Deterministic Replay and Debugging for Robotic Systems

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Non-determinism in robotic applications

- Robotic Operating System (ROS)
- Autonomous vehicle accidents
- ROSBAG replay

Challenges of deterministic replay

RoboDbg Architecture

Preliminary evaluation

Takeaway

Subscriber-centric recording in publisher-subscriber based robotic application middleware can lead to deterministic replay.

RoboDbg allows for replayability of ROS nodes with an average of 95% accuracy when compared with the default ROS player.