

Smart Cars for Safe Pedestrians

D. M. Gavrila

Dept. of Environment Perception, Daimler R&D, Ulm, Germany

Intelligent Autonomous Systems Group, Univ. of Amsterdam, The Netherlands



One of the most significant large-scale deployments of intelligent systems in our daily life nowadays involves driver assistance in smart cars.

Accident statistics show that roughly one quarter of all traffic fatalities world-wide involve vulnerable road users (pedestrians, bicyclists); most accidents occur in an urban setting. Devising an effective driver assistance system for vulnerable road users has long been impeded, however, by the "perception bottleneck", i.e. not being able to detect and localize vulnerable road users sufficiently accurate. The problem is challenging due to the large variation in object appearance, the dynamic and cluttered urban backgrounds, and the potentially irregular object motion. Topping these off are stringent performance criteria and real-time constraints. I give an overview of the remarkable computer vision progress that has been achieved in this area and discuss the main enablers: the algorithms, the data, the hardware and the tests.

Daimler has recently introduced an advanced set of driver assistance functions in its Mercedes-Benz 2013-2014 S-, E-, and C-Class models, termed "Intelligent Drive", using stereo vision. It includes a pedestrian safety component which facilitates fully automatic emergency braking - the system works day and night. I discuss "Intelligent Drive" and future research directions, on the road towards accident-free driving.

Bio

Darius M. Gavrila received the PhD degree in computer science from the University of Maryland at College Park, USA, in 1996. Since 1997, he has been with Daimler R&D in Ulm, Germany, where he is currently a Principal Scientist. In 2003, he was further appointed professor at the University of Amsterdam, chairing the area of Intelligent Perception Systems (part time). Over the past 15 years, Prof. Gavrila has focused on visual systems for detecting humans and their activity, with application to intelligent vehicles, smart surveillance and social robotics. He led the multi-year pedestrian detection research effort at Daimler, which materialized in the Mercedes-Benz S-, E-, and C-Class models (2013-2014). He is frequently cited in the scientific literature and obtained several conference paper awards. He received the I/O 2007 Award from the Netherlands Organization for Scientific Research (NWO) and the IEEE ITS Outstanding Application Award 2014. His personal Web site is www.gavrila.net.