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(54) **SYSTEMS, METHODS, SOFTWARE, AND INTERFACES FOR MULTILINGUAL INFORMATION RETRIEVAL**

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CPC ***G06F 17/30616*** (2013.01); ***G06F 17/30669*** (2013.01); ***G06F 17/30864*** (2013.01)

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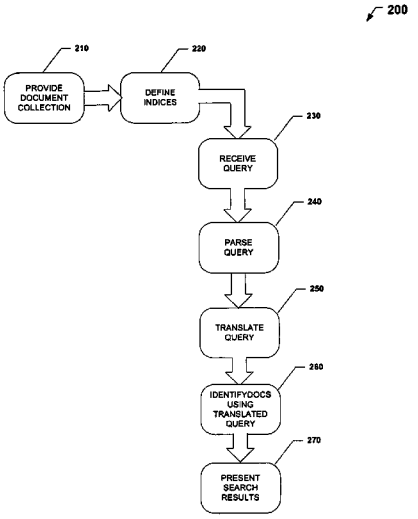
(57) **ABSTRACT**

The present inventors have a devised one or more novel methods, systems, and interfaces for facilitating multi-lingual searches. One exemplary method entails creating multiple language-specific indices for a collection of documents, with each index including stemmed and non-stemmed versions of terms from the documents. Users submit queries that are associated with a set of one or more target languages. Query processing entails translating original and stemmed versions of each term in a query into each of the target languages, using one or more techniques that each yield a set of potentially equivalent query terms. Each set of potentially equivalent query terms is then processed against the corresponding language-specific index, using a conventional monolingual search technique, such as a Boolean or natural language query, to identify documents from the collection. The resultant documents are presented to the user in language groupings or by computed relevance.

25 Claims, 2 Drawing Sheets



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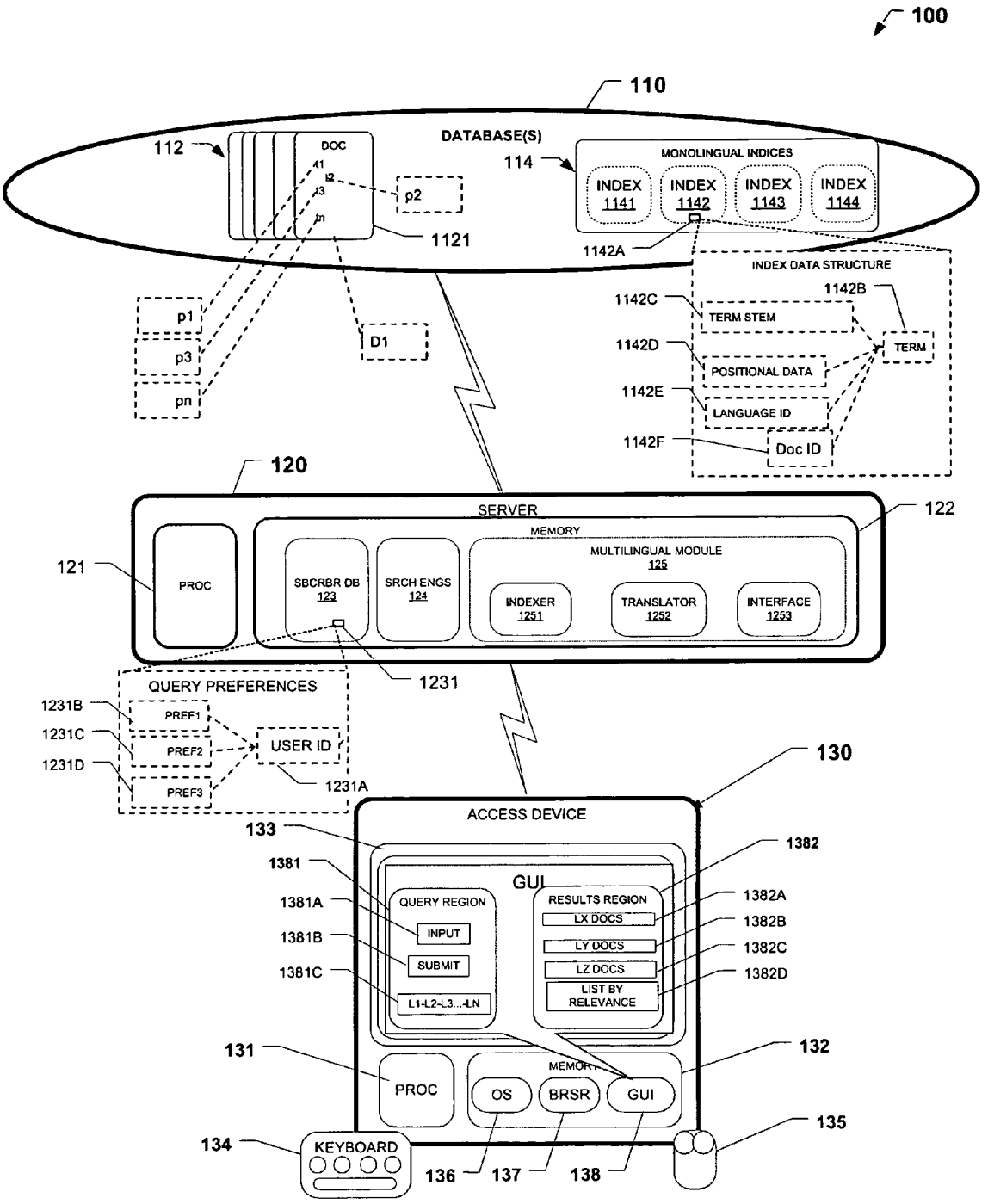
100
110
DATABASE(S)
112
DOC
i1
i2
i3
in
p2
1121
114
MONOLINGUAL INDICES
INDEX 1141
INDEX 1142
INDEX 1143
INDEX 1144
1142A
INDEX DATA STRUCTURE
1142B
1142C
TERM STEM
TERM
1142D
POSITIONAL DATA
1142E
LANGUAGE ID
1142F
Doc ID
p1
p3
pn
D1
120
SERVER
122
MEMORY
121
PROC
SBCRBR DB 123
SRCH ENGS 124
MULTILINGUAL MODULE 125
INDEXER 1251
TRANSLATOR 1252
INTERFACE 1253
1231
QUERY PREFERENCES
1231B
PREF1
1231C
PREF2
1231D
PREF3
USER ID
1231A
130
ACCESS DEVICE
133
1382
1381
GUI
1381A
QUERY REGION
RESULTS REGION
1382A
INPUT
LX DOCS
1382B
1381B
SUBMIT
LY DOCS
1382C
1381C
LZ DOCS
1382D
L1-L2-L3...-LN
LIST BY RELEVANCE
131
132
PROC
MEMORY
OS
BRSR
GUI
135
134
KEYBOARD
136
137
138

