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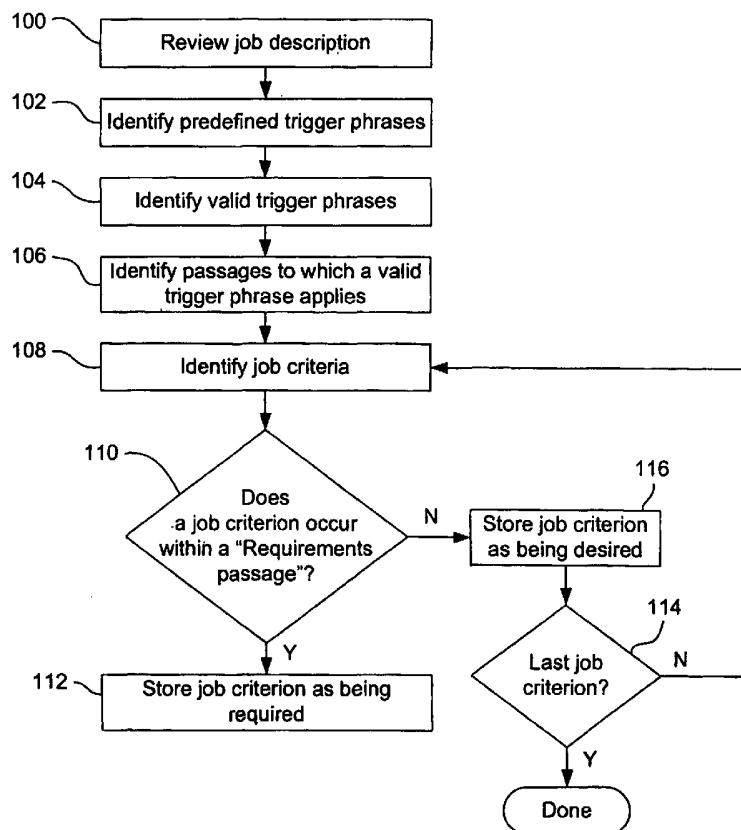
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(54) Title: AUTOMATICALLY IDENTIFYING REQUIRED JOB CRITERIA



(57) Abstract: A technique is disclosed for automatically identifying a criterion of designated type. The technique comprises providing a description; identifying a passage of the description with a predefined trigger phrase; determining whether the passage includes a type of criterion; and identifying a criterion within the passage as being the same type of criterion associated with the trigger phrase.



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AUTOMATICALLY IDENTIFYING REQUIRED JOB CRITERIA

The present invention relates generally to computer software. More specifically, a technique for assisting in criteria search is disclosed.

BACKGROUND OF THE INVENTION

5 A challenge common to nearly all companies is hiring the most talented employees. Finding the best candidates can be a very daunting task for a recruiter or hiring manager due to an overwhelming volume of resumes available. As a result, many companies rely on automation to help with the task of finding qualified candidates in a large candidate pool. The standard practice within a human resources department is to create a job requisition and
10 associated description for each open position. The requisition is then typically posted or advertised so that potential candidates can locate and review it. In order to identify qualified candidates the recruiter often performs a resume search using an automated system. The recruiter typically faces the task of choosing appropriate search terms and formulating potentially complex queries to perform the search.

15 It would be desirable to simplify the process of searching for qualified candidates. The present invention addresses such a need.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the invention are disclosed in the following detailed description and the accompanying drawings.

Figure 1 is a flow diagram of a technique for automatically identifying required
5 criteria from a job description text according to an embodiment of the present invention.

Figures 2A – 2B show another example of a technique for automatically identifying required job criteria from a job description text according to an embodiment of the present invention.

Figure 3 is a flow diagram of a technique according to an embodiment of the present
10 invention for applying required criteria to a resume.

DETAILED DESCRIPTION

The invention can be implemented in numerous ways, including as a process, an apparatus, a system, a composition of matter, a computer readable medium such as a computer readable storage medium or a computer network wherein program instructions are
5 sent over optical or electronic communication links. In this specification, these implementations, or any other form that the invention may take, may be referred to as techniques. In general, the order of the steps of disclosed processes may be altered within the scope of the invention.

