

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
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Statistical Visual Computing Lab, UC San Diego

This project makes real-time accurate detection of high contagious risk area become possible.

- 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

Faster Neural Path Planner (FNPP) based on MPNet	03/2020 – 06/2020
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Course Research Project. MPNet is a neural network for path planning in environments with obstacles. FNPP reaches a real-time performance on the same dataset by proposing an improved neural path planning framework.

- Designed the FNPP algorithm
- Trained and tested the network, the success rate is higher and the running time is similar to the C++ version of MPNet when FNPP is implemented by Python

Autonomous Driving System for Mail Delivery in UC San Diego	10/2019 – 12/2019
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Autonomous Vehicle Lab, UC San Diego

- Developed script tools for quick deployment and maintenance of autonomous vehicle software

R&D of Commercial Low-power SoC Software	2018-2019
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Camel Microelectronics Inc., San Jose, CA

- CamelStudioX, an IDE for software development of targeted low-power SoC. This project enables the users to develop SoC software on a robust and efficient platform. It includes
 - 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 essential standard GCC library functions, such as soft-float library, stdio, etc.
 - Developed cross compiler toolchains, including the GNU C/C++ compilers, custom make system, an ELF analyzer and converter which generates firmwares for bare metal systems
 - Designed robust serial-port software for the communication between the SoC and the upper PC, e.g. uploading firmware, debugging interface
 - Deployed the IDE on servers for software distribution and update release
- Worked with teammates to test SoC and developed software patches for hardware hotfix

Prototype Ultrasonic System for Measuring Blood Flow Field	2018-2019
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- 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
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- Designed and built the mechanical system using SolidWorks
- Implemented the PID controller and finished the hyper-parameter tuning

For more exciting projects and details (e.g. SLAM etc.), please visit: <https://daizhirui.github.io/projects>

Teaching Experience

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

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

Teaching Assistant, School of Information Science and Technology, Fudan University	2018-2019
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- 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

Publication

- Zhirui Dai, Yi Li, Bo Liu, Nuno Vasconcelos. BEV-Net: Social Distancing Detection with Geometric Reasoning. CVPR 2021, Under review
- DAI Zhi-rui, BAI Cui-qin. Study of the physical process of the pipette hot fountain[J].College Physics, 2019, 38(4): 42-44

HONORS & AWARDS

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| • 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 |