Google Patents: The global patent search engine

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Google Patents: The global patent search engine

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Abstract

Google Patents (www.google.com/patents) includes over 8 million full-text patents. Google Patents works in the same way as the Google search engine. Google Patents is the global patent search engine that lets users search through patents from the USPTO (United States Patent and Trademark Office), EPO (European Patent Office), etc. This study begins with an overview of how to use Google Patent and identifies advanced search techniques not well-documented by Google Patent. It makes several suggestions for improving Google Patents. This study also compares the citation counts provided by Google Patents for journals in the field of library and information science (LIS). Finally, it concludes that Google Patents provides a free alternative or complement to other patent databases. It also addressed the advantages of Google Patents, for example, easy-use search interface and fast search engine; convenient access to patent images in PDF format; and fast downloads of PDF patent documents.

Keywords

Introduction to Google Patents

Patents are highly detailed documents which allow inventors to register their inventions at the national and international level for a specified length of time. Patents are very important and valuable in the process of knowledge production and knowledge commercialization. They can

make products more competitive and desirable in national and international markets and increase the value of products to consumers. Accessibility to patent information is an important element for research, innovation and development.

Google Patents is a search engine from Google that indexes patents and patent applications (patents applied for but not yet granted) from the United States Patent and Trademark Office (USPTO), and European Patent Office (EPO), which are taken from the USPTO, and the EPO databases. It should be noted that patents granted by the USPTO, and the EPO are classified as public domain information. Google Patent is located on the Web at www.google.com/patents.

The service was launched on December 14, 2006, using the same technology as that underlying Google Books (Wikipedia 2013), allowing scrolling through pages, and zooming in on specific areas (Banks 2006). Google Patents makes it possible to search the full-text of the USPTO (www.uspto.gov), and the EPO (www.epo.org) databases in order to find, identify, and obtain the most interesting patents for inventors and other people involved with patents, trademarks and copyrights, ranking patent results according to their relevance for a given search query (Google 2013).

Google Patents allows users view a summary of the patent claims, the entire image itself, view PDF and download PDF of the full-text of USPTO patents, print patents, and read them online. With the 'Prior Art Finder' tool, users can find documents related to a particular patent application or grant (Google 2013). The 'Prior Art Finder' is a great tool that allows to determine the novelty of a patent and makes it possible to find multiple sources for related content that existed at the time the patent was filed (Orwant 2012).

> *The Prior Art Finder identifies key phrases from the text of the patent, combines them into a search query, and displays relevant results from Google Patents, Google Scholar, Google Books, and the rest of the web.* (Orwant 2012)

Google Patents is easy to use and easy to view and download patents. Each Google Patents record includes patent summary (publication number, publication type, application number, publication date, filing date, priority date, also published as, inventors, original assignee, and external links), title, description, claims, images (drawings), patent citations, 'referenced by' notes, classifications, and legal events.

Search techniques on Google Patents

Google Patents works same as the normal Google's search engine with some additional features added to make patents' search possible. There are two ways to search: simple and advanced.

Simple Search

The simple search of Google Patents works just like the normal Google search engine. Searching the keywords in the Google Patents collection is easy. The user can run a query (e.g., cigarettes lung cancer, liver tumors alcohol consumption) to find patents that have at least one of the selected keywords.

When the user click on a hit, a new page comes up with his/her selection and the following information: title, abstract, publication number, publication type, application number, publication date, filing date, priority date, inventors, applicant, classifications, legal events, external links, etc. In fact, Google Patents allows users to search by patent number, inventor, filing date, assignee, classification code (U.S. and international), and general keyword search. Quick and easy to search, Google Patents' interface search screen is one simple search-box. Table 2 summarizes and illustrates some of the powerful search strategies often overlooked by searchers.

