Wengxi Li

CONTACT INFORMATION

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RESEARCH INTERESTS

How to design information representations that can be easily and fluidly transferred between humans and AI, and what are the potential scenarios

EDUCATION

University of Michigan, Ann Arbor, MI
Master of Science in *Electrical & Computer Engineering*, GPA: 4.00/4.00 — April 2023

University College London, London, United Kingdom
Master of Science with **Distinction** in *Medical Image Computing* — August 2021

Beijing Normal University, Beijing, China
Bachelor of Science in *Physics*, GPA: 3.60/4.00 — June 2020

PUBLICATIONS

Wengxi Li, Roy Pea, Nick Haber, Hari Subramonyam, "Tutorly: Turning Programming Videos Into Apprenticeship Learning Environments with LLMs." (Under review)

RESEARCH EXPERIENCE

Totorly: Turning Programming Videos Into Apprenticeship Learning Environments with LLMs
Advisor: Prof. Hariharan Subramonyam — *Stanford Institute for Human-Centered AI*

- **Practice Video Content by Learning Goals**
  - Designed a video segmentation algorithm that can use large language models (LLM) to segment programming tutorial videos into short clips based on user-input learning goals
  - Created an algorithm that could use LLM to extract the procedural and declarative knowledge from video segments and arrange cognitive apprentice methods for each segment
- **Domain-Specific Language for Conversation**
  - Deployed a domain-specific language (DSL) containing the action and interaction for each teaching method for producing prompts and parameters to generate active guidance
  - The DSL can be automatically generated and freely customized from videos on various topics (e.g., exploratory data analysis, machine learning, game development, etc)
- **Intelligent Conversational System and Evaluation**
  - Implemented a Chatbot as a JupyterLab extension, which leverages the DSL to provide adaptive direction and monitoring for students to learn the video content and acquire knowledge
  - Conducted technical evaluation and user study on the system. The accuracy of the generated dialog reached over 80% and participants' performance on tests increase from 55% to 74.5%

Real-time Refocusing Algorithms for Acoustic Neurostimulations [Paper] [Poster][Code]
Advisor: Dr. Antonio Stanziola, Prof. Bradley Treeby — *Biomedical Ultrasound Group, UCL*

- **Geometric Algorithms Design and Simulation**
  - Applied the Time Reversal (TR) algorithm to simulate the ultrasonic focus movement during neurostimulation sessions and got the transmit phases of three fixed targets
  - Calculated the phase difference of the transmitted wave due to the head movements for the three targets using the Geometric Beamforming (GB) algorithm
- **Dataset Built and Deep Neural Network Training**

- Simulated the phase difference for 50 different patients, 50 random targets for each patient, and 10 sets of transformations (including displacements and rotations) for each target
- Implemented a neural network model that takes target position, head displacement, and rotation as input and outputs phase difference prediction

- **Results and conclusions**
  - Geometric method: The GB algorithm works only when the focal point is at the center and the near side, so neural network prediction is necessary
  - Deep neural network: A single model for all the skulls performs poorly, so training a specific model for each skull is more effective

COURSE PROJECTS

ErgoSmart: Workers-AI Interaction for Ergonomic Solutions with a Vision Language Approach
Advisor: Prof. Anhong Guo [Report] [Code]

- **Dataset Built and Model Fine Tune**
  - Created a dataset containing images of ten ergonomic problem categories, along with a script that maps each problem to a list of feasible solutions
  - Fine-tuned the Bootstrapping Language-Image Pre-training (BLIP) model, which takes images as input and outputs question titles, with an accuracy of 73.39%
- **Human-AI Interaction Design**
  - To achieve human-in-the-loop, a feedback mechanism is designed that puts the user's choices and the suggestions of ergonomics experts into practice
  - ErgoSmart can adjust the overall solution priority according to all users' preferences and provide a platform for communication with experts when no satisfactory solution is found

SERVICE

Volunteer
UIST 2023 San Francisco, CA (**Win the T-shirt Design Contest!**)

Social Inverstigator
Microscopic survey of China's real progress (Completed **150** sample families' household surveys)

SKILLS

- Back-end development & Statistical: Python (Flask, PyTorch), C++, MATLAB, R
- Front-end development: HTML, CSS, JavaScript, TypeScript, React, Vue.js

HONORS AND AWARDS

The First-Class Fellowships (Top 5%) of Beijing Normal University	2018
The First-Class Competition Scholarship (Top 5%) of Beijing Normal University	2018
Meritorious Winner (Top 7%) of Mathematical Contest in Modeling	2018