Formal Language Driven Data Analysis Research Group Report

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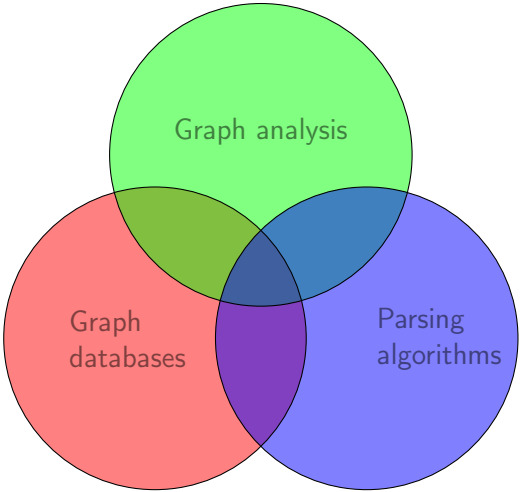
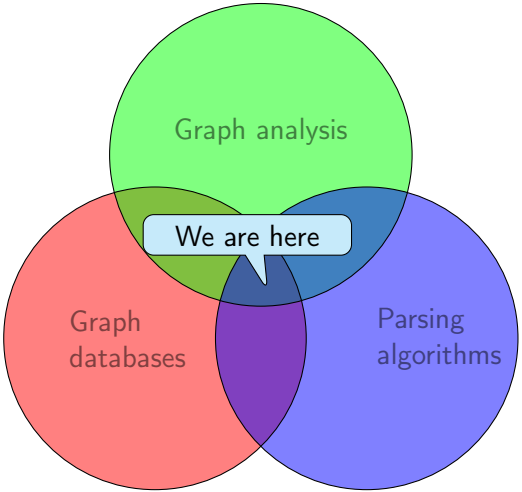
Research Area



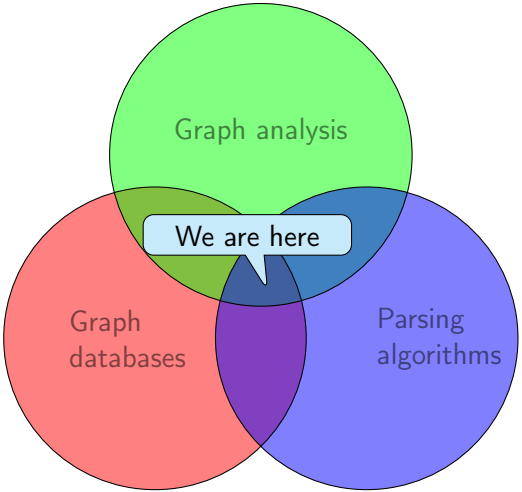
Research Area



Research Area

Applications

- Code analysis
- Code querying
- Code parsing



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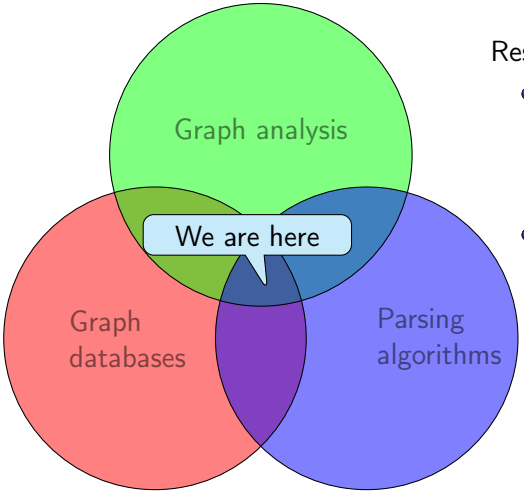


Research directions

- Graph algorithms
  - Dynamic graphs
  - Linear algebra
  - Path querying
- Formal languages
  - Languages classes and properties
  - Parsing algorithms
  - **Formal language constrained path querying**

Code Analysis and Querying

Huge software projects
- millions LOC
- complex structure
- dynamic

→

Huge graphs for analysis
- millions of vertices
- dynamic

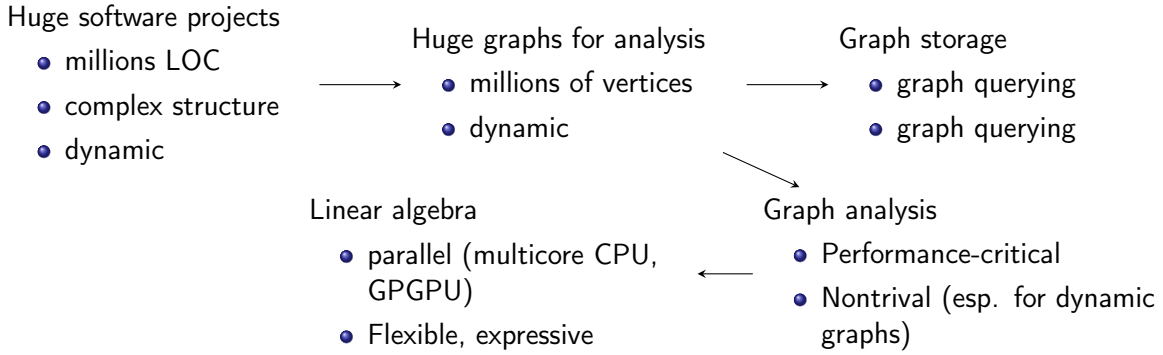
→

Graph storage
- graph querying
- graph querying

↘

Graph analysis
- Performance-critical
- Nontrival (esp. for dynamic graphs)

Code Analysis and Querying



Code parsing (for IDE)

- Dynamic
- Error recovery

Results

- Graph analysis layer for symbolic execution engine
- Formal language constrained path querying
  - Evaluation
  - Implementation

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- Formal language constrained path querying
  - Evaluation
  - Implementation
- Linear algebra
  - Brahma
  - SPLA
- Graph analysis algorithms
  - Complexity

Rustam Azimov

- !!!

Ekaterina Shemetova

- !!!

Vladimir Kutuev

- !!!

Egor Orachev

- !!!

Vlada Pogozhelskaya

- !!!

Ilya Epelbaum

- !!!

Dmitriy Panfilenok

- !!!

Kirill Garbar

- !!!

Artyom Chernikov

- !!!

Denis Porsev

- !!!

Possible Ways for Collaboration

- Algebraic Path Problem framework applicability for network analysis
  - Which constraints can be specified in terms of semirings?
    - Length minimality
    - Nodes to visit
    - ...
  - Is it flexible enough?
- High-performance network analysis
  - GraphBLAS-based solution
  - Algorithms development and analysis
  - Algorithms implementation and evaluation