai*, FIG. 3 (annotated)

Also, as its name suggests, area 67 is to receive handwritten character input, and *Arai* discloses "input[ing] stroke data through pressing, with a stylus 3, on the coordinate input surface of the coordinate input unit 5 (the display screen of the

display unit 2)” and that the coordinate input unit 5 is implemented as a “transparent resistance film digitizer (known as a ‘touch panel’).” *Arai* ¶[0032]; *Ward* ¶100.

*Arai* provides an example of receiving two handwritten Japanese characters—**工** and **場**. *Arai* ¶[0144] (“Here the explanation will be for a case wherein the handwritten character ‘工場’ has been inputted.”). *Arai* discloses that **工場** consists of two inputs. *Ward* ¶101. More particularly, *Arai* discloses that “first ‘工’ is inputted” (*Arai* ¶[0150]), and then later “the character ‘場’ is inputted” (*id.* ¶[0151]). *Ward* ¶101. A POSITA would have understood “工場” to be Japanese characters, because the original patent is written in Japanese (*Arai*, (11), (12)) and in the certified translation of *Arai* “工場” remains in the original Japanese. *Compare Arai* ¶[0144] (translated version) with *Arai* ¶[0144] (original Japanese version); *Ward* ¶102.

Accordingly, a POSITA would have understood *Arai* to disclose or suggest a user inputting by handwriting “工場,” of which the **工** is the first input (“receiving a first user input, wherein the first user input is handwritten input”), and the handwritten characters are input through areas 67a and 67b on a touch panel of a mobile information device (“received on the touchscreen of the mobile device”). *Ward* ¶103.

- c. 1[b]: “determining a first recognized sequence based on the first user input; wherein the first recognized sequence is a best match of the first user input;”**

*Arai* discloses or suggests this feature. *Ward* ¶¶104-109.

For example, *Arai* discloses that “a recognition process is executed on the stroke data that has been obtained, where candidate characters (character codes) that are the recognition results are stored in the RAM 7.” *Arai* ¶[0142]. *Arai* takes the “distinctive feature data for the stroke data” and conducts “a matching process,” by comparing stroke data to “the recognition dictionary.” *Id.* Using the “reference character dictionary data” the system calculates “the values for the degree of matching (the evaluation values),” and stores those “recognition result candidates” for those having the “highest degrees of matching.” *Id.*

Referring to the same example from §VIII.A.1.b, *Arai* analyzes each handwritten input (e.g., each of 工 and 場) in the handwritten character recognition unit 35 to determine a recognized sequence for each character. *Ward* ¶106. More particularly, in the “case wherein the handwritten character ‘工場’ has been inputted,” *Arai* evaluates each input by assigning an “evaluation value” for the input. *Arai* ¶[0144]. For example, “the first candidate character in the recognition result for ‘工’, by the handwritten character recognition unit 35, is ‘工’, and **the evaluation value is 100**, where the second candidate character is ‘工’, **with an evaluation value of 100**, and the third candidate character is ‘工’, **with an evaluation value of 90.**” *Id.* ¶[0144]; *see also id.* ¶[0145] (“Next the first candidate character for the recognition result for ‘場’ is ‘揚’, **with an evaluation value of 98**, where the second candidate character is ‘場’, **with the evaluation value for the degree of matching being 96.**”).

*Arai* equates the “values for the degree of matching” with “evaluation values.” *Id.* ¶[0142] (stating that “the character codes, and the *values for the degree of matching (the evaluation values)*, corresponding to the reference character dictionary data that have the highest degrees of matching, are stored as the recognition results”); *see also id.* ¶[0145] (describing “the evaluation value for the degree of matching being 96”); *Ward* ¶107.

Based on its evaluation values, *Arai* determines that the first recognized sequence matches the input of 工. *Arai* ¶[0144] (“First the first candidate character in the recognition result for ‘工’ ... is ‘工’.”); *Ward* ¶108. *Arai* also indicates that the best recognized sequence for the second input of 場 does not match the intended input, but rather results in a different character, 揚. *Arai* ¶[0145] (“Next the first candidate character for the recognition result for ‘場’ is ‘揚’.”); *Ward* ¶108.

Accordingly, a POSITA would have understood *Arai* to disclose or suggest 工 to be the first recognized sequence of the first input of 工 (“determining a first recognized sequence based on the first user input”) wherein 工 is selected as the first recognized sequence with an evaluation value of 100 based on comparison of the stroke data with the recognition dictionary (“wherein the first recognized sequence is a best match of the first user input”). *Ward* ¶109.

**d. 1[c]: “writing the first recognized sequence to a memory storage buffer of the mobile device;”**

*Arai* discloses or suggests this feature. *Ward* ¶¶110-116.

For example, *Arai* discloses that “a recognition process is executed on the stroke data [where] the *recognition results* are *stored in the RAM 7*.” *Arai* ¶[0142]. Moreover, the “RAM 7 ... functions as a data work area and *temporary storage area*.” *Id.* ¶[0026]; *see also id.* ¶[0140] (disclosing “work areas, and the like, in the RAM 7, used by the processes, ... executed primarily by the handwritten character recognition unit 35”). A POSITA would have understood from *Arai*’s disclosure that the RAM to which the recognition results (e.g., each of 工 and 揚) are written to constitute a memory storage buffer as recited in the claim. *Ward* ¶¶111-112.

The term “memory storage buffer” appears only in the claims of the ’428 patent but not in the specification. *Id.* ¶113. Nevertheless, the ’428 patent specification repeatedly refers to a “temporary storage buffer,” “buffer,” or “recognized character buffer.” *See, e.g., ’428Pat*, Abstract, 6:4-7, 6:46-47. A POSITA would have understood the ’428 patent to use the terms “buffer,” “temporary storage buffer,” and “memory storage buffer” interchangeably to refer to a memory or storage device (or portion thereof) used to temporarily store information. *Ward* ¶¶113-114 (citing definitions of “buffer,” “buffer storage,” and “memory” from *Computer Dictionary*). A POSITA would have understood *Arai*’s

RAM (i.e., random access memory) to constitute a “memory storage buffer” because it is RAM that serves the purpose of temporarily storing recognition results by the character recognition unit 35 of stroke data inputted through *Arai*’s touch panel for later use by, for example, *Arai*’s post-processing unit 34. *Ward* ¶114.

A POSITA would have also understood *Arai*’s disclosure that the recognition results are “stored in the RAM 7” (*Arai* ¶[0142]), to constitute “writing ... to a memory storage buffer” as recited in the claim. *Ward* ¶115 (discussing definition of “write” and “RAM” in *Computer Dictionary*).

Accordingly, a POSITA would have understood *Arai* to disclose or suggest temporarily storing (“writing”) “工” (“the first recognized sequence”) in the RAM (“to a memory storage buffer”) of a mobile information device (“of the mobile device”). *Ward* ¶116.