A detailed description of one or more embodiments of the invention is provided
10 below along with accompanying figures that illustrate the principles of the invention. The invention is described in connection with such embodiments, but the invention is not limited to any embodiment. The scope of the invention is limited only by the claims and the invention encompasses numerous alternatives, modifications and equivalents. Numerous specific details are set forth in the following description in order to provide a thorough
15 understanding of the invention. These details are provided for the purpose of example and invention may be practiced according to the claims without some or all of these specific details. For the purpose of clarity, technical material that is known in the technical fields related to the invention has not been described in detail so that the invention is not unnecessarily obscured.

20 Figure 1 is a flow diagram of a technique for automatically identifying required criteria from a job description text according to an embodiment of the present invention. In this example, a job description is reviewed (100). For example, each word within the job description can be reviewed. Although job descriptions are used herein, it is merely used for

illustrative purposes. Other descriptions can be used such as those for on-line dating services.

In this embodiment, passages with predefined trigger phrases are then identified (102), and those phrases are further checked for validity (104). Examples of predefined trigger phrases for determining what are required criteria for a particular job description include the following: verb forms of the word "require", "requirement", "compulsory", "crucial", "essential", "got to", "has to", "have to", "imperative", "is/are key", "key skill", "key criteria/qualification", "mandatory", "must", "prerequisite", and "vital". In some embodiments, trigger phrases are considered valid as long as they are not preceded or followed by a negating word such as "no", "not", or "never", and do not appear within a list of nontrigger words or phrases. A nontrigger phrase may contain a predefined trigger phrase but is not indicative of a description that actually defines the criteria. For example, if "essential" is predefined as a trigger phrase, then nontrigger phrases can include: "essential information", "essential nutrient(s)", "essential mix", and "essential element(s)". Likewise, if "vital" is a trigger phrase then nontrigger phrases may include "vital statistic(s)", "vital sign(s)", and "vital record(s)".

Passages around predefined trigger phrases can be identified in various ways, depending upon the type of written description. For example, a job description passage with a predefined trigger phrase can be identified as a "requirements" passage if it is a clause containing a valid trigger phrase. For example, the following statements could be identified as job description passages with valid trigger phrases. "Must be strong with Excel." "Oracle experience required." "At least three years of business/commercial lending experience required." "[Strong interpersonal skills,] paired with the ability to build effective teams will

be crucial in this role.” In the last example, the text in brackets would not be part of the requirements passage since it occurs in a different clause than the trigger phrase “crucial”.

Another example of identifying passages, such as requirements passages, can be a paragraph that starts with a valid trigger phrase followed closely by a colon, a hyphen (two
5 dashes), and/or new line(s), up to the end of the first sentence. Examples of identifying such a passage include the following.

“REQUIREMENTS: Must be persistent, energetic and entrepreneurial and available for local travel. [Prior experience in the construction, equipment or tool industry is preferred...]”

10 “PREREQUISITE SKILLS and REQUIREMENTS:

Outstanding customer service and relationship building skills.

[Proven track records of successful sales management ...]”

In these examples, the text in brackets is not part of the requirements passage since it occurs after the end of the first sentence following the valid trigger phrase.

15 In the example shown in Figure 1, passages are identified to which a valid trigger phrase applies (106). Such a passage can be referred to as a “requirements passage”, in this example. Job criteria are then identified in the job description (108). It is then determined whether a requirements passage includes a job criterion (110). In other words, it is
20 determined whether a particular skill described in the job description is required of the candidate. An example of this determination is if a predefined trigger phrase found in the passage is a required criterion trigger phrase. If the passage includes a required criterion

trigger phrase, then each job criterion within the passage is stored as being required in this example (112).

In one embodiment, if the passage does not include a required criterion (110), then it may be called a "desired criteria" passage. For example, "Prior experience in the
5 construction industry is preferred" would be a desired criteria passage if it does not contain a valid, required criterion trigger phrase. If a job criterion occurs within a desired criteria passage, the criterion is stored as being a desired criterion (114).

