Zhirui Dai

Electrical and Computer Engineering, UC San Diego
E-Mail: zhdai@eng.ucsd.edu Website: https://daizhirui.github.io

EDUCATION

M.S., Electrical and Computer Engineering, UC San Diego 06/2021 (Expected)
- Current GPA: 4.0/4.0

B.S., Physics, Fudan University 06/2019
- Graduated with Excellent Student Award

Exchange, Computer Science, Humboldt Universität 04/2018 – 08/2018

Research Experience

BEV-Net: Social Distancing Detection with Geometric Reasoning 2020
- Designed a multi-task privacy-preserved network for detecting area where people are violating social distancing restriction with a monocular surveillance system
- Developed a unified framework based on PyTorch, which supports training and testing networks of different configurations and optimal hyper-parameter searching
- Worked with teammates to create a new dataset, CityUHK-X-BEV, for the social distancing task
- Defined and solved the geometry problem of reasoning people's ground position
- Developed the user interface for geometry calibration with PyQt5
- Developed and verified the proposed differentiable homography transformation module at different input scales

Autonomous Driving System for Mail Delivery in UC San Diego 10/2019 – 12/2019
- Developed script tools for quick deployment and maintenance of autonomous vehicle software

Low-power SoC Software 2018-2019
- An IDE for software development of targeted low-power SoC, including
  - Designed the user interface and program all the functional modules
  - Developed a hardware abstract layer library to provide users with concise APIs to manipulate modules on SoC
  - Developed an ELF analyzer and converter which generates firmwares for bare metal systems
- Worked with teammates to test SoC and developed software patches for hardware hotfix

Prototype Ultrasonic System for Measuring Blood Flow Field 2018-2019
- Used AutoCAD and SolidWorks to design the system
- Designed and established the electronic system for measurement
- Collected and analyzed the data to reconstruct the blood flow velocity distribution

Robot Capable of Self-balancing on a Pivot 2017-2018
- Designed and built the mechanical system using SolidWorks
- Implemented the PID controller and finished the hyper-parameter tuning

Study of the Thermal Dynamics of Pipette Hot Fountain 2016
- Created the physics model of pipette hot fountain
- Did the simulation of pressure and temperature distribution inside the pipette with COMSOL Multiphysics
- Designed and constructed the system to verify the proposed physics model

For more exciting projects and details, please visit: https://daizhirui.github.io/projects

Teaching Experience

Teaching Assistant, Physics Department, Fudan University 01/2019 – 07/2019
- Physics Modelling

Teacher, the Second Affiliated Junior School of Fudan Univeristy 01/2019 – 07/2019
- Arduino Programming

Teaching Assistant, School of Information Science and Technology, Fudan University 2018-2019
- SoC: Theory and Implementation

SKILLS

- **Programming**: C, C++, Python, Assembly, Swift, Java, Shell Script, HTML, CSS, Javascript
- **Software Development**: Qt5, macOS App, iOS App, Android App
- **Machine Learning**: PyTorch, MXNet, Tensorflow
- **Virtualization**: Docker, VMWare
- **Math Software**: MATLAB, Mathematica
- **Design Software**: AutoCAD, SolidWorks
- **Circuit Design**: Verilog, Cadence, Quartus, Modelsim
- **Hardware**: STM32, Arduino, Raspberry Pi, FPGA

- **Other**: Git, Latex

HONORS & AWARDS

- Excellent Graduated Student Award 06/2019
- Scholarship for Outstanding Students at Fudan University 12/2018 & 12/2017
- 2017 Hornors Student Award in Physics 07/2017
- Xu Zeng-shou Scholarship 12/2016
- The first prize of China Undergraduate Physics Tournament(CUPT) 08/2016
- The champion of Shanghai Undergraduate Physics Tournament(SUPT) 07/2016