**e. 1[d]: “generating a first candidate sequence, wherein the first candidate sequence is a best match of one or more recognized sequences;”**

*Arai* discloses or suggests this feature. *Ward* ¶¶117-119.

As discussed in the previous sections, *Arai* receives the two inputs 工 and 場 (§VIII.A.1.b), determines the recognized sequence for each, namely, 工 and 揚 (§VIII.A.1.c), and from these two sequences, *Arai* generates a first candidate sequence, namely 工揚. Because *Arai* generates 工揚 using an “evaluation value” and “first-ranked recognition result,” a POSITA would have understood this first

candidate sequence 工揚 to be a best match of the first and second recognized sequences (工 and 揚). *Arai* ¶¶[0144], [0145], [0151]; *Ward* ¶118.

Accordingly, a POSITA would have understood *Arai* to disclose or suggest determining 工揚 as a sequence (“generating a first candidate sequence”) wherein the sequence is comprised of the two recognized sequences 工 and 揚, in which each had the highest evaluation values for the inputs 工 and 揚, respectively (“wherein the first candidate sequence is a best match of one or more recognized sequences”). *Ward* ¶119.

- f. 1[e]: “presenting the first candidate sequence to the user, wherein the presenting includes displaying the first candidate sequence to the user and allowing the user to edit the first candidate sequence;”

*Arai* discloses or suggests this feature. *Ward* ¶¶120-124. For example, *Arai* discloses displaying the first candidate sequence 工揚. *Arai* ¶[0151] (disclosing “the display will be ‘工揚’ as the recognition result in the input character buffer area 61.”); *see also id.* ¶¶[0084] (describing that “the area 61 ... **displays** a first candidate for the handwritten character recognition result”), [0085] (describing that “a character that is not the intended candidate ... is **displayed** in the input character buffer area 61 ...”), [0087] (disclosing a “set of first candidate characters that is **displayed** in the input character buffer area 61 ...”); *Ward* ¶121.

In addition, *Arai* explains that it has “a text editing processing unit, which executes editing processes on a text character string obtained from the handwritten character recognition unit 35, such as deletion, kana-kanji conversion, insertion into a character input area of an application, and the like.” *Arai* ¶[0051]. *Arai* discloses that a user may edit any of the characters displayed in the “input character buffer area 61” (e.g., 工揚) by deleting using the “Backspace key button (the deletion button)” (*id.* ¶[0089]), selecting a different character from a list of candidates (*id.* ¶[0086]), or converting Japanese hiragana characters to kana-kanji (*id.* ¶[0088]); *Ward* ¶¶122-123.

Accordingly, a POSITA would have understood *Arai* to disclose or suggest displaying 工揚 in the input character buffer area (“presenting the first candidate sequence to the user, wherein the presenting includes displaying the first candidate sequence to the user”) and allowing at least deletion, replacement of candidate sequence or kana-kanji conversion of the sequence in the input character buffer area (“and allowing the user to edit the first candidate sequence”). *Ward* ¶124.

**g. 1[f]: “identifying at least a first sequence portion of the first candidate sequence wherein the identifying is at least partially based on one or more rules or dictionaries of words accessible to the mobile device;”**

*Arai* discloses or suggests this feature. *Ward* ¶¶125-130.

*Arai* discloses a “post-processing dictionary data (dictionary data for chain probability calculation)” stored in ROM 8. *Arai* ¶[0027]. *Arai* discloses the post-processing unit 34 determines a character string “through considering the probability that the characters in the candidate character string ... are linked together, and considering the degree of match with reference character dictionary data within the recognition dictionary.” *Id.* ¶[0053]. A POSITA would have understood that the post-processing unit 34 makes this determination using the post-processing dictionary data. *Id.* ¶[0146] (“in the post-processing unit 34 the chain probabilities for the character strings combining these candidates are calculated using a dictionary for post-processing”); *Ward* ¶126. The post-processing unit 34 selects the candidate combination with “the highest chain probabilities between the character strings, to change the display within the input character buffer area 61 to display the combination with the highest value as the first candidate.” *Arai* ¶[0114].

For example, using chain probabilities and a dictionary, *Arai* determines that 工場 should probably be 工場. *Id.* ¶[0146] (“In this case, in the post-processing unit 34 the chain probabilities for the character strings combining these candidates are calculated **using a dictionary** for post-processing. The combinations are, for example, ‘工場’, ‘工場’, ‘工場’, ‘工場’, ‘工場’, ‘工場’. Given this, the post-processing unit 34 determines the candidate character string with the highest chain probability among these accommodations.”), [0148] (“As described above, when ‘工場’, is

inputted as the handwritten characters, then even if the recognition results by the handwritten character recognition unit 35 are ‘工場’, the process in the post-processing unit 34 in Step S904 will determine that the candidate character string with the highest chain probability is ‘工場,’ so ‘工場’ is read out as the candidate character string for the handwritten character. In this case, here the ‘工場’ that is the recognition result by the handwritten character recognition processing unit 35 may be replaced with ‘工場.’”); *see also id.* ¶[0152] ( “Next the candidate character string that has the highest chain probability, for a combination among the recognition candidates by the handwritten character recognition unit 35, is recognized, and if that candidate character string is ‘工場,’ then the ‘工場’ of the display of the input character buffer area 61 will be replaced with ‘工場’ by the post-processing unit 34.”)

Moreover a POSITA would have understood *Arai*’s post-processing dictionary data to include words. *Ward* ¶129. More particularly, a POSITA would have understood references in *Arai* to “dictionary data” and “dictionary” to encompass a data set comprising words. *Id.* (citing *Merriam-Webster’s Collegiate Dictionary*).<sup>6</sup>

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<sup>6</sup> The *Merriam-Webster’s Collegiate Dictionary* is cited in this Petition merely to demonstrate a POSITA’s knowledge and/or the state of the art. It is not part of the unpatentability grounds.

Accordingly, a POSITA would have understood *Arai* to disclose or suggest determining that 工揚 should probably be 工場, where 工 is a portion of the first candidate sequence 工揚 (“identifying at least a first sequence portion of the first candidate sequence”) using a dictionary and chain probabilities (“wherein the identifying is at least partially based on one or more rules or dictionaries of words”) stored in the ROM of a mobile information device and accessible to the mobile device’s post-processing unit 34 (“accessible to the mobile device”). *Ward* ¶130.

- h. 1[g]: “removing the first sequence portion from the memory storage buffer, wherein the removing is performed in the absence of receiving user input editing the first candidate sequence, representing a space character, or selecting a word; and”**

*Arai* in combination with *Fenwick* discloses or suggests this feature. *Ward* ¶¶131-144.

