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Self-Supervised Learning for Perception Tasks in Automated Driving

Abstract: At the Toyota Research Institute we are following the one-system-two-modes approach to building truly automated cars. More precisely, we simultaneously aim for the L4/L5 chauffeur application and the the guardian system, which can be considered as a highly advanced driver assistance system of the future that prevents the driver from making any mistakes. TRI aims to equip more and more consumer vehicles with guardian technology and in this way to turn the entire Toyota fleet into a giant data collection system. To leverage the resulting data advantage, TRI performs substantial research in machine learning and, in addition to supervised methods, particularly focuses on unsupervised and self-supervised approaches. In this presentation, I will present three recent results regarding self-supervised methods for perception problems in the context of automated driving. I will present novel approaches to inferring depth from monocular images and a new approach to panoptic segmentation.

Biograpghy: Wolfram Burgard is VP for Automated Driving Technology at the Toyota Research Institute. He is on leave from his professorship at the University of Freiburg where he heads the research group for Autonomous Intelligent Systems. Wolfram Burgard is known for his contributions to mobile robot navigation, localization and SLAM (simultaneous localization and mapping). He has published more than 350 papers in the overlapping area of robotics and artificial intelligence.