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(56) Documents Cited:
GB 2392744 A **GB 2376767 A**
EP 1124360 A2 **WO 2002/037867 A2**
Jones M., et al. "Sorting Out Searching on Small Screen Devices", September 2002, Proceedings of the 4th International Symposium on Mobile HCI, pages 81-94
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(continued on next page)

(54) Abstract Title: **Searching for and indexing mobile content on a network**

(57) A web server configured to provide an indication to an internet indexer that mobile content, such as WAP sites, is available at a certain location. An internet indexer configured to interrogate a web server as to the availability of mobile content is also provided, as is an internet indexer configured to examine internet content from a web server for the presence of a signature of a content-transcoding scheme.

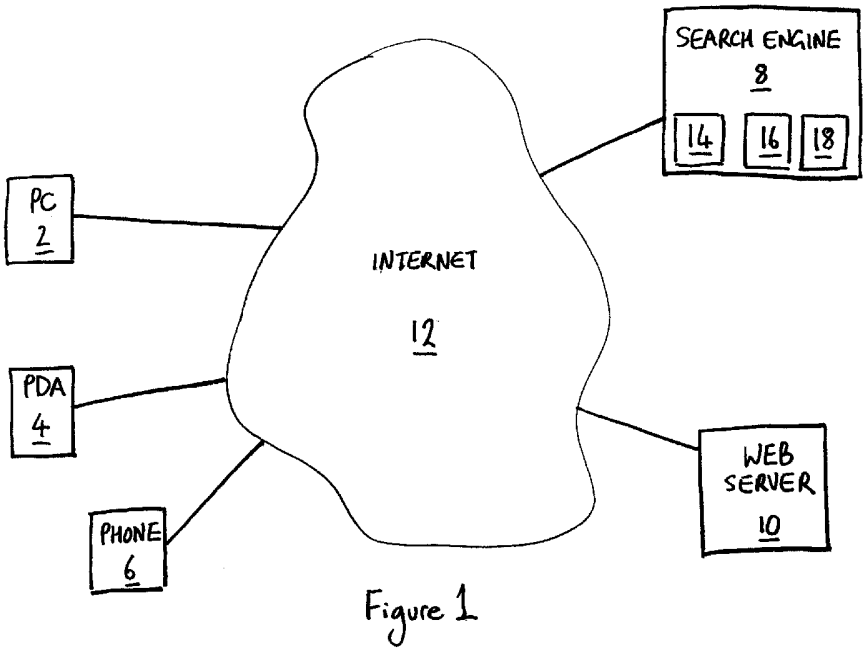

Figure 1

GB 2 417 104 A

GB 2417104 A continuation

(56) cont
http://www.wirelessdevnet.com/channels/wireless/features/wir eless_search.phtml

(58) Field of Search:
UK CL (Edition X) **G4A**
INT CL[7] **G06F**
Other: **Online: EPODOC, WPI, JAPIO, OPTICS, INTERNET**

