THE UNIVERSITY OF HONG KONG

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Project Title:	PERQ: Predicting, Explaining, and Rectifying Failed Questions in KB-QA Systems

Abstract:

A KB-QA system processes a natural language question (e.g., "Who is the wife of Barack Obama?") using a knowledge base (KB) through a number of steps. These include parsing the question to identify named entities (e.g., "Barack Obama") and relations (e.g., "is-wife-of"); locating relevant resources in a KB (e.g., the entity record in a knowledge graph that represents "Barack Obama"); structured query composition and answer ranking.

We observe that existing KB-QA systems generally register an accuracy of 70-80% for simple questions, and only around 50-60% for more complex ones. We propose the PERQ framework that includes three elements to boost answer accuracy: (1) **Prediction**. Given a question *q* and a KB-QA system *S*, we study different machine learning techniques to construct a predictor that predicts whether *q* can be answered correctly by *S*. (2) **Explanation**. We study the design of an explainer that, given a question *q* that is predicted (by our predictor) to be failed by a system *S*, explains which features are the culprits --- the features that sway the prediction to "incorrectly answered" the most. (3) **Rectification**. We apply an interactive module to seek the enquirer's help in rectifying *q*. We devise an *action plan* for each of the most common culprit features. We study how these action plans should be intelligently designed so that minimal efforts are required from the enquirers. Moreover, we develop a prototype KB-QA system under the PERQ framework and then extend it to other applications, such as interactive recommendation on video streaming services and legal advisor systems.