As discussed in §VIII.A.1.d, *Arai* discloses or suggests writing handwritten character recognition results to a temporary memory such as RAM. *Arai* is silent on when and under what conditions the results are removed from the RAM. *Ward* ¶132. *Arai* states, however, that conventional handwritten character recognition techniques may be used to implement its invention. *See, e.g., Arai* ¶¶[0002] (“Conventionally there have been character recognition devices for identifying paths (strokes) of inputted handwritten characters.”), [0028] (“Input stroke data can be recognized into a corresponding character code, by a handwritten character recognition function that

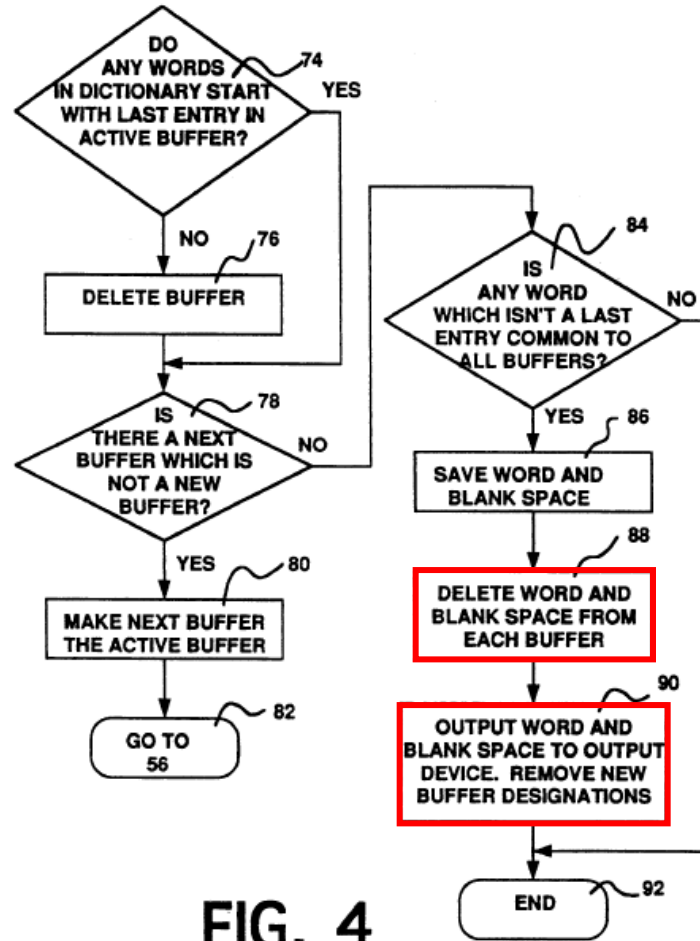
that [sic] has existed conventionally, to be inputted into the mobile information device 1.”), [0112] (“Following this, distinctive feature data of the character is extracted from the position coordinate data using an online handwritten character recognition algorithm that has existed conventionally.”), [0141] (“Given this, feature points (distinctive feature data) are extracted through performing normalization of the position coordinate data using a conventional algorithm.”).

*Fenwick* relates “to a pattern recognition system for recognizing known patterns or groups of pattern,” and is an example of a conventional handwritten character recognition system. *Fenwick*, 1:7-9; *Ward* ¶133. Similar to *Arai*, in *Fenwick*’s system “characters are entered into the system by pattern input device 12, which could be any of a number of different types of devices, such as an electronic writing tablet.” *Fenwick*, 3:16-22; *see also id.*, 1:13-21 (disclosing “[w]riting tablets” and the “process of recognizing characters”); *Ward* ¶133. A POSITA would have understood that because *Fenwick* discloses an “electronic writing tablet” as an input device, and also discloses overcoming the problem of “sloppy handwriting” and other problems of “handwriting recognition systems,” that *Fenwick*’s pattern recognition includes handwriting recognition. *Ward* ¶134; *see also Fenwick*, 1:6-48.

*Fenwick*’s handwritten character recognition system further teaches storing recognized characters to memory buffers. *Ward* ¶135. More particularly, *Fenwick* discloses that after retrieving a character, the system will check to see if a memory

buffer is available, and if not, “an empty buffer is created.” *Fenwick*, 4:40-49. *Fenwick* explains that the system designates an “active buffer so that the system always starts from a consistent memory location.” *Id.*, 4:49-51. The above-retrieved character is then “appended to the content of all of the available buffers.” *Id.*, 4:52-54. “If the character is stored in an empty buffer, this character would form the first character of a series of characters to be stored in the buffer. If the character is stored in a buffer containing other characters, this character is added to the preexisting series of characters in that buffer, thereby continuing formation of the series in that buffer.” *Id.*, 4:54-60; *see also id.*, FIG. 2 (blocks 32 (retrieving a character), 38 (appending a character to all buffers)).

*Fenwick* analyzes its buffers, and if there is a word “common to all of the remaining buffers ... then that word has been properly identified and can be saved with its appended blank space in memory.” *Id.*, 6:21-26. “After saving the word and blank space, both are deleted from each of the buffers, block 88. The word and blank space are then output to the output device, block 90.” *Id.*, 6:26-29; *see also id.*, FIG. 4 (blocks 88, 90).



*Fenwick*, FIG. 4 (annotated)

Additionally, *Fenwick* depicts the removal of a word without user input in rows 6 and 7 of Figure 5a, in which the word “the” is deleted from the buffer. *See id.*, FIG. 5a. *Fenwick* deletes the word “the” once it has confirmed that “the” is the correct word based on user input and comparisons to words in a dictionary. *Id.*, 7:18-26 (“In Pass 6, another word was formed in Buffer 1, so its contents were copied to Buffer 3, which was deleted in Pass 5, and a space was appended to the last entry of

Buffer 1. Since the last entry in Buffer 2 ‘ew’ did not correspond to the start of any word in the dictionary, Buffer 2 was deleted. In addition, the word ‘the’ was saved from Buffers 1 and 3 and then deleted because ‘the’ was a common word in all of the remaining buffers.”); *see also id.*, FIG. 5a.

| 100  |          | 102      |  | 104               |  | 106               |  | 108      |  |
|------|----------|----------|--|-------------------|--|-------------------|--|----------|--|
| PASS |          | BUFFER 1 |  | BUFFER 2          |  | BUFFER 3          |  | BUFFER 4 |  |
| 1    | t        |          |  |                   |  |                   |  |          |  |
| 2    | th       |          |  |                   |  |                   |  |          |  |
| 3    | the_     |          |  | the               |  |                   |  |          |  |
| 4    | the_n    |          |  | then_             |  | then              |  |          |  |
| 5    | the_ne   |          |  | then_e            |  | <del>the</del> ne |  |          |  |
| 6    | the_new_ |          |  | <del>the</del> ew |  | the_new           |  |          |  |
| 7    | new_t    |          |  | newt              |  | newt_             |  |          |  |
| 8    | new_to_  |          |  | newto             |  | newt_o            |  | new_to   |  |

*Fenwick*, FIG. 5a (annotated)

Thus, a POSITA would have understood *Fenwick* to teach removing a word from the buffer after it has been confirmed as the correct word without receiving user input editing the candidate sequence, representing a space character or selecting a word. *Ward* ¶¶136-138.

