UNIVERSITY OF TARTU
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DIRE: A Scalable RDFSE Reasoner For Time-Varying RDF Graphs

Master's Thesis (30 ECTS)

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Abstract:
The core tenet of Symbolic Artificial Intelligence is the concept of machine reasoning: the act of deducting knowledge, new or old, from already-existing machine-readable facts. In spite of the ice age that Symbolic AI has been enduring, certain industry fields that heavily depend on knowledge graphs, such as the medical one, not only still make usage of machine reasoning, but do so with ever-increasing amounts of data that change at an even greater rate. New techniques are needed in order to reincarnate machine reasoning into the age of big data. Our contribution lies in the development of a reasoning engine that is built upon a streaming and distributed computational model that has first-class support for calculating fixpoints and handling both the addition and removal of data efficiently, one of the most complicated challenges that permeate the field. The state of the art is significantly outperformed in symmetric performance between additions and deletions, while at the same time being distributed.

DIRE: Skaleeritav RDFSE arutleja ajaliselt muutuvate RDF graafikute jaoks

Lühikokkuvõte:
Sümboolse tehisintellekti keskseks fookuseks on masinarutluse kontsept: uue või vana informatsiooni järeldamine juba eksisteerivatest masinloetavatest faktidest. Hoolimata jääajast, mida sümboolne tehisintellekti haru on pidanud taluma, teatud valdkonnad, näiteks meditsiinivaldkond, mis väga tugevalt sõltuvad teadmiste graafikutest, siiski kasutavad masinarutlust, kuid tehes seda aina suurema hulga ja aina kiiremini muutuvate andmetega. Seega, vaja on leida uusi tehnikaid, et reinkarneerida masinarutlus suurandmete ajastusse. Meie panuseks on eksperimentaalsel voogesitusel ja hajutatud arvutusmudelil põhinev võrdluspunktide arvutamisele ja ühele ala kõige keerulisemale probleemile - andmete efektiivsele lisamisele ning eemaldamisele - tugevalt fokuseeritud arutlusmasin. Meie arutlusmasin, olles samaegselt hajussüsteem, oluliselt edestab jõudluses tipptasemel arutlejaid sümmeetriliselt nii andmete lisamisel kui ka eemaldamisel
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