Special Issue

Simultaneous Localization and Mapping (SLAM) for Mobile Robot Navigation

Message from the Guest Editors

Recent years has seen a surge of mobile robot technologies entering our daily lives. This trend accelerated during the COVID-19 pandemic amplifying the need for automated mobile solutions, e.g. for delivery, surveillance, inspection, or mapping applications. However, for mobile robots to be deployed in a meaningful fashion, they need to be able to navigate safely in dynamic, possibly even unknown, environments and interact naturally with humans. Simultaneous Localization and Mapping (SLAM) is seen as one of the key enablers for the successful deployment of mobile robots. Despite the popularity of SLAM, it remains a challenging task for SLAM algorithms to work robustly in dynamic, poorly lit, featureless or unknown environments. In fully autonomous operation, data from computer vision, inertial, LiDAR and other time-of-flight sensors are typically coupled with the latest Artificial Intelligence (AI) and Machine Learning techniques such as Gaussian Process Regression and Graph Signal Processing for SLAM algorithms to overcome these technical hurdles.

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