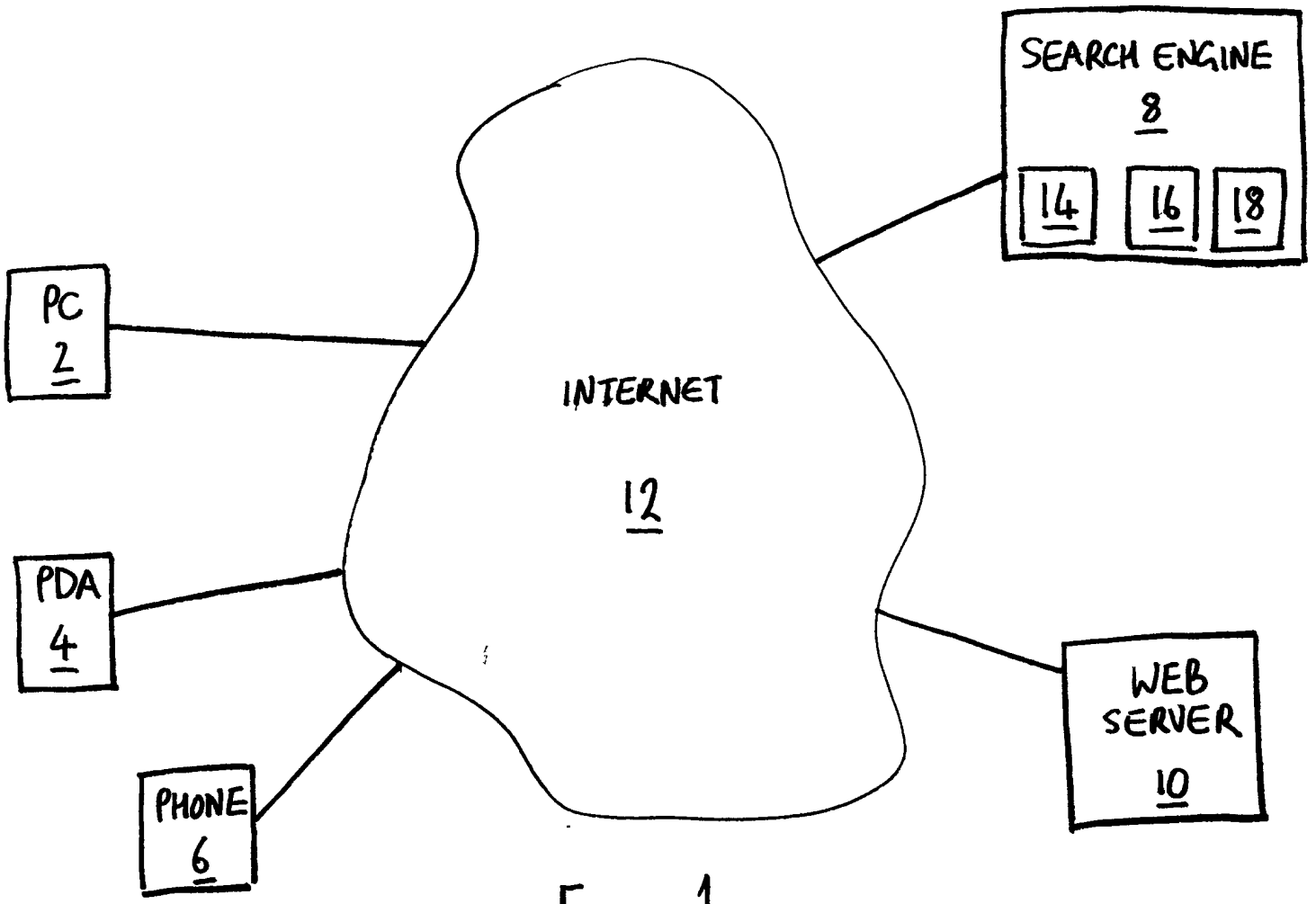
SEARCH ENGINE
8
14
16
18
PC
2
INTERNET
12
PDA
4
PHONE
6
WEB
SERVER
10

Figure 1

INDICATING MOBILE CONTENT

The invention relates to search engines, internet directories and the like and their interaction with web servers.

The internet can be accessed using many different types of device. For example, material from the internet, hereinafter termed "internet content", can be downloaded into desktop and laptop computers, personal digital assistants (PDAs) and mobile telephones. However, different types of device have different capabilities in terms of being able to present internet content to a person. For example, a web page with a complicated visual layout and animated parts is more suited to presentation to a person through a PC than through a mobile telephone. Indeed, such a web page is unlikely to display at all on a mobile telephone. Thus, it is normal to provide internet content that is tailored to the capabilities of devices such as mobile telephones, PDAs and the like that, in comparison with desktop computers, have small memories and small screen sizes (usually due to compromises between functionality and portability). Commonly, such internet content is referred to as "mobile content" and the sector of the internet that is concerned with its delivery is referred to as the "mobile internet". In this document, internet content that has not been adapted for the needs of such resource-constrained devices will be referred to as "plain" internet content.

