# Zhanyu Guo

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## EDUCATION

**California Institute of Technology** — 1200 E California Blvd, Pasadena
*Master of Science in Electrical Engineering* — Sept. 2023 – Dec. 2024

**Southwest Jiaotong University** — Chengdu, China
*Bachelor of Engineering in Electronic and Electrical Engineering* — Sept. 2019 – July. 2023
**Major GPA:** 3.9/4.0
**Courses:** Digital Electronics & Microcontrollers (98.3), Electronic Design Project (96.7), Electronic Circuit Design (95), Control Systems (97.3)

## INTERNSHIP EXPERIENCE

**CITIC Securities Co., Ltd.** — Hangzhou, Zhejiang, China
*Data Analyst Intern* — Aug. 2021 – Sept. 2021
- Collected an operational dataset with more than 1,000 items of product details with Python crawler for business analytics.
- Conducted data cleaning and modeling using machine learning techniques, including linear regression, trees, random forest, naive Bayes, and deep neural networks; performed data visualization with seaborn and Matplotlib.
- Scrutinized the modeling results by self-proposed evaluation metrics and optimized model performance by hyperparameter tuning.

## PROJECT EXPERIENCE

**University Delivery system** — Leeds, UK
*Advisor: Lotfi Mhamdi, University of Leeds*
- Build a management system to manage the status of the order, delivery and restaurant, which uses Springboot and Java as the backend, and html, Vue.js as the frontend.
- Use Google-supported firestore database to store and manage all data and connect apps and web applications.
- Use Dart language and the flutter structure to build the mobile app which realizes the function similar to Uber eat.

**Vision-controlled Self-driving Robot Car** — Chengdu, Sichuan, China
*Advisor: Prof. Jingwen Dong, Southwest Jiaotong University* — Jun. 2021 – Aug. 2021
- Investigated into the development of robot control logic and embedded systems; systematically studied robot operating systems.
- Integrated a PID-based control logic with contour recognition into a Raspberry Pi embedded system.
- Built a robot self-driving car with image processing, wireless communication, and mechanical control module.

**Game console based on FPGA** — UK, leeds
Feb. 2022 – May. 2022
- Learned about the Verilog and systematically learned the relevant basic knowledge of the FPGA.
- Run the Verilog on the Xilinx FPGA board with the help of the Quartus, after the simulation on the Modelsim.
- Realize the snake game on the FPGA board which is displayed on the screen by HDMI interface.

## RESEARCH EXPERIENCE

**How Do Tiny Brains Control Complex 3D Behaviors of Worms?** — Leeds, West Yorkshire, England, UK
*Advisor: Prof. Netta Cohen, University of Leeds* [Link] — Jun. 2022 – Sept. 2022
- Constructed a 3D motion dataset and a nerve signal dataset based on the planar swimming and crawling locomotion of worms.
- Implemented a 3D twisting mechanism for worm motion simulation in Prof. Cohen's biomechanical model.
- Reconstructed several 3D worm behaviors with the collected datasets and observed their relationship with nerve signals.

**An Improved Lightweight YOLO v5 Model for Mask Wearing Detection** — Chengdu, Sichuan, China
*Independent Research* — Aug. 2021 – Feb. 2022
- Developed a lightweight mask detector based on YOLO v5 with coordinate attention mechanism; Improved the inference speed by 28.3% and achieved a classification precision of 95.2%.
- Proposed a novel ShuffleCANet as the model backbone and applied a BiFPN network for feature processing.

**Machine Learning Theory & Applications** — Los Angeles, CA, USA
*Advisor: Prof. Victor Adamchik, University of Southern California* [Link] — Sept. 2020 – Dec. 2020
- Researched on regression, classification, clustering, and Markov decision algorithms.
- Applied linear regression, logistic regression, Bayesian inference, and SVMs with different kernels on real-world problems.

## PUBLICATIONS

[1] Sheng Xu, **Zhanyu Guo**, Yuchi Liu, Jingwei Fan, and Xuxu Liu. "An Improved Lightweight YOLOv5 Model Based on Attention Mechanism for Face Mask Detection". *31st International Conference on Artificial Neural Networks*. Bristol, UK. Sept. 2022. [Link]
[2] **Zhanyu Guo** and Pengyu Wang. "Research on Train Positioning Algorithm with Special Rail Characters". *14th International*

*Conference on Advanced Computer Science and Information Systems*. **ACCEPTED**.

## ADDITIONAL INFORMATION

**Programming & Software Skills:** C, C++, HTML, Java, Springboot, Dart, JavaScript, MATLAB, Proteus, Python, SQL, Verilog,
**Research Interests:** Software development, Artificial Intelligence, Robotics, Control systems, Embedded Systems