

**A DYNAMIC HIGHLIGHTING INTERFACE OF MULTI WORD PREFIXES
OF RESULTS OBTAINED BY INCREMENTAL SEARCH WITH REDUCED
TEXT ENTRY ON TELEVISION AND MOBILE DEVICES USING A KEYPAD
WITH OVERLOADED KEYS**

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ABSTRACT

[0001] A dynamic highlighting interface of multi word prefixes of results obtained by incremental search with reduced text entry on television and mobile devices using a keypad having overloaded keys(multiple alphabets on the same physical key). The interface described in the present invention eliminates the intermediate disambiguation/prediction step in current search interfaces by dynamically displaying the results of search as the user types each character (one key press per character) with the search string prefix matches highlighted in the displayed results to inform the user of the multiple term matches generated by the ambiguous text input. Thus the user's focus is always maintained on the results. The incremental search used in conjunction with this interface does a prefix match on one or more words of the results space for a given input query word. The input query could also be a multi-word prefix query matching more than one word in the results space. The highlighting method described in the present invention obviates the need for the user to explicitly choose the intended query from all query strings generated by the ambiguous text input. The method first orders the results by single word and multi word matches followed by abbreviation matches. This results list is further ordered based on the relevance of the term matches generated by the ambiguous text input. The dynamic incremental highlighting mechanism implicitly conveys to the user the actual characters that were typed in addition to directly providing the results.

BACKGROUND OF THE INVENTION

Field of Invention

[0002] The present invention relates to a dynamic highlighting interface of multi word prefixes of results obtained by incremental search with reduced text entry on television and mobile devices using a keypad having overloaded keys (multiple alphabets on the same physical key).

Description of Related Art

[0003] The 12-key keypad (Fig. A) present in most cell phones, and recently in television remote controls, has multiple alphabets overloaded on the same key. Text entry using this keypad has required either a disambiguation step where user press each key multiple times (e.g. to choose B, user presses the “2” key twice), or a vocabulary based completion choices for a word(e.g. the T9 text input). Neither of methods are optimal interfaces for incremental search (where user gets results dynamically as each search term character is typed), in terms of the number of steps to get to the result. The deficiency of the multi-press interface is the very characteristic of the interface itself – too many key strokes. The key deficiency of the vocabulary based completion interface for search is the introduction of an additional step where the user has to make a choice from a list of all possible terms generated by the ambiguous text input. This deficiency is even more apparent for a search system where results could ideally be obtained by the entry of just a few characters. The lesser the characters, the greater the ambiguity of the input – the ambiguity decreases as the input character count increases. This fact has the undesirable consequences of diminishing the power of a search engine that has the potential to retrieve results with just a few input characters.

[0004] Hence there is a need for an interface for incremental search that can take ambiguous text input from a 12 keypad like interface and still be able to produce desired results with reduced text entry and without a disambiguation step.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Figure A illustrates a keypad in accordance with the prior art.

[0006] Fig. 1 illustrates a text entry system in accordance with one or more embodiments of the invention being used in a different range of network configurations.

[0007] Fig. 2 illustrates a television configuration to perform text entry.

[0008] Fig. 3 illustrates the simple flowchart for finding results with reduced text entry using an overloaded keypad.

[0009] Fig. 4A illustrates the different match possibilities for a single word and multi word query.

[0010] Fig. 4B illustrates ordering criteria for results.

[0011] Fig. 5 illustrates an embodiment interface of the invention where the results of incremental search are displayed. A 12-key keypad is used in this interface for illustrative purposes. In this illustration user has entered a single word query.

[0012] Fig. 6 illustrates an embodiment interface of the invention where the results of incremental search are displayed. A 12-key keypad is used in this interface for illustrative purposes. In this illustration user has entered a multi word query.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Preferred embodiments of the present invention and their advantages may be understood by referring to Figs. 1-6, wherein like reference numerals refer to like elements.

[0014] Referring to **Fig. 1**, an overall system for text entry on a television in accordance with one or more embodiments of the invention is illustrated. A server farm 101 serves as the source of media data with the network 102 functioning as the distribution framework. The distribution could be a combination of wired and wireless connections. The television 103 is coupled with a remote control 104 having an overloaded keypad (**Fig. A**).