It is widely appreciated that a person might have difficulty in locating internet content of interest and entities known as search engines have been devised to address this problem. Broadly speaking, a search engine is a collection of software processes that a person can query through the internet in order to locate internet content of interest. In essence, a search engine is based around a database of locations of internet content and search software for interrogating the database with queries received from the internet. The locations within the database are indexed with indications of the internet content that is to be found at those locations and the search software is capable of resolving received queries into information that can be compared against the locations or their indexing information in order to formulate replies that contain locations from the database that most closely match the queries. Other facilities, similar to search engines, for locating internet content of

interest, also exist. For example, there are directories of internet content in which one can select a branch of internet content of interest and peruse internet locations that provide internet content of the selected type. In this document, search engines, directories and like services will be referred to as "internet indexes".

Clearly, since the internet is dynamic, internet indexes need to be kept up to date. For this purpose, an internet index will normally include a software element such as a web crawler, a spider or a web robot. Such elements will hereinafter be referred to as "indexers". The purpose of an indexer is to visit internet locations and report back to an internet index with indications of the internet content to be found at those locations so that the internet index can be refreshed.

So prevalent at present is the use of desktop and laptop computers to access the internet that internet indexes and, consequently, indexers provide very little support for users of the mobile internet. Thus, it can be difficult for a person to locate mobile content of interest.

According to one aspect, the invention provides a web server that is configured to provide an indication to an internet indexer that mobile content is available at a certain location.

Thus, the invention provides an interaction between an internet indexer and a web server that facilitates the support of mobile content by internet indexes.

In some embodiments, the indication is provided in internet content, such as a web page, that has been requested by an indexer. The indication can be provided in a header within the internet content or in a meta tag within the internet content.

The indication may direct an internet indexer to another internet location for mobile content or the indication may indicate that mobile content is available from the same location via, e.g., a content transcoding scheme.

The indication may be in the form of a signature of a content transcoding scheme.

The indication may be available in a file that is customarily provided to give instructions to visiting internet indexers.

The invention also relates to an internet indexer configured to interrogate a web server as to the availability of mobile content.

The invention also relates to an internet indexer that is configured to examine internet content from a web server for the presence of a signature of a content transcoding scheme.

By way of example only, certain embodiments of the invention will now be described with reference to Figure 1 which shows several devices connected to the internet.

More specifically, Figure 1 shows a desktop PC 2, a PDA 4, a mobile telephone 6, a search engine 8 and a web server 10, all connected to the internet 12. The PDA 4 and the mobile telephone 6 use the mobile internet whereas PC 2 does not.

Search engine 8 has a database 14 of uniform resource locators (URLs). Each URL in the database 14 is annotated with an indication of whether the internet content at that URL is, or can be provided in the form of, mobile content and with an indication of the subject matter of the internet content to be found at that URL. The PC 2 can contact the search engine 8 to seek out plain internet content whilst the mobile telephone 6 and the PDA 4 can use the search engine to locate mobile content.

In order to keep the database 14 current, the search engine 8 also includes an internet indexer 18, which is typically a web crawler, a spider or a web robot. The internet indexer 18 visits URLs and assesses the internet content that it finds there with the aim of including the visited URLs in the database 14 with appropriate annotations.

The interaction between the internet indexer 18 and a web server will now be described in more detail using, as an example, the case where the internet indexer probes a URL "www.mobile-life.com" held at web server 10. To initiate this process, internet indexer 18

sends web server 10 a standard request for the internet content that is held at the URL "www.mobile-life.com":

```
GET http://www.mobile-life.com/HTTP/1.1
Host:www.mobile-life.com
User-Agent:SlipStream Search Engine Indexer
Accept:*/*
```

where "SlipStream Search Engine Indexer" is the name assigned to internet indexer 18.

