Chapter 16
Expert Mining and Traditional Chinese Medicine Knowledge

Gu Jifa
Chinese Academy of Sciences, China

Song Wuqi
Dalian University of Technology, China

Zhu Zhengxiang
Dalian University of Technology, China

Gao Rui
China Academy of Chinese Medical Sciences, China

Liu Yijun
Chinese Academy of Sciences, China

ABSTRACT

Expert mining is an emergent theory and technique that is useful for collecting the ideas, experiences, knowledge and wisdom from experts. Thus, in this paper, the authors have applied expert mining to solve problems related to social system and knowledge systems pertaining to specific types of information. TCM (Traditional Chinese Medicine) masters accumulated useful knowledge in medicine from ancient China paying close attention to collecting and maintaining the ideas, experiences, knowledge and wisdom from famous elder masters in TCM. In collecting this information, a large project was conducted from 100 famous elder masters in TCM supported by the Ministry of Science and Technology of China, State Administration of Traditional Chinese Medicine. Due to the enormity of this project, subprojects have been established using advanced IT technology, Artificial Intelligence, Knowledge Science and Systems Science to analyze and express these masters’ experiences and theories. One of the subprojects uses expert mining and other techniques to analyze both individual and group ideas and knowledge. This paper will describe results and future planning in how this subproject will be conducted while introducing methods and tools used for expert mining.

DOI: 10.4018/978-1-4666-1782-7.ch016
1. INTRODUCTION

In the middle of 1980’s when Gu dealt with some problems related to the regional development strategy system for Beijing, besides of collecting the data, information and knowledge and constructing a series of mathematical models we found that the expert opinions are very important for solving the problems. In order to determine the objectives, constraints and possible alternatives for development strategies we had designed a detailed questionnaires and sending to 400 experts for collecting their opinions about the objectives, constraints and possible alternatives for development strategies in Beijing (Gu & Yang, 1987). The selected 400 experts consisted from the top leaders from Beijing municipalitiy (20), carderes with middle rank from Beijing municipalitiy (180), experts from research institutions and experts from universities and others (200). After data processing we had obtained the statistical results about development strategy in line of Delphi method. But when we submitted the final results to the top leaders from Beijing municipalitiy, results were not accepted by them. After then we wished to find the reasons, Gu had asked his graduated student to run a cluster analysis for all responders in 400 questionnaires, finally we found that with the decreasing of the $\lambda$ there appeared one large clusters and two small clusters. The large cluster consisted of carderes with middle rank from Beijing municipalitiy and experts from research institutions,whose consideration were more practical The first small cluster of experts came from universities, whose considerations were more academic and the last small cluster from the top leaders from Beijing municipalitiy, whose considerations were more political and applicable. It was understandble that the top leaders had their own considerations on base of more higher political perspective and more practical manageable manipulation. Since then we think the more justic Delphi method for all experts maybe impractical we’d better use the weighted summation to process our data statistics, it means we should give different weights to peoples with different rank.

In the 90’s we had met with some technical system with heavy human factors, the first case related to the water resource management in Qinhuangdao city. When we wish to establish some satisfaction criterion to determine what level of water in reservoir will be better for operation. The criterion function we chosed had five parameters which were very difficult for us to estimate, finally we ask an appropriate expert who gave the estimation for three parameters directly according to his experience (Gu & Tang, 2006). The second case was how can we construct the diagram of standards of commerce on base of a little number of existed standards. In paper (Gu, Tang, Wang et al., 1997) we proposed a set of methods to collect the expert’s opinions., such as Brainstorming, Delphi, AHP, cluster analysis etc. In the brainstorming stage we usually invited 4-8 experts in giving the framwork for our study and designing the questionarie. We invited 30 experts from different department stores to fill the questionarie. Finally we convened the expert meeting with different knowledge background from department stores, research institutions and management organization around 20 persons and we used the majority principle and decision power from higher leaders in making final decision.

In 2004 Gu started involve in studying the social harmony problems. The social system is an open giant complex system. There are three kinds of channels to obtain information: formal society, informal society and network society. In order to collect and process useful information we have to use different mining techniques: data mining, text mining, web mining, model mining, psychology mining, and expert mining: The first four mining techniques deal with mainly the explicit data and information. The later two techniques mainly deal with the tacit information. In recent years we pay much attention to develop the expert mining (Gu, Tang, & Niu, 2005; Gu, 2006).