FIGURE 1

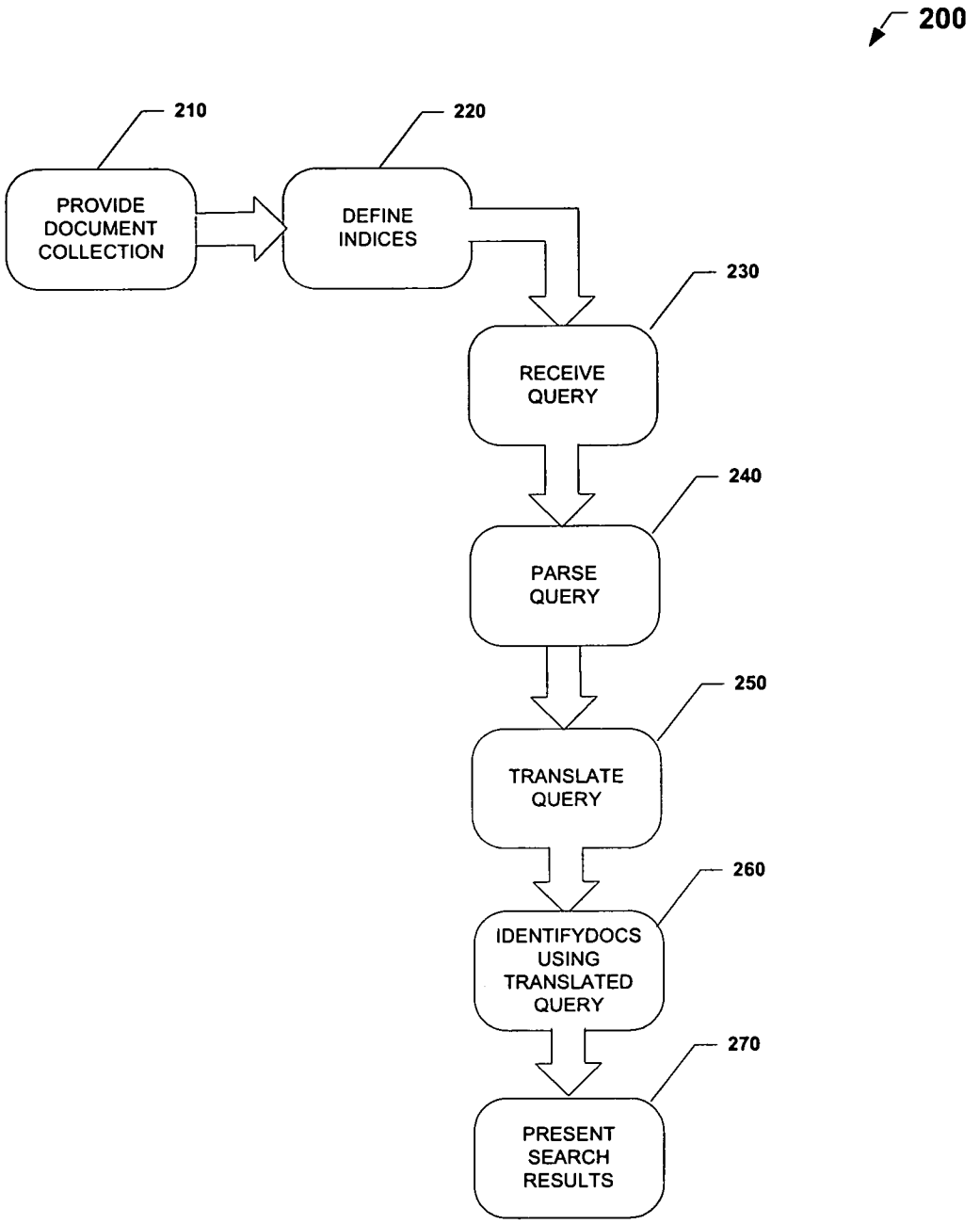
200
210
PROVIDE DOCUMENT COLLECTION
220
DEFINE INDICES
230
RECEIVE QUERY
240
PARSE QUERY
250
TRANSLATE QUERY
260
IDENTIFYDOCS USING TRANSLATED QUERY
270
PRESENT SEARCH RESULTS