The nature of web server 10 determines the response that is made to this request. First, let us consider the case where web server 10 is capable of content transcoding, i.e. where web server 10 is capable of providing internet content in both "mobile" and "plain" forms. In such circumstances, the web server 10 will usually respond by default with plain internet content that is located at the URL "www.mobile-life.com", as follows:

```
HTTP/1.1 200 OK
Set-Cookie: JSESSIONID=E5B3F22A404C9D5DB81D70F73C351E16C; Path=/
X-Mobile-Compatible: generator=SlipStream&vendor=www.mobile-life.com
Content-Type: text/html
Date: Mon, 29 Mar 2004 16:59:21 GMT
Server: Apache-Coyote/1.1
Connection: close
Content-Length: 1435

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
<head>
<title>Mobile Life - Leading The Way With Mobile Web Solutions</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-
1"/>
<link href="styles/regweb.cas" rel="stylesheet" media="screen"
type="text/css"/>
</head>
<body>
<p>Welcome to SlipStream, the easiest way to create web sites for
mobile devices and PDA's.</p>
<p>This section could contain large images, frames and large content
blocks that would not display on a mobile device</p>
</body>
</html>
```

The internet indexer 18 evaluates this response and informs the search engine 8 that plain content is available at the URL "www.mobile-life.com" and also provides the search engine with an indication of the subject matter of that content. The search engine 8 can use this information to add or, as the case may be, update a record in database 14 concerning

the URL "www.mobile-life.com". As mentioned, the response from the web server 10 contains plain internet content that is unlikely to be presented successfully by a device requiring mobile content. However, the response from the web server 10 contains the header X-Mobile-Compatible which indicates to internet indexer 18 that mobile content is also available at the same URL, "www.mobile-life.com", on account of the content transcoding capabilities of the web server.

Upon detection of the header X-Mobile-Compatible, the internet indexer 18 sends a request to web server 10 for mobile content from the URL "www.mobile-life.com":

```
GET http://www.mobile-life.com/HTTP/1.1
Host:www.mobile-life.com
User-Agent:SlipStream Search Engine Indexer
X-Confirm-Mobile-Content:*
Accept:*/*
```

This request contains the header X-Confirm-Mobile-Content which specifies a list of MIME types to check for. In this instance, an asterisk is specified as a "wild card", indicating that all MIME types should be checked for. The web server 10 now responds with mobile content:

```
HTTP/1.1 200 OK
X-Mobile-Compatible: generator=SlipStream&vendor=www.mobile-life.com
Content-Type: application/vnd.wap.xhtml+xml
X-Confirm-Mobile-Content-
Reply:text/vnd.wap.wml;application/xhtml+xml;application/vnd.wap.xhtml+
xml;text/html
Date: Mon, 29 March 2004 18:19:02 GMT
Server: Apache=Coyote/1.1
Connection: close
Content=Length: 1435

<?xml version-"1.0"?><!DOCTYPE html PUBLIC "-//OPENWAVE//DTD XHTML
Mobile 1.0//EN" "http://www.openwave.com/DTD/xhtml-mobile10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml"
xmlns:wml="http://www.wapforum.org/2001/wml" xml:lang="en">
<head>
<title>Welcome To Mobile Life</title>
</head>
<body>
<p>Welcome to SlipStream, the easiest way to create web sites for
mobile devices and PDA's.</p>
<p>This section is for mobile devices and has limitations regarding
image size, no frames support and small content blocks. </p>
</body>
</html>
```

This time the response contains the header X-Confirm-Mobile-Content-Reply listing the formats in which the web server 10 can deliver mobile content. The internet indexer 18 informs the search engine 8 that mobile content is available from the URL "www.mobile-life.com" in the stated formats and also provides the search engine with an indication of the subject matter of that content. The search engine 8 uses this information to update its record in database 14 for the URL "www.mobile-life.com".

