**Big Graph Bisimulation: Computation and Analysis**

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### 1. Motivation
- Big graphs are ubiquitous. E.g., social networks, web graphs, online reviews, etc.
- Smaller graphs → faster analytics → faster decision making
- Goal: Compress big graphs into small graphs (graph reduction)
- No practical solution for graph reduction on real big graphs under bisimulation, a robust general reduction notion → SeeQR Project

### 2. Example of \(k\)-Bisimulation

Graph’s structural information is preserved, while the size is significantly reduced.

### 3. Our solutions

Average running time of our two algorithms for \(k = 10\) on various datasets (# of nodes, # of edges): Jamendo (0.49M, 1.05M), LinkedMDB (2.33M, 6.15M), DBLP (23M, 50.2M), WikiLinks (5.71M, 130.16M), DBPedia (38.62M, 115.3M), Twitter (41.65M, 1468.37M), Random (10M 200M), Power (8.39M, 200M)

- External Memory Algorithms for Bisimulation [1]
  - Analyze big graphs on a single machine
- MapReduce Algorithms for Bisimulation [2]
  - Leverage the power of parallelism
- Bisimulation Result Analysis [3]
  - What does the reduced graph look like?

**References**