YULUN ZHUANG

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EDUCATION

Southern University of Science and Technology (SUSTech) ***Sep. 2018 – Jun. 2022***
• *Majoring in Robotics Engineering* ***GPA****: 3.77/4.00 (Top 6%)* ***IELTS****: 7.5* *Shenzhen, China*

RESEARCH EXPERIENCE

Deep RL for MPC Control of Quadruped Locomotion ***Oct. 2021 – May. 2022***
Senior Design Project *Prof. Wei Zhang, CLEAR Lab, SUSTech*
- Transferring *MIT Cheetah* controller to *NVIDIA Isaac* simulator to control *Aliengo* quadruped robot.
- Building neural network policy and using *PPO* algorithm to train parameters of the controller.

Deep RL Control of Soft Peg-in-Hole Assembly ***Jun. 2021 – Aug. 2021***
Summer Research Intern *Prof. Jing Xu, Institute of Mechatronic Engineering, THU*
- Applied *SAC* algorithm to planned stiffness reference for an impedance controller based on force-torque observations and deployed our algorithms on an ABB robot arm.
- Applied two cameras to predict the deformation of the soft-peg for adjusting the bound of actions.

Jump Control of Wheeled-Bipedal Robot ***Sep. 2020 – May. 2021***
Team Leader *Prof. Wei Zhang, Prof. Chenglong Fu, 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 and jumping control algorithms.
- Derived the dynamics model based on the *SLIP* model, planed the torque curve based on the Bayesian optimization algorithm, and solved the optimal parameters of the jumping controller.

Autonomous Steering Control of Tractor ***Jun. 2020 – Aug. 2020***
Summer Research Intern *Prof. Bill Goodwine, AgJunction Inc., ND*
- Built a high-fidelity tractor in Webots simulator, including steering capability and body suspension.
- Derived the dynamics model of the tractor, and applied 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***
Undergraduate Research *Prof. Wei Zhang, CLEAR Lab, SUSTech*
- Designed a surface vessel platform aiming to form a surface platform including thrusters and *IMU*.
- Designed a connection mechanism that can use servo motors to switch between rigid ball-socket connections based on the dead-point position of linkages and flexible cable connections.
- Applied closed-loop speed control using Kalman filter to estimate the body speed from the IMU data.

PUBLICATION

Y. Zhuang *et al.*, "**Height Control and Optimal Torque Planning for Jumping with Wheeled-Bipedal Robots**," *2021 6th IEEE International Conference on Advanced Robotics and Mechatronics*

PATENTS

[W. Zhang, Y. Zhuang, *et al.*] [**Biped robot**] [China CN112977666A], filed [Mar 4, 2021]. pending.
[Y. Zhuang *et al.*] [**Connecting Structure and Multi-Hull Ship**] [China CN212637810U], filed [Jun 4, 2020], and issued [Mar 2, 2021].

TECHNICAL SKILLS

Languages & Frameworks: *C++, Python, MATLAB, Java, HTML/CSS, OpenCV, PyTorch*
Mechatronics Systems: *Linux, ROS, Raspberry Pi, STM32, SOLIDWORKS*

PROJECTS EXPERIENCE

Two-wheel Self-balancing Car | C++, 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.

Mobile Robot SLAM and Navigation | C++, ROS

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

Gesture Human Computer Interaction System | C++, OpenCV

- Applied the watershed algorithm in *OpenCV* 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

- Applied *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*.

LEADERSHIP & ACTIVITIES

Head of Office, SUSTech Volunteer Association ***Jul. 2019 - Sep. 2020***

- Recruited over 700 volunteers to participate in Shenzhen and international volunteer activities.
- Managed the logistical support of SUSTech volunteer activities.

Mechanics Group Member, Robotics Club ***Sep. 2018 - Jun. 2019***

- Prototyped and maintained a gimbal with a shooting gun.
- Won the third prize in the south division of 2019 RoboMaster Robotics Competition.

VOLUNTEER WORK

Coordinator of Volunteers, SUSTech 10th Anniversary Celebration ***Dec. 2020***
Volunteer, International Youth Innovation Conference ***Nov. 2019***
Coordinator of Volunteer, Nanshan Half Marathon ***Oct. 2019 - Nov. 2019***
Coordinator of Volunteer, 2019 FIBA Basketball World Cup ***Aug. 2019 - Sep. 2019***

HONORS & AWARDS

Outstanding Undergraduate Thesis **2022**
Outstanding Graduates of SUSTech **2022**
First Class of the Merit Student Scholarship (Top 5%) ***Nov. 2020 & 2021***
Top Ten Volunteers of SUSTech ***Jan. 2021***
Outstanding Student Leaders ***May. 2020***
Second Class of the Merit Student Scholarship (Top 10%) ***Nov. 2019***