JIAWEI TANG

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EDUCATION

Hong Kong University of Science and Technology; GPA: 3.77/4.3 2019.9 - 2021.8

Master of Philosophy in Electronic & Computer Engineering ***Supervisor: Prof. Ling Shi***

Related courses: Convex optimization; Linear system theory; Networked control and estimation; Aerial robotics; Stochastic Processes; Robot Perception and Learning.

The Hong Kong Polytechnic University; GPA: 3.56/4.0 2014.9 - 2019.6

BEng(Hons) in Electronic & Information Engineering

RESEARCH INTERESTS

- **Motion Planing; Trajectory Optimization; Optimal Control; Learning-based Control; State Estimation**

EXPERIENCES

Research Student at HKUST, working with Prof. Ling Shi 2019.9-present

- **Motion Planning for Mobile Robots with Uncertainty**
  - Proposed a probabilistic approach to solve the motion planning problem in a noisy environment.
  - Presented an optimization-based motion planning control framework with ILQR and MPC, and developed a convergence-guaranteed algorithm to achieve safety and optimality simultaneously.
- **Multi-robot Control**
  - Built a physical multi-robot testbed and a ROS-based simulation platform from scratch.
  - Implemented various control algorithms including leader-follower control, formation control, cooperative control, optimal control, extended Kalman filter and so on.
  - Researched on formation-based multi-robot collaborative parcel moving.
- **Optimal Control in Positive System**
  - Investigated infinite-horizon LQR design for positive linear systems for the first time.
  - Proposed an optimization-based framework for positivity-preserving LQR design with gain variations.
- **Perception, Planning and Control for Quadrotor**
  - Implemented DLT method for pose estimation, optical flow method for visual odometry.
  - Implemented Augmented EKF for quadrotor state estimation with visual odometry, tag detection and IMU.
  - Implemented optimal path planning, minimum snap optimization-based trajectory generation and PID trajectory tracking control.
  - Integrated the above implementation on-board the drone.

Research Intern at RI, CMU, worked with Prof. Michael Kaess 2018.6-2018.8

- **Automatic Extrinsic Calibration System of a Camera and a 3D LiDAR**
  - Developed an efficient extrinsic calibration toolbox for camera and 3D LiDAR with a user-friendly GUI.
  - Improved the calibration accuracy and system robustness. Report available in pp.140-144 of [RISS Journal]

Capstone Project Student at PolyU, worked with Prof. Kenneth Lam 2018.9-2019.5

- **Low Resolution Face Recognition**
  - Addressed the low-resolution face recognition with conventional method and deep-learning method.
  - Conventional method: match the LR images with HR images using multidimensional scaling.
  - DL method: guide the LR images' training with the feature difference between HR and LR images.
  - Developed a web-based demonstration system with Flask, HTML, Javascript and CSS.

Power Electronics Intern at ASM Pacific Technology 2017.6-2018.5

- **Project 1**: Designed feed-forward & PID control algorithm for digital controlled laser diode driver.
- **Project 2**: Simulated the performance of capacitance sensor in measuring the liquid height with MATLAB.
- **Project 3**: Developed a metal length measurement system with ADI ultrasonic sensor.

PUBLICATIONS

- **Jiawei Tang.** "**Motion Planning for Mobile Robot with Uncertainty: A Model Predictive Control Approach**". *HKUST MPhil Thesis 2021.*
- Nachuan Yang, **Jiawei Tang**, Yik Ben Wong, Yuzhe Li, Shi Ling. "**Linear Quadratic Control of Positive Systems: A Projection-Based Approach**". *2nd Round Review by Transactions on Automatic Control.*
- Sil Kwong Tse, Yik Ben Wong, **Jiawei Tang**, Peihu Duan, Suk Wai Winnie Leung, Ling Shi. "**Relative State Formulation-based Warehouse Multi-robot Collaborative Parcel Moving**". *Accepted to ICPS 2021.*

VOLUNTEER ACTIVITIES

- **Phnom Penh**, Cambodia, built solar panel charging stations for local villagers. 2015.6
- **Phnom Penh**, Cambodia, built a library with obsolete container and solar panels for local schools. 2016.6
- **Phnom Penh**, Cambodia, built a study center with obsolete container for local primal schools. 2017.6
- **Ya'an**, Sichuan, China, built 3D-print zero-carbon building for local villagers. 2017.9 - 2018.9
- International Student Ambassador: promoted Chinese traditional food and culture. 2016.9 - 2017.6

AWARD & SCHOLARSHIP

- Postgraduate Studentship, HKUST 2019.9-2021.8
- UG Summer Research Abroad Sponsorship, PolyU 2018.6
- Mingxi Outstanding Youth Award 2017.11
- Hall Residences with Outstanding Contribution (2 of 250) 2017.7
- Second Runner-up Award of Robotic Challenge 2016, PolyU 2016.8
- HKSAR Government Scholarship Fund - Reaching Out Award 2016.6
- Best Sem GPA Award; Dean's List Honor; International Student Ambassador Scheme Outreaching Award

SKILLS

- **Programming**: C++, Python, MATLAB, Java, HTML, JavaScript, LaTeX
- **Others**: Pytorch, ROS, Git, Arduino, Spice, PCB Fabrication
- **Language**: Chinese Mandarin-Native; Chinese Cantonese-Fluently; English-Fluently