A POSITA would have found it obvious to incorporate these teachings of *Fenwick* into *Arai* to delete the recognition results from the RAM when, for example,

the candidate sequence 工場 (which includes the identified first sequence portion 工) is identified as the correct sequence. *Id.* ¶139. A POSITA would have been motivated to combine *Arai* and *Fenwick*, because *Arai* seeks to solve the problem of a user being “forced to perform other input operations in addition to the actual intended character input, adversely affecting a natural use experience.” *Arai* ¶[0004]. *Arai* seeks to “achieve[] post-processing naturally, and by appropriate processing units, through the post-processing continuation determination unit, ***without the user consciously making any particular inputs instructing the end*** or continuation, or the like, of a text element.” *Id.* ¶[0019]; *see also id.* ¶[0156] (discussing how it is “possible to achieve a handwritten character recognition environment wherein character input and editing operations are carried out naturally without the user having to be aware of continuing or confirming the post-processing on the inputted character string (that is, without having to execute an operation to designate breaks in the post-processing unit). This enables a handwritten character recognition environment wherein the user can input the intended text easily.”); *Ward* ¶139.

While *Arai* requires hitting the Enter Key to send a word (or words) to the application (*Arai* ¶[0091]), *Fenwick* performs this function automatically absent any user input (*Fenwick*, 6:21-34; FIG. 4 (blocks 88, 90)). A POSITA would have been motivated to incorporated *Fenwick*’s teachings regarding automatically sending

recognized words to an application into *Arai* because this would have furthered *Arai*'s purpose of having a natural, uninterrupted flow in entering characters without having to press extra keys. *Ward* ¶139.

The combination would also have been obvious as amounting to applying a known technique (*Fenwick*'s recognition of words without additional user confirmation and deletion of words from the buffer when no longer needed—e.g., when the recognition results are sent to an application) to a known method (*Arai*'s method of performing handwriting recognition which also uses temporary memory for storing handwritten character recognition results) ready for improvement to yield predictable results (the *Arai-Fenwick* combination in which recognition results are sent to an application without further user confirmation—e.g., pressing the Enter Key—and handwritten character recognition results are removed from the temporary memory such as RAM when the recognition results are sent to the application). *Id.* ¶140.

To be sure *Fenwick* also discloses removing words from the buffers with a user input comprising a “hard space,” which arguably may represent a space character. *Fenwick*, 4:65-68 (“A ‘hard space’ or ‘end character’ is any character, symbol, pattern, or large blank space which indicates that an end of a sentence or line of characters has been reached.”). For example, *Fenwick* first deletes all non-words or less preferable words from the buffers. *See id.*, 5:9-24. Next, as

demonstrated in figure 2, *Fenwick* saves words from buffers (step 44), deletes words from buffers (step 46), and outputs the words (step 48), all as a result of the user entering a hard space character. *Id.*, 5:25-47. This, however, is merely an alternative disclosure in *Fenwick* for removal of words from the buffers and does not teach away from removal of a word from the buffer absent user inputs as described in the preceding paragraphs. *Ward* ¶¶141-142. Nothing in the '428 patent or the claim language precludes sometimes removing a sequence of characters from memory as a result of a user input representing a space character, editing a sequence or selecting a word, so long as the requirements of 1[g] are also performed/met. *Id.* ¶142.

Indeed, the specification of the '428 patent expressly contemplates that a user may select from “one of the candidate sequences” or “edit the text,” or “the system may auto-commit the sequence.” ’428Pat, 7:17-29; *Ward* ¶143; *see also* ’428Pat, 3:22-47 (describing “at least four different ways” to flush the content of the buffer, two of which include where the “user selects a candidate from the candidate list” or it is done by an “auto-commit” feature); *Ward* ¶143.

Accordingly, a POSITA would have understood the *Arai-Fenwick* combination to disclose or suggest deleting recognition results from a buffer after being properly identified (“removing the first sequence portion from the memory storage buffer”) wherein deletion from the buffer occurs based on comparison of recognition results to a dictionary without further user confirmation—e.g., pressing

the Enter Key (“wherein the removing is performed in the absence of receiving user input editing the first candidate sequence, representing a space character, or selecting a word”). *Ward* ¶144.

**i. 1[h]: “sending the first sequence portion to an application running on the mobile device.”**

*Arai* in combination with *Fenwick* discloses or suggests this feature. *Ward* ¶¶145-148.

*Arai* discloses that “the present invention” includes “an electronic mail application that *runs on the mobile information device*” (*Arai* ¶[0068]) and enters confirmed character strings from the input character buffer area 61 into the electronic mail application (*id.* ¶¶[0071],[0091]); *Ward* ¶146. For the reasons discussed in §VIII.A.1.h, in the *Arai-Fenwick* combination the method recognizing 工場 as the correct input, sends the sequence 工場 to the current application, such as the body of an electronic mail without the user having to press the Enter Key. *Id.* ¶147.

Accordingly, a POSITA would have understood the *Arai-Fenwick* combination to disclose or suggest sending the sequence 工場 to an electronic mail application (“sending the first sequence portion to an application”) that runs on a mobile information device (“running on a mobile device”). *Ward* ¶148.

**2. Claim 2**

**a. 2[a]: “The method of claim 1, further comprising:  
receiving at least a second user input;”**

*Arai* in combination with *Fenwick* discloses or suggests this feature for the reasons discussed in §VIII.A.1.b, in which *Arai* discloses a second input 場. *Ward* ¶149.

**b. 2[b]: “determining a second recognized sequence based  
on the second user input; and”**

*Arai* in combination with *Fenwick* discloses or suggests this feature for the reasons discussed in §VIII.A.1.c, in which *Arai* determines a second recognized sequence, 揚, based on the second user input 場. *Ward* ¶150.

**c. 2[c]: “revising the first candidate sequence, wherein the  
revised first candidate sequence is based on the first  
recognized sequence and the second recognized  
sequence.”**