Table 2. Useful search tips often overlooked by searchers

Command	Function	Example
+	Searches stop words	+II, +G +8
-	Removes a word or phrase	eyes diseases -animal
OR	Boolean operator to expand search. Must be capitalized.	mouse OR mice
"Quotation marks"	Phrase searching	"Gamma knife"
~	Searches similar terms. A tilde (~) should be added to the beginning of the search term.	otoplasty ~surgery ~pediatric plastic surgery
intitle:	Returns results that include the search term in the title of the patent	intitle:iphone intitle:colon intitle:cancer
allintitle:	Searches for all the words in the title of the patent	allintitle: colon cancer allintitle: "Plastic surgery"
inventor:	Searches for the word in the inventor's name	ininventor:Microsoft ininventor:"Shai Dekel" ininventor:"Alexander Natanzon"
*	Searches the phrase (enclosed in quotation marks) and * replaced by any single word. This operator can be used for proximity searching to retrieve a compound name or a phrase that appear a specified number of words in the middle of it.	"post-plastic * surgery" "skin ulcers ** reductive potential" "skin ulcers **** water solution" "skin ulcers ***** solution"

By using Boolean operators and special characters, such as AND (+), OR (|), NOT (-), and phrase searching using "quotation marks", researchers can fine-tune their search queries and increase the accuracy and relevancy of retrieved results. Pressing ENTER after typing a search

query will default to search. When the patent is available, the first link gives the URL for the original patent.

Overall, the best way to learn how to search more effectively is to understand how Google Patents works and how it interprets search requests. Based on our experience with Google Patents and Google, we offer the following basic tips for better searching:

1. Keyword Search Rules

- Keywords must be exact and specific, searching for <u>foot</u> will not return <u>feet</u> or <u>football</u>
- Keyword searches are not case sensitive – <u>EYE SURGERY</u> is the same as <u>eye surgery</u>
- Keyword order is important especially in phrase searching, searching for <u>oncology surgical</u> will produce more results than searching for <u>surgical oncology</u>.

2. The AND Assumption

Google Patents always assumes there is an AND between any keywords. For example, if a searcher enters:

orthopedic surgery

Google Patents will search for patents containing both the word <u>orthopedic</u> and the word <u>surgery</u>.

To force Google Patents to search for a particular term, a + (plus) sign should be put in front of the word in the query. Note that there should not be a space between the + and the word, as illustrated in the following example:

eye surgery +laser

Vitamin +B +12

3. The NOT Command

To find patents *without* a particular term, a **-** sign should be put in front of the word in the query. The **-** sign indicates that the searcher wants to exclude patents that contain a specific term. Note that there should not be a space between the **-** and the word, for example

Rabies -animal

which searches for *rabies*, but does not return patents relating to *animal*. No patents containing the word "*animal*" will be returned by this query.

4. Searching for an Exact Phrase

Putting quotation marks around keywords will make it possible to search for an exact phrase. For example, if a searcher enters:

"life-cycle management engine"

Google Patents will only search for patents containing the entire phrase <u>life-cycle management engine</u>.

To search for a phrase, a proper name, or a set of words in a specific order, the searcher should put them in quotation marks. A query with terms in quotes finds patents containing the exact quoted phrase. For example, ["lean integration"] finds patents containing exactly the phrase "lean integration".

It is possible to include more than one quoted string in a query. All quoted query phrases must appear on a result page; the implied AND works on both individual words and quoted phrases. For example:

"child care" "swing chair"

"life-cycle" "management engine" "cloud computing"

5. The OR Command or | (vertical bar)

If a searcher would prefer to search for one word *or* another, s/he should enter OR in capital letters between the keywords. Any (or all) of the search terms separated by the operator must appear in the record. It is also possible to use | (vertical bar). For example:

mouse OR mice

tooth | teeth

Google Patents will search for patents containing *either* the word <u>tooth</u> *or* the word <u>teeth</u>.

