16833: ORB-SLAM Paper Summary

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March 2021

1 Summary

ORB-SLAM is a feature based monocular SLAM system operating in small and large indoor and outdoor environments in real time. This visual SLAM system estimates the camera trajectory while simultaneously reconstructing the environment. This method uses ORB features over other feature detectors such as SURF and SIFT, which are computationally expensive and BRIEF, which is not invariant to rotation or scale. Use of covisibilty graphs enables real time operation in large environments, and real time loop closing is based on pose graph optimization of an "Essential Graph". Map initialization is based on model selection using an automatic approach to select between a homography for planar scenes and a fundamental matrix for non-planar scenes. Keyframe selection based approach is used over filtering every frame. [1]

References

[1] Raul Mur-Artal, Jose Maria Martinez Montiel, and Juan D Tardos. "ORB-SLAM: a versatile and accurate monocular SLAM system". In: *IEEE transactions on robotics* 31.5 (2015), pp. 1147–1163.