

Autonomous Driving in Urban Environments

Ü. Özgüner (PI), A. Krishnamurthy, F. Özgüner, P.I. Sivilotti, B. Weide,
K. Redmill and T. Pavlic

Departments of Electrical and Computer Engineering, Computer Science and Engineering
The Ohio State University, Columbus, Ohio, 43210

The specific application context driving our research is **autonomous vehicles operating safely in mixed-traffic urban environments.**

Such a car will be in a world where it interacts with other cars, humans, other external effects, and internal and external software modules. This is a prototypical CPS with which we have considerable experience over many years, including participation in the recent DARPA Grand and Urban Challenges.

Even in the latter case, though, operation to date has been restricted to relatively “clean” environments (such as multi-lane highways and simpler intersections with a few other vehicles).

Theoretical advances and new models have been evaluated both by large-scale simulations, and by implementation on laboratory robots and road-worthy vehicles driven in real-world situations. The key issues identified and addressed in this Project are:

- Scalability of approaches
- Robustness against model simplicity
- Computational complexity of situation awareness
- Real-time performance and reliability
- Humans