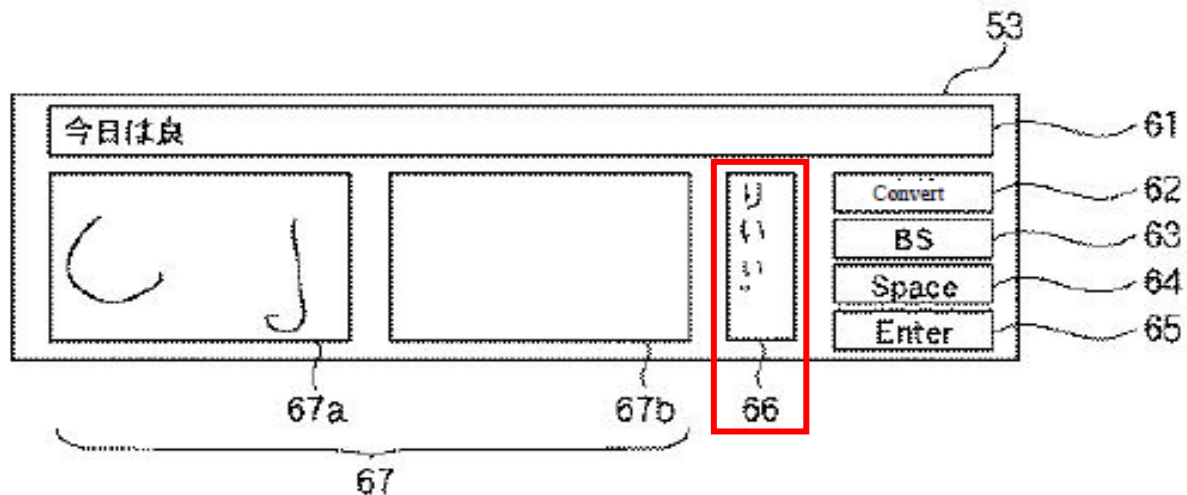
*Arai* in combination with *Fenwick* discloses or suggests this feature for the reasons discussed in §VIII.A.1.e (generating the first candidate sequence 工揚) and §VIII.A.1.g (replacing 工揚 after post-processing with a revised first candidate sequence 工場). *Ward* ¶151.

**3. Claim 3: “The method of claim 1, further comprising:  
determining at least a second candidate sequence based on  
the first user input; and presenting at least the second  
candidate sequence to the user.”**

*Arai* in combination with *Fenwick* discloses or suggests this feature. *Ward* ¶¶152-156.

For example, *Arai* discloses “the first candidate character in the recognition result for ‘工,’ by the handwritten character recognition unit 35, is ‘工,’ and the evaluation value is 100, where the second candidate character is ‘ㄣ” (*Arai* ¶[0144]), and that this result is “displayed in the input character buffer area 61” (*id.* ¶[0150]). *Arai* explains that “when the user selects, through tapping, an arbitrary character within the input character buffer area 61, a group of the first through fourth candidates for that character will be displayed, in the rank order of the candidates, in the candidate display area 66.” *Arai* ¶[0086]; *see also id.*, FIG. 6 (area 66). As such, a POSITA would have understood *Arai* to disclose or suggest that tapping on 工 would result in the display of the first through fourth candidates for 工, meaning that *Arai* discloses at least a second candidate sequence being presented to the user, the second candidate sequence being based on the same first user input. *Ward* ¶155.

[FIG. 6]



Arai FIG. 6 (annotated)

Accordingly, a POSITA would have understood the *Arai-Fenwick* combination to disclose or suggest determining from the first input  $\sqcup$  a first candidate sequence  $\sqcup$  and a second candidate sequence  $\sqcup$  (“determining at least a second candidate sequence based on the first user input; and”) which will be displayed in box 66 of Figure 6 along with two other candidates related to the input  $\sqcup$  when the user taps on  $\sqcup$  in the input character buffer 61 (“presenting at least the second candidate sequence to the user”). *Ward* ¶156.

- 4. Claim 7: “The method of claim 1, wherein the dictionaries of words include words in Chinese, Japanese, or Korean languages.”**

*Arai* in combination with *Fenwick* discloses or suggests this feature. *Ward* ¶¶157-160.

As discussed in §VIII.A.1.g, *Arai* determines that 工場 should probably be 工場 using a post-processing dictionary for chain probability calculations. *Ward* ¶158. For example, *Arai* teaches that it uses “recognition dictionary data for recognizing handwritten characters [and] post-processing dictionary data.” *Arai* ¶[0027]. *Arai* further discloses a “recognition dictionary.” *Id.* ¶¶[0053], [0055], [0084], [0142]. As an example, *Arai* describes comparing 今日は, which a POSITA would have understood to be Japanese characters, to “shapes that are registered in the recognition dictionary.” *Id.* ¶[0084]. While *Arai* does not explicitly state that the dictionary is in Japanese, a POSITA would have understood that the dictionaries to which *Arai* refers would be Japanese dictionaries because *Arai* is concerned with Japanese language handwriting recognition. *Ward* ¶159. At a minimum, it would have been obvious to a POSITA to use a Japanese dictionary to look up Japanese characters/words. *Id.*

Accordingly, a POSITA would have understood the *Arai-Fenwick* combination to disclose or suggest at least a Japanese language post-processing dictionary to perform post-processing chain probability determinations of Japanese characters (“wherein the dictionaries of words include words in Chinese, Japanese, or Korean languages”). *Id.* ¶160.

**5. Claim 8: “The method of claim 1, wherein the first user input includes at least one of a Chinese character, a Japanese character, or a Korean character.”**

*Arai* in combination with *Fenwick* discloses or suggests this feature for the reasons discussed in §§VIII.A.1.b and VIII.A.4. *Ward* ¶161.

**6. Claim 9**

**a. 9[pre]: “At least one non-transitory computer-readable storage medium storing instructions for data input, wherein the data input is performed at a wireless device having a processor and a memory, comprising:”**

To the extent the preamble is limiting, *Arai* discloses or suggests this feature. *Ward* ¶162-169. For example, *Arai* discloses a mobile information device with a non-transitory computer-readable storage medium storing instructions. *Ward* ¶163. *Arai* discloses a CPU 6 and a ROM 8 (*id.* ¶[0023]), in which the “CPU 6 is connected through a system bus 13 to the various constituent elements of the mobile information device 1, such as ... the ROM 8, the coordinate input unit 5, the display unit 2, and the like. Moreover, the CPU 6 executes various types of control through programs that are stored in the ROM 8” (*id.* ¶[0025]).

Additionally, *Arai* discloses that “the present invention may be formed as, for example, ... a storage medium, or the like.” *Id.* ¶[0199]. *Arai* explains that “the present invention includes a case that is achieved by a software program for achieving the functions of the embodiments ... where a computer of the system or

device reads out and executes the supplied program code.” *Id.* ¶[0200]; *see also id.* ¶[0201] (stating that the program code “is an implementation of the present invention”). The medium for supplying the “program may be, for example, a Floppy (registered trademark) disk, a hard disk, an optical disc, a magneto-optical disc, an MO, a CD-ROM, a CDR, a CD-RW, a magnetic tape, a nonvolatile memory card, a ROM, a DVD (a DVD-ROM, DVD-R), or the like.” *Id.* ¶[0203]. A POSITA would have understood these media to be examples of non-transitory computer readable medium. *Ward* ¶¶163-166.