[0015] Referring to **Fig. 2**, in one configuration, a television 103 has display 201, a processor 202, volatile memory 203, text input interface 204 which is through a wireless remote control 104, remote connectivity 205 to a server 101 through a network 102, a persistent storage 206.

[0016] Referring to **Fig. 3**, user enters a character using an ambiguous text input interface (**Fig. A**) where a single key press is performed for each character 301. The incremental search scheme displays results that match the input character 302. Since the input is ambiguous the match of results would be even more than the match for a single character. To address this increased match, the underlying search method adopts in addition to a relevance based ordering scheme other criteria such as character count based subspace biasing. On the resultant list it finally applies an ordering criteria based on the lexical match with single term prefixes, multiple term prefixes, and lastly abbreviation matches. User continues to enter more characters is the desired result is not reached 303.

[0017] **Fig. 4A** illustrates the two broad categories of input queries and the various potential matches they could have in the results space. A single word query 401 can either match a single word term 403 or an abbreviation representing multiple words 405. A multi word prefix query 402 can match a multi word term 404 or an abbreviation presenting multiple words. The matches could be a direct match on terms representing a title (e.g. **Gods must** be crazy) or it could be matches on different terms (e.g. **Tom Hanks Volleyball**). As described earlier, these matches are then order in decreasing relevance 409 of single word term 406 and multi word term matches 407 followed by multi word abbreviation matches 408.

[0018] **Fig.5** illustrates the results for a single word text input “866” (501) using 12-key keypad (502). The single word term matches(503 and 504) are ordered before abbreviation matches 505.

[0019] **Fig. 6** illustrates the results for a multiword text input “866 2” (601) using a 12-key keypad 602. As discussed earlier, the multi word term matches 603 are ordered above multi word abbreviation matches.

