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# Surveillance Study for Technological Trend Analysis Technology Using Patent Information

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## 1. Introduction

Enterprises and research laboratories develop a new technology, and they not only publish a paper, but also they, especially enterprises, apply for a patent. They apply for a patent, because they can have the right of the exclusive execution of the business. In the patent law, they are demanded to open the new technology to the public as compensation for admitting the exclusive right for the patent applicant. After one and a half years from the patent application, the Patent Office is usually issuing patent publications to open the technology that applies for the patent.

It is important to enterprises and research laboratories for forecasting the directionality of the research and development in the future and deciding the theme to know a current flow in the technical field researched and developed. For instance, patent publications are possible to be material to know the research and development trend as well as the paper, because they open a new technology to the public. The system extracting the data from the patent information and visualizing the technological trends are possible to be tool to decide the research and development theme.

The technological trend analysis technology using patent information is separately investigated for the three processes as; (1) technology of extracting technical terms, (2)

technology of conversion from patent term to simple term, (3) technology of the visualization of technological trends.

(1) It is investigated from the viewpoint how the technical term that shows technology trends can be extracted from the patent information.

(2) It is investigated from the viewpoint whether it is possible to convert the patent term to a comprehensible word because the patent term is difficult to understand.

(3) It is investigated from the viewpoint what visualization technology is good to overview technology trends.

And the result of investigation of these technologies is reviewed as what technology are effective or should be improved, and the effective combination of technologies are examined, after that the effective system will be drawn including three processes (1)~(3) as a series of system.

## 2. Research on technological trend analysis technology using patent information in the past

The technological trend analysis technology using patent information is separately investigated for the three processes as follows.

### **(1) Technology of extracting technical terms**

There are researches on the analysis of the title of the paper, the automated classification of the patent publication, the determination hierarchy between words, the technological trend analysis using the quotation between patents, and the extract from the patent information by a cue word and so on.

I tried to consider whether the analysis of the title of the paper is able to be applied to patent information, and whether the structure analysis between words is possible in patent information.

### **(2) Technology of conversion from patent term to simple term**

There are researches on the construction of the retrieval environment that integrates data bases of the paper and the patent, the automatic conversion from paper term to patent term, the extract a simple term from the patent specification corresponding to the patent term and so on.

The paper term is researched as a simple term converted from the patent term, and I focus on the effectiveness of the automatic conversion from the paper term to the patent term.

### **(3) Technology of the visualization technological trends**

There are researches on the network diagram using the quotation between the patents, the network diagram as for a gravitational model similarly using quotation between the patents, the network diagram that common term between patents is considered as parent node, the technological trend map using drawings in the patent information, the technological trend map using new patent classification given by the Patent Office, the patent map using data mining and so on.

There are so many mapping technologies, I consider on the point what technology of visualization is easy to look or easy to make map for understanding technological trends.

### 3. Verification of tool

I verify the tool for analyzing technological trends centering on the data mining tool. The verification is done referring the report on patent trends and paper trends published by the Japan Patent Office.

As a result, it is tuned out that to use the data mining tool, expert knowledge is need for selecting the words, and it is not suitable for obtaining the time series information.

### 4. Conclusion

As to the technology of extracting technical terms, I think that the analyzing the structure is possible on the patent information, for example, in the claims by cue words. And also I think that the patent classification is possible using common words in the forequarter (preamble) in the claim that describes the prior art in patent information.

And as to the technology of conversion form the patent term to a simple term, I think that it is difficult to convert from the patent term to a simple term, because the patent terms are expressed in different way by the writer of the patent specification.

Finally, as to the technology of the visualization the technological trends, I think the network diagram is effective in which common term between patents is considered as parent node of technical term and arranges node according to the first filing date of the patent.