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**Inria Autonomous Driving Demonstration: Focus on the Embedded Bayesian Perception System**

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**Perception framework**

CMCDOT is a Bayesian filtering system for dynamic occupation grids, allowing parallel estimation of occupation probabilities for each cell of a grid, inference of velocities, prediction of the risk of collision and association of cells belonging to the same dynamic object. It takes as input instantaneous occupation grids generated by sensor models for different sources (Lidars, stereo cameras, ...). The core of the application is implemented on GPU Nvidia (Cuda), allowing real-time analysis of the local vehicle environment on embedded boards (Tegra X2).

**Experimental set up & Demonstration**

The experimental platform is an electric Renault Zoe car, which has been transformed to be autonomous. It can be programmed, driven manually or driven manually with advanced driving assistance functionalities. It is equipped with lidars, camera and IMU. The projection of the car’s trajectory onto a dynamic occupancy grid computed by the CMCDOT allows the system to continuously estimate in real time the collision risk associated to each possible driving command, and then to drive the car safely. Relying on this, the demonstration consists in driving autonomously the car along a given path in a map, while avoiding dangerous static and dynamic obstacles perceived by the onboard sensors.

 

**References**

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