*Arai* further discloses data input performed on a mobile information device as discussed in §§VIII.A.1.a and VIII.A.1.b. A POSITA would have understood that *Arai*’s disclosure of a mobile information device “such as a PDA (Personal Digital Assistant), mobile telephone ... or the like” (*Arai* ¶[0022]), encompasses “wireless” devices. *Ward* ¶¶167-168 (citing *Holmes* (disclosing both PDA and mobile telephones as wireless)).<sup>7</sup>

Accordingly, a POSITA would have understood *Arai* to disclose or suggest that the ROM stores programs for performing the method described in *Arai*, including data input (“[a]t least one non-transitory computer-readable storage

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<sup>7</sup> *Holmes* is cited in this Petition merely to demonstrate a POSITA’s knowledge and/or the state of the art. It is not part of the unpatentability grounds.

medium storing instructions for data input”) where the handwritten input occurs on a mobile information device capable of wireless communication with a CPU, ROM and RAM (“wherein the data input is performed at a wireless device having a processor and a memory”). *Ward* ¶169.

**b. 9[a]: “receiving a first user input and at least a second user input;”**

*Arai* discloses or suggests this feature for the reasons discussed in §VIII.A.1.b (discussing two user inputs, 工 and 場). *Ward* ¶170.

**c. 9[b]: “wherein the first and second user input are handwritten input received on a handwriting input area of the wireless device;”**

*Arai* discloses or suggests this feature for the reasons discussed in §VIII.A.1.b (discussing receiving two handwritten inputs, 工 and 場, in “two regions 67a and 67b” for “alternatingly filling in handwritten character[s]”), and §VIII.A.6.a (explaining that the mobile information device is a “wireless device”). *Ward* ¶171.

**d. 9[c]: “determining a first sequence based on a best match of the first and second user inputs, wherein the first sequence includes at least the first input;”**

*Arai* discloses or suggests this feature. *Ward* ¶172. For the reasons discussed in §VIII.A.1.e, *Arai* determines the first sequence 工場 based on the best match of the first user input 工, and the second user input 場. *Id.* A POSITA would have

understood that this first sequence 工場 includes “at least the first input,” because it includes 工. *Id.*

**e. 9[d]: “storing the first sequence to a memory of the mobile device;”**

*Arai* discloses or suggests this feature. *Ward* ¶173. For the reasons discussed in §VIII.A.1.d, each of 工 and 揚 in the sequence 工場 are stored in the mobile device’s RAM. *Id.*

**f. 9[e]: “automatically determining that at least a portion of the sequence matches a word or phrase in a database of acceptable words and/or phrases without the user inputting a space or selecting a word; and”**

*Arai* discloses or suggests this feature. *Ward* ¶¶174-182.

For example, *Arai* discloses sending the sequence 工場 to the post-processing unit 34 for additional processing. *Arai* ¶[0146]; *see also id.* ¶[0143]. The post-processing unit 34 receives “character candidate strings” and determines “the combinations that have the highest chain probabilities ... to display the combination with the highest value.” *Id.* ¶[0114] (“The post-processing unit 34 determines, from the character candidate strings, which comprise the character codes and the evaluation values for the recognition candidates, the combinations that have the highest chain probabilities between the character strings, to change the display within the input character buffer area 61 to display the combination with the highest value as the first candidate.”).

*Arai* also discloses the use of dictionaries and chain probabilities. For example, *Arai* determines that 工場 should probably be 工場 (*id.* ¶[0148]) based on chain probabilities “calculated using a dictionary for post-processing” (*id.* ¶[0146]). *Arai* explains that the possible “combinations are, for example, ‘工場’, ‘工場’, ‘工場’, ‘工場’, ‘工場’, ‘工場’. Given this, the post-processing unit 34 determines the candidate character string with the highest chain probability among these accommodations.” *Id.* ¶[0146]. A POSITA would have understood that these six combinations comprise at least acceptable words pulled from a dictionary or database as the system would not offer non-words. *Ward* ¶177. At a minimum, a POSITA would have understood that at least the combinations with the highest values after post processing would result in a combination with acceptable words or phrases. *Id.*

As discussed in §VIII.A.1.g, *Arai* includes a specific example in which for the given sequence 工場, the post-processing unit returns 工場 as the most probable correct sequence based on chain probabilities. *See Arai* ¶[0148]; *Ward* ¶178. But *Arai* also contemplates that the post-processing unit could return any of the character strings 工場, 工場, 工場, 工場, 工場, 工場, and that it would be possible for the first sequence 工場 to be determined to have the highest chain probability. *See id.* ¶[0146]; *Ward* ¶178. A POSITA would have understood that *Arai* contemplates that any of the six combinations may have the highest chain probability, including the first sequence 工場. *Ward* ¶178.

With regards to post-processing, *Arai* discloses use of “post-processing dictionary data (dictionary data for chain probability calculation), various types of table and setting data, and the like.” *Arai* ¶[0027]. A POSITA would have understood this disclosure to encompass that the dictionary data would be stored in a database or other similar data structure. *Ward* ¶¶179-180 (citing *Baker* ¶¶[0049] (disclosing “reference database 40 that includes a dictionary”), [0072] (disclosing that the “reference database 40 can be a dictionary, thesaurus,” etc.), [0095] (same)).<sup>8</sup>

Moreover, *Arai* automatically conducts post-processing without the user having to input a space or select a word. *Ward* ¶181. *Arai*’s figure 4 describes scenarios when the system will continue post-processing versus when it will evaluate whether to stop post-processing. *Id.*; *Arai*, FIG. 4. A POSITA would have understood *Arai* to disclose or suggest that, as long as the user continues “Handwritten Character Input,” *Arai* continues post-processing on that input. *Arai*, FIG. 4 (continuation of post-processing for “Handwritten Character Input”); *Ward* ¶181. Because *Arai* continues post-processing while the user continues handwritten character input, a POSITA would have understood that *Arai* determines that at least

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<sup>8</sup> To be clear, here *Baker* is being used as evidence of a POSITA’s knowledge and the state of the art. *Baker* is not part of Ground 1.

a portion of the sequence matches a word or phrase without the user entering a space or selecting a word. *Ward* ¶181.

Accordingly, a POSITA would have understood *Arai* to disclose or suggest that the sequence 工場 could be the combination with the highest chain probability based on post-processing dictionary data or various types of table and setting data (“determining that at least a portion of the sequence matches a word or phrase in a database of acceptable words and/or phrases”) without the user entering the space key or selecting another candidate (“automatically determining ... without the user inputting a space or selecting a word”). *Ward* ¶182.

**g. 9[f]: “sending the first sequence to an application or service running on, or accessible by, the wireless device, wherein the sending comprises removing the first sequence from the memory storage buffer, and wherein the sending is performed in the absence of user editing of the first sequence”**

*Arai* in combination with *Fenwick* discloses or suggests this feature. *Ward* ¶¶183-187. As discussed in §VIII.A.6.f, *Arai* discloses or suggests a scenario in which in response to the first sequence 工場, post-processing unit 34 determines 工場 to have the highest chain probabilities. In this scenario, the *Arai-Fenwick*

combination discloses or suggests removing the sequence 工揚 from memory,<sup>9</sup> in the same manner and for the same reasons as discussed in §VIII.A.1.h. *Id.* ¶184.