PRIOR ART

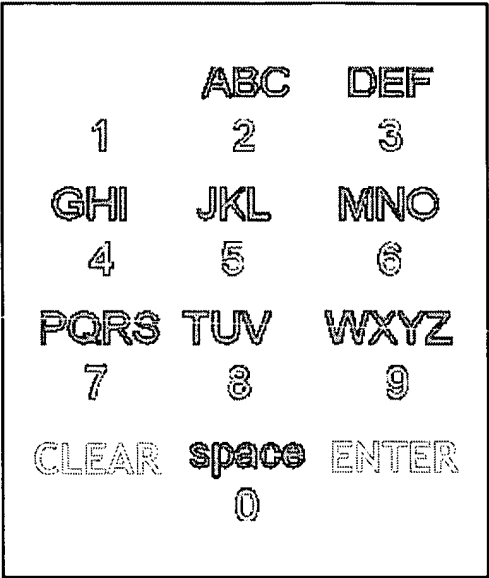


FIG. A

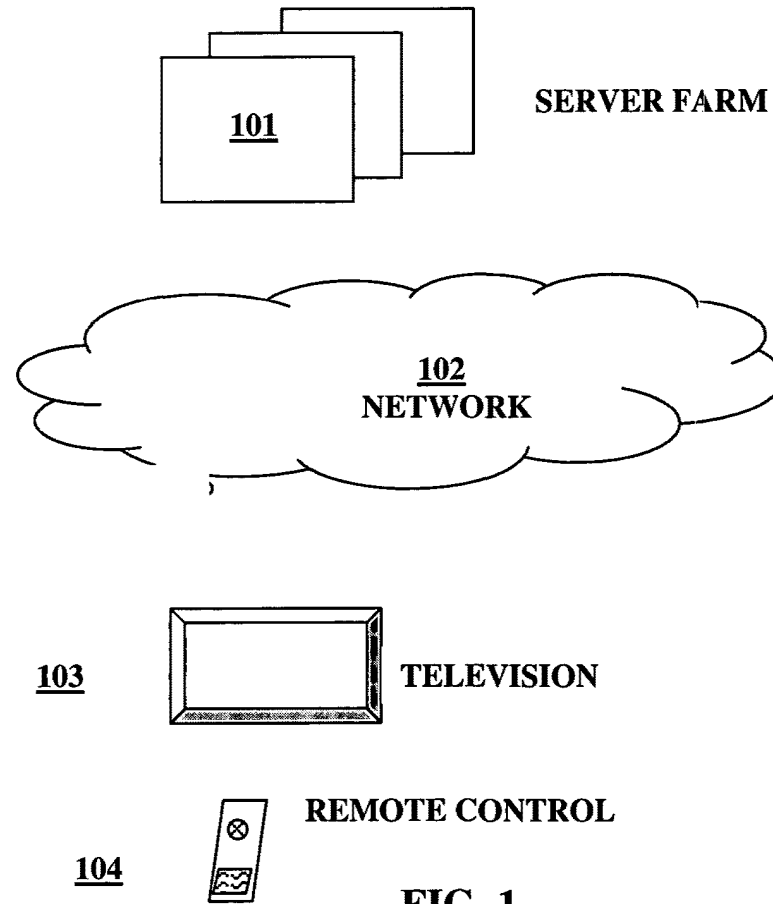


