

Even though many public parking lots are located underground and indoors, most existing automatic parking space detection and tracking methods have difficulty handling such scenarios due to severe illumination and complex obstacle conditions. To overcome this problem, this paper proposes a method that detects and tracks parking spaces in underground and indoor environments by fusing sensors already mounted on mass produced vehicles. The proposed detection method finds parking spaces based on a high-level fusion of two complementary approaches: parking slot marking-based and free space-based. Parking slots are detected by estimating parallel line pairs and free spaces are detected by recognizing the positions of parked vehicles as well as pillars. The proposed tracking method enhances the previous method by considering pillar information. Since pillars degrade parking slot tracking performance, this method estimates a pillar region and utilizes it to remove false edges and to estimate the amount of occlusion.