SIWEI FENG

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EDUCATION

Rutgers, the State University of New Jersey   *Aug. 2018 - Now*

Ph.D. candidate (*post Qual*) in Robotics, Department of Computer Science. GPA: *4.0/4.0*

University of Science and Technology of China (USTC)   *August 2014 - June 2018*

Bachelor of Computer Science and Technology

Talent Program in Computer Science. School of the Gifted Young. Overall GPA: *3.71/4.3*

EXPERIENCE

Research Intern at Nokia Bell Labs   *Summer, 2022*

Mentor: Dr. Fangzhe Chang. Manager: Dr. Thomas Woo

- Obstacle location estimation for multi-robot path planning
- Implemented algorithm in Python for ROS simulation and in Go for real system integration

Research Assistant at Rutgers Algorithmic Robotics and Control Lab   *Since 2018*

Advisor: Dr. Jingjin Yu

- Design and implement algorithms for multi-robot systems
- Perform simulation and physical experiments for quadcopters, quadruped and robot arms
- Lead or work in a team to participate in robotics competitions including ARIAC and OCRTOC
- Assist teaching courses related to robotics by giving lectures, mentoring students, etc.

PUBLICATIONS

Si Wei Feng, Teng Guo, and Jingjin Yu. Optimal allocation of many robot guards for sweep-line coverage. In *International Conference on Robotics and Automation (ICRA)*, 2023

Teng Guo, **Si Wei Feng**, and Jingjin Yu. Polynomial time near-time-optimal multi-robot path planning in three dimensions with applications to large-scale uav coordination. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022

Si Wei Feng and Jingjin Yu. Barrier forming: Separating polygonal sets with minimum number of lines. In *IEEE International Conference on Robotics and Automation (ICRA)*, 2022

S. D. Han, B. Huang, S. Ding, C. Song, **S.W. Feng**, M. Xu, H. Lin, Q. Zou, A. Boularias, and J. Yu. Toward fully automated metal recycling using computer vision and non-prehensile manipulation. In *IEEE International Conference on Automation Science & Engineering (CASE)*, 2021

K. Gao, **S.W. Feng**, and J. Yu. On minimizing the number of running buffers for tabletop rearrangement. In *Robotics: Sciences and Systems (RSS)*, 2021

Si Wei Feng, Kai Gao, Jie Gong, and Jingjin Yu. Mobile sensor placement for globally optimal coverage of 3d-embedded surfaces. In *International Conference on Robotics and Automation (ICRA)*, 2021

Si Wei Feng, Teng Guo, Kostas Bekris, and Jingjin Yu. Team rubot's lessons and experiences from ariac. *invited submission to Special Issue in Robotics and Computer-Integrated Manufacturing (RCIM)*, 2020

Si Wei Feng and Jingjin Yu. Optimally guarding perimeters and regions with mobile range sensors. In *Robotics: Science and Systems (RSS)*, 2020

Si Wei Feng and Jingjin Yu. Optimal perimeter guarding with heterogeneous robot teams: Complexity analysis and effective algorithms. *International Conference on Robotics and Automation (ICRA with RA-L)*, 2020

Shuai D. Han, **Si Wei Feng**, and Jingjin Yu. Toward fast and optimal robotic pick-and-place on a moving conveyor. *International Conference on Robotics and Automation (ICRA with RA-L)*, 2020

Si Wei Feng, Shuai D. Han, Kai Gao, and Jingjin Yu. Efficient algorithms for optimal perimeter guarding. In *Robotics: Science and Systems (RSS)*, 2019

AWARDS

2nd / 3rd place in NIST ARIAC (Agile Robotics for Industrial Automation Competition)   *2019, 2020*
Ranked within 1000 in Hackercup 2021, 2022. Ranked 7th place at ICPC Greater NY Regional 2019
First Prize in China Undergraduate Mathematical Contest (Anhui division, non-math major)   *2016*
USTC Scholarship for Talent Program in Computer Science   *2015-2017*
USTC Scholarship for Outstanding Students   *2014, 2016, 2017*

SELECTED PROJECTS

Sensor Location Optimization (My main research direction)

- Develop efficient algorithms for a set of facility/sensor layout optimization problems, e.g. where to put UV lights, tracking cameras in a room, how to deploy guards and so on
- Develop practical exact or approximation algorithms, as well as theoretical results like hardness or inapproximability bounds
- Most results are published at robotics conferences or journals such as RSS, ICRA and RA-L

Agile Robot Manipulation System for Ariac Competition

- Develop robotic softwares in simulation for warehouse packing with robot arms
- Implement and test modules as robot motion planning, task planning and failure recovery
- Won 2nd and 3rd place as the main contributor in 2019 and 2020

Learning-based Quadruped Locomotion Control

- Use and modify the URDF file to simulate Unitree robot dog in Issac Gym, Pybullet and Gazebo
- Apply reinforcement learning algorithm for the robot dog to learn walking, running and flipping

Multi Quadrotor Platform

- Implement customized onboard/offboard controller for AscTec Hummingbird and Crazyflie
- Simulate a set of agile maneuvers as flipping, circling as well as conduct real experiments
- Set up a multi drone platform with optical tracking system

6D Pose Estimation

- Work in a team to build a pipeline for estimating the poses of some YCB objects and apply reinforcement learning for tabletop rearrangement

SKILLS

Strength: Besides robotics, I also have strong background in math and theoretical computer science.

Programming Language: C/C++, Python, LaTeX, Java, Bash, Verilog, Assembly (on x86, ARM and MIPS), Go, Markown.   *(ranked primarily by familiarity)*

Tools: ROS, Gazebo, PyBullet, Gurobi, Blender, OpenCV, Point Cloud Library, Open3D, OptiTrack, Tensorflow, PyTorch, Scikit-learn, Linux, Git, Parallel Programming (OpenMP, MPI, CUDA), GNU cross compiler, Keil μ-version, ISE, ModelSim, Vivado etc.

GRADUATE COURSES TAKEN

At Rutgers: Advanced Data Structure (Algo. I) and Sublinear Algorithm (Algo. II), Robot Manipulation, Computational Robotics, Computer Vision, Machine Learning, Nonlinear Optimization, Natural Language Processing, Computational Complexity, Computer Networks, Seminars in Robotics. At USTC: Privacy and Economics in Big Data, Parallel Programming.

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[1]Last Updated in Mar., 2023