

Research on Technology Opportunity Recognition and Evaluation Based on Semantic Mining and Knowledge Network

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Timely discovery and grasp of valuable technology opportunity is an important prerequisite for breakthrough technology innovation. However, there are several open problems in the existing research on the discovery of technology opportunity. Firstly, the characterized-granularity of technology opportunity is too large to interpret the opportunities; Secondly, the depth and breadth of technology opportunity discovery is insufficient, leading to the possibility of missing some valuable technology opportunities; thirdly, the evaluation of existing technology opportunities relies too much on the subjective judgment of experts, lack of empirical support for evaluation criteria. In order to address these issues, this study proposes an approach to discovery technology opportunity based on semantic mining and knowledge networks.

The method mainly consists of three steps. In the first step, we construct a domain knowledge network. We identify the semantic relationship between technology topics from the title and abstract of the patent, regard the SAO structure composed of technology topics as the smallest-granularity representation of technology opportunity, and extract the SAO structure as the knowledge element in the knowledge network. At the same time, the co-occurrence relationship of knowledge elements is considered as the edge of the network. The network is then used to identify candidate technology opportunity. After that, we choose regression model to evaluate the value of technology opportunities. Evaluation function and objective function of technology opportunity are formed by screening the opportunity features that have an impact on the value of technology opportunities. The work then use the heuristic genetic algorithm to search for technology opportunities in the domain technology knowledge network, and interpret the optimal set of technology opportunities obtained. Finally, this study applies the method to the field of "artificial intelligence", empirically testing the feasibility and effectiveness of the proposed approach in opportunity discovery.

Keywords: Technology Opportunity, Semantic Mining, Knowledge Network, heuristic genetic algorithm, patent analysis
