Abstract

Self localization of mobile autonomous systems is fundamental step in various applications, such as assistant navigation systems for blind people or smart house appliances. This paper presents a novel framework for Vision-based Simultaneous Localization and Mapping which focuses on the class of indoor mobile robots using only a monocular camera. A method to combine local and global features mapping have been proposed in a nested graph representation, where the indoor environment is divided into locations which is then decomposed into different views. The Scale Invariant Feature Transform is used to extract and build up a global map which provide rough estimation of the robot position. Horizontal, vertical and diagonal details of the wavelet coefficients are then used to provide finer estimation of the robot position and pose. The output topological map is validated with the ground truth of the environment. Moreover, the number of decomposition levels of the wavelet transform is analysed. The results show high localization accuracy and low rate of matching time.

References

Index Terms

Computer Science
Automation
**Keywords**

Robot Vision  Local Features  Global Features  SIFT  Wavelet Transform
Topological Map