Towards Production-Ready Data Management with Deep Reinforcement Learning

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Development process
1. Application-side contribution
2. Problem framing
3. Advanced model understanding
4. Training configuration

Project Goals
1. Comparison of frameworks.
2. Partitioning with DRL.
3. Studying how to provide safety guarantees.

Extensible DRL

Deep Reinforcement Learning in Data Management

Findings: Partitioning and Comparison

Findings: Safety

Safety concerns include robustness (adversarial robustness, distribution shift, safe exploration) and specification (reward gaming, safe interruptibility, side-effect avoidance) aspects.

Distributional shift requires proper models and is challenging to study.

Future Directions
1. Extensions to our cross-DRL-framework tool. Model understanding and learning from demos. Structured training and hierarchical designs.
2. Production-ready solutions for partitioning and join ordering.
3. Robustness with Bayesian uncertainty estimates.

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