# Zhirui Dai

Electrical and Computer Engineering, UC San Diego
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## 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 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
- Defined and solved the geometry problem, and developed 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
- Developed an IDE for software development of targeted low-power SoC, including
  - Design User Interface and program all the functional modules
  - Develop a hardware abstract layer library which provides users with concise APIs to manipulate modules on SoC
  - Develop an ELF analyzer and converter which generates firmwares for bare metal systems
- Worked with teammates to test SoC and develop 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 data

**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 for experiment condition control, data collection and analysis

For more interesting 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, Verilog, 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**: 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