

**РЕАЛИЗАЦИЯ СЕМАНТИЧЕСКОЙ СЕГМЕНТАЦИИ В РЕАЛЬНОМ ВРЕМЕНИ
ДЛЯ СИСТЕМЫ ORB-SLAM
REAL-TIME SEMANTIC SEGMENTATION IMPLEMENTATION FOR THE ORB-
SLAM SYSTEM**

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Abstract.

This article states an ORB-SLAM based system with an efficient and real-time segmentation model. This implementation provides a better mapping of the surrounding and improve the robustness of the slam system.

Introduction.

The segmentation model when added to a simultaneous localization and mapping system can provide better understanding of the surrounding environment. It provides better mapping, because the robot will be able to understand the essence of each object, and it helps him perform higher level tasks. It also provides robustness to the localization system, by filtering out the tracking of the dynamic objects in the scene.

Main Part.

Semantic segmentation, also called scene labeling, refers to the process of assigning a semantic label (e.g., door, wall, people, chair) to each pixel of an image. It is an essential data processing step for robots and other unmanned systems to understand the surrounding scene. Despite decades of efforts, semantic segmentation is still a very challenging task due to large variations in natural scenes.

Recently, ORB-SLAM system is the state-of-the-art opensource slam system for indoor tracking and mapping. It consists of several threads working in parallel to provide a real-time localization scheme, as well as feature-based mapping.

This work will implement an additional thread to provide an efficient semantic segmentation model to the orb-slam system. This thread assigns a semantic label to each object depicted in the SLAM map, and its location relative to the world system. The semantic model can classify the objects to static and dynamic objects.

Results.

The proposed implementation provides a better mapping process since orb-slam doesn't provide a segmentation thread. Also, this system outperforms the semantic slam **Kimera**, due to the fact, that orb-slam system works more accurately in indoors environment with an error less than 1 cm in rooms sequences in TUM datasets, in the presence of dynamic objects.

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Подпись

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Подпись