Enhancing Semantic Information Retrieval (Sir) Through Antonyms Extraction For Retrieving Precise Covid-19 Information

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Abstract

The Semantic Web extends the capabilities of the traditional Web by enabling machines to process and interpret data through ontology knowledgebase. Integrating ontologies into the Web facilitates more accurate and precise searches, task automation, and optimized integration between systems. This research work focuses on semantic information retrieval (SIR) for COVID-19-related queries, leveraging ontologies to generate precise search results and antonyms to reduce irrelevant results. By conducting syntactic and semantic analysis, the system expands the search query using the context derived from the ontology. The query is further refined by extracting antonyms via the ontology relations. The refined query is then submitted to the search engine to retrieve more precise results. A ranking module further filters and prioritizes the most pertinent result links. The SIR

approach is novel among existing information retrieval systems in that it eliminates irrelevant search results via antonyms, rather than displaying all the retrieved results based on the query, and in that it re-ranks the results semantically. The SIR algorithm demonstrates significant performance improvements for most queries, primarily due to the semantic analysis, antonyms addition and re-ranking processes. The query dataset achieved 100% precision and 80% recall, outperforming existing search engines in these metrics.

Author keywords

Antonym analysis; COVID-19; Information retrieval; Ontology; Semantic analysis

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