# ABSTRACT

Vision-based road detection is of high relevance for autonomous vehicle navigation. Currently, most road detetion algorithms need pre-collected training samples, which will be unreliable once the road scene changes. Therefore, a robust road detection algorithm that could sample online is urgently required to tackle this problem.

To make the online road detection more robust, we first investigate the shape properties of the road region laying ahead of the vehicle, and propose a general road shape prior. Then, the detected road region is enforced to be road-shaped by encoding this shape prior into a graph-cut framework. Further, we propose a new iterated graph cut algorithm, achieving the online initialization and updating of the training samples and road shape information, and thus realizing the robust online road detection. In addition, the road type can be recognized simultaneously by utilizing the road axis acquired by iteration, hence fulfilling the task of road scene understanding.

Qualitative and quantitative experiments conducted on our own database validate the robustness and efficiency of our approach. We believe that the proposed road shape prior can also benefit many other road detection algorithms.

Key Words: Road segmentation; Road detection; Road shape; Graph cut; Road type recognition