A POSITA would have been motivated to combine *Arai* and *Fenwick* for the same reasons as discussed in §§VIII.A.1.d and VIII.A.1.h to send the first sequence 工揚 to an application (e.g., an electronic mail application) in the absence of the user editing the first sequence. *Id.* ¶185.

Further, as discussed in §VIII.A.6.a, the mobile information device is a wireless device, and as discussed in §VIII.A.1.i, it sends the sequence to an electronic mail application ***running on the mobile information device***. *Id.* ¶186.

Accordingly, a POSITA would have understood the *Arai-Fenwick* combination to disclose or suggest sending the first sequence 工揚 to an electronic mail application on the wireless mobile information device (“sending the first sequence to an application or service running on, or accessible by, the wireless device”), wherein 工揚 is also removed from the buffers without the user editing 工揚 (“wherein the sending comprises removing the first sequence from the memory

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<sup>9</sup> Of note, this limitation requires removal from “***the*** memory storage buffer,” but this is the first appearance of this term in claim 9. Petitioners assume that “the memory storage buffer” refers back to “a memory” in claim limitation 9[d]. *Ward* ¶184.

storage buffer, and wherein the sending is performed in the absence of user editing of the first sequence”). *Id.* ¶187.

7. **Claim 12: “The computer readable medium of claim 9 further comprising: presenting the first sequence to the user, wherein the presenting includes displaying the first sequence to the user and allowing the user to edit the first sequence.”**

*Arai* in combination with *Fenwick* discloses or suggests this claim for the reasons discussed above in §VIII.A.1.f (“presenting the first sequence to the user, wherein the presenting includes displaying the first sequence to the user and allowing the user to edit the first sequence”). *Ward* ¶188.

8. **Claim 13: “The computer readable medium of claim 9, wherein the first user input and the second user input include at least one of a Chinese character, a Japanese character, or a Korean character.”**

*Arai* in combination with *Fenwick* discloses or suggests this claim for the reasons discussed above in §VIII.A.5, as well as in §§VIII.A.1.b and VIII.A.4. *Ward* ¶189.

**B. GROUND 2: *ARAI* IN COMBINATION WITH *FENWICK* AND *BAKER* RENDERS OBVIOUS CLAIMS 9 AND 12-13**

**1. Claim 9**

**a. 9[pre] through 9[d] and 9[f]**

*Arai* in combination with *Fenwick* discloses or suggests 9[pre] through 9[d], and 9[f] for the same reasons discussed in §§VIII.A.6.a through VIII.A.6.e, and §VIII.A.6.g, respectively. *Ward* ¶190.

**b. 9[e]: “automatically determining that at least a portion of the sequence matches a word or phrase in a database of acceptable words and/or phrases without the user inputting a space or selecting a word; and”**

For the reasons discussed in §VIII.A.6.f, the *Arai-Fenwick* combination discloses or suggests this limitation, including “a database of acceptable words and/or phrases.” *Ward* ¶¶191-199. To the extent the Board disagrees that *Arai*’s disclosure encompasses that its dictionary data would be stored in a database or other similar data structure, *Arai* in combination with *Fenwick* and *Baker* discloses or suggests this limitation, including “a database of acceptable words and/or phrases.” *Id.* ¶191.

*Baker* relates “to methods and systems for word<sup>10</sup> recognition,” (*Baker* ¶[0001]), including “a [handwritten] character recognition process” (*id.* ¶[0004]). *Ward* ¶192. *Baker* also “employ[s] context and meaning to recognize a word, or a series of words.” *Baker* ¶[0001]. To perform character recognition, *Baker* teaches that it uses “known techniques” to “offer several words as choice words to replace [an] unrecognized word.” *Id.* ¶[0025]. One method of determining the unrecognized word is to use a dictionary. *See, e.g., id.* ¶¶[0037] (disclosing use of “an established reference source, such as a dictionary ... [t]o evaluate a choice word”), [0040] (disclosing that “the reference source is a conventional dictionary”). *Baker* discloses storing its dictionary as a database. *See, e.g., id.* ¶¶[0049] (disclosing a “reference database 40 that includes a dictionary”), [0072] (disclosing that the “reference database 40 can be a dictionary, thesaurus,” etc.), [0095] (same); *Ward* ¶¶193-194. More particularly, *Baker* discloses that it compares choice words to a “reference database 40 [that] can be a dictionary” (*id.* ¶[0072]), to determine context and whether the “dictionary definition” is “semantically related to the respective choice word 20” (*id.* ¶[0073]); *Ward* ¶195.

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<sup>10</sup> While *Baker* mostly refers to “word recognition” throughout the specification, it explains that the term “word” encompasses characters. *Baker* ¶[0033]; *Ward* ¶192.

A POSITA would have been motivated to use *Baker*'s teachings of using a database to store/implement the *Arai-Fenwick*'s dictionary. *Ward* ¶196. *Arai* discloses the use of a dictionary without disclosing how the dictionary is stored/implemented. *Id.*; see *Arai* ¶¶[0027], [0146]. *Baker* provides the details for how to store/implement such a dictionary (e.g., in a database). *Baker* ¶¶[0049], [0072], [0095]; *Ward* ¶196. Indeed, *Baker* discloses that a dictionary in itself may be a database. *Baker* ¶[0095]; *Ward* ¶196.

A POSITA would have found it obvious to combine *Baker* with the *Arai-Fenwick* combination because it would have amounted to applying a known technique (*Baker*'s use of a database to store/implement a dictionary) to a known device (the *Arai-Fenwick* combination that uses a dictionary to calculate chain probabilities in post processing) ready for improvement to yield predictable results (the *Arai-Fenwick-Baker* combination in which the dictionary is stored/implemented in a database). *Ward* ¶197.

The remainder of the features of this limitation would have been disclosed or suggested by the *Arai-Fenwick-Baker* combination for the reasons discussed in §VIII.A.6.f. *Ward* ¶198.

Accordingly, a POSITA would have understood the *Arai-Fenwick-Baker* combination to disclose or suggest that the sequence 工揚 could be the combination with the highest chain probability based on a post-processing dictionary data stored

in a database (“determining that at least a portion of the sequence matches a word or phrase in a database of acceptable words and/or phrases”) without the user entering the space key or selecting another candidate (“automatically determining ... without the user inputting a space or selecting a word”). *Ward* ¶199.

## **2. Claims 12 and 13**

*Arai* in combination with *Fenwick* and *Baker* discloses or suggests claims 12 and 13 for the same reasons discussed in §§VIII.A.7 and VIII.A.8, respectively. *Ward* ¶200.

## **IX. THE DISCRETIONARY FACTORS FAVOR INSTITUTING TRIAL**

### **A. 35 U.S.C. § 314(a)**

To the extent the patent owner asks the Board to exercise its discretion to deny institution despite the strong invalidity showing on the merits, the Board should decline to do so because the weight of the factors articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential) favors institution.<sup>11</sup>

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<sup>11</sup> The *Fintiv* framework should not be followed because it is legally invalid as (1) exceeding the Director’s authority, (2) arbitrary and capricious, and (3) adopted without notice-and-comment rulemaking.

