Kai Gao

732-215-2539 | kg627@scarletmail.rutgers.edu

EDUCATION

Rutgers, the State University of New Jersey Aug. 2019 – Present
Robotics PhD Piscataway, USA

- GPA:93/100
- **Three first-author papers** in top robotics conferences in 2021.
- Related courses: Computer Vision, Machine Learning

University of Science and Technology of China(USTC) Aug. 2015 – Jun. 2019
Bachelor in Mathematics Hefei, China

- Outstanding Graduates(2019)
- Outstanding Student Scholarship (2015-2016) (2017-2018)
- Gold Award of China Undergraduate Mathematical Contest in Modeling in Anhui Province(2017)(1/65 in USTC)
- Related courses: Computer Graphics

Pohang University of Science and Technology (POSTECH) Feb. 2017 – Aug. 2017
Exchange Student Pohang, South Korea

RESEARCH EXPERIENCE

Object Rearrangement Mar. 2020 – Present
Research Assistant Algorithmic Robotics and Control Lab(ARCL), Rutgers University, USA

- Set up a complete vision-planning-control pipeline with UR-5e.
- Studied structural properties and developed efficient algorithms for different scenarios.
- Supervised two summer interns working with UR-5e and uArm Swift Pro.

Vehicle Routing Problem Aug. 2019 – Mar. 2020
Research Assistant Algorithmic Robotics and Control Lab(ARCL), Rutgers University, USA

- Designed fast algorithms for vehicle routing problems
- Conducted comprehensive UE-4 based simulation studies for the drone scenario.

Multi-Robot Path Planning Jul. 2018 – Sep. 2018
Research Intern Algorithmic Robotics and Control Lab(ARCL), Rutgers University, USA

- Designed fast algorithms to solve the path planning problems with different objectives.
- Designed an efficient algorithm to solve the perimeter guarding problem.
- Proved some lemmas and theorems on the efficiency of the algorithms.

Image Registration Sep. 2017 – Jun. 2019
Research Assistant Graphics&Geometric Computing Laboratory(GCL), USTC, China

- Designed a fast non-rigid registration algorithm which is robust to noise and outliers and outperforms the state of the art.
- Implemented the algorithm with C++ and visualized it with OpenGL.

PUBLICATIONS

K. Gao and J. Yu. “Capacitated Vehicle Routing with Target Geometric Constraints.” 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021).
K. Gao, S. W. Feng, and J Yu. “On Minimizing the Number of Running Buffers for Tabletop Rearrangement.” 2021 Robotics: Science and Systems (RSS 2021).
R. Wang*, **K. Gao***, D. Nakhimovich*, J. Yu, and K. E. Bekris. “Uniform Object Rearrangement: From Complete Monotone Primitives to Efficient Non-Monotone Informed Search.” 2021 IEEE International Conference on Robotics and Automation (ICRA 2021).
S. W. Feng, **K. Gao**, J. Gong, and J. Yu. “Sensor Placement for Globally Optimal Coverage of 3D-Embedded Surfaces.” 2021 IEEE International Conference on Robotics and Automation (ICRA 2021).
S. W. Feng, S. D. Han, **K. Gao**, and J. Yu. “Efficient Algorithms for Optimal Perimeter Guarding.” 2019 Robotics: Science and Systems (RSS 2019).

Other Submitted Works

K. Gao, D. Lau, B. Huang, K. E. Bekris and J. Yu. “Fast High-Quality Tabletop Rearrangement in Bounded Workspace.” submitted to 2022 IEEE International Conference on Robotics and Automation (ICRA 2022).
E. R. Vieira, D. Nakhimovich, **K. Gao**, R. Wang, J. Yu and K. E. Bekris. “Fast High-Quality Tabletop Rearrangement in Bounded Workspace.” submitted to 2022 IEEE International Conference on Robotics and Automation (ICRA 2022).

Invited Presentations

On Minimizing the Number of Running Buffers for Tabletop Rearrangement May 2021
TRIPODS (Transdisciplinary Research in Principles of Data Science) Seminar Virtual

- A 20-minute presentation introducing my RSS 2021 paper.

OTHER EXPERIENCE

Teaching Assistant Sep. 2019 – Dec 2020
Rutgers University Piscataway, USA

- Courses: CS314 Principles of Programming Languages; CS205 Introduction to Discrete Structures I

Class President Apr. 2016 – Jun. 2019
University of Science and Technology of China Hefei, China

- The class won the Outstanding Class Prize in the school(ranking 1st among 9 classes)

Vice President of International Cooperation Voluntary Group Feb. 2016 – May 2017
University of Science and Technology of China Hefei, China

- Co-organized the reception of foreign exchange students and visiting professors during their visits in USTC.
- Organized a ball as the managing director for international students in USTC.

SKILLS

Programming Languages : Python, Matlab, C++
Tools : Git, ROS, Gazebo, OpenCV, Gurobi