6. Inventor Search

Google Patents will make it possible to search for inventor names by entering the first name (initial) first, followed by a space and last name. It is also possible to enter last names without initials. First names and initials are searchable when using "inventor:" command, but results are often erratic. It is possible to enter a surname without any initials to find all inventors with that surname. For example:

ininventor:"Sergey Brin"

ininventor:"Larry Page"

ininventor:Brin alone finds the same names.

ininventor:Wuerstlin AND ininventor:Feichtmayr finds patents invented by both Franz Wuerstlin and Franz Feichtmayr.

ininventor:"Sergey Brin" OR ininventor:"Larry Page" finds patents invented by either Brin or Page (or both Brin and Page). It is also possible to use quotation marks (") around the words.

If the surname contains an apostrophe, or hyphen, the searcher should enter the name both with and without the punctuation mark. Likewise, s/he should enter a surname with embedded spaces with and without the spaces. It is also possible to join two versions of the name by the Boolean operator OR. For example:

ininventor:"R Obrien" OR ininventor:"R O'Brien"

ininventor:"M O'Hara" OR ininventor:"M OHara"

inauthor:"Lopez-Gonzalez" OR inauthor:Lopezgonzalez

The * sign can be used as the proximity search operator to search for inventors that have middle names. *Proximity searching* is efficient when the searcher knows the first name and the last name of an inventor, but being unsure of his/her middle name. For example:

"Lopez * Gonzalez"

Proximity searching can be useful when you want to find patents that include someone's name in any of the following orders: first middle last, last first middle, first last, last first (Blachman & Peek, 2007). Moreover, diacritical marks are searchable. Variations of names that contain diacritical marks in the original can be searched. The name Jørgensen may appear in the database as Jorgensen OR Jørgensen:

ininventor:Jørgensen OR ininventor:Jørgensen

Generally, inventor names appear in Google Patents exactly as they do in the source patent. It is advisable to search for all variations of names.

10. Date Search

Using the "Advanced Patent Search" (see Figure 1) makes it possible to limit results to a date range or restrict date by filing date or by issue date.

Advanced Patent Search

"Advanced Patent Search" strategies can be combined with a variety of options such as: patent number, title, inventor, original assignee, U.S. classification, international classification, patent type/status, date, and restrict date by. This combination of actions allows the user to search for patents by patent title, inventor name, or keywords, find patents that cite a particular patent, and look at the context of citations made within and to a particular patent (see Figure 1). "Advanced Patent Search" of Google Patents is available via http://www.google.com/advanced_patent_search
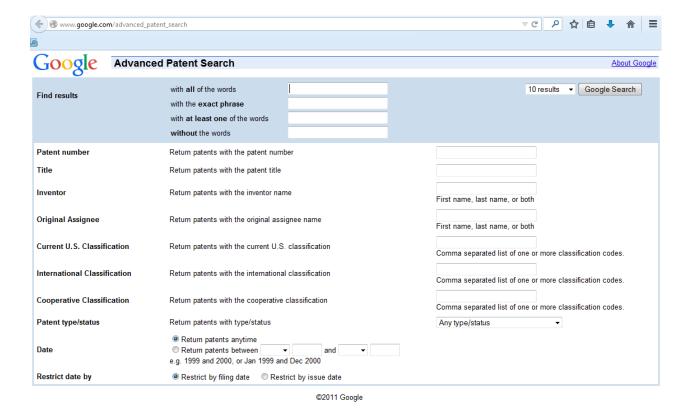

Figure 1. Google Patents' Advanced Patent Search

It should be noted that some of the advanced search commands can be used in the simple search-box as follows:

ininventor:"Michael J. Jackson"

inassignee:"Lockheed Martin Corporation"

ininventor:"Michael J. Jackson" AND inassignee:"Lockheed Martin Corporation"

Google Patents Limitations and Suggestions for improvements

The following are some of the pros and cons of Google Patents.

Pros

It uses the Google basic and advanced search screens.

The user interface of Google Patents is quite easy and is an ideal example of simplicity. The record display pages are fairly simple and intuitive, and the patent summary page provides an easy-to-skim overview. The system also offers numerous hyperlinks to various portions of the patent documents, which improves efficiency by allowing users to quickly navigate to the information of interest.

