

ZHENG CHEN

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2425 N Milo B Sampson Ln, Bloomington, IN 47408

EDUCATION

Indiana University Bloomington, Bloomington, USA

Aug 2018 - present

PhD student at Vehicle Autonomy and Intelligence Lab, Intelligent Systems Engineering

Research Interest: Robotics, Computer Vision, Deep Learning

Adviser: Lantao Liu

Technical University of Madrid, Madrid, Spain

Jan 2017 - Jun 2017

Exchange program: Trajectory Optimization Using Quintic Bessel Spline for Quadrotors

Adviser: Ignacio Gomez Perez

Northwestern Polytechnical University, Shaanxi, China

Sep 2013 - Jun 2017

Bachelor at Dept. Aerial Vehicle Design and Engineering

Adviser: Zhou Zhou

PUBLICATIONS

- **Zheng Chen**, Zhengming Ding, David Crandall, Lantao Liu. Polyline Based Generative Navigable Space Segmentation for Autonomous Visual Navigation. submitted to ICRA 2022
- **Zheng Chen**, Lantao Liu. NSS-VAEs: Generative Scene Decomposition for Visual Navigable Space Construction. NeurIPS 2021 Workshop on Machine Learning for Autonomous Driving
- **Zheng Chen**, Shi Bai, Lantao Liu. Efficient Map Prediction via Low-Rank Matrix Completion. 2021 IEEE International Conference on Robotics and Automation
- **Zheng Chen**, and Lantao Liu. "Navigable Space Construction from Sparse Noisy Point Clouds." IEEE Robotics and Automation Letters 6.3 (2021): 4720-4727.
- **Zheng Chen**, Weizhe Chen, Shi Bai, Lantao Liu. Multi-Objective Autonomous Exploration on Real-Time Continuous Occupancy Maps.
- **Zheng Chen**, Malintha Fernando, Lantao Liu. A Visual Feature based Obstacle Avoidance Method for Autonomous Navigation. In 2019 IEEE Applied Imagery Pattern Recognition Workshop (AIPR) (pp. 1-7). IEEE.

PROJECT EXPERIENCE

Polyline Based Generative Navigable Space Segmentation for Autonomous Visual Navigation

Mar 2021 - Sep 2021

Bloomington, Indiana

We propose a visual navigation system, which consists of a navigable space segmentation module and a motion-primitives-based planning module.

Generative Visual Navigable Space Construction

Feb 2021 - Jul 2021

Bloomington, Indiana

We propose a new network, NSS-VAEs (Navigable Space Segmentation Variational AutoEncoders), a representation learning-based framework to enable robots to learn the navigable space segmentation in an unsupervised manner.

Efficient Map Prediction using Low-Rank Matrix Completion

May 2020 - Nov 2020

Bloomington, Indiana

We propose a novel map prediction method built upon recent success of *Low-Rank Matrix Completion*. The proposed map prediction is able to achieve both map interpolation and extrapolation on raw poor-quality maps with missing or noisy observations.

Multi-Objective Exploration on Continuous Occupancy Mapping

Jan 2020 - May 2020

Bloomington, Indiana

We propose to use a multi-objective variant of Monte-Carlo tree search that provides a non-myopic Pareto optimal action sequence leading the robot to a frontier with greatest extent of unknown area uncovering.

Navigable Space Construction from Sparse Noisy Map Points

Jan 2019 - Oct 2020

Bloomington, Indiana

We present a framework for creating navigable space from cluttered point clouds generated by low-end sensors with high sparsity and noise.

Visual Feature based Obstacle Avoidance

Mar 2019 - Oct 2019

Bloomington, Indiana

We propose a simple but effective obstacle-avoiding approach for autonomous robot navigation.

Trajectory Optimization Using Quintic Bessel Spline for Quadrotors

Jan 2017 - Jun 2017

Madrid, Spain

We develop an efficient trajectory optimization for quadrotors using quintic Bessel spline and we validate the effectiveness of our proposed method in intensive simulated experiments.

HONORS

- First-class scholarship in Northwestern Polytechnical University in the school year of 2014, 2015, and 2016
- Ke Wei speciality scholarship in 2015
- CATIC speciality scholarship in 2016

SERVICES

- Reviewer for IROS2021, ICRA2022
- Teaching assistant for ENGR E511 Machine Learning for Signal Processing, 2020 Spring
- Project mentor for students in New Albany High School