On Knowledge Base Embeddings

Abstract for Invited Talk

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Embeddings of knowledge bases (KBs) emerged as a way of "softening" their classical crisp representation. The idea is to represent KBs in vector spaces via an optimization procedure that encourages axioms in the KB to hold. To illustrate, consider a KB that keeps the records of politicians. There may be crisp rules such as the condition that politicians need to be lawful citizens to be elected but also data patterns indicating that politicians are commonly senior male natives. By including facts and rules from the KB in the optimization procedure, the resulting vector representation can accommodate both "soft" inferences based on data patterns and rule based inferences, all within the vector representation. In this talk, I will discuss opportunities and challenges of representing the semantics of KBs in vector spaces, focusing on geometric-based embedding methods. I will cast light on certain aspects of data analysis such as biases and fairness, as well as relate KB embeddings with approximate reasoning and query answering.

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