

General Information

Name : Ruochen Yin

Nationality : China

Currently : Junior Researcher at LUT, Finland

Language : English (Fluent), Chinese (Native language)

Research interests : Robotic pick-and-place, Peg-in-hole assembly, Reinforcement learning, Deep learning, Computer vision



Education

2012 Bachelor of Science at Shanghai Normal University, majoring in Computer Science and Technology.

2017 Master of Engineering at Kunming University of Science and Technology (KMUST), majoring in Computer Application Technology.

From 2017 to now, I am entering the Double Doctoral Degree program between the University of Science and Technology of China (USTC) and Lappeenranta-Lahti University of Technology (LUT). I will get my doctoral degree from USTC and LUT at the end of this June and the end of this year, respectively.

Projects and Publications

2014 – 2017 : Natural Language Processing

During my time in KMUST , our team worked on the implementation of bilingual translation between Chinese to minor Southeast Asian languages through a recurrent neural network-based approach.

2017 – 2019 : High-precision map construction for Autopilot

During the period in USTC China, I joined an autopilot research team. My main research interest is to advance the level of automated construction of high-precision maps, I pioneered the idea of semantic segmentation for the top view of LiDAR point clouds, and by employing classification data from visual imagery, we successfully attained superior semantic segmentation of the sparse LiDAR point clouds' top view. Owing to the precision inherent in LiDAR data, our semantic segmentation outcomes can be readily utilized for constructing high-precision maps, thereby significantly expediting the map development procedure.

Publication: *FusionLane: Multi-Sensor Fusion for Lane Marking Semantic Segmentation Using Deep Neural Networks*, IEEE Transactions on Intelligent Transportation Systems (IF:9.55) Doi:

[10.1109/TITS.2020.3030767](https://doi.org/10.1109/TITS.2020.3030767)

2020- Now: Robotic automated operations inside the nuclear fusion reactor

I'm currently a doctoral student and junior researcher at LUT, Finland. Our team is focusing on the Remote Handling Maintenance System inside the nuclear fusion reactor. My primary scholarly fascination lies in facilitating autonomous robotic operation functions under challenging environments, such as the robotic grasping, peg-in-hole assembly, robotic pick-and-place and so on. In our project, both the target object and environment are made of smooth metal materials. Depth camera could hardly achieve accurate observation results under such a situation. Thus, all of our research needs to be carried out with the absence of accurate 3D information. Therefore, we first achieve a reliable robotic grasping by combining the deep learning with some traditional computer vision algorithms, then based on deep reinforcement learning algorithms, the robot is trained to perform high-precision peg-in-hole assembly task in a manner similar to human hand-eye coordination by fusing vision sensor and force sensor. Finally, We build a virtual environment with multiple sub-environments and train reinforcement learning algorithms in parallel so that the robot can rely solely on 2D image data for robotic pick-and-place tasks.

Publications:

RGB-D-Based Robotic Grasping in Fusion Application Environments, Applied Sciences (IF:2.84) Doi: <https://doi.org/10.3390/app12157573>

Mastering Autonomous Assembly in Fusion Application with Learning-by-doing: a Peg-in-hole Study, arXiv: <https://arxiv.org/abs/2208.11737>, video: <https://youtu.be/Vna5jrJm85l>

Monocular Camera-Based Robotic Pick-and-Place in Fusion Applications, Applied Sciences (IF:2.84) Doi: <https://doi.org/10.3390/app13074487>, video: <https://youtu.be/z-LApEu1-hw>

Other Interests

I would describe myself as a **Gym Rat** and a beginner of downhill skiing.

Links:

Google Scholar: <https://scholar.google.com/citations?user=Kk2l14wAAAAJ&hl>

ORCID: <https://orcid.org/0000-0002-0751-3138>

Personal page : <https://rolandying.github.io>