Xinlei Yu

Xinlei's Website(click here)   Los Angeles, California, United States   xinleiyu@usc.edu/leoyuusc@gmail.com

Education	**University of Southern California**, Los Angeles, CA, United States January 2022-Present Master of Science in Computer Engineering Graduation: December 2023 Current GPA:3.54/4.0 **Iowa State University**, Ames, IA, United States January 2018-December 2021 Bachelor of Science in Computer Engineering with Cum Laude

On-Going Work   Wearable Electro-tactile Rendering Device   June 2023-Present
- Working on a haptic project that investigates the human perception of and emotional response to electro-tactile stimulation. The further goal is to build a personalized and pleasant electro-tactile device that works seamlessly with other stimulus modalities such as visual and auditory.

Presentations

Electro-tactile Stimulation as a Modality for Sensation Illusion on the Arm, Irvine, CA, United States. [Presenter]. Southern California Robotics Symposium, Oral Presentation, September 2023 (SCR '23).

Tummy Time Toy: CV-based Infant Motor Learning Assistant Toy, Los Angeles, CA, United States [Co-Presenter]. NSF DARE conference, Demo, March 2023 (DARE '23).

Research Experience

USC HaRVI Lab with Prof. Heather Culbertson   May 2023-Present

Worked on a *Electro-tactile rendering device* project as the leading researcher and presented preliminary results at the SCR conference.
- Presented work on investigating the perception of Electro-tactile feedback on the forearm at the Southern California Symposium in relation to factors such as location, frequency, and skin moisture based on previous studies.
- Designed a reinforcement learning-based Electro-tactile calibration method using a multi-armed bandit algorithm to discover the unknown human perception of the electro-tactile stimulation and find the optimal and personalized signal parameters for rendering pleasant electro-tactile stimulation.
- Participated in presenting research results at the World Haptics Conference 2023.

USC Valero Lab with Prof. Francisco Valero-Cuevas   August 2022-April 2023

Worked on *Tummy Time Toy: Infant Motor Learning Assistant Toy* project.
- Designed a computer vision-based infant motor learning assistant toy, aptly named the "Tummy Time Toy" (patent pending). This toy, similar to a play gym, rewards infants with lights and music when they lift their heads past a certain threshold, encouraging the development of prone motor skills. Its primary goal is to study if babies can learn to control their bodies when on their tummy, potentially assisting in muscle control and increasing tummy time tolerance. From a technical perspective, the toy is divided into two components: the front end, which offers user interaction, and the back end, which is responsible for computer vision, control logic, and various APIs.
- Implemented CV algorithm to extract babies' head movement using opencv-python and a web app full stack using HTML/CSS/JS and Python Flask to provide researcher remote monitoring and control to the toy.
- Contributed to presenting the Tummy Time Toy at NSF DARE conference 2023.

Grad Research-based Course Projects

EE 675 Data Analysis and Control Techniques for Neurotechnology Design with Prof. Maryam Shanechi   Fall 2023 (ongoing)
- The main research question is whether the use of the Kalman filter and smoothing can enhance the accuracy of EEG in recognizing emotions, especially considering prior work has demonstrated high accuracy. The project utilized SEED dataset provided from BCMI@SJTU.

EE 554 Cyber-Physical Systems, with Prof. Paul Bogdan   Fall 2022

- Wrote a course paper evaluates Dijkstra's, Bellman-Ford, and Floyd-Warshall algorithms for the shortest path problem, using LLVM for graph generation and Gephi for visualization and property analysis; increasing input nodes significantly boosts graph size while maintaining stable clustering and modularity coefficients.
- It delves into graph partitioning techniques to generate parallelized code for these algorithms, with increased parallelization (more clusters) enhancing execution speed.

Teaching Experience	**CprE 308 Operating System**	August 2021-December 2021

Undergraduate Teaching Assistant with Prof. Mai Zheng

- Teaching assistant for the CprE308 Operating System: Principle and Practice.
- Conducted weekly lab sessions with 25 students, graded homework and lab assignments throughout the semester, and hosted weekly office hours.

Other Experience

ISU Undergraduate Summer Research at Biocentury Research Farm, *Undergraduate Researcher* May 2019-August 2019

Awards

2018 Gold Merited Scholarship, Office of Admission, Iowa State University – $32,000

Community Involvement

IEEE-HKN@ISU, *Student Member*

References

Prof. Heather Culbertson
Assistant Professor of Computer Science at USC, **Email:** hculbert @usc.edu

Prof. Francisco Valero-Cuevas
Professor of Biomedical Engineering at USC, **Email:** valero@usc.edu