

# Survey on Big Search in Cyberspace

Bin Zhou<sup>1</sup>, Binxing Fang<sup>\*2</sup>, Manqing Wu<sup>3</sup>, Yan Jia<sup>1</sup>, Aiping Li<sup>1</sup>, Lihua Yin<sup>4</sup>

<sup>1</sup>Computer School NUDT., <sup>2</sup>BUPT,<sup>3</sup> 38CET,<sup>4</sup>IIECAS

The *ShuangQing Forum of Big Search in Cyberspace* was held in September 2014 and the National Nature Science Foundation of China (NSFC) has launched key project group of *Big Search in Cyberspace*. This project group will play an important role in responding to important scientific challenges of Chinese information technology development, promoting development of big data, cloud computing and other new IT technologies, assuring national security and social stability. The research of *Big Search in Cyberspace* has attracted broad attention and enthusiastic support in academics and industry, with the purpose of leading the development of the information industry and safeguarding national interests.

This paper describes the background of this key project group, noting that expansion of cyberspace, development of web application model and arrival of the era of big data, will make traditional search engines stride forwards the next generation of *Big search*, which meet the needs of multi-source, intelligence and ubiquity. Then, the paper introduces the connotation of cyberspace *Big search*, and its four key research problems: 1) how to construct and manage knowledge warehouse which is a refinement of the rough knowledge, and how to update the knowledge warehouse to keep it evolving? 2) how to understand and percept user search intentions which are expressed by natural language, and convert to computer's inner representations? 3) how to search and match computer representation of user's search intention in knowledge warehouse fast and accurately, to infer unknown knowledge, and to show the search results? 4) how to make the whole search process secure and trust, including that trusted data sources, control of search process and filter of search results. Then, we conclude up-to-date research situations of search engines and some existing problems. Lastly, we point out the common scientific issues and scientific objectives of big search, and introduce expected achievements of the project.

*Big search* is expecting to be a new generation search with *wisdom*, which can accurately understand the user's search intention, and realize Searching information relates to characters, objects and content at the object level, in the massive, heterogeneous, polymorphic and uncertain data, so as to provide the most suitable search results for users. Nowadays, as the rapid development of Internet technologies and applications, big search obtains extremely important strategic significance. In the future, big search will have great impact on many domains including politics, economy, livelihood, etc.