

Siyou Pei

PH.D. STUDENT · ELECTRICAL AND COMPUTER ENGINEERING

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Research Interests

Expressive interactions and sensing for Mixed Reality

Education

University of California, Los Angeles

M.S./PH.D. PROGRAM IN ELECTRICAL AND COMPUTER ENGINEERING

3.87/4.00

Sep. 2019 – Present

- Advisor: Yang Zhang
- Human-Centered Computing & Intelligent Sensing Lab ([HiLab](#))

Zhejiang University

B.ENG. IN ELECTRONIC AND INFORMATION ENGINEERING (WITH HONORS)

3.92/4.00

Aug. 2015 – Jun. 2019

National University of Singapore

EXCHANGE STUDENT IN ELECTRONIC AND COMPUTER ENGINEERING

4.00/4.00

Aug. 2017 – Dec. 2017

Research Experience

ForceSight: Non-Contact Force Sensing with Laser Speckle Imaging 🏆 📄

UIST '22, Bend, OR

SIYOU PEI, PRADYUMNA CHARI, XUE WANG, XIAOYING YANG, ACHUTA KADAMBI, YANG ZHANG

- Developed a non-contact force sensing approach that leverages discernable laser speckle shifts caused by deformation at an applied force.
- Evaluated the validity of the technologies with a set of materials and demonstrated example applications, e.g. Projective Augmented Reality.
- Distilled and summarized guidelines on expanding the sensing principle to various surface materials and their effect on the performance of the sensing technique, to promote its scalability.

Hand Interfaces: Using Hands to Imitate Objects in AR/VR for Expressive Interactions 🏆 📄

CHI '22, New Orleans, LA

SIYOU PEI, ALEXANDER CHEN, JAEWOOK LEE, YANG ZHANG

- Proposed the idea of using hands to imitate virtual objects for expressive interactions in AR/VR.
- Created a wide array of interaction designs around this idea to demonstrate its applicability in object retrieval and interactivity.
- Collected quantitative and qualitative feedback which indicated that Hand Interfaces is effective, expressive, and fun to use.

AURITUS: An Open-Source Optimization Toolkit for Training and Development of Human Movement Models and Filters Using Earables 📄

IMWUT '22

SWAPNIL SAYAN SAHA, SANDEEP SINGH SANDHAA, SIYOU PEI, VIVEK JAIN, ZIQI WANG, YUCHEN LI, ANKUR SARKER, MANI

SRIVASTAVA

- Developed a head pose recognition system using Earable (sensor-embedded earphones) and OptiTrack System for calibration and data collection.
- Implemented binaural sound (e.g. Doppler effect) with IMU in Earables and in VR headset, with the resolution of around 10°.
- Improved system accuracy and robustness significantly with XGBoost after sufficient comparison and analysis.

Quick Question: Interrupting Users for Microtasks with Reinforcement Learning 📄

ICML 2021 Workshop on HILL

BO-JHANG HO, BHARATHAN BALAJI, MEHMET KOSEGLU, SANDEEP SANDHA, SIYOU PEI, MANI SRIVASTAVA

- Employed a reinforcement learning solution in task allocation to minimize user annoyance about smartphone notifications.
- Designed and optimized a Markov decision process model that effectively allocates tasks based on training from 41 real users data.
- Achieved greater user experience with an RL algorithm A2C and proved better performance over a conventional supervised learning method.

Work Experience

Student Researcher Intern at Google

Sep - Dec 2022

Skills

Programming	C#, Python, JavaScript, C/C++, Verilog, MATLAB, Java, SQL, HTML, VB
Mixed Reality	Unity, Oculus Quest v1/v2; Lens Studio, Snap Spectacles
Computer Vision	PyTorch, OpenCV; Image segmentation, Classification, Optical flow, Face detection and recognition.
Design & Modeling	Fusion 360, Unity, Procreate, PS, PR, AE, Blender

Teaching Experience

ECE 100 Electrical and Electronic Circuits - Winter 2021

DR. FARID MESGHALI

ECE 113 Digital Signal Processing - Spring 2021

DR. KAMBIZ SHOARINEJAD

ECE 102 Signals and Systems - Fall 2021

PROF. JONATHAN KAO

ECE 100 Electrical and Electronic Circuits - Winter 2022

PROF. YANG ZHANG

ECE 209 Engineering Interactive Systems - Spring 2022

PROF. YANG ZHANG

ECE 188 Engineering Interactive Systems - Fall 2022

PROF. YANG ZHANG

Courses

2020 – 2021 ACADEMIC YEAR

CS 219 IoT Connectivity and Sensing

2020 – 2021 ACADEMIC YEAR

ECE 231A Information Theory

ECE 211A Digital Image Processing

ECE 209AS Special Topics in Circuits and Embedded Systems: Human-Computer Interaction

ECE M495 Teaching Preparation Seminar: Teaching and Writing Pedagogies for Electrical Engineers

2019 – 2020 ACADEMIC YEAR

ECE 239AS Special Topics in Signals and Systems: Reinforcement Learning Theory and Applications

ECE 233 Wireless Communications System Design, Modeling, and Implementation

ECE 219 Large-Scale Data Mining: Models and Algorithms

ECE C247 Neural Networks and Deep Learning

ECE 205A Matrix Analysis

ECEN202A Embedded Systems

ECE 236A Linear Programming