Ruijie Ren

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EDUCATION

Technical University of Denmark
Master of Science in Autonomous Systems — 2021 – 2023

University of Leeds
Bachelor of Engineering in Mechanical Engineering with Honours — 2016 – 2020
First Class Honour (Average Score: 80.9, UK Grading System)

Southwest Jiaotong University
Bachelor of Engineering in Mechanical Engineering* — 2016 – 2020
GPA:4.0/4.0 (China Grading System)
*This degree is a dual degree with University of Leeds

PUBLICATIONS

[1] **Ruijie Ren***, Mohit Gurnani Rajesh*, Jordi Sanchez-Riera, Adrian Lopez-Rodriguez, Yurun Tian, Antonio Agudo, Yiannis Demiris, Krystian Mikolajczyk, Francesc Moreno-Noguer, "Grasp-Oriented Fine-grained Cloth Segmentation without Real Supervision", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022.* **in submission**. (* denotes equal contribution.) [pdf]

[2] Weihao Xuan, **Ruijie Ren**, Siyuan Wu, Changhao Chen, "MaskVO: Self-Supervised Visual Odometry with Learnable Dynamic Mask", *IEEE/SICE International Symposium on System Integration (SII), 2022.* [pdf]

[3] Yixuan Lin, Weihao Xuan, **Ruijie Ren**, Ji Liu, "On a Discrete-Time Network SIS Model with Opinion Dynamics", *IEEE Conference on Decision and Control (CDC), 2021.* [pdf]

[4] Weihao Xuan, **Ruijie Ren**, Chutian Wang, "Multi-agent Interactive Prediction under Challenging Driving Scenarios", *IEEE International conference on Control, Automation and Robotics, 2021.* (**Best paper finalist.**) [pdf] [video]

[5] Weihao Xuan, **Ruijie Ren**, Philip E. Paré, Mengbin Ye, Sebastian Ruf, Ji Liu, "On a Network SIS Model with Opinion Dynamics", *International Federation of Automatic Control World Congress (IFAC), 2020.* [pdf] [video]

KEY SKILLS

Programming Languages: Python, MATLAB, LabView, C/C++
Libraries: PyTorch, TensorFlow, OpenCV.
Tools: LaTeX, Microsoft Office, Git, Docker.
Robotics: ROS, SolidWorks.

RESEARCH EXPERIENCE

Grasp-Oriented Fine-grained Cloth Segmentation without Real Supervision
Supervised by Prof. Francesc Moreno-Noguer and Prof. Krystian Mikolajczyk — 03/2021 – 09/2021

- Generate large and realistic synthetic data and collect a mid-size real dataset of deformed T-shirts.
- Explored the problem of fine-grained edge segmentation in depth maps of highly deformed clothes.
- Explored the limits of domain adaptation strategies that leverage uniquely on supervision from synthetic annotations.

On a Network SIS Model with Opinion Dynamics
Supervised by Prof. Ji Liu from Stony Brook University — 07/2017 – 01/2021

- Proposed a novel SIS model coupled with opinion dynamics.
- Analyze the model by characterizing its limiting behavior, equilibria, and their stability, by using MATLAB and nonlinear system theory.
- Modified the continuous-time model into discrete-time model which is more realistic.
- Two publications in IFAC world congress 2020 and CDC 2021 respectively.

MaskVO: Self-Supervised Visual Odometry with Learnable Dynamic Mask
Supervised by Dr. Changhao Chen, Postdoc at University of Oxford 03/2020 – 03/2021

- Proposed a novel learnable mask network for a self-supervised VO system, one that provides dynamic masks to remove the impacts from environmental issues.
- Introduced a temporal-aware VO framework that exploits the temporal dependencies of visual motions from image sequences, and extracts suitable features for pose estimates.
- Conducted experiments against existing scale-consistent self-supervised VO systems, in which our model outperforms them.

WORK EXPERIENCE

Nanyang Technological University (NTU) Singapore
Research Assistant supervised by Prof. Shijian Lu 01/2022 - *Present*

- Reproduced state-of-the-art domain adaptation methods in object detection.
- Worked on cross-modality Domain Adaptation algorithms among Pinehole-Panoramic cameras.

Institut de Robòtica i Informàtica industrial, IRI (CSIC-UPC) Barcelona, Spain
Research Assistant supervised by Prof. Francesc Moreno-Noguer 03/2021 - 03/2022

- Tackled the problem of fine-grained region detection in deformed clothes using only a depth image.
- Propose a multilayered domain adaptation (DA) strategy instead of real data supervision.
- Tackled the challenging problem of 3D reconstruction on objects with high transparency.

PROFESSIONAL DEVELOPMENT

MicroMasters in Robotics [Certificate]
Awarded from University of Pennsylvania (in collaboration with edX) 2018 - 2020

Courses:

- Kinematics and Mathematical Foundations.
- Vision Intelligence and Machine Learning.
- Dynamics and Control.
- Locomotion Engineering.

EVENTS

IEEE RAS Winter School on SLAM in Deformable Environments
Held by University of Technology Sydney (Online) 07/2021

- Participated cutting-edge seminars focused on research of robot localisation, mapping and navigation in deformable environments.
- Completed workshop project and awarded 3rd Place. [Code]

Robotic Vision Summer School
Held by Australian Center for Robotic Vision 02/2019

- Participated cutting-edge seminars and discussed state-of-art ideas with researchers and Ph.D. candidates from top universities.
- Collected data and trained vision-based autonomous driving system by Raspberry Pi. (Awarded 2nd Place in the workshop competition). [Code]