



Pixels, Stixels, and Objects

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The new Mercedes Benz S-class and E-class vehicles will be equipped with a powerful STEREO camera system perceiving their environment in 3D. Modern dense disparity estimation combined with top-performing pedestrian classification sets new standards in vehicle safety. Our vehicles are able to react to crossing traffic and to perform fully autonomous emergency braking at speeds up to 72km/h if a pedestrian is endangered. Even more, for the first time Mercedes Intelligent Drive will offer autonomous driving at low speeds in traffic jams.

In its first part the talk will present the new driver assistance systems and sketch the algorithms behind them, all developed by Daimler Research & Development. This covers real-time dense stereo analysis, the 6D-Vision principle that estimates depth and 3D-motion for tracked pixel and high-performance pedestrian recognition.

In the second part the talk will concentrate on next generation robust image understanding for complex urban scenes. The so called Stixel-World will be presented that aims at a compact medium-level representation of traffic situations. It acts as the basis for a multitude of subsequent high-level tasks and adds robustness w.r.t. adverse weather and lightning conditions. Modern optimization techniques like Graph-Cuts are used to segment the Stixel-World in order to detect independently moving objects and to estimate their motion state.

Real-world experiments illustrate the high performance available in the experimental car – hopefully further paving the way towards accident-free driving.