quadgrams for the phrase "al pacino" include "a_pa", "al_p", "a_pc", etc. These variants help compensate for typical orthographic and typographic misspellings that users make. These errors are in essence errors of insertion (e.g., "alledge" instead of "allege"), deletion (e.g., "tomorow" instead of "tomorrow", "Johnson" instead of "Johnston"), substitution (e.g., "crutial" instead of "crucial", "edlipse" instead of "eclipse"), and transposition (e.g., "sienfeld" instead of"seinfeld"), which generate phonetic equivalents of the intended search term. In some embodiments, N-gram prefixes can be formed by limiting the number of characters dropped from the front of the descriptive term or phrase, e.g., dropping only the first character. Thus, trigram prefixes for the term "pacino" can include "pci", "pac", "aci", and "acn". However, in this example, "cin" and "cio" would not be generated because more than the first letter would need to be dropped.

[0032] In accordance with one or more embodiments of the invention, at step **303**, an inverted list is created for prefix and fragment strings of single and multiple term combinations as well as unordered term combinations determined in step **300** that went through the variants generation process in steps **301** and **302**. One example of an inverted list is a collection of content items, related descriptive tenns and phrases, and their error-resilient variants that is indexed on the descriptive terms and phrases and their variants. The inverted list entries are all mapped to their numeric equivalents **304** where the mapping is based on the keypad layout, an example of which is shown in FIG. A. For instance, a letter "A", "B", or "C" would be mapped to a numerical "2", while a letter "J", "K", or "L" would be mapped to a numerical "5". Other device specific mappings are used for keypads that have different overloaded key layouts. Thus, when the user enters input text, the device type is used to determine the choice of mapping for performing incremental search.

[0033] The users may also press incorrect adjacent keys on the keypad of the interface device when attempting to enter a search tenn prefix. For example, the user may wish to enter the prefix "sei" for the descriptive term "seinfeld". The encoded string for this prefix using the keypad shown in FIG. A is "734". However, the user may accidentally enter "731" because the "1" and "4" keys are adjacent. Therefore, in embodiments of the invention, step **304** also includes adding typographic error variants of the encoded prefixes to the inverted list. These typographic error variants are compiled based on which keys are adjacent on the keypad layout of the user entry device. Thus, the "1", "5", and "7" keys can be substituted for the "4" key when building the typographic error variants, while the "3", "6", and "9" keys would not be. The diagonally adjacent keys "2" and "8" can also be substituted for the "4" key, depending upon the spacing of the keys and the likelihood of the user accidentally pressing them. In addition, transposition error variants can be generated based on the encoded strings. In the alternative, transposition error variants can be generated during the N-gram generation process.

[0034] The encoded inverted list is then converted to trie data structure **305**. A trie data structure, also known as a prefix tree, is an ordered tree structure that is used to store strings. All the descendents of any one node of the trie data structure have a common prefix of the string associated with that node. In the illustrative embodiment, trie data structure **305** indexes prefix variants of all terms and phrases (e.g., "a_, ap_, apo_" for "apocalypse" where "_" represents space character) and variants of unordered term combinations (e.g., "t_cruise", to_cruise", "c_tom", "cr_tom"). The length of the prefix for each term that is indexed and the number of terms in the term combinations whose prefixes are indexed are configurable parameters, which is determined based on memory available and retrieval time desired (memory and retrieval time being a trade-off). This static multiple term prefix indexing builds error resilience into the system. The resilience is achieved by indexing the prefixes of the variants of the original term and term combinations.

[0035] FIG. **4** illustrates the operations performed, in one or more embodiments of the invention, on each terms space (e.g. an encoded inverted list), as the user enters a multiple prefix query string **400** where the input string includes ambiguous encoded text (e.g. such as that created using the keypad shown in FIG. A). The input string would then be used to descend down a trie data structure as described in FIG. **5** (step **401**). One example of a trie structure used for incremental searching is described in U.S. patent application Ser. No. 11/136,261, filed May 24, 2005, entitled "Method And System For Performing Searches For Television Content Using Reduced Text Input" which is incorporated by reference herein in its entirety. During this descend down the trie, a multi-prefix query string with errors may be compensated for, by the error compensation scheme described above.

[0036] For example, an input of the form "GN NV" would yield the results for "gun navarone" with the error compensation accomplished by the pre-computation scheme described earlier. If the desired result is not found (step **402**) and the returned results fall below a certain limit or the upper limit for trie descent is reached (step **403**), then a dynamic intersection is performed (step **404**). The dynamic intersection uses the information from the multiple prefix strings to compensate for the error in the input of an individual term; the intersection matches user-entered prefixes to entries in the inverted list in order to find descriptive terms. If the user entry contains errors, distance functions known in the art are used to assign penalties for each error. For example, a penalty value is assigned for each addition, deletion, substitution, or transposition that must be performed to make an input match a term or phrase prefix in the inverted list. This comparison can be done on disambiguated input or on the encoded ambiguous input. In addition, these functions are used in conjunction with the error-resilient entries in the inverted list to approximate what terms the user intended to enter. If the total penalty exceeds a threshold, the input string is not considered for further processing.

[0037] As described above, each descriptive term is associated with items that may be of interest to the user. Thus, each user-entered prefix will have a set of items associated with the prefix. These sets are intersected to reveal items that are associated with all (or many) of the prefixes. These items are then presented to the user. Each set of items associated with the prefixes may be ordered and/or ranked according to various criteria, e.g., popularity of the item, geographic relevance of the item given the user's location, temporal relevance of the item, etc. The techniques described in U.S. patent application Ser. No. 11/246,432, filed Oct. 7, 2005, entitled "Method and System for Incremental Search with Reduced Text Entry Where the Relevance of Results is a