FIG. 1

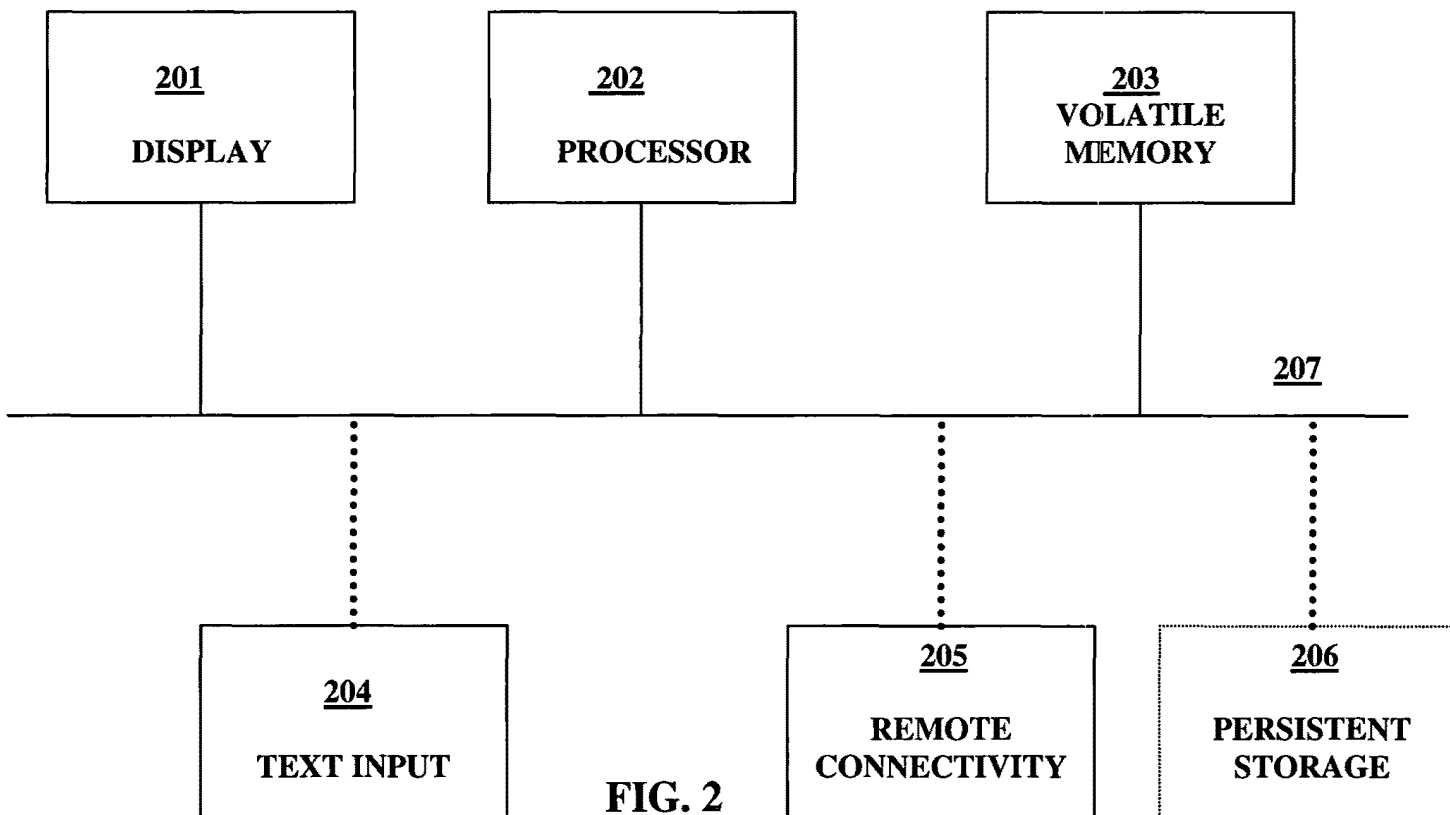


FIG. 2

