Path Prediction for Autonomous Ground Vehicles (#8153)

A feedback control method and software for autonomous ground vehicles

Inventors at Georgia Tech have developed a feedback control method and software, called Robust model predictive path integral (R-MPPI), for autonomous ground vehicles. This technology achieves real-time computation of the path expectation for a ground vehicle and is based on path integral control theory. The method computes a weighted average of the sequences according to their desirability resulting in a smooth, low cost trajectory. The software implements the R-MPPI and the main computational component runs on a graphics processing unit (GPU), while the communication and small processing components run on a standard CPU.

Benefits/Advantages

- Versatile — Can operate in real time and dynamically react to a changing environment
- Agile — System can operate on a fast control loop so that the vehicle can perform quick aggressive maneuvers

Potential Commercial Applications

- Controlling autonomous vehicles
- Industrial ground vehicles
- Military ground vehicles

Background/Context for This Invention

Autonomous vehicles are increasingly being asked to solve critical tasks in highly dynamic and non-linear environments. In order to successfully operate in such environments, these vehicles need to be able to plan and execute trajectories utilizing the full range of its capabilities, while ensuring that it achieves any other relevant objectives.

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For more information about this technology, please visit:
https://industry.gatech.edu/technology/path-prediction-autonomous-ground-vehicles