An automated knowledge structure construction approach: applying information retrieval and genetic algorithm to journal of Expert Systems with Applications

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Abstract

In this study, information retrieval and genetic algorithm are integrated to propose a new knowledge structure construction method and this method is further applied to the papers published on the journal of Expert Systems with Applications (ESWA). The purpose of this method is to explore the major topics as well as the related techniques and methods of the papers published in various periods of time and help understand the research tendencies among these published papers. We use vector space model to present the published papers and feature and adopt chi-square test to examine the independence of topics. Then we apply genetic algorithm to facilitate automatic topic selections used to construct the knowledge structures for the journal in study.
We select ESWA as the source of samples mainly because the papers published on this journal feature an extensive use of methods and techniques and have been widely applied in many domains. Moreover, it is also a SCI listed journal. In recent years, more and more outstanding scholars have published their papers on this journal, so citation of the papers on this journal by other papers is frequent. It can be viewed as an internationally prominent journal.
In our experiment, knowledge structures are constructed and analyzed. The representativeness of the

selected topics and whether published papers have been classified into appropriate topics are also evaluated.
From the experimental results, we discover that the constructed knowledge structures could not
only effectively present representative topics, related techniques and issues, but also help understand the
research tendencies.

Keyword：Knowledge structure
Information retrieval
Genetic algorithm
Chi-square test
Topic selection