# DeepSLAM: Deep Learning based Localization and Mapping

## Introduction

When a robot carrying a camera is placed in an unknown location in a new environment, simultaneous localization and mapping (SLAM) aims to construct a map of the unknown environment while simultaneously keeping track of the robot's location within it. SLAM is considered to be the key to enabling autonomous navigation for mobile robots and self-driving vehicles among the robotics community. In recent years, SLAM has also played an important role in virtual reality (VR), augmented reality (AR) and metaverse as a tool to connect the real world with the virtual world.

## Motivation and Goals

Traditional SLAM solutions rely on the matching of manually designed feature points (e.g. orb, sift), and simultaneously estimate the robot's pose and 3D scene map based on the inter-frame geometric relationship. These geometry-based approaches lack the ability to understand the scene at a high level, and are unable to exploit the priori information obtained from the preceding tasks. Based on the great progress deep learning has made in recent years, our work aims to explore a purely DNN based end-to-end SLAM framework to achieve a more robust and intelligent system.
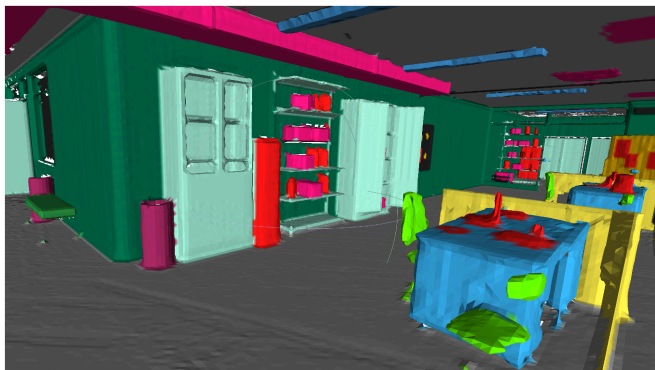


## Tasks

In this study you will try to implement several core technologies (visual odometry, mapping and back-end optimization) of SLAM using the state-of-the-art deep learning methods. Specific tasks will be determined based on your background, interests and total working hours. It would be helpful if you send me your CV including your related background knowledge introduction.

## Requirements

- Good knowledge on deep learning
- Proficient in python and pytorch programming
- Basic knowledge on computer vision and SLAM

## Contact

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