FIGURE 2

SYSTEMS, METHODS, SOFTWARE, AND INTERFACES FOR MULTILINGUAL INFORMATION RETRIEVAL

RELATED APPLICATION

The present application claims priority to U.S. Provisional Application 60/641,669 which was filed on Jan. 4, 2005, and which is incorporated herein by reference.

TECHNICAL FIELD

Various embodiments of the present invention concern information retrieval, particularly multi-lingual or cross-lingual information retrieval systems, methods, and software.

BACKGROUND

The importance of search engine technology has grown significantly in the last decade or so, mirroring the expansion and usage of the Internet. When a user clicks a search button, a search engine hunts through tens of millions of terms to find terms and corresponding documents that satisfy the query. But, this superficial simplicity obscures the complexity of the underlying search technology, because good search engines do not generally stop with a simple matching of query terms.

To appreciate the complexity, consider that search engines fall generally into one of two categories: monolingual or multilingual. Monolingual search engines receive queries or search requests in one language, and retrieve documents in the same language. For example, Spanish language queries yield Spanish language documents. Monolingual search engines typically process a query by breaking, or parsing, it into individual terms, and then reducing or "stemming" each individual term to its root or base form. The stemmed terms, sometimes in combination with equivalent terms, are then used to find relevant documents. Thus, for example, a search for documents containing the word 'cat' also retrieves documents that include the term cats, cat's, cats', or even feline.

Multilingual searches engines, on the other hand, receive search requests in one language, such as German, and retrieve relevant information in another language, such as French or English. In such cases, the challenge of effective searching is more complex, because in non-English languages, nouns can be masculine, feminine, or neutral; verbs change form to show number (singularity or plurality), to show tense (present, past, future and so forth), and to show person—first ("I"), second ("you"), and third ("he/she/it."); adjectives change form based on the nouns they modify; and character punctuation, such as accent or other diacritical marks, significantly affect meaning. While stemming resolves these complexities in a monolingual search, stemming alone cannot address the added complexities of linguistic conflicts across languages, and in some cases, may even interfere. For example, gender in most languages can be normalized to a single stem without loss of significant meaning; however, there are some languages, such as Portuguese, that require gender to be retained in order to maintain meaning. As a result, multilingual search engines typically rely on some method of translating queries and possibly documents into a common language.

Although there is continuing research in this area, the present inventors have recognized a need for alternative methods, systems, and interfaces for facilitating multi-lingual searches.

SUMMARY

To address this and/or other needs, the present inventors have a devised one or more novel methods, systems, and interfaces for facilitating multi-lingual searches. For example, one exemplary method entails creating multiple language-specific indices for a collection of documents, with each index including stemmed and non-stemmed versions of terms from the documents. Each term in the index is associated with a document identifier, a position indicator, and a language indicator. The exemplary method further entails receiving a query and a set of one or more target languages from a user. The query is parsed into one or more terms or phrases, with each term or phrase associated with a specific language.

