

UWB and 2D LiDAR-based indoor SLAM for UAVs in fire scenes

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ABSTRACT

In order to estimate the position of the unmanned aerial vehicle (UAV) in an indoor disaster environment, such as fire scene, it is recommended to utilize methods using wireless signals regardless of smoke or dust. Among the wireless signal-based localization methods, UWB-based SLAM is becoming more popular. In an environment surrounded by walls or pillars, there is a significant difference between UWB signal's line-of-sight (LOS) measurement and non-line-of-sight (NLOS) measurement. In this paper, we propose the UWB-based localization method that compensates for UWB ranging measurement by predicting NLOS multipath using a ray-tracing algorithm based on given floor plan. We also apply SLAM algorithm based on UWB odometry and 2D LiDAR data. Experiments were conducted indoors in the test complex site.

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