

Data-Intensive Systems

Bachelor project proposals 2021

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Our research group

Our interests

- Data management, data analysis, machine learning
- Efficiency and scalability
- Models and algorithms

Our methods

- Formalize real world problems
- Devise concepts and algorithmic solutions
- Evaluate empirically

Our tools and results

- Theoretical analysis and prototype implementations



Query results and analysis

Projects in a Nutshell

Algorithms for
Approximating Betweenness
Centrality on Large Graphs

Content-Based Influence by
the Linear Threshold Model

Creating and Personalizing
Large Knowledge Graphs

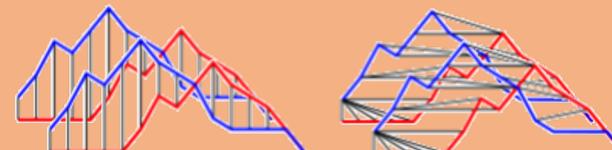
Graph alignment: the good,
the bad, and the ugly



Graphs

Similarity Search with
Dynamic Time Warping

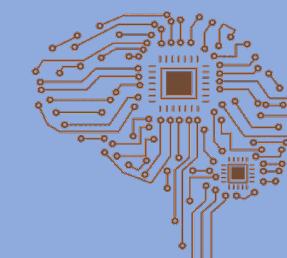
Authenticating Geometric
Queries



Complex data

Studying the fairness of ML
models

Interactive Explainable AI



AI

Graphs



Algorithms for
Approximating Betweenness
Centrality on Large Graphs



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Creating and Personalizing
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Graph alignment: the good,
the bad, and the ugly



How can we easily find "broker"
people in a social network?

How can a message best spread
in a network after we share it
with friends and followers?

How do we create and maintain
high-quality knowledge graphs
for medical doctors?

How are two graphs related, can
we find the same users in two
social networks?

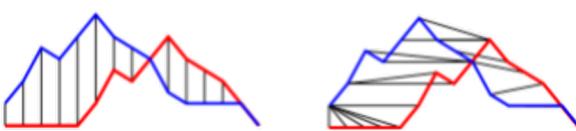
Complex data analysis



Similarity Search with
Dynamic Time Warping



Authenticating Geometric
Queries



How can we efficiently search time
series under complex distance
models?

How can we verify that query results
are genuine, especially if data is
outsourced?

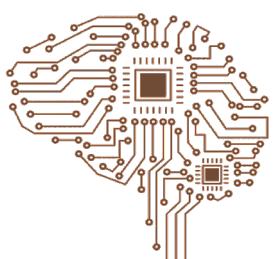
AI



Studying the fairness of
ML models



Interactive Explainable
AI



Is a ML algorithm fair? Can a
machine be fair? Are there good
models for fairness?

Is it possible to explain a ML
algorithm in a way that the user
trusts predictions and
explanations