Juntong Peng

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RESEARCH INTEREST

Multi-Agent Graph Intelligence, Trajectory Prediction, Collaborative Perception

EDUCATION

Shanghai Jiao Tong University
Shanghai,China | Jun 2024(expected)

B.Eng in Information Engineering

Coursework: Practice of Autonomous Localization and Navigation(A+); Digital Electronics(A+); Thinking and Methodology in Programming(A); Data Structure(A-); Probability and Statistics(A-); Reinforcement Learning(A-); Machine Learning(A-); Enrolled in: Information Theory; Algorithms and Complexity; Visual Localization and Perception;

Honors: 2021 SEIEE Outstanding Student Scholarship(Top 30%)

Purdue University, West Lafayette
Indiana, United States | Summer 2023

Visiting Scholar

PUBLICATIONS

[1]. Yuxi Wei, **Juntong Peng**, Tong He, Chenxin Xu, Jian Zhang, Shirui Pan, and Siheng Chen. "Compatible Transformer for Irregularly Sampled Multivariate Time Series". *2023 IEEE International Conference on Data Mining*.

[2]. **Juntong Peng**, Hrishikesh Viswanath, Kshitij Tiwari, Aniket Bera, "Graph-based Decentralized Task Allocation for Multi-Robot Target Localization", submitted to *2024 IEEE International Conference on Robotics and Automation*.

[3]. Yue Hu, **Juntong Peng**, Yunqiao Yang, Xiaoqi Qin, Zhiyong Feng, Wenjun Zhang, Siheng Chen, "Communication-Efficient Multi-Agent 3D Detection via Hybrid Collaboration", submitted to *2024 IEEE International Conference on Robotics and Automation*.

RESEARCH EXPERIENCE

Communication Hyperefficient Co-Perception
CMIC, Shanghai Jiao Tong University

Supervisor: Prof. Siheng Chen
Nov 2022 – now

- Developed a hybrid collaboration method that combines the advantages of raw-data-based early collaboration and result-based late collaboration.
- The method allows a fine-grained and spatial dynamic compression rate adjustment, which is not capable for previous feature-based intermediate methods. It achieved a better tradeoff between communication cost and detection performance.
- **Coauthored a paper submitted to *ICRA2024* as the second author.**
- Working on using adaptive codebook compression to further reduce the information being transmitted. Co-author of a manuscript paper.

Multi-Robot Collaborative Task Allocation
IDEAS Lab, Purdue University

Supervisor: Prof. Aniket Bera
June 2023 - Now

- Proposed a novel graph-based collaborative algorithm for decentralized task allocation in multi-robot target localization, under a heterogeneous setting, especially the difference in mobility and perception.
- The model adopted heterogeneity-aware feature representation, graph attention network, and shortcut connection to help gather information from long-range neighbors.
- The model shows the ability to take advantage of both individual preferences and collaborative information to achieve better task allocation.
- **The work was submitted to *ICRA24* and is available here.**

Multi-Agent Behavior Prediction
CMIC, Shanghai Jiao Tong University
Supervisor: Prof. Siheng Chen
May 2022 – June 2023

- Assisted in designing a multi-agent trajectory prediction model to deal with time irregular data.
- The attention mechanism applied to both temporal neighbors and social neighbors, together with time embedding, makes it possible for our method to model an irregular sequence accurately.
- Conducted experiments of training and testing the model(and relevant baseline models) , generated the irregularly sampled datasets from real world data.
- Coauthored a paper as the second author; the paper will be publicly available soon

Social Recommodation System with Massive Data
ANL, Shanghai Jiao Tong University
Supervisor: Prof. Xiaofeng Gao
Aug 2021 – Oct 2022

- Undertook works on literature research in a cooperative project with Alibaba focusing on enhancing the effect of social recommendation system by proposing a method using GNN.
- Validated the significant positive impact that a time-domain down-sampling based on data features may have on the accuracy and performance of a time-series prediction task.

TEACHING ASSISTANCE

CS1108 | Introduction to Data Science
Fall 2023

- Provide help in preparing hand-on examples and additional materials for the class, especially the lectures that introduce PyTorch and machine learning.
- The codes are available after this semester, in the form of Jupyter Notebook.

PROJECT EXPERIENCE

SRC | RoboCup SSL team representing SJTU
Oct 2021 – now

- Served as the leader of the electronic control team, leading the team in the major upgrade of our robots.
- We replaced the main control chip from STM32 with a Raspberry Pi in order to deploy more powerful distributed algorithms and faster interactive communication, as the number of robots in the competition is increasing.
- Developed planning algorithm to enable robots automatically breakthrough tight defences. Developed methods to assess the situation in the field, which are useful in various decision strategies.
- Our team got third place in 2023 China RoboCup.

ICE3307 | Course Project
Spring 2023

- Constructed an experimental virtual channel for bit-stream transfer. The deep-learning-based encoder-decoder structure is used to convert bits into spectral information, achieving high robustness to Gaussian noise.
- Conducted comprehensive experiments under different assumptions, including known and unknown preamble and preamble free communication. Toleration on noise signal makes it possible for our encoder-decoder to mix up load and noise, hence preventing attackers from monitoring human action through channel state information.
- The source code is available here. We are still working to improve the model.

SKILLS&LANGUAGE

Programming Languages: C++/C, Python, VHDL, Matlab, Kotlin
Tools: Git, LaTeX, Pytorch, Slurm, Altium Designer
TOEFL iBT: 108/120(speaking 23)