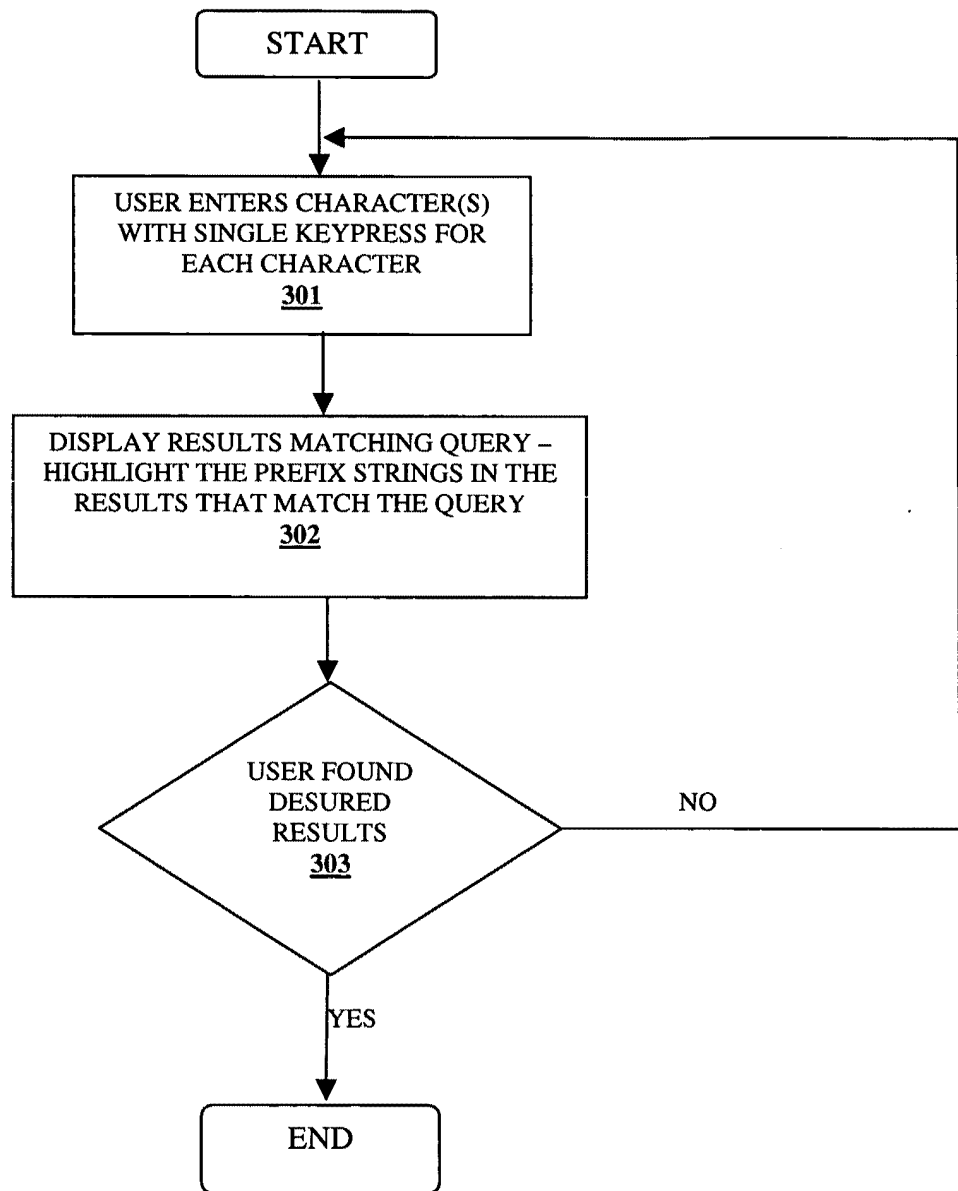


FIG. 3

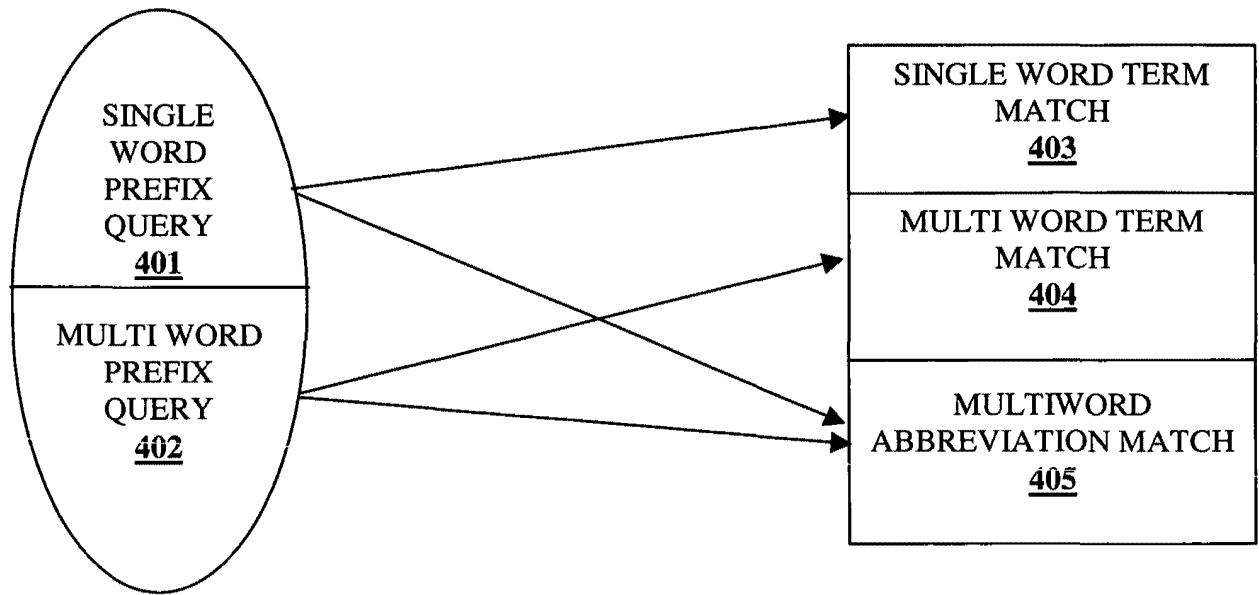


