

TIANXING WU

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🎓 EDUCATION

Harbin Engineering University, College of Automation

Sept. 2015 – Present

- *Bachelor student* in Automation, expected June 2020
- *Research Intern* at Institute of Intelligent Control
- Average Grade: 90.04 / 100

Harbin Institute of Technology Robot Group

July 2019 – Aug. 2019

- 2019 ROS Summer School in China
- Courses: ROS basics, Industrial robots, ROS2 and RTS, Reinforcement learning, Humanoid robot, UAV simulation, Computer vision, SLAM
- *2nd Prize* of the final robot competition

🔬 RESEARCH & PROJECTS

Visual Robots Localization Based on SLAM Method

June 2016 – Dec. 2016

Research Intern, Supervised by Dr. Zhi Zhang

- Collaborated with the team to build a binocular visual odometry for mobile robot localization in indoor environment based on EKF-SLAM
- Acquired the framework of binocular Vision-SLAM by exploring state-of-art algorithms
- Implemented feature points extracting and matching from binocular images using OpenCV in C++

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

July 2017 – Present

Project Leader, Supervised by Dr. Shujuan Wang

- 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 video stalling data, significantly enhancing the prediction accuracy for video stalling ratio

Vision-Based Control for Ball and Plate System

June 2018 – July 2018

- Detected and transferred position of the ball using OpenCV-Python and serial communication
- Implemented two separate independent PD control loops on the MCU for 2 dimensional positioning
- Optimized the algorithm to overcome large noises using noise-robust differentiator

A Gesture Recognition System Based on Capacitive Sensor

July 2018 – Aug. 2018

Sub-team 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

Flocking Algorithm for Swarm Robots Inspired by Foam Dynamics

Oct. 2018 – Present

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

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 classic PD control to the system

Real-time Driver Fatigue Monitoring System

Dec. 2018 – Apr. 2019

Algorithm Engineer, Supervised by Prof. Qiang Zhang

National Undergraduate Training Programs for Innovation and Entrepreneurship

- 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

★ SELECTED AWARDS & HONORS

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

⚙️ SKILLS

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- **Programming Language:** Python, C/C++, MATLAB, Verilog
 - **Software:** Simulink, SOLIDWORKS, Multisim, Quartus, Keil
 - **Hardware:** STM32, 89C51, Arduino microcontrollers
 - **Others:** Linux, Git, OpenCV, Dlib, LaTeX, Markdown

📖 ENGLISH PROFICIENCY

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- **IELTS:** 7.5 (Listening 8.5, Reading 9.0, Writing 6.0, Speaking 6.5)
 - **CET-6:** 635 (Listening 218, Reading 229, Writing & Translating 188)

🔧 MISCELLANEOUS

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- **Research Interests:** Robotics, Computer Vision
 - **GitHub:** <https://github.com/TianxingWu>
 - **Homepage:** <https://tianxingwu.github.io>