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ABSTRACT

Despite the recent advances in automotive research, a fully autonomous system operating in general road environments has not been realized due to several limitations, such as data perturbations, sensing limitations, occlusion, and computational constraints. The development of a smart infrastructure to support autonomous vehicle (AV) systems is inevitable. This essay discusses the emerging trends in the infrastructure market to resolve AVs limitations and allow high levels of autonomy. These approaches are 1) supporting CAVs' High Definition (HD) Maps with semantic layers of road information datasets and 2) enhancing road infrastructure readiness for CAVs. An overview of HD mapping technology challenges and trends are presented and discussed. A novel simulation-based approach for creating semantic HD maps for AV systems using Light Detection and Ranging data is discussed. The proposed work offers a solution to resolve significant bottlenecks due to existing CAV technologies and help government agencies build performance-based HD maps for AVs on a large scale.

"A graphical abstract is shown on the following page."

Graphical Abstract