FIG. 4A

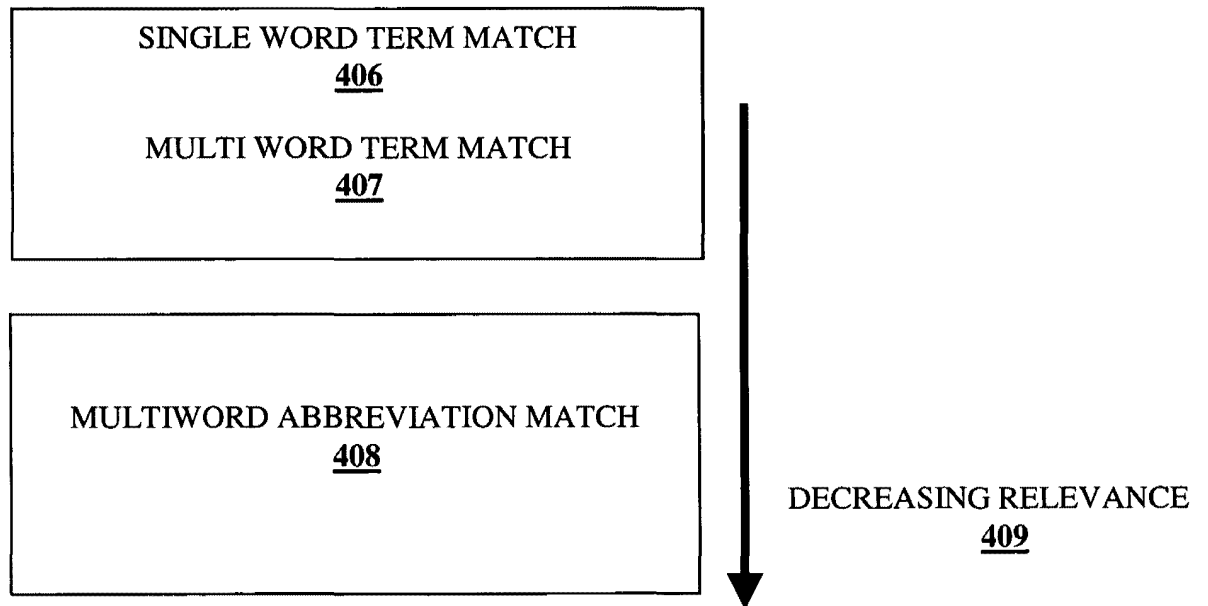


FIG. 4B