The original and stemmed versions of each term or phrase are then translated into the target languages, using one or more techniques that each separately yields a set of one or more potentially equivalent query terms. Exemplary techniques include using a database of pre-translated documents, an electronic language dictionary, an automated translator, and pivot language. Each set of potentially equivalent query terms is then taken as a separate query and processed against the corresponding language-specific index, using a conventional monolingual search technique, such as a Boolean or natural language query, to identify documents from the collection. The resultant documents are presented to the user in language groupings or by computed relevance.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of an exemplary multilingual information retrieval system corresponding to one or more embodiments of the present invention.

FIG. **2** is a flow chart of an exemplary method of operation which corresponds to one or more embodiments of the present invention

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENT(S)

This description, which references and incorporates the above-identified Figures, describes one or more specific embodiments of an invention. These embodiments, offered not to limit but only to exemplify and teach the invention, are shown and described in sufficient detail to enable those skilled in the art to implement or practice the invention. Where appropriate to avoid obscuring the invention, the description may omit certain information known to those of skill in the art.

Exemplary Multilingual Information-Retrieval System

FIG. **1** shows an exemplary online multilingual information-retrieval system **100**, which incorporates teachings of the present invention. System **100** includes one or more databases **110**, one or more servers **120**, and one or more access devices **130**.

Databases **110** include a set of multilingual documents **112** and corresponding set of monolingual indices **114**.

Documents **112**, in the exemplary embodiment, include English, French, German, and Japanese documents. (Other embodiments may include other languages, and in some embodiments, some of the documents are multilingual, meaning that one or more portions, such as a paragraph, are written in a different language than other portions of the documents.) Each of the documents, of which document **1121** is representative, is associated with a unique document identifier, such as D**1**, and includes a number of terms, such as terms t**1**, t**2**, t**3**, . . . , tn, with each term having a corresponding

position within the document, such as p**1**, p**2**, p**3**, . . . , pn. Multilingual documents **112** are associated logically with monolingual indices **114**.

Monolingual indices **114** include an English index **1141**, a French index **1142**, a German index **1143**, and a Japanese index **1144**, each of which has a similar structure. Representative of the other indices, French index **1142** includes a number of data structures, such as representative data structure **1142**A. Data structure **1142**A includes a term **1142**B in its original form from at least one of documents **112**, a normalized or stemmed version of the term **1142**C, positional data **1142**D, language identifier **1142**E, and document identifier **1142**F. Assigning document terms to these language-specific indexes not only enables the system to discern the language type of each document term, both in its original form and its stemmed form, but also enables the system to find each term in a document, with all the searching options available in conventional monolingual searches. In some embodiments, the indices are logical portions of a single index, whereas in other embodiments, each index is logically independent of the others and may reside in separate storage locations or devices.

Databases **110**, which take the exemplary form of one or more electronic, magnetic, or optical data-storage devices, include or are otherwise associated with respective indices (not shown). Each of the indices includes terms and phrases in association with corresponding document addresses, identifiers, and other conventional information. Databases **110** are coupled or couplable via a wireless or wireline communications network, such as a local-, wide-, private-, or virtual-private network, to server **120**.

Server **120**, which is generally representative of one or more servers for serving data in the form of webpages or other markup language forms with associated applets, ActiveX controls, remote-invocation objects, or other related software and data structures to service clients of various "thicknesses." More particularly, server **120** includes a processor module **121**, a memory module **122**, a subscriber database **123**, a search module **124**, and a multilingual module (or software) **125**.

Processor module **121** includes one or more local or distributed processors, controllers, or virtual machines. In the exemplary embodiment, processor module **121** assumes any convenient or desirable form.

Memory module **122**, which takes the exemplary form of one or more electronic, magnetic, or optical data-storage devices, stores subscriber database **123**, search engines **124**, and multilingual module **125**.

Subscriber database **123** includes subscriber-related data for controlling, administering, and managing pay-as-you-go or subscription-based access of databases **110**. In the exemplary embodiment, subscriber database **123** includes one or more preference data structures, of which data structure **1231** is representative. Data structure **1231** includes a customer or user identifier portion **1231**A, which is logically associated with one or more search preferences, such as preferences **1231**B, **1231**C, and **1231**D. Preference **1231**B and **1231**C include respective default value governing whether search results include documents from first and second languages, such as German and Japanese. Preference **1231**D includes a default value governing whether search results are presented based strictly on relevance, or whether they are grouped via language. (In the absence of a temporary user override, for example, an override during a particular query or session, the default value for the search preferences governs.)

Search module **124** includes one or more search engines and related user-interface components, for receiving and processing queries against one or more of databases **110**, with use of indices **114**. In the exemplary embodiment, one or more search engines associated with search module **124** provide Boolean, tf-idf (term frequency-inverse document frequency), and/or natural-language search capabilities.