It should be noted that the wild card in the header X-Confirm-Mobile-Content sent out by internet indexer 18 could be replaced with a set of one or more desired types of mobile content, e.g.:

```
X-Confirm-Mobile-Content:text/vnd.wap.wml;application/xhtml+xml
```

in the case where the web server 10 can handle all of the requested content types, then the header X-Confirm-Mobile-Content-Reply returned by web server 10 becomes:

```
X-Confirm-Mobile-Content-Reply:text/vnd.wap.wml;application/xhtml+xml
```

It is thus clear that a mechanism is provided by which an internet indexer can unambigiously determine whether a web server supports specific types of mobile content.

Let us now examine the case where web server 10 is not capable of content transcoding.

In these circumstances, web server 10 responds to the initial request from the indexer 18 with plain internet content as follows:

```
HTTP/1.1 200 OK
Set-Cookie: JSESSIONID=E5B3F22A404C9D5DB81D70F73C35E16C; Path=/
Content-Type: text/html
Date: Mon, 29 Mar 2004 16:59:21 GMT
Server: Apache-Coyote/1.1
Connection: close
Content-Length: 1435

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
<head>
<title>Mobile Life - Leading The Way With Mobile Web Solutions</title>
```

```
<meta name="Mobile-Compatible"
content="location=xhtmlmpindex.html,wmlindex.wml
generator=SlipStream&URL=www.mobile-life.com"/>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-
1"/>
<link href="styles/regweb.css" rel="stylesheet" media="screen"
type="text/css"/>
</head>
<body>
<p>Welcome to SlipStream, the easiest way to create web sites for
mobile devices and PDA's.</p>
<p>This section could contain large images, frames and large content
blocks that would not display on a mobile device</p>
</body>
</html>
```

The internet indexer 18 evaluates this response and informs the search engine 8 that plain content is available from the URL "www.mobile-life.com" and also provides the search engine with an indication of the subject matter of that content. The search engine 8 uses this information to add, or as the case may be, update a record in database 14 concerning the URL "www.mobile-life.com". The response from web server 10 to the query from the internet indexer 18 contains the meta tag "Mobile-Compatible" which indicates to the indexer 18 that internet content is available from two alternative URLs, "www.mobile-life.com/htmlmpindex.html" and "www.mobile-life.com/wmlindex.wml", one for XHTML Mobile Profile (XHTMLMP) content and one for WAP Mark-up Language (WML) content, respectively.

The internet indexer 18 recognises the meta tag "Mobile-Compatible" and proceeds to retrieve the mobile content from the specified URLs. Consider the case where the internet indexer 18 requests mobile content from the URL "www.mobile-life.com/htmlmpindex.html" by issuing a request:

```
GET http://www.mobile-life.com/xhtmlmpindex.html HTTP/1.1
Host:www.mobile-life.com
User-Agent:SlipStream Search Engine Indexer
Accept:*/*
```

The web server 10 responds by returning mobile content as follows:

```
HTTP/1.1 200 OK
X-Mobile-Compatible: generator=SlipStream&vendor=www.mobile-life.com
Content-Type: application/vnd.wap.xhtml+xml
Date: Mon, 29 Mar 2004 18:19:02 GMT
Server: Apache-Coyote/1.1
```

```
Connection: close
Content-Length: 1435

<?xml version="1.0"?><!DOCTYPE html PUBLIC "-//OPENWAVE//DTD XHTML
Mobile 1.0//EN" "http://www.openwave.com/DTD/xhtml-mobile10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml"
xmlns:wml="http://www.wapforum.org/2001/xml" xml:lang="en">
<head>
<title>Welcome to Mobile Life</title>
</head>
<body>
<p>Welcome to SlipStream, the easiest way to create web sites for
mobile devices and PDA's.</p>
<p>This section is for mobile devices and has limitations regarding
image size, no frames support and small content blocks. </p>
</body>
</html>
```

The internet indexer 18 evaluates the retrieved mobile content and informs the search engine 8 that mobile content is available from the URL "www.mobile-life.com/htmlmpindex.html" and also provides the search engine 8 with an indication of the subject matter of that content. The search engine 8 uses this information to add or, as the case may be, update a record concerning the URL "www.mobile-life.com/htmlmpindex.html" in database 14. The internet indexer can, if desired, then proceed to request mobile content from any other URLs specified in the "Mobile-Compatible" meta tag, and provide information about those URLs to the search engine 8 for database 14.