## **1. Stay**

Factor 1 is neutral. Petitioners have not requested a stay but intend to do so. The PTAB has explained that it will not speculate on how any such motion would be resolved, before one is filed. *Google LLC v. Parus Holdings, Inc.*, IPR2020-00847, Paper 9 at 12 (PTAB Oct. 21, 2020); *see also Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021) (concluding that without evidence of a requested stay or consideration by the district court in the parallel litigation, this factor does not significantly impact the Board’s exercising discretion to deny institution of the IPR).

## **2. Trial Date**

The district court in the parallel litigation held a scheduling conference on March 25, 2024, and set jury selection for August 4, 2025, approximately 12 months away. EX1019. Any comparison of a projected FWD date against the scheduled trial date is speculative. *See Dish Network LLC v. Broadband iTV, Inc.*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).

Setting that aside, this Petition is filed on August 9, 2024, so a FWD would be expected by February 2026. Although this is approximately six months after the currently scheduled (speculative) trial date, this factor is not determinative or

considered in isolation. *Facebook, Inc. v. USC IP P'Ship*, IPR2021-00034, Paper 13 at 11 (PTAB Apr. 13, 2021) (“[T]his factor is not considered in isolation, but holistically along with other factors”) (citation omitted). Moreover, the Board has instituted IPR and found, on similar facts, that this factor weighs only minimally in favor of denial. *See, e.g., Google LLC, et al. v. Multimodal Media LLC*, IPR2024-00056, Paper 9 at 8 (PTAB Apr. 12, 2024) (a period of about six months between trial and the expected FWD “weighs only marginally in favor” of denial); *NetNut Ltd. v. Bright Data Ltd.*, IPR2021-01492, Paper 12 at 9-16 (PTAB Mar. 21, 2022) (instituting IPR without stipulation and copending trial date six months before FWD); *Facebook*, IPR2021-00034, Paper 13 at 11 (a period of five months between trial and expected FWD “slightly favors denial”); *CoolIT Systems, Inc. v. Asetek Danmark A/S*, IPR2021-01195, Paper 10 at 11 (PTAB Dec. 28, 2021) (a period of five months between trial and expected FWD “weighs slightly in favor” of denial); *Equipmentsshare.com Inc. v. Ahern Rentals, Inc.*, IPR2021-00834, Paper 19 at 13 (PTAB Nov. 16, 2021) (a period of seven months between trial and expected FWD “weighs somewhat in favor” of denial).

### **3. Diligence/Investment**

Factor 3 weighs strongly against discretionary denial. No substantive orders have been issued by the court in the underlying litigation, and investment in the parallel litigation will have remained low at the time of institution. *See, e.g., Hulu*

*LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 12-14 (PTAB May 19, 2021) (holding that this factor supports instituting IPR given the early stage of the district court proceedings, the lack of substantial discovery related to invalidity claims, and the petitioner’s diligent filing of the petition after receiving preliminary infringement contentions). Assuming that a Decision on Institution is issued by February 2025, much work in district court will remain. *Id.* The *Markman* hearing is scheduled for February 21, 2025, opening expert reports are due March 17, 2025, and dispositive motions are due April 28, 2025. *Id.*

#### **4. Overlap**

Factor 4 weighs against discretionary denial. Petitioners challenge claims 1-3, 7-9, and 12-13, whereas Patent Owner has alleged infringement of only claim 1. EX1018. Accordingly, a material number of the challenged claims will not be addressed by the district court. *See, e.g., Precision Planting LLC v. Maschio Gaspardo S.p.A.*, IPR2024-00008, Paper 12 at 18 (PTAB Mar. 26, 2024) (holding that despite substantial overlap in issues between the IPR petition and parallel district court action, the inclusion of claims in the petition not contested in court argues against discretionary denial due to incomplete overlap).

#### **5. Parties**

Petitioners and PO are also parties to the parallel litigation.

**6. Other considerations.**

Even if the *Fintiv* factors favor discretionary denial (which they do not), the merits are compelling here. The Office did not consider a wealth of prior art during prosecution that discloses and/or suggests the alleged invention.

Petitioners therefore respectfully submit that the *Fintiv* factors favor institution and that discretionary denial of this Petition would be neither appropriate nor equitable.

**B. 35 U.S.C. §325(d)**

The Board should likewise not exercise its discretion under §325(d) to deny institution of Petitioner's petition. There are no references presented in the unpatentability grounds that were previously considered by the Office.

**X. MANDATORY NOTICES UNDER 37 C.F.R. §42.8**

**A. Real Parties-in-Interest**

Petitioners identify themselves as the real parties-in-interest.

**1. Related Matters**

To the best of Petitioners' knowledge, the '428 patent has only been involved in the following district court litigation: *Cerence Operating Co. v. Samsung Electronics Co., Ltd. et al.*, 2:23-cv-00482-JRG-RSP (E.D. Tex.), filed October 13, 2023 ("District Court Litigation").

To the best of Petitioners' knowledge, the '428 patent has not been challenged

in any other *inter partes* review or post-grant review prior to this proceeding.

Along with Google LLC, Petitioners have also challenged Patent Owner's U.S. Patent 7,395,078 (IPR2024-00978) and U.S. Patent 8,081,993 (IPR2024-00979). Google LLC is not a co-petitioner or real party-in-interest to this Petition.

**B. Lead and Backup Counsel**

| Lead Counsel                                                                                                                                                                                                                | Back-Up Counsel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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**C. Service Information**

Please address all correspondence to lead and back-up counsel at the addresses shown above. Petitioners consent to electronic service by email at the following addresses:

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**D. Power of Attorney**

A power of attorney is filed herewith according to 37 C.F.R. §42.10(b).

**XI. FEES**

Petitioners concurrently electronically submits the required fees for this Petition. The Board is authorized to charge Arnold & Porter Kaye Scholer LLP's deposit account, No. 50-2387, for any fee deficiency.

Date: August 9, 2024

Respectfully submitted,

/Ali R. Sharifahmadian/

Ali R. Sharifahmadian (Reg. No. 48,202)  
Counsel for Petitioners

**CERTIFICATE OF COMPLIANCE**

The undersigned hereby certifies that the foregoing Petition for *Inter Partes* Review contains 10,836 words, excluding those portions identified in 37 C.F.R. §42.24(a), as measured by the word-processing system used to prepare this paper.

/Ali R. Sharifahmadian/

Ali R. Sharifahmadian (Reg. No. 48,202)  
Counsel for Petitioners

**CERTIFICATE OF SERVICE**

I certify that on August 9, 2024, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,026,428 and supporting exhibits to be served via overnight delivery on the Patent Owner at the following correspondence address of record as listed on PAIR:

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