Tianxing Wu

https://tianxingwu.github.io

✉ twu012@e.ntu.edu.sg · ⌗ TianxingWu

🎓 Education

Nanyang Technological University (NTU)   Singapore
Master of Science in Computer Control & Automation   *Jan. 2021 – Jan. 2022 (Expected)*
- Deferred erollment 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

- *Honorable Mention*, Mathematical Contest in Modeling (MCM)   *2018*
- *Outstanding Undergraduate Student in HEU*   *2017*
- *1st Prize & Champion*, 'Shenzhen Cup' Mathematical Modeling Challenge   *2017*
- *1st Prize*, Northeast China Mathematical Contest in Modeling   *2017*
- *1st Prize*, China Undergraduate Mathematical Contest in Modeling (Heilongjiang Division)   *2017*
- *1st Class Scholarship for Outstanding Students*   *2016*
- *2nd Prize*, National English Competition for College Students (NECCS)   *2016*

⚙ SKILLS

- **Programming Language**: Python, MATLAB, C/C++, C#, Verilog
- **Software**: OpenCV, 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**)