Multilingual module **125** includes an indexer module **1251**, a translator module **1252**, and an interface module **1253**. Indexer module **1251** comprises machine readable and/or executable instructions for processing documents **112** and defining or updating indices **114**. Translator module **1252** comprises machine-readable and/or executable instructions for translating and/or extending query terms (or concepts) submitted in a user query to multiple sets of equivalent query terms in one or more corresponding target languages. Interface module **1253** comprises machine readable and/or executable instructions for wholly or partly defining web-based user interfaces (such as a user interface **138**) over a wireless or wireline communications network on one or more accesses devices, such as access device **130**.

Access device **130** is generally representative of one or more access devices. In the exemplary embodiment, access device **130** takes the form of a personal computer, workstation, personal digital assistant, mobile telephone, or any other device capable of providing an effective user interface with a server or database. Specifically, access device **130** includes a processor module **131**, a memory **132**, a display **133**, a keyboard **134**, and a graphical pointer or selector **135** (also known as a mouse).

Processor module **131** includes one or more processors, processing circuits, or controllers. In the exemplary embodiment, processor module **131** takes any convenient or desirable form. Coupled to processor module **131** is memory **132**.

Memory **132** stores code (machine-readable or executable instructions) for an operating system **136**, a browser **137**, and a graphical user interface (GUI)**138**. In the exemplary embodiment, operating system **136** takes the form of a version of the Microsoft Windows operating system, and browser **137** takes the form of a version of Microsoft Internet Explorer. Operating system **136** and browser **137** not only receive inputs from keyboard **134** and selector **135**, but also support rendering of GUI **138** on display **133**. Upon rendering, GUI **138** presents data in association with one or more interactive control features (or user-interface elements). (The exemplary embodiment defines one or more portions of interface **138** using applets or other programmatic objects or structures from server **120**.)

More specifically, graphical user interface **138** defines or provides one or more display regions, such as a query or search region **1381** and a search-results region **1382**. Query region **1381** is defined in memory and upon rendering includes one or more interactive control features (elements or widgets), such as a query input region **1381**A, a query submission button **1381**B, and a language selection region **1381**C. Query input region **1381**A also allows a user to designate or identify the language of one or more of the terms input in the query region. Language-selection region **1381**C allows a user to select, using check boxes, radio buttons, or pull-down menus, one or more languages in which to search.

Search-results region **1382** is also defined in memory and upon rendering includes one or more interactive control features **1382**A-**1382**D. Control features **1382**A-**1382**C correspond to one or more monolingual document lists and enable a user to selectively access or retrieve one or more corresponding documents relevant to the governing query from databases **110** via server **120**. Each of control features **1382**A-**1382**C includes a respective document identifier or label, such as LX DOCS, LY DOCS, and LZ DOCS, identifying

respective languages and/or the number of corresponding documents. In some embodiments, the control feature is incorporated with a folder icon or associated with a particular language tab. Control feature **1382**D enables a user to selectively change the contents of results region **1382** to a relevance mode, where the documents found to be relevant to the governing query are listed in rank order of relevance.

In the exemplary embodiment, each of these control features of interface **138** takes the form of a hyperlink or other browser-compatible command input. Although FIG. **1** shows query region **1381** and results region **1382** as being simultaneously displayed, some embodiments present them at separate times.

Exemplary Methods of Operating a Multilingual Information-Retrieval System

FIG. **2** shows a flow chart **200** of an exemplary method of operating a multilingual information retrieval system, such as system **100** in FIG. **1**. Flow chart **200** includes blocks **210**-**270**, which are arranged and described serially. However, other embodiments execute two or more blocks in parallel using multiple processors or processor-like devices or a single processor organized as two or more virtual machines or sub processors. Other embodiments also alter the process sequence or provide different functional partitions or blocks to achieve analogous results. Moreover, still other embodiments implement the blocks as two or more interconnected hardware modules with related control and data signals communicated between and through the modules. Thus, the exemplary process flow applies to software, hardware, and firmware implementations.

At block **210**, the exemplary method begins with provision of a multilingual document collection—that is a collection comprising two or more documents written in two or more languages. In the exemplary embodiment, the document collection takes the form of one or more databases, such as database **110** in FIG. **1**, which includes English, French, German, and Japanese documents. In the exemplary embodiment, each document is treated as a single unit with a single identifier no matter how many languages it contains, and each term in the document, regardless of its language, is associated with that single document. The assignment of consecutive word positions across language boundaries within the same document provides full text searching across language types. The process of tokenizing a document, that is, finding the words in the document, is language specific, meaning that each document (or document portion) is tokenized with a tokenizer consistent with its language. The exemplary method continues at block **220**.

