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Promotionsverfahren von **Herrn M.Sc. Leschek Matthäus Zloch**
Auslage der Dissertation und Gutachten sowie Termin der mündlichen Prüfung
Anlage: Einseitige Zusammenfassung der Dissertation

Sehr geehrte Damen und Herren,

in dem oben genannten Promotionsverfahren wird die Annahme der Dissertation

Facilitating Knowledge Graph Analysis - Acquisition and Large-Scale Analysis of Topological Graph Measures

von den Berichterstattern Prof. Dr. S. Conrad und Prof. Dr. S. Dietze beantragt. Sie kann zusammen mit den Gutachten in der Zeit

vom 10.01.2021 bis 21.01.2021

im Promotionsbüro (Gebäude 25.32, Ebene 00, Raum 36) zu den Sprechzeiten eingesehen werden.

Einsprüche gegen diese Dissertation können nur zwei Tage nach der vorgenannten Frist geltend gemacht werden. Erfolgt kein Einspruch, so gilt die Dissertation als angenommen (§ 7 Ziffer (5) PO).

Sofern die Dissertation angenommen wird, findet die mündliche Prüfung am

26.01.2021 um 16:00 Uhr

als Online-Prüfung statt. Als Prüfer sind vorgesehen:

Prof. Dr. M. Leuschel, Prof. Dr. M. Mauve und Prof. Dr. M. Schöttner.

Zuhörer sind bei der Prüfung nicht zugelassen.

Mit freundlichen Grüßen
im Auftrag

Athina Stefanidou

The topology of knowledge graphs differs fundamentally from that of other graphs, for example, computer networks or social graphs. This is due to the inherent semantics that this graph-based model entails: vertices represent Web entities, and relationships between entities are represented by directed and labeled edges.

Analyzing and understanding the distinct topology, and employing meaningful measures for the appropriate characterization of knowledge graph topologies is crucial, and can guide and inform the development of, for example, profiling tools, benchmarking solutions, efficient data structures and indexes, and compression techniques.

This cumulative dissertation introduces and describes tools and methods to investigate the efficient acquisition of knowledge graphs and the computation of graph measures; the evaluation of graph measure effectivity and meaningfulness; and the application of the obtained results in related research areas of knowledge graphs. The thesis makes three scientific contributions, each of which constitutes one part of the work.

First, we introduce and describe a software framework that enables to perform large-scale analyses on state-of-the-art knowledge graphs. By consolidating different third-party tools, the framework is able to acquire knowledge graphs from different knowledge domains, to represent them as programmatic graph objects, and to efficiently compute graph-based measures on their topologies.

In a second step, we calculate 54 different graph measures on 280 knowledge graphs from nine popular knowledge domains, and empirically evaluate graph-measure effectiveness and meaningfulness in order to generate concise topological profiles for the obtained knowledge graphs. We also assess the capacity of graph measures to discriminate knowledge graphs from other knowledge domains.

Apart from the aforementioned tasks of knowledge graph acquisition, graph data preparation, and measure computation, we demonstrate in a third step the tool's feasibility to provide solutions in other related research areas – that is, application-specific benchmarking suites for knowledge graphs. The first contribution generates realistic queries from graph representations of knowledge graphs by means of query templates obtained from real-world query logs. In addition, we present a flexible "business use case"-driven approach that allows to assess response times of database queries more reliably by building query groups.

Zloch, Matthäus 26. November, 2020