Trend Review for Forecasting of Technology using Patent

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Abstract: *Over recent years, it is more becoming important to intellectual property all over the world, many scholars study on application methods of intellectual property. Especially, most of them study actively on forecasting of future promising technology using patent. This study analyze various analysis techniques to technology forecasting using patent.*

Keywords: *Intellectual Property, Patent, Forecasting of Technology, Analysis Technique*

1. Introduction

Cause of economic growth is start to motivation about innovation which can take benefit [1]. Intellectual property is right that protect intellectual creation of inventor. This right stimulate the inventor to develop as protecting their right. Also, protecting intellectual property is vital to economic growth [2]. More importantly, patent of intellectual property is institution protecting technology. So, many companies have interested in this institution. Patent include the latest information of technologies and abundant data as cumulating data a long time. These data is used to forecast technology [3]. Thus, this study research trend for technology forecasting using patent.

2. Trend Analysis of Technology Forecasting

Recently, it is actively researching about techniques of technology forecasting using patent. This study define the techniques and examine algorithms of the techniques.

2.1. Clustering

Clustering is analysis technique that make grouping entity which have similar attribute by similarity or distance. According to measurement method of similarity or distance, it is divide to various clustering techniques. Typical technique of clustering are K-means clustering.

K-means clustering select k entity as center points of initial clustering and calculate distance between center points and other points. Then, it allocates points to particular clustering located closer each point. If new entity enter into cluster, new center point is selected as calculating distance among points. It is compare repeatedly new center point until there is no change.

Charles V. Trappey studied technology forecasting through K-means clustering using china patent related RFID. To Key phrases, it is need to preprocessing which change unstructured patent data into structured data. Preprocessing is eliminating vacant between words and phrases and extracting meaningful words from documents by term frequency. Key phrases is composed of high frequency keywords from patent documents. K-means clustering is conducted using these key phrases. After conducting K-means clustering, the key phrases are divided to each clusters by similarity. In each clusters, documents are composed of similar technologies. Each clusters is defined as technology which is represented to what kinds of technologies by key phrases. Then, they determine specific stage of growth curve stages; introduction, growth, mature, decline. According to analysis results, they forecast situation for specific technologies and suggest strategies [4].

2.2. Network Analysis

Network analysis is visualization technique which analyse relation among nodes. The analysis has index such as indegree, outdegree, centrality, betweenness, closeness, etc. It is analysed using these index.

Jinho Choi(2011) forecasts technology through analysis of keywords relation using network analysis from patent documents. Experiment data is collected as LED(Light Emitting Diode). To analyse, he extracts keywords from patent abstract, and changes data into structured data by each patents. Extracted data is conducted by correlation analysis, then constitute a network community. He analyses connection ratio of community which composed of extracted keywords from test data. Thorough analysing relation between new imported keywords and existing community, technology is forecasted [5].

2.3. Patent Map

Patent map is represented by visualization techniques about patent analysis. It helps understanding easy as representing visualization map. The aim is to collect related patent documents about a specific field of technologies and to analyse the patent documents [6]. Also, current visualization techniques of patents are based on mapping of patent information and analysed that. Consequentially, it can be understanding advance of emerging technologies and forecasting future trends [7].

Sungjoo Lee (2009) studied forecasting of new technology using patent map based on keywords. He proposed 3 approaches that composed of development of patent map, identification of patent vacancy, and test of vacancy validity. In first stage, they collect patent documents about PDA and develop PDA patent map based on keywords using text mining. In second stage, they define technologies and determine vacant technology the space is vacant. They forecast vacant technology and conduct patent listing. In final stage, they conduct importance analysis, trend analysis, and feature analysis to verify validity of vacant technology [8].

3. Conclusion

This study analyse trends about technology forecasting techniques using patent which studied actively. We review clustering techniques which cluster similar documents; forecasting technique to technology life using clustering and forecasting method to vacant technology using clustering. Also we analyse network analysis which visualize relation among documents and forecast technology and patent map which forecast technology through developing, analysing patent. Although many studies are conducting, it is difficult to change data which unstructured patent documents into structured data. In this process, the scholars have different opinion. Also, they have many differences which extract features and analyse information from patent documents. In analysis process, it is problems that lose information and lack objective index.

To solve these problems, it is need to objective index which can represent patent information and algorithms which more appropriate to patent documents.

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