Block **220** entails defining a set of one or more language-specific indices for the document collection, using for example indexer **1251** in FIG. **1**. In the exemplary embodiment, this entails tokenizing each of the documents in the collection, eliminating stop words, and then stemming the remaining terms. Stemmed and non-stemmed versions of the remaining terms are then stored in association with one or more document identifiers for uniquely identifying the corresponding collection document that contain the terms, and with one or more positional indicators for indicating positions of the terms in the documents. Additionally, a language indicator or identifier is stored in association with the terms to facilitate language-specific searching and to effectively define logical language-specific indices including a number of data structures, such as data structure **1142**A in FIG. **1**. Some embodiments may simply store terms in language-specific locations or files. After the one or more indices are defined, processing continues at block **230**.

Block **230** entails receiving a query from a user. In the exemplary embodiment, this entails a user directing a browser in a client access device, such as device **130** in FIG. **1**, to an internet-protocol (IP) address for an online information-retrieval system, such as system **100**, and then logging onto the system using appropriate credentials. Successful login results in a web-based search interface, such as interface **138** in FIG. **1** (or one or more portions thereof) being output from server **120**, stored in memory **132**, and displayed by client access device **130**.

The user then defines the query by interacting with the interface, specifically entering terms of the query into a query input region and selecting one or more of the listed target languages for use in directing the query to appropriate databases or portions thereof; and finally actuating a query submission feature to transmit the query to a server, such as server **120** for processing. In some embodiments, the user also identifies the language of the query, or the language of one or more portions, such as words or phrases, in the query. The identification of language may be done automatically and/or with user assistance, such as confirmation of automatically generated and presented language identifiers. The exemplary embodiment supports the following use cases:

User Query	Target Language for Search Results
One language	Same language as query
One language	One different language
One Language	Many different languages
One Language	Same language plus different languages
Multiple Languages	Same Languages as query
Multiple Languages	One different language
Multiple Languages	Many different languages
Multiple Languages	Same languages plus many different languages

Execution then advances to block **240** (as shown in FIG. **2**.)

Block **240** parses the query into one or more query terms, with each query term associated with a corresponding language identifier. In the exemplary embodiment, this entails parsing the query using conventional language-specific parsing techniques and eliminating language-specific stop words. The exemplary embodiment also entails stemming the words using language-specific stemmers to define stemmed versions of the query terms. Execution of the exemplary method continues at block **250**.

Block **250** translates the original and stemmed versions of each query term into each of the target languages to define respective sets of one or more equivalent query terms; In the exemplary embodiment, translating the original and stemmed versions of each term includes identifying equivalent query terms using each of the following: a lexicon built from a database of pre-translated documents (that is, a parallel corpus), an electronic language dictionary, an automated translator, and a pivot language.

For lexicons built from parallel corpora, the exemplary embodiment considers a parallel corpus to be a body of documents where each document is represented in at least two languages A and B. Exemplary parallel corpora include legal documents in the European Union, which are commonly provided in at least German, French, and English. Patents are also sometimes translated into multiple languages and can also serve as parallel corpora. The parallel corpora can be used, in combination with an IBM statistical machine translation training phase and a similarity thesaurus, to generate a

one-way lexicon of terms where a term has one to many weighted translations. That is each term a →(maps or translates to equivalent query terms) b_1^w, b_2^w, b_3^w. The electronic dictionary provides a one-way lexicon of terms where each term has one or more translations: for example, a →b_1, b_2. Automatic machine translation is used in the exemplary embodiment for natural language translation of a phrase or sentence from language A to B: for example. "a_1 a_2"→b_1. A pivot language may be used to create the associations between two languages that have each established associations to the pivot language. If a term or concept in language A has an associated term or concept in language B, and if the same term or concept in language A has its associated term concept in language C, then the concept in language B has an associated concept in language C. In other words, if a→b and a→c, then b→c.

Thus, in the exemplary embodiment, each query term (concept or phrase) is associated with 2× sets of equivalent query terms, with X being the number of target languages. Moreover, each set of equivalent terms results from as many as four possible translation or equivalence-determination techniques. Integrating several translation methodologies or techniques is believed to result in more accurate and meaningful translations with fewer ambiguities. Execution continues at block **260**.

Block **260** entails identifying one or more sets of documents from the document collection for each of the target languages, with each set identified based on the equivalent query terms for the corresponding target language. In the exemplary embodiment, this entails use of a Boolean or natural-language search engine to process each of the sets of equivalent query terms using a corresponding one of the language specific indices **114**. Each of the equivalent monolingual queries is resolved by relying on the OR operator to provide hits for one or more of the language specific terms in a document. In some embodiments, other logical operators may be used to combine the various sets of equivalent monolingual query terms. For natural-language searching, identifying each set of documents includes determining a relevance score for documents based on the equivalent query terms, and then identifying documents having a relevance score exceeding a predetermined threshold.