It is then determined whether this job criterion is the last job criterion (116). If it is the last criterion, then the process is complete. If, however, it is not the last criterion, then a
10 particular job criterion is identified in the description (108).

Figures 2A-2B show another example of a technique for automatically identifying required job criteria from a job description text according to an embodiment of the present invention. In this example, a word of a job description is reviewed (200). It is determined whether the word is part of a valid trigger phrase (202). If it is part of a valid trigger phrase,
15 then the position of the word is stored (208). A range of positions for the requirements passage is then determined (212). Assume for example, that the valid trigger phrase is "necessary", and it is found in the job description at position number 17. Also assume that there is a set of predetermined rules, such as "any clause containing a valid trigger word/phrase" or any other rule, that can be used to determine a requirements passage. Then
20 the position number of the trigger phrase and the rule can be used to determine the range of positions for the requirements passage. For example, if the passage is "Oracle experience is necessary.", and "necessary" is at position number 17, then the range of positions for the requirements passage is position 14-17.

If the word being reviewed in the job description is not part of a valid trigger phrase (202), then it is determined whether the word is part of a job criterion (204). If the word is part of a job criterion, then the position of the word is stored (210). Existing computerized technology, such as Resumix Knowledge Base and Extractor, can be used to determine the
5 job criteria from a job description. Assume, for example, that the job description includes the passage "Oracle experience is necessary". Also assume that "Oracle experience" is determined to be a job criterion and occurs at position numbers 14-15. Then the position numbers 14-15 are stored as the range for a job criterion (214).

It is then determined whether the range of a job criterion lies within the range of a
10 requirements passage (216). A job criterion that does occur within a requirements passage is stored as being required (220). Otherwise it is stored as being desired (218).

It is then determined whether the particular word being reviewed is the last word of the description (206). If it is the last word in the job description then the process is complete. If, however, it is not the last word then another word of the job description is reviewed (200).

15 Figure 3 is a flow diagram of a technique according to an embodiment of the present invention for applying required criteria to a resume. In this example, a resume is reviewed (300). It is then determined whether all of the required criteria of a particular job description were found (302). If not all of the required criteria were found in the resume, the resume is not listed in the search result associated with this particular job description (306). If,
20 however, all the required criteria were found (302), then it is determined whether any desired criteria associated with this particular job description were found (303). If no desired criteria were found but all of the required criteria were found in this resume, then the resume is listed in a secondary portion of the search result (308). If, however, desired criteria were found in

this resume (303), along with all of the required criteria (302), then this resume is listed in a primary part of the search result (304). Accordingly, a recruiter performing a search for a particular job description can view a search result where a candidate with all of the required criteria and at least one of the desired criteria is listed above a candidate who simply has all
5 of the required criteria but none of the desired criteria.

Some embodiments of the present invention can be used in conjunction with Resumix Knowledge Base And Extractor by Yahoo! Resumix in Sunnyvale, CA. Accordingly, US Patent No. 5,197,004 entitled METHOD AND APPARATUS FOR AUTOMATIC CATEGORIZATION OF APPLICANTS FROM RESUMES, and US Patent No. 5,164,899
10 entitled METHOD AND APPARATUS FOR COMPUTER UNDERSTANDING AND MANIPULATION OF MINIMALLY FORMATTED TEXT DOCUMENTS, are herein incorporated by reference for all purposes.

Although the foregoing embodiments have been described in some detail for purposes of clarity of understanding, the invention is not limited to the details provided. There are
15 many alternative ways of implementing the invention. The disclosed embodiments are illustrative and not restrictive.

CLAIMS

1. A method for automatically identifying a criterion comprising:
providing a description;
identifying a passage of the description with a predefined trigger phrase;
5 determining whether the passage includes a type of criterion; and
identifying a criterion within the passage as being the same type of criterion
associated with the trigger phrase.
2. The method of claim 1, wherein the trigger phrase is a valid, job requirements trigger
phrase.
- 10 3. The method of claim 1, wherein the description is a job description.
4. The method of claim 1, wherein the type of criterion is a required criterion.
5. The method of claim 1, further comprising storing a position of the trigger phrase.
6. The method of claim 1, further comprising storing a position of the criterion.
7. The method of claim 1, wherein identifying the passage uses a predefined rule that
15 defines a passage.
8. The method of claim 1, wherein the passage includes a clause that contains a trigger
phrase.
9. The method of claim 1, wherein the passage begins with a paragraph that starts with
the trigger phrase, and is followed approximately immediately by a colon, and ends with the
20 end of the sentence.
10. The method of claim 1, wherein the passage begins with a paragraph that starts with
the trigger phrase, and is followed approximately immediately by a hyphen, and ends with
the end of the sentence.

