

TIANXING WU

<https://tianxingwu.github.io>

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🎓 EDUCATION

Nanyang Technological University (NTU)

Singapore

Master of Science in Computer Control & Automation

Jan. 2021 – Jan. 2022 (Expected)

- Deferred enrollment to January 2021 due to COVID-19

Harbin Engineering University (HEU)

Harbin, China

Bachelor of Engineering in Automation

Aug. 2015 – June 2020

- Research Intern at [Institute of Intelligent Control](#)
- Supervisor: [Prof. Qidan Zhu](#), [Prof. Zhi Zhang](#)
- GPA: 89.14 / 100

Harbin Institute of Technology Robot Group

Hefei, China

2019 ROS Summer School in China

July 2019 – Aug. 2019

- Topics: ROS, Industrial robots, RTS, Reinforcement learning, Humanoid robot, Simulation, SLAM
- *2nd Prize* of the final robot competition

🔬 RESEARCH & PROJECTS

Deep Learning Based Image Preprocessing for Maritime Scenes

Jan. 2020 – July 2020

B.Eng Thesis, Supervised by Prof. Zhi Zhang

- **Excellent presentation** (6 awardees of 42 students in the lab)
- Designed a new foggy image synthesis algorithm based on air scattering characteristics of sea fog
- Analysed the effectiveness and optimal parameter settings of AOD-Net, DnCNN and traditional methods for maritime image defogging and denoising, implementing with PyTorch and OpenCV
- Proposed a modular image preprocessing framework that can be effectively applied to maritime scenes

OpenVHead

Sept. 2019 – Present

Independent Project ([Open-sourced on Github](#))

- **Top 5** most stars under the topic 'Vtuber' on Github
- Built a vision-based head motion & facial expressions capture system for VTubers
- Front-end (Python): Face landmarks tracking using Kalman filter and mean filter; Pose estimation with PnP algorithm; Robust facial expression measure construction
- Back-end (Unity + C#): Smooth pose control with Kalman filter; Robust facial expression control using incomplete derivative PID with deadzone; Eye-blink modeling; Socket communication

From QoS to QoE: A Data-Driven Model for Mobile Video Services

July 2017 – Present

Project Leader, 'Shenzhen Cup' Mathematical Modeling Challenge, Supervised by Prof. Shujuan Wang

- **Champion** (2 awardees of 65 finalist, including THU/FDU/ZJU teams)
- Built an accurate mathematical model of the relation between network capability and video experience for network planning and assessment, successfully solving the problem proposed by Huawei Technologies
- Constructed a nonlinear function based on both TCP mechanism and a dataset with 89,266 samples
- Introduced unsupervised anomaly detection algorithm to remove noise data for regression analysis
- Proposed and implemented a probabilistic method to solve the heteroscedasticity of the data, significantly enhancing the prediction accuracy

Real-time Driver Fatigue Monitoring System

Dec. 2018 – Apr. 2019

Algorithm Engineer, National Undergraduate Training Programs, Supervised by Prof. Qiang Zhang

- Developed a vision-based fatigue monitoring module for the system
- Extracted geometry features by face alignment using Dlib
- Designed a robust indicator to classify the eye state of the driver
- Eliminated disturbance of eye blink from video sequence using queue data structure

Face Detection and Tracking Using Pan-Tilt Camera

Sept. 2018 – Nov. 2018

Independent Project, Supervised by Prof. Haihong Chi

- Designed a pan-tilt system consisting of two servos and a USB camera
- Implemented face detection pipeline using image processing and Haar Cascades with OpenCV
- Achieved face tracking with reasonable speed and precision by adding and tuning two separate independent PD control loops on the MCU

Flocking Algorithm for Swarm Robots Inspired by Foam Dynamics

Oct. 2018 – Jan. 2019

Independent Project, Supervised by Prof. Haihong Chi

- Proposed a distributed control scheme for multi-agent systems inspired by the physics of liquid foams
- Implemented a convincing simulation of 3D flocking behaviour with obstacle avoidance in MATLAB based on an ODE system derived from the dynamic behavior of the foam
- Greatly enhanced the computing efficiency by introducing graph data structure and optimizing the algorithm to a vectorized version, enabling for simulation of massive multi-agent systems

A Gesture Recognition System Based on Capacitive Sensor

July 2018 – Aug. 2018

Software Group Leader, Supervised by Dr. Yuan Liu

- Led a 5-person software team to develop the overall software architecture of the system
- Designed the key algorithm and training method for recognizing different gestures through capacitance data given by FDC2214 sensor, using median filter to reduce impulsive noises
- Added Palm Rejection function by implementing real-time statistical analysis on the microcontroller for time series data

★ SELECTED AWARDS & HONORS

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| • <i>Honorable Mention</i> , Mathematical Contest in Modeling (MCM) | 2018 |
| • <i>Outstanding Undergraduate Student in HEU</i> | 2017 |
| • <i>1st Prize & Champion</i> , ‘Shenzhen Cup’ Mathematical Modeling Challenge | 2017 |
| • <i>1st Prize</i> , Northeast China Mathematical Contest in Modeling | 2017 |
| • <i>1st Prize</i> , China Undergraduate Mathematical Contest in Modeling (Heilongjiang Division) | 2017 |
| • <i>1st Class Scholarship for Outstanding Students</i> | 2016 |
| • <i>2nd Prize</i> , National English Competition for College Students (NECCS) | 2016 |

⚙️ SKILLS

- **Programming Language:** Python, MATLAB, C/C++, C#, Verilog
- **Software:** OpenCV, PyTorch, ROS, Simulink, Unity, SOLIDWORKS, Multisim, Quartus, Linux, Git
- **Hardware:** STM32, 89C51, Arduino microcontrollers

📖 ENGLISH PROFICIENCY

- **IELTS:** 7.5 (Listening 8.5, Reading 9.0, Writing 6.0, Speaking 6.5)
- **GRE:** 324.5 (Verbal Reasoning 152, Quantitative Reasoning 169, Analytical Writing 3.5)