The performance of Google Patents is considered to be very good in terms of response time and precision when search parameters are well adjusted. The excellent speed of the system promotes its usability (ease of use).

The translation of patents into another language is available, especially for European patents. In many cases, European patents are issued in the language of the country of origin and English. Previously European Patent Office required translation of European patents into one of their official languages, i.e. English, French or German, etc.

Keywords can be truncated to pick up various forms of a word (including plurals, irregular forms and various conjugations). For example, users might truncate a keyword as '*metasearch**' to retrieve different forms of the word '*metasearchengine*'; however, it does not work well.

Cons

The indexing system of Google Patents is not perfect. There are scanning errors in some of the patent information.

Google patents' database does not contain the most recent patents, and contains only the first version of each patent.

It does not currently include international patents (non Euro-American patents), but they are looking forward to expanding the coverage in the future.

Google Patents does not support 'CREATE ALERT', while Google Scholar has made it possible to create an alert via the user's Google Account. Furthermore, a citation alert is

useful in order to notify inventors by email whenever a patent s/he choose has been cited by a new patent that has been added to the database. It seems that the tools available on Google Scholar, such as My Citations, My updates, Alerts, Metrics, and so on, can be added to Google Patents.

Google Patents has many great features, but there are ways it can be improved. As mentioned previously, an inventor wants to get cited and wants to know how often s/he is cited and who is citing his/her patent. Therefore, Google Patents should provide a *citation alert* system to notify inventors by e-mail whenever a new patent has cited one of his or her patents. Alternately, researchers could use this feature to keep track of citations to their favorite or most useful patents by others.

Google Patents can provide a new method of locating potentially relevant patents on a given subject by identifying subsequent patents that reference or cite a previously issued patent. An important feature of this method is that inventors can use it to trace interconnections among patents referencing or citing patents on the same topic and to determine the frequency with which others reference or cite a specific patent. Therefore, we suggest that Google Patents add the "Cited by" feature. Google Patents would be more useful if it classifies the patents according to the International Patent Classification (IPC). Such data can be used for patentometric analysis and patent intelligence.

Other areas are suggested for improvement in Google Patents:
1. To cover non Euro-American patents (less important over time as more patents become available online).
2. To distinguish subfields more accurately (e.g. Google Patents will not disambiguate two inventors with the same name).
3. To add a collection of checkpoints to search by language, country, and other advanced searching techniques.
4. To add "wildcard" searches (e.g. Metaphysi*).
5. To enhance and improve the "similar-patent" retrieval system (related patents).
6. To improve and expand the '*cited by*' feature and offer a more comprehensive database.

Patent citations

Patent citations, particularly the citations to scientific references, are considered as the most popular indicator to track the relation between science and technology. During the patent granting procedure, the examiners should review the prior art and list them in the front page of the patent document in order to ensure the innovative and usefulness of the invention. Compared with the references provided by the applicants/inventors, the examiners references are

determinant for the patent granting. The patent examiners can add new references or remove the existent ones given by the applicants/inventors (Narin and Olivastro 1998; Van Looy et al. 2006).

The number of citations to a journal in patents indicates to what extent the journal is industry-technology oriented and centered around applications. Therefore, it is an ideal place for specialists from industry and research, and is consistently focused on staying at the leading edge of the industry. A phrase search on Google Patens shows that, for example in the field of library and information science (LIS), "*Journal of the American Society for Information Science and Technology" OR "Journal of the American Society for Information Science"* also known as *JASIST*, as a technical scientific journal, received more than twenty two thousands citations in patents; while *"Journal of Documentation"*, as a research journal covering theories, concepts, models, frameworks, and philosophies in information science, received about two hundred fifty citations in patents. Comparing them, we find that *JASIST* is an industry-technology oriented journal.

