SINONG(SIMON) ZHAN

Github⋄ Personal Page⋄ Google Scholar

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EDUCATION

University of California, Berkeley — *August 2018 - Present*

Major in Computer Science and Applied Mathematics(Statistic cluster); **GPA:3.7**

High School Affiliated to Renmin University of China — *Sep 2015 - Jun 2018*

IGCSE/AL program; **Valedictorian Speaker**

PRESENTATION

- **RElectrode: A Reconfigurable Electrode For Multi-Purpose Sensing Based on Microfluidics**. Poster session of *ACM CHI 2021*.

RESEARCH EXPERIENCE

University of California, Berkeley — April 2022-Now

Undergrad Researcher — *Advised by Prof.Sanjit Seshia*

· I'm working on LOGiCS Project, the STR pipeline. We design a set of automated design-optimization, simulation, control/path planning, and verification tool-chain on Unmanned Underwater Vehicle for specific mission sets. Details are listed in this website.

IDEAS Lab, Northwestern University — March 2022-Now

Research Assitant — *Advised by Prof.Qi Zhu*

· I'm researching on how to provide formal verified aspects to the Cyber-Physical Systems with the state-of-art Reinforcement Learning Method. We implemented a framework that jointly conducts reinforcement learning and formal verification by formulating and solving a bi-level optimization problem, which can cope with both deterministic and stochastic safety-critical systems. Here is Github. One paper is in submission to *ICLR*, and another is prepared to submit to *ICCPS*.

Human Computing Lab, ISCAS and XDiscovery Lab, Dartmouth — May 2019-Sep 2021

Research Assistant — *Advised by Prof Feng Tian & Prof Teng Han & Prof Xingdong Yang*

· I have researched on the new fabrication and novel interaction techniques under the HCI context. Specifically, I have worked on developing novel input and feedback devices, using fast prototyping techniques, in the VR environment, and also explored the applications of advance materials and technology of other industries, such as photovoltaic material and microfluidic tech, in the ubiquitous computing and sensing industry.

PUBLICATION(* STANDS FOR EQUAL CONTRIBUTION)

Enforcing Hard Constraints with Soft Barriers: Safe Reinforcement Learning in Unknown Stochastic Environments Yixuan Wang, Simon Sinong Zhan, Ruochen Jiao, Zhilu Wang, Wanxin Jin, Zhuoran Yang, Zhaoran Wang, Chao Huang, Qi Zhu. **In submission**

LightSticker: Enabling Contextual Sensing of Legacy Devices with a Thin Light Sensor Simon Zhan*, Wei Sun*, Zengqi Huang, Tingqing Wu, Jiaxuan Ren, Chutian Jiang, Prof. Dr. Meng Su, Teng Han, Feng Tian, Xing-Dong Yang. **In submission**.

MicroFluID - A Reconfigurable RFID Platform for Robust Interaction Sensing Based on Microfluidics Wei Sun, Yuwen Chen, Yanjun Chen, Simon Zhan, Yixin Li, Jiecheng Wu, Teng Han, Feng Tian, Jingxian Wang, Haipeng Mi, Xing-Dong Yang. **Published** by Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (*UbiComp 2022*)
link: `https://dl.acm.org/doi/abs/10.1145/3550296`

RElectrode: A Reconfigurable Electrode For Multi-Purpose Sensing Based on Microfluidics. Wei Sun, Yanjun Chen, Simon Zhan, Teng Han, Feng Tian, Hongan Wang, Xing-Dong Yang. **Published** by ACM Conference on Human Factors in Computing Systems 2021 (*CHI 2021*)
link: `https://doi.org/10.1145/3411764.3445652`

PATENT

No.CN201710953534.X **The Device generating control instruction for multi-targets based on EMG(electromyography) signal** Simon Zhan, Junjun Fan, Feng Tian, Wei Sun. *Protected by Patent Law of the People's Republic of China*

No.CN202110377915.4 **A complex microfluidic pipeline composite structure and microfluidic pattern deformation system based on microfluidic technology** Wei Sun, Yanjun Chen, Simon Zhan, Teng Han, Feng Tian, Hongan Wang, Xing-Dong Yang. *Protected by Patent Law of the People's Republic of China*

No.CN202110378536.7 **A fluid pattern re-configurable system based on microfluidic technology** Wei Sun, Yanjun Chen, Simon Zhan, Teng Han, Feng Tian, Hongan Wang, Xing-Dong Yang. *Protected by Patent Law of the People's Republic of China*

TECHNICAL STRENGTHS

Computer Languages	C/C++, Python, Java, R, C#, RISC-V, MATLAB, Julia
Software & Tools	HTML, Excel, Mathematica, Unity3D, Simulink, LaTeX, Autodesk Fusion360
Language	Academic proficiency in Chinese and English, Limited proficiency in German

PROJECTS

MARS   Python/Simulink/HTML
Participant   *Github*

· Developed blocks feature of simulation tool in MARS system same as blocks in Simulink.
· Conducted testing on existing features on simulatin tool and automatic translation tool.
· Formulated demonstration of MARS system using textbook example such as Feedback system, etc.
· Developed both online and local GUI for graphing system using python Tkinter, flask, and HTML

Get a Grip   SteamVR/Unity3D/C#
Participant(CHI 2020 Best Paper Honorable Mention)   *Video*

· Designed and fabricate the pen model with 3D printing technologies
· Implemented button events on a pen model using bluetooth module for transmission
· Tracked pen movements using OptiTrack V120:Trio and OptiTrack Motive software (Spec detail)
· Mapped pen motions into VR environment using HTC Vive, SteamVR API, and Unity3D
· Reflected button event on pen as SELECT in VR environment
· Constructed a VR environment for experiment use in Unity3D

Geocentric   Dynamic System/ Sensors fusion and network/ Simulation
Group Project   *Github*

· Constructed robot cars to symbolize different planets such as Moon and Earth

· Implemented BLE controller on mother planet to control its trajectory
· Formulate Dynamic System equation for orbiting movement
· Simulated the dynamic system as mother planet moves in arbitrarily trajectory in Simulink
· Designed and built sensors network using IR and EO(electrical optic) sensors on Berkeley Buckler

EMG(electromyography) controlled vehicle   Arduino Uno/C++
Individual project   *Github*

· Collected EMG data through Myo armband and analyze the EMG signal based on FFT algorithm.
· Constructed the vehicle and bluetooth module based on Arduino Uno board.
· Implemented instruction sets on vehicle using Myo built-in API and bluetooth module for transmission.
· Collected testing data and train SVM model based on LIBSVM in C++.

TECHNICAL COURSES WORK(TAKING/TAKEN)

1. Linear Algebra(Math110)
2. Abstract Algebra(Math113)
3. Numerical Analysis(Math128A)
4. Optimization Models(EECS127/227A)
5. Probability theory(Stat134)
6. Statistical methods(Stat135)
7. Efficient Algorithm(CS170)
8. Database(CS W186)
9. Real Analysis(Math104)
10. Neural Network(CS182/282A)
11. Machine Learning(CS189/289A)
12. Embedded System(EECS149/249A)
13. Complex Analysis(Math185)
14. Time Series(Stat153)
15. Partial Differential Equation(Math 126)
16. Nonlinear System(EE C222)
17. Reinforcement Learning(CS 285)

TEACHING

Fall 2022: Math 128A TA