Evaluating the Coverage of Entities in Knowledge Graphs behind General Web Search Engines

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Knowledge graphs are used to support entity search feature of search engines and the quality of knowledge graphs is essential to the performance of entity search. However, studies on the quality of knowledge graphs from the angle of entity coverage are scant in the literature. This study aims to investigate the coverage of entities of knowledge graphs behind Google and Bing. Entities from Wikipedia in English were selected to test those two search engines. Each entity was submitted to Google and Bing separately in March of 2017. The occurrences of knowledge cards in Google and Bing were counted and compared. A Chi-square test of independence was employed to test the difference of the coverage of entities between two search engines. Google returned 259 knowledge cards for the 720 tested entities while Bing returned 385 cards. The result of the Chi-square test suggests that the coverage of entities in the knowledge graph is significantly different between Google and Bing. Then, the occurrence frequency of knowledge cards of Google and Bing was compared in 12 major categories under Wikipedia. A three-dimensional cross-tabs analysis was done to explore the relationships between categories and the coverage rate of entities. The coverage of entities between Google and Bing is significantly different under the category of health and fitness, mathematics and logic, philosophy and thinking, religion and belief systems, society and social sciences, and technology and applied sciences. The results suggested that the entity search feature of Bing is better that Google. Google should devote more on the construction of knowledge graph to improve the entity search feature especially in some specific domains.