Block **270** entails presenting a graphical user interface listing the identified set of documents in groups based on corresponding language and/or in rank order of relevance. In the exemplary embodiment, this entails displaying a listing of the identified set of documents on interface **138**, specifically search-results region **1382**. Whether the set is displayed in language groupings or in rank order of relevance (or other criteria such as date) is governed by user preference stored in subscriber database **123**. Some embodiments include a command feature on the interface, enabling a user to selectively alter the display mode from the language-grouping mode to the relevance mode and vice versa. In some embodiments, the relevance mode results in normalization of the scores between documents of different language types. In addition, search concepts are weighted by language type.

CONCLUSION

In furtherance of the art, the present inventors have presented various embodiments of multilingual information-retrieval systems, methods, software, and interfaces. One exemplary system enables a user to submit a single monolingual or multilingual query and search one or more collections of monolingual or multilingual documents. Components of the system include multiple monolingual indices, a mechanism for translating a query into multiple sets of equivalent monolingual query terms, and a mechanism for effectively routing the respective sets of monolingual query terms to the appropriate monolingual indices for identification of relevant documents. Ultimately, the exemplary embodiment allows any combination of collections and languages to be searched with a single query and a single search platform.

The embodiments described above and in the claims are intended only to illustrate and teach one or more ways of practicing or implementing the present invention, not to restrict its breadth or scope. The actual scope of the invention, which embraces all ways of practicing or implementing the teachings of the invention, is defined only by the issued claims and their equivalents.

What is claimed is:

1. A method computer-implemented comprising:

defining a set of one or more language-specific indices, in at least one data-storage device, for a collection of documents, with each index including stemmed and non-stemmed versions of terms contained in the documents;

receiving a query from a user, with the query associated with a set of one or more target languages;

parsing the query into one or more terms, using at least one processor, with each term associated with a corresponding language identifier and a stemmed version of the term;

translating the original and stemmed versions of each term, using at least one processor, into each of the target languages, using at least one processor, to define respective sets of one or more equivalent query terms; and

identifying a set of documents from the collection of documents for each of the target languages, with each set identified based on the equivalent query terms for the corresponding target language.

2. The method of claim **1**, wherein each term in each index is associated with a document identifier for uniquely identifying one of the documents in the collection, a positional indicator for indicating a position of the term in the one of the documents, and a language indicator for indicating language of the term.

3. The method of claim **1**, wherein before receiving the query from a user, the user defines the query by interacting with a graphical user interface having a query submission screen having a control region for entering terms of the query; a control region for selecting one or more of the target languages; and a control region for submitting the query.

4. The method of claim **1**, wherein the query is associated with a set of one or more target languages selected by the user.

5. The method of claim **1**, wherein translating the original and stemmed versions of each term into two or more equivalent query terms in one of the target languages, includes identifying equivalent query terms using at least two of the following: a database of pre-translated documents, an electronic language dictionary, an automated translator, and a pivot language.

6. The method of claim **1**:

wherein identifying the set of documents from the collection for each of the target languages, includes:

determining a relevance score for documents based on the equivalent query terms; and

identifying documents having a relevance score exceeding a predetermined threshold; and

wherein the method further comprises presenting a graphical user interface listing the identified set of documents in groups based on corresponding language and/or in rank order of relevance.

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7. A computer-implemented system comprising:

a collection of documents;

a set of one or more language-specific indices for the collection of documents, with each index including stemmed and non-stemmed versions of terms contained in the documents; and

a server for interacting with the collection of documents and the set of language-specific indices, with the server configured:

to receive a query from a user, with the query associated with a set of one or more target languages;

to parse the query into one or more terms, with each term associated with a corresponding language identifier and a stemmed version of the term;

to translate the original and stemmed versions of each term into each of the target languages and thus define respective sets of one or more equivalent query terms; and

to identify a set of documents from the collection of documents for each of the target languages, with each set identified based on the equivalent query terms for the corresponding target language.

8. The system of claim 7, wherein each term in each index is associated with a document identifier for uniquely identifying one of the documents in the collection, a positional indicator for indicating a position of the term in the one of the documents, and a language indicator for indicating language of the term.

9. The system of claim 7, wherein the server is further configured to define a graphical user interface for enabling a user to submit a query, the interface having a query submission screen having a control region for entering terms of the query; a control region for selecting one or more of the target language; and a control region for submitting the query.

10. The system of claim 7, wherein to translate the original and stemmed versions of each term into two or more equivalent query terms in one of the target languages, the server is further configured to identify equivalent query terms using at least two of the following: a database of pre-translated documents, an electronic language dictionary, an automated translator, and a pivot language.