11. The method of claim 1, wherein the passage begins with a paragraph that starts with the trigger phrase and is followed approximately immediately by a new line, and ends with the end of the sentence.

12. A system for automatically identifying a criterion, comprising:

5 a processor configured to provide a description; identify a passage of the description with a predefined trigger phrase; determine whether the passage includes a type of criterion; and identify a criterion within the passage as being the same type of criterion associated with the trigger phrase; and

a memory coupled with the processor, the memory being configured to provide the
10 processor with instructions.

13. A computer program product for automatically identifying a criterion, the computer program product being embodied in a computer readable medium and comprising computer instructions for:

providing a description;
15 identifying a passage of the description with a predefined trigger phrase;
determining whether the passage includes a type of criterion; and
identifying a criterion within the passage as being the same type of criterion
associated with the trigger phrase.

20

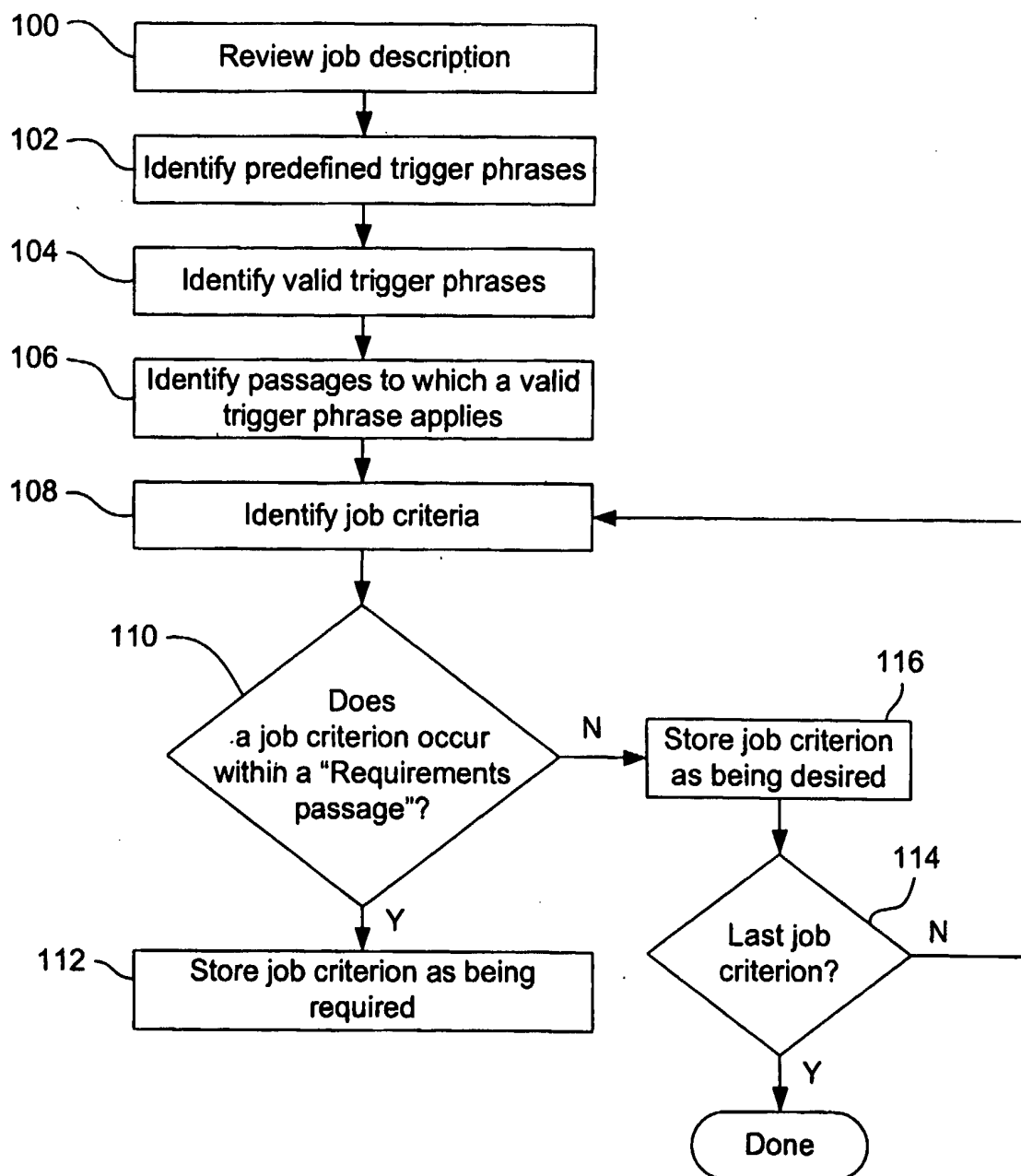
FIG. 1

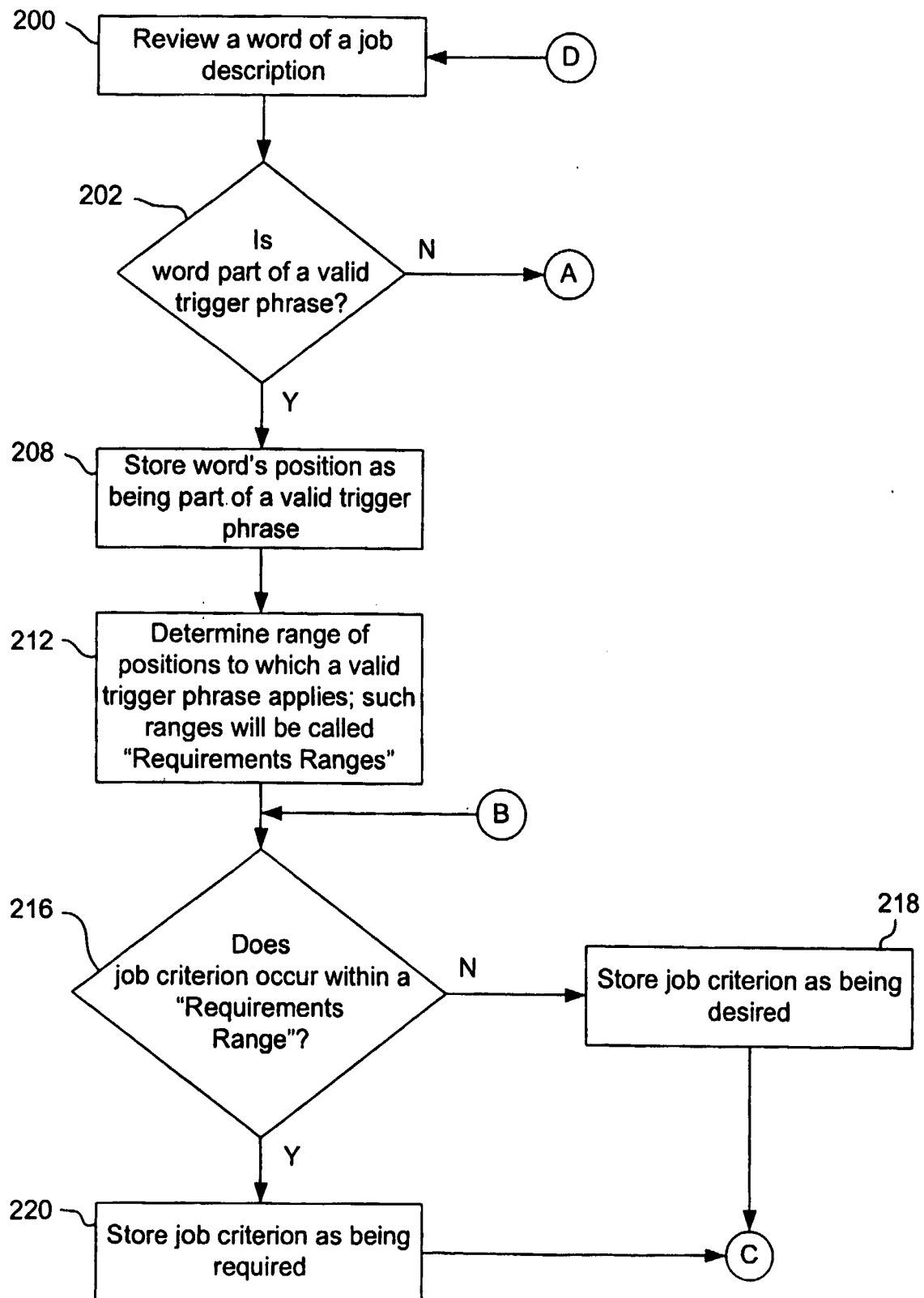
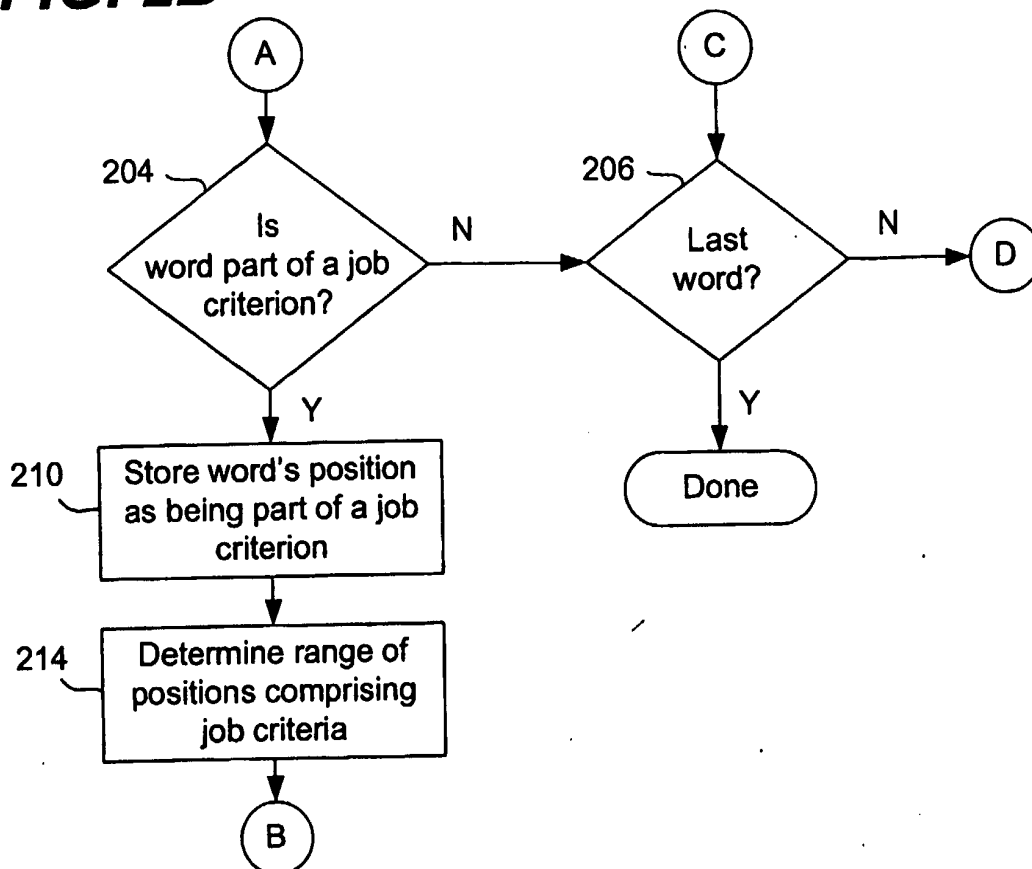
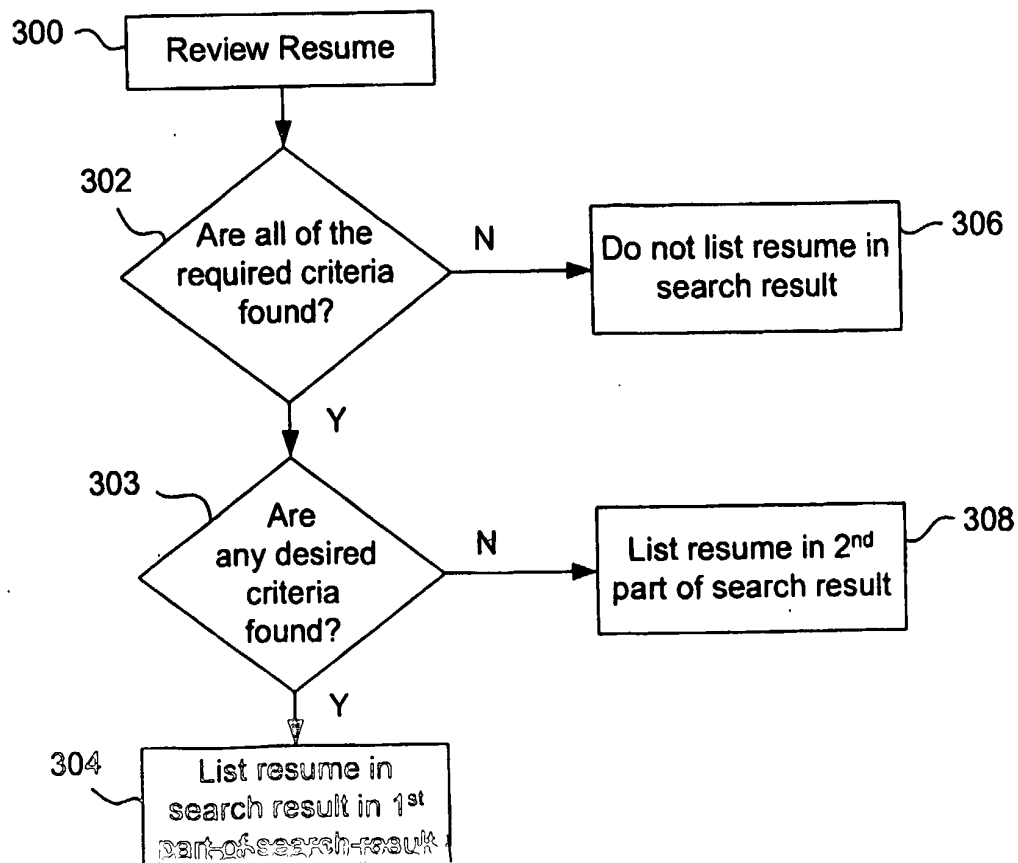
FIG. 2A