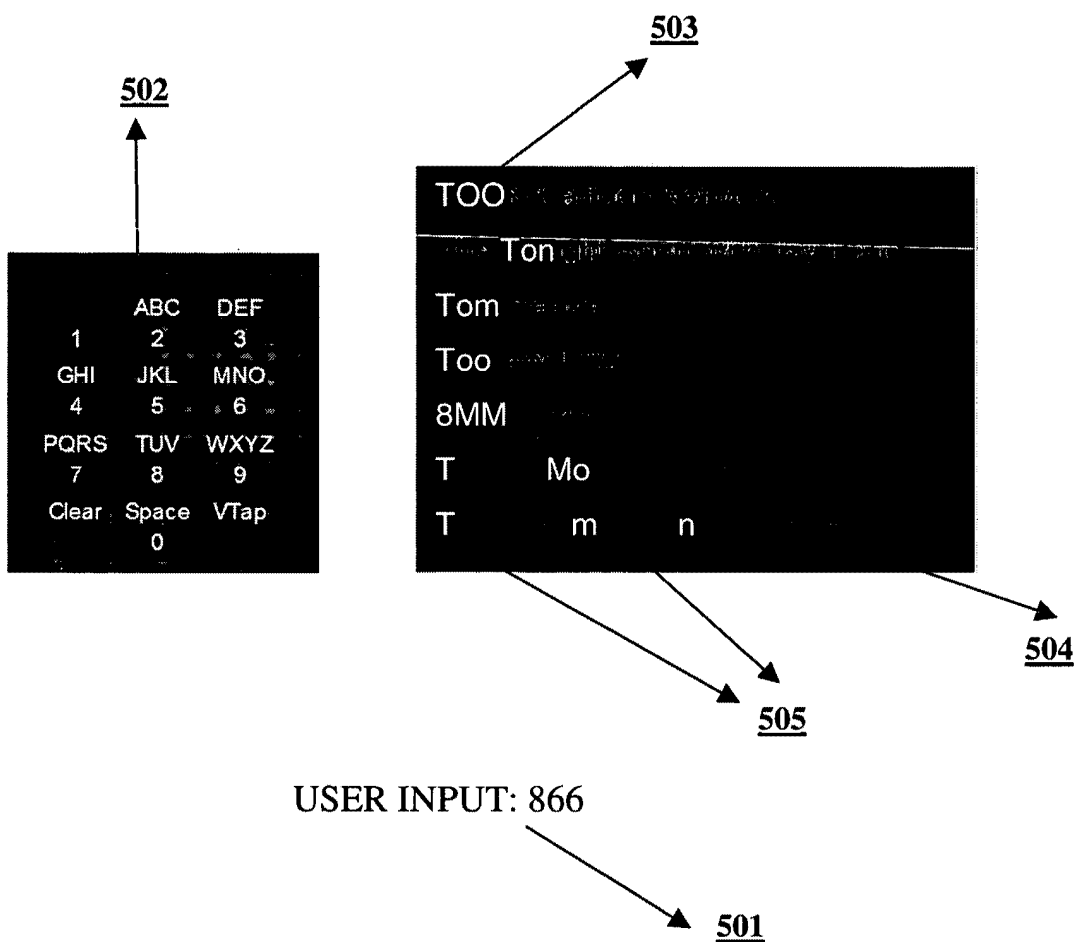


FIG. 5

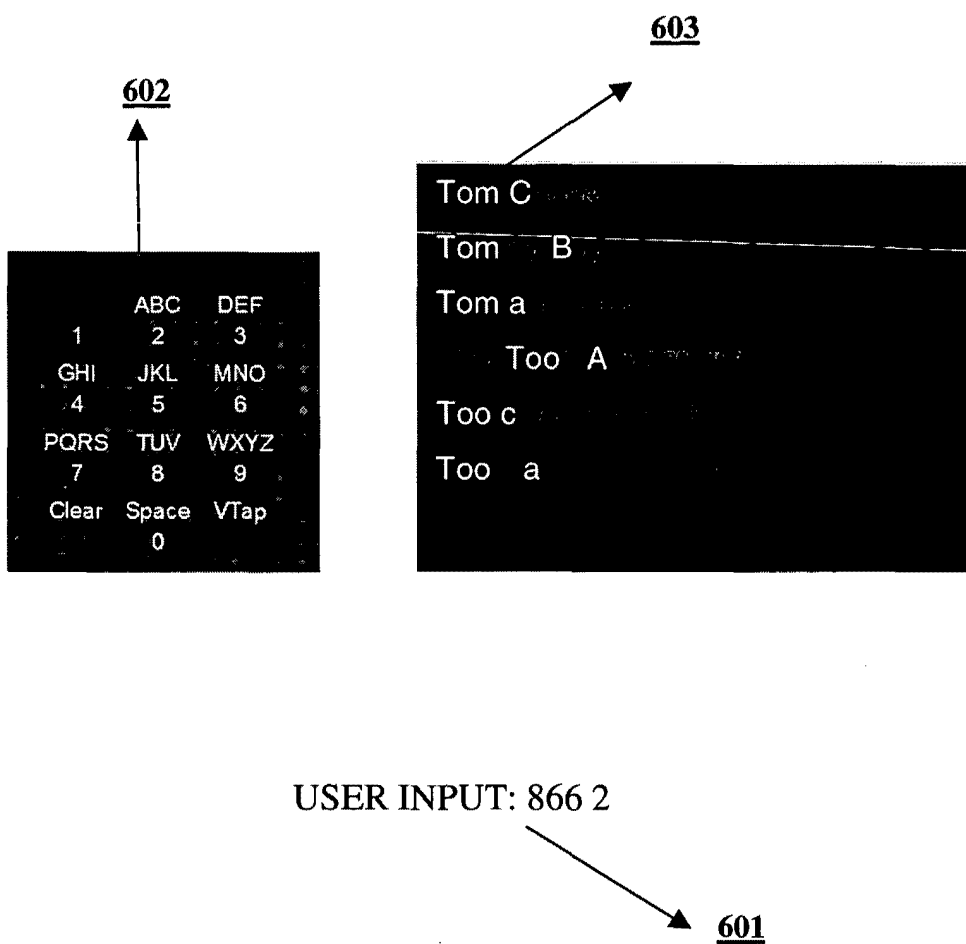


FIG. 6