Another embodiment makes use of the convention that web servers make available control files containing instructions for visiting internet indexers to obey. Such a control file can be modified to include an indication that mobile content is available from its web server or some other source. A visiting internet indexer can pick up the mobile content information from the control file and feed this back to a search engine.

In yet another embodiment, the internet indexer is configured to recognise a signature of a content transcoding system upon visiting a URL. The signature can include, for example, one or more of the product name of the transcoding scheme, the URL of the developer or publisher of the transcoding scheme and information identifying the version of the transcoding scheme. Such an internet indexer can be arranged to feed back to a search engine information about any mobile content that can be derived from signature analysis.

CLAIMS

1. A web server configured to provide an indication to an internet indexer that mobile content is available at a certain location.

2. A web server according to claim 1, wherein said indication identifies the specific type or types of mobile content that are available.

3. A web server according to claim 1 or 2, wherein the indication is in internet content served by the server to the indexer.

4. A web server according to claim 3, wherein the indication is in a header of said internet content.

5. A web server according to claim 3, wherein the indication is in meta tag information in said internet content.

6. A web server according to any one of claims 3 to 5, wherein the location specified in the indication is different to the location of said internet content.

7. A web server according to claim 3, wherein the indication is or includes a signature of a content transcoding scheme that appears in said internet content.

8. A web server according to claim 1, wherein the web server is configured to make a control file available to a visiting internet indexer and said indication is included within said control file.

9. An internet indexer configured to interrogate a web server as to the availability of mobile content.

10. An internet indexer according to claim 9, configured to interrogate a web server as to the availability of one or more specific types of mobile content.An internet indexer configured to examine internet content from a web server for the presence of an indication that mobile content is available from the server.

11. An internet indexer according to claim 11, wherein said indication identifies the specific type or types of mobile content that are available.

12. An internet indexer according to claim 11, wherein said indication is or includes a signature of a content-transcoding scheme.

13. An internet indexer configured to examine a location specified by a web server as providing mobile content to verify that mobile content is available at said location.

14. A reference structure, such as a search engine, that can be interrogated to locate internet content of interest, the structure being configured to present to an interrogating device only search results that pertain to internet content that can be handled by said device.

Application No: GB0417999.0 **Examiner:** Mr Paul Marshall

Claims searched: 1-8 **Date of search:** 12 April 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-8	Jones M., et al. "Sorting Out Searching on Small Screen Devices", September 2002, Proceedings of the 4th International Symposium on Mobile HCI, pages 81-94 See whole document.
X	1-8	"Mobile Search Engines White Paper", Sonera MediaLab, 15th November 2002, http://www.medialab.sonera.fi/workspace/MobileSearchEnginesWhitePape.pdf See whole document.
X	1-8	Greg Notess, "Web Wanderings", August 2002, http://notess.com/write/archive/200008ww.html See whole document.
X	1-8	"Search Engine Watch", 20th February, 2002, http://searchenginewatch.com/links/article.php/2156391 See whole document.
X	1-8	Kennedy, "Wireless Search Engines: Bigger Isn't Better", 23rd January, 2001 http://www.wirelessdevnet.com/channels/wireless/features/wireless_search.phtml See whole document.
X	1-8	WO02/037867 A2 (Nokia) See whole document.
X	1-8	EP 1124360 A2 (NEC Corporation) See whole document.
X	1-8	GB 2376767 A (Hewlett-Packard) See whole document.
X	1-8	GB 2392744 A (Hewlett-Packard) See whole document.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

G4A

Worldwide search of patent documents classified in the following areas of the IPC[07]

G06F

The following online and other databases have been used in the preparation of this search report

Online: EPODOC, WPI, JAPIO, OPTICS