

Topological simultaneous localization and mapping: A survey

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Abstract— One of the main challenges in robotics is navigating autonomously through large, unknown, and unstructured environments. Simultaneous localization and mapping (SLAM) is currently regarded as a viable solution for this problem. As the traditional metric approach to SLAM is experiencing computational difficulties when exploring large areas, increasing attention is being paid to topological SLAM, which is bound to provide sufficiently accurate location estimates, while being significantly less computationally demanding. This paper intends to provide an introductory overview of the most prominent techniques that have been applied to topological SLAM in terms of feature detection, map matching, and map fusion.

Index Terms— Mobile robots; SLAM; Topological modeling of robots; Feature detection; Robot localization

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