

Identifying the latent technology opportunities based on a perspective of coupling publications with patents

Abstract

In the prior studies on TOA (technology opportunities analysis) preferred to the relevant approaches based on patent data. In the traditional methodological framework, the patents are the main data for the technology forecasting, technology evaluation and innovation opportunities analysis.

Basically, besides the patent data, publication data also could provide the supplemental information to enhance the TOA, especially for some specific topics of science or technology; for example, in the early stage, the relevant publications on some emerging technologies or emerging materials could be much more than the patents. Therefore, an integrated framework for TOA through a novel perspective of coupling publications with patents is proposed in this paper.

Compared with the prior studies, two research gaps are described and attempted to mitigate through a new perspective and an integrated computing framework. The two possible research gaps are depicted in the following.

(1) The relationships between scientific research and technology application under the same or very close topic discourse, are further explored and visualized. For example, regarding the same topic, the growth of scientific research is not always synchronous or desynchronized with the growth of technology application or commercialization. The possible or potential technology opportunities underlying the synchronized or desynchronized relationships are further explored and discussed under an integrated framework of computation.

(2) How to measure the transformation degree or speed of the relevant scientific studies on the specific topic is still controversial and have the room to reach a consensus in the previous literatures. In this paper, two indicators are proposed to enhance the measurements on the transformation of scientific studies based on

coupling publications with patents within a specific topic.

Aiming at the above research gaps, the analytical method or work flow of this paper is shown in the Fig. 1.

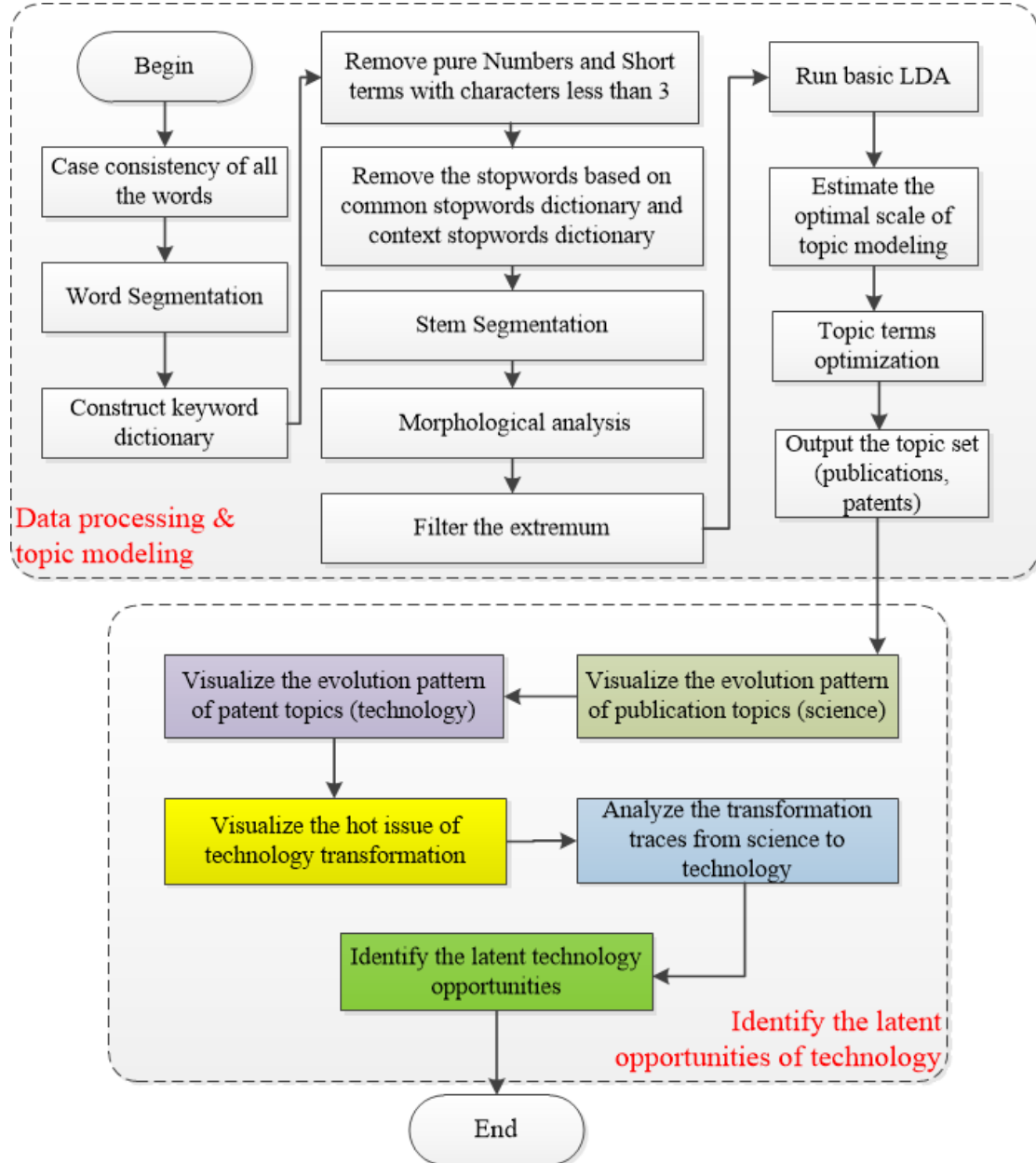


Fig.1. The research methodology or work flow of this paper.

In the Fig.1, an integrated framework of computation is proposed to identify the latent or possible technology opportunities; and the data preprocessing and topic modeling, topic similarity, topic evolution and technology transformation etc. are involved of the computation framework.

To verify the proposed framework of computation in the above, a case study on

artificial intelligence is conducted, and over 230 thousands publications retrieved from WOS (Web of Science) and over 26 thousands patents from DII (Derwent Innovations Index) are included.

Keywords: TOA (technology opportunities analysis); Topic modeling; LDA(Latent Dirichlet allocation); Artificial intelligence