

# YULUN ZHUANG

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## Education

### Southern University of Science and Technology

Bachelor of Robotics Engineering **GPA:** 3.77/4.00 (Top 6%) **IELTS:** 7.5

Sep 2018 – June 2022

Shenzhen, China

- Probability and Statistic (91%)
- Robot Modeling&Control (97%)
- Engineering Optimization (93%)
- Modern Control&Estimation (98%)
- Computer Vision (95%)
- Data Structures&Algorithm (92%)

## Experience

### Deep RL Control for Soft Peg-in-Hole Assembly

Jun 2021 – Oct 2021

Summer Research Intern

Prof. Jing Xu, Institute of Mechatronic Engineering, THU

- Used offline SAC to train a impedance-controller based model for assembly using 12-dim force data.
- Used vision to predict the deformation of the soft-pegs and adjust the latent space and policy function.

### Wheeled-Bipedal Robot

Sep 2020 – May 2021

Team Leader

Prof. Wei Zhang, CLEAR Lab, SUSTech

- Designed a wheeled-bipedal robot, integrated knee and hip motors by a four-bar linkage.
- Built the robot in Webots simulator and implemented balancing, squatting and jumping control algorithms.
- Derived the dynamics model based on the *SLIP* model, planned the torque curve based on the Bayesian optimization algorithm, and solved the optimal parameters of the jumping controller.

### Tractor Autonomous Steering Simulation

Jun 2020 – Oct 2020

Summer Research Intern

Prof. Bill Goodwine, AgJunction Inc., ND

- Built a high-fidelity tractor model in Webots simulator, including four-wheel steering capability and body suspension.
- Derived the simplified dynamics model of the tractor, and used the *MATLAB* system identification toolbox to identify the system parameters by analyzing the *IMU* data when the real tractor crossed mound.

### Hybrid-Connection Autonomous Floating Vessels

Sep 2019 – May 2020

Team Leader

Prof. Wei Zhang, CLEAR Lab, SUSTech

- Designed a vessel aiming to connect with each other robustly to form a surface platform, including thrusters and *IMU*.
- Designed the connection mechanism that can switch between rigid and rope connection by using servos and dead-point.
- Used *STM32* to control four thrusters and studied the velocity control algorithm by filtering IMU data.

## Projects

### Mobile Robot SLAM and Navigation | C++, ROS, SOLIDWORKS

- Used *SolidWorks* to build the *URDF* model of the four-wheel car, deployed the *Gmapping* algorithm for *SLAM*, deployed the *iFLYTEK* voice recognition algorithm and used the *ROS* navigation package to implement voice navigation.

### Two-wheel Self-balancing Car | C++, PID, STM32

- Built a two-wheeled robot based on *STM32F1 MCU*, *DC motor*, *IMU* and *Bluetooth module*, applied series *PID* for position and velocity control and used *Bluetooth* to perform remote control.

### Gesture Human Computer Interaction System | Python, OpenCV

- Used the watershed algorithm to perform skin color segmentation, implemented gesture recognition by template matching, and implemented the gesture interaction with mouse and keyboard hotkey based on *Win32 API*.

### Neural Machine Translation Challenge | Python, PyTorch

- Used attention mechanism to reproduce the *Transformer* deep neural network model based on the *PyTorch* framework. Trained models on *Multi30K* dataset, and implemented beam search for translation, getting a *BLEU* score of 37.39.

## Publications

### Height Control and Optimal Torque Planning for Jumping With Wheeled-Bipedal Robots

Jul 2021

*Y. Zhuang\**, *Y. Xu\**, *B. Huang\**, *M. Chao*, *G. Shi*, *X. Yang*, *K. Zhang*, *C. Fu* [[PDF](#)]

ICARM

### Connecting Structure and Multi-Hull Ship

Mar 2021

*Y. Zhuang*, *W.Zhang*, *B.Wang*, *T.Ren*, *H.Chen* [[PDF](#)]

CN212637810U

## Technical Skills

**Languages & Frameworks:** Python, C++, HTML/CSS, MATLAB, Java, OpenCV, PyTorch

**Mechatronics Systems:** Linux, ROS, STM32, Raspberry Pi, SOLIDWORKS, EDGECAM

## Honors & Awards

Top Ten Volunteers of University (2020 – 2021)

Outstanding Student Leaders (2019 – 2020)

The First Class of the Merit Student Scholarship (2019 – 2020)

The Second Class of the Merit Student Scholarship (2018 – 2019)