FIG. 2B**FIG. 3**

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/028903

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F17/60 G06F17/27

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 164 899 A (INN YUL J ET AL) 17 November 1992 (1992-11-17) cited in the application abstract; claims 1,4,9; figures 19,23,25-27 column 2, line 40 - line 64 column 9, line 39 - column 12, line 5 -----	1-13
X	WO 00/26839 A (KALINDINDI VASUDEVA V ; INFODREAM CORP (US); PAPPU NAGARAJU (US); ANDL) 11 May 2000 (2000-05-11) abstract; figures 2,3,6,7 page 4, line 15 - page 5, line 16 page 7, line 11 - page 8, line 7 page 11, line 4 - page 15, line 2 page 23, line 7 - page 24, line 19 ----- -/--	1-13



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *G* document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/028903

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 197 004 A (INN YUL J ET AL) 23 March 1993 (1993-03-23) cited in the application abstract; figure 1 column 3, line 45 - line 59 column 4, line 29 - line 47 -----	1,2,4, 7-13
X	US 5 999 939 A (REESE JOHN ET AL) 7 December 1999 (1999-12-07) abstract; figure 1 column 3, line 15 - line 34 -----	1,2,7-13
A	US 6 473 730 B1 (KAN MIN-YEN ET AL) 29 October 2002 (2002-10-29) abstract; claims 1,9; figures 1-3 paragraphs '0014! - '0017! -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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