11. The system of claim 7, wherein the server includes a processor and a memory, and the memory includes coded instructions for causing the processor: to receive the query from a user, to parse the query into one or more terms, to translate the original and stemmed versions of each term into each of the target languages and thus define respective sets of one or more equivalent query terms, and to identify a set of documents from the collection of documents for each of the target languages.

12. A server for interacting with a collection of documents and a set of language-specific indices, with the server configured:

to receive a query from a user, with the query associated with a set of one or more target languages;

to parse the query into one or more terms, using at least one processor, with each term associated with a corresponding language identifier and a stemmed version of the term;

to translate the original and stemmed versions of each term, using at least one processor, into each of the target languages and thus define respective sets of one or more equivalent query terms; and

to identify a set of documents from the collection of documents for each of the target languages, with each set identified based on the equivalent query terms for the corresponding target language.

13. The server of claim 12, wherein each term in each index is associated with a document identifier for uniquely identifying one of the documents in the collection, a positional indicator for indicating a position of the term in the one of the documents, and a language indicator for indicating language of the term.

14. The server of claim 12, wherein the server is further configured to define a graphical user interface for enabling a user to submit a query, the interface having a query submission screen having a control region for entering terms of the query; a control region for selecting one or more of the target language; and a control region for submitting the query.

15. The server of claim 12, wherein to translate the original and stemmed versions of each term into two or more equivalent query terms in one of the target languages, the server is further configured to identify equivalent query terms using at least two of the following: a database of pre-translated documents, an electronic language dictionary, an automated translator, and a pivot language.

16. The server of claim 12, wherein the server includes a processor and a memory, and the memory includes coded instructions for causing the processor: to receive the query from a user, to parse the query into one or more query terms, to translate original and stemmed versions of each query term into each of the target languages and thus define respective sets of one or more equivalent query terms, and to identify a set of documents from the collection of documents for each of the target languages.

17. A non-transitory machine-readable medium for causing a server to interact with a collection of documents and a set of language-specific indices, with the medium comprising instructions for causing the server:

to receive a query from a user, with the query associated with a set of one or more target languages;

to parse the query into one or more terms, with each term associated with a corresponding language identifier and a stemmed version of the term;

to translate the original and stemmed versions of each term into each of the target languages and thus define respective sets of one or more equivalent query terms; and

to identify a set of documents from the collection of documents for each of the target languages, with each set identified based on the equivalent query terms for the corresponding target language.

18. The non-transitory medium of claim 17, wherein each term in each index is associated with a document identifier for uniquely identifying one of the documents in the collection, a positional indicator for indicating a position of the term in the one of the documents, and a language indicator for indicating language of the term.

19. The non-transitory medium of claim 17, further including instructions to define a graphical user interface for enabling a user to submit a query, the interface having a query submission screen having a control region for entering terms of the query; a control region for selecting one or more of the target language; and a control region for submitting the query.

20. The non-transitory of claim 17, wherein the instructions for causing the server to translate the original and stemmed versions of each term into two or more equivalent query terms in one of the target languages, include instructions to identify equivalent query terms using at least two of the following: a database of pre-translated documents, an electronic language dictionary, an automated translator, and a pivot language.

21. A system comprising:

a set of one or more language-specific indices for a collection of documents, with each index including stemmed and non-stemmed versions of terms contained in the documents;

a computer comprising a processor and a non-transitory memory, the memory comprising instructions when executed by the processor configured to:

receive a query from a client access device, with the query associated with a set of one or more target languages;

parse the query into one or more original terms, with each term associated with a corresponding language identifier and a stemmed version of the term;

translate the original and stemmed versions of each term into each of the target languages to define respective sets of one or more equivalent query terms; and

identify a set of documents from a collection of documents for each of the target languages, with each set identified based on the equivalent query terms for the corresponding target language.

22. The system of claim **21**, wherein each term in each index is associated with a document identifier for uniquely identifying one of the documents in the collection, a positional indicator for indicating a position of the term in the one of the documents, and a language indicator for indicating language of the term.

23. The system of claim **21**, wherein the client access device includes a graphical user interface having a query submission screen having a control region for entering terms of the query; a control region for selecting one or more of the target languages; and a control region for submitting the query.

24. The system of claim **21**, wherein the memory further comprises instructions when executed by the processor configured to: identify equivalent query terms using at least two of the following: a database of pre-translated documents, an electronic language dictionary, an automated translator, and a pivot language.

25. The system of claim **21**:

wherein the memory further comprises instructions when executed by the processor configured to:

determine a relevance score for documents based on the equivalent query terms; and

identify documents having a relevance score exceeding a predetermined threshold; and

wherein the system comprises a display configured to present a graphical user interface listing the identified set of documents in groups based on corresponding language and/or in rank order of relevance.

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