A phrase search with quotation marks around the title of a scientific journal let us know the position of the journal in technology (i.e., patents). Table 1 shows the sheer number of citations in patents to a sample of high-impact factor journals in the field of LIS on Google Patents. In fact, Table 1 indicates the general presence of LIS journals in patents, rather than the exact number of citations in patents. Briefly, the table illustrates the linkage between academic journals (science) and industrial innovation (technology) in the field of LIS.

Table 1. Number of Citations to LIS Journals in Google Patents

Journal Title	Impact Factor 2012	Number of citations received in patents
J Am Soc Inf Sci Tec: Journal of the American Society for Information Science / Journal of the American Society for Information Science and Technology (JASIST)	2.005	22343
J AM MED INFORM Assoc: Journal of the American Medical Informatics Association	3.571	2750
Annu Rev Inform Sci: Annual Review of Information Science and Technology (ARIST)	2.174	1050
MIS QUART: MIS Quarterly	4.659	478
Int J Geogr Inf Sci: International Journal of Geographical Information Science	1.613	156
J Strategic Inf Syst: Journal of Strategic Information Systems	1.500	145
J Comput-Mediat Comm: Journal of Computer-Mediated Communication	1.778	104
Int J Inform Manage: International Journal of Information Management	1.843	44
J Knowl Manag: Journal of Knowledge Management	1.474	42

Eur J Inform Syst: European Journal of Information Systems	1.558	40
Gov Inform Q: Government Information Quarterly	1.910	10
J INFORMETR: Journal of Informetrics	4.153	2
J Health Commun: Journal of Health Communication	2.079	2
Int J Comp-Supp Coll: International Journal of Computer-Supported Collaborative Learning	1.717	0
J INF TECHNOL: Journal of Information Technology	3.532	*
Inform Technol Manag: Information Technology and Management	3.025	*
Scientometrics	2.133	*
Inform Syst Res: Information Systems Research	2.010	*
Inform Manage-Amster: Information & Management	1.663	*
Telecommun Policy: Telecommunications Policy	1.594	*

Note: The asterisk (*) character means that the journal has a general title or its name is part of the title of other journals. For example, the title of '*Journal of Information Technology*' is present in the title of the following journals: *Asian Journal of Information Technology; Electronic Journal of Information Technology; International Arab Journal of Information Technology; International Journal of Information Technology.*

In the future, Google Patents may be used for patent citation analysis, through patentometric techniques, which measure the impact factor of an individual patent as a function of the number of citations it receives from subsequent inventors. In addition, any inventor may legitimately wish to determine whether his/her own patent has been criticized or used by others patents on Google Patents. Inventors are interested in knowing whether anyone has cited their patents and/or whether other inventors in their fields have commented on them. Google Patents facilitates this type of feedback in the scholarly communication cycle. Regardless of the year that the patent was granted, Google Patents permits inventors to identify where that patent was cited. Inventors can locate recent patents that have cited the particular patent. A further use of Google Patents is to identify inventors currently working in specific branches of science and technology in order to suggest collaboration, to enter into correspondence, etc.

Conclusion

Regardless of its limitations, the main unique advantage of Google Patents is its international coverage. It is an alternative interface to international patent databases such as the USPTO, and the EPO databases. One other advantage of Google Patents is that it returns the patent or patent application as it was published, making it easier to view the drawing figures and to download a PDF version of the patent or published application. Google Patents also facilitates patent citation analysis (citations to a patent in other patents) and journal citation analysis (citations to a journal in patents).

Comparing Google Patents to other databases is difficult given the differences in formats and coverage indexed in the resources. Thus, Google Patent again serves as a good complement to commercial and government databases. Ultimately, despite some disadvantages and the need for improvements, Google Patents offers another resource for locating quality information. It may also become an extremely important database for patent citation analysis. Improvements in the Google Patents system will increase its use by those already familiar with it and gain it new users. In the future, the data available on Google Patents may enable us to conduct patent intelligence analyses and may be the basis for patentometric studies. Despite the pros and cons of Google Patents, it should be addressed as the global search engine for patents; nevertheless there are ways it can be improved.

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