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MSc Project

Topic: Implementing regular path queries in graph database management systems

Answering regular path queries (RPQs) is fundamental for graph database management systems (GDBMS). However, current graph database management systems have no capacities to process regular path queries.

This MSc project explores how to support regular path queries in the state-of-the-art Kùzu graph database management system.

Tasks

- **Task 1: Literature Review**
 - Study the relevant research work [1][3][2]
- **Task 2: Hands on Kùzu**
 - Compile the code base of Kùzu
 - Identify relevant system components of Kùzu
 - Modify the source codes and run tests to confirm your understandings
- **Task 3: Modifying Cypher grammar to support RPQs in Kùzu**
 - Identify the functions on Cypher grammars
 - Define the Cypher grammar for RPQs
 - Implement the cypher grammar for RPQs
- **Task 4: Implement RPQs in Kùzu** This includes one of the following approaches:
 - FA plan [3]
 - α -RA plan [1]



• **Task 5: Write the report**

- Summarize the literature review, your implementations and results in a final report.

References

- [1] R. Agrawal. Alpha: An extension of relational algebra to express a class of recursive queries. *IEEE Transactions on Software Engineering*, 14(7):879–885, 1988.
- [2] X. Feng, G. Jin, Z. Chen, C. Liu, and S. Salihoğlu. Kuzu graph database management system. In *CIDR*, 2023.
- [3] N. Yakovets, P. Godfrey, and J. Gryz. Query planning for evaluating sparql property paths. In *Proceedings of the 2016 International Conference on Management of Data*, pages 1875–1889, 2016.

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