

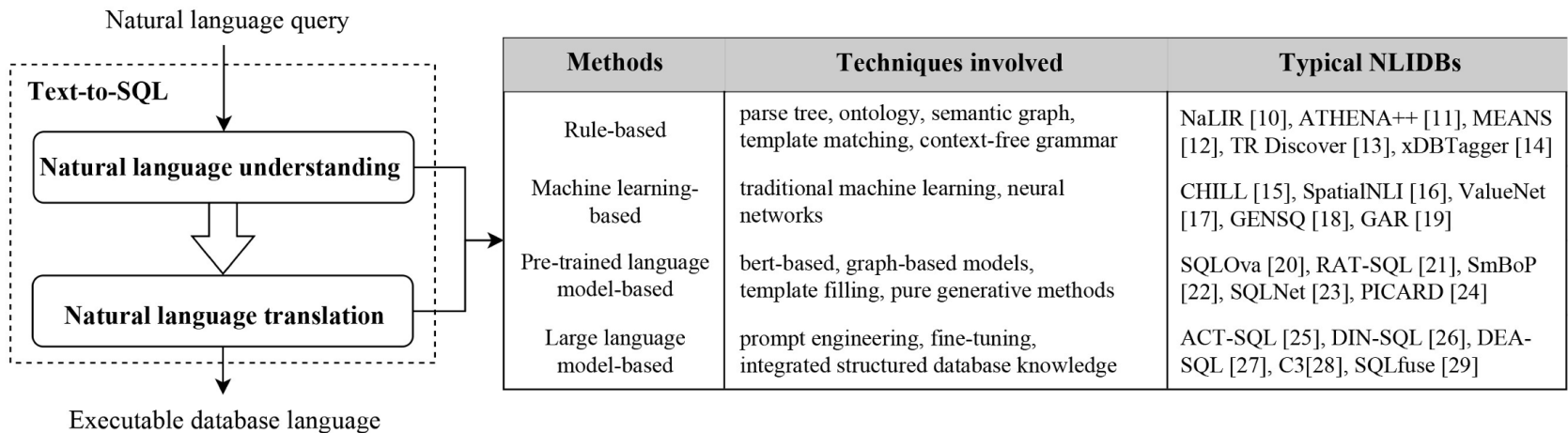
A Systematic Review of Natural Language Interfaces for Databases

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Problems & Ideas

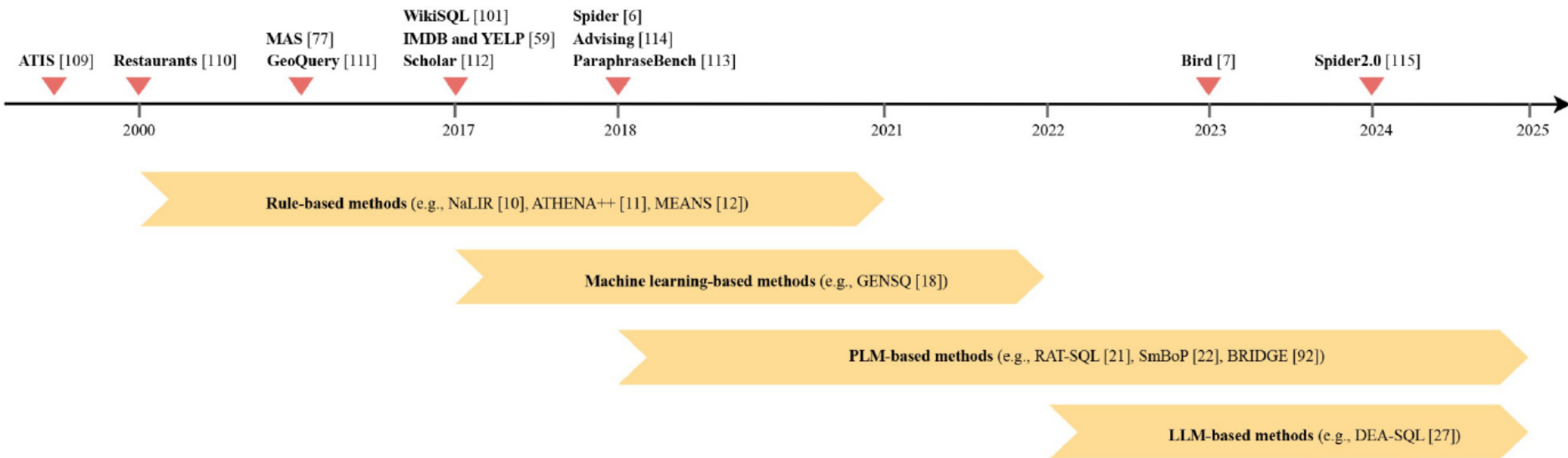
- Problems:
 - Gap between natural language queries and SQL;
 - Difficulty handling complex queries.
- Ideas:
 - A unified two-stage framework: natural language understanding (NLU) + natural language translation (NLT);
 - Classify methods by technical evolution: rule-based → machine learning → pre-trained language model → large language model.



The two-stage framework and technical methods of Text-to-SQL.

Main Contributions

- Contributions:
 - Propose a systematic two-stage framework (NLU + NLT);
 - Provide a technology-driven taxonomy across four paradigms;
 - Highlight trade-offs: accuracy, generalization, interpretability, cost;
 - Analyze benchmark datasets & evaluation metrics;
 - Offer insights for robustness, security, and effectiveness of existing Text-to-SQL systems.



Timeline of Text-to-SQL benchmarks and method paradigm shifts.