Andrew (Maozheng) Zhao

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Introduction

I'm a computer science PhD candidate focusing on multi-modal human-computer interaction on mobile devices. I have publications in CHI, UIST, and IUI. I interned at Meta and Google. I have experience with LLM fine-tuning, CNN training and implementing machine learning models on Android/iOS devices. I've built multiple end-to-end mobile applications with multi-modal input and machine learning backend for enhanced interaction experience. I have 4 years experience of mobile development with Android/iOS, 3 years experience of deep learning, and 1 year experience of Unity development for VR.

Internship experience

Student researcher, Google, Mountain View, CA
Dec, 2022 - May, 2023
Fine tuned LLMs to enable Android settings search to understand natural language queries.

Research Intern, Google, Mountain View, CA
Oct, 2022 - Dec, 2022
(Same as the Google student researcher project above)

Research Scientist Intern, Meta, Redmond, WA
Reduced users' hand movement burden by 30% during gesture typing in virtual reality by utilizing users' eye gaze input. Published a conference paper in IUI 2024 from this internship project.

Education

Ph.D., Stony Brook University, USA
Major: Computer Science. Advisor: Prof. Xiaojun Bi. GPA: 3.78
Graduation date: December 2023.
The CS program is ranked #23 in the US by CSRankings.org
Aug, 2016-present.

M.S., Beijing University of Posts and Telecommunications, China
Major: Information and Communication Engineering. GPA: 3.80
Sep, 2013 - Mar, 2016

B.S., Harbin Engineering University, China
Major: Electronic and Information Engineering. GPA: 3.58
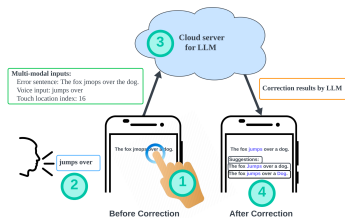
Aug, 2009 - Jul, 2013.

Programming skills

Python (7 years), Java (3 years), Swift (2 years), Pytorch (2 years), TensorFlow (0.5 year), C# (0.5 year)

Android development (3 years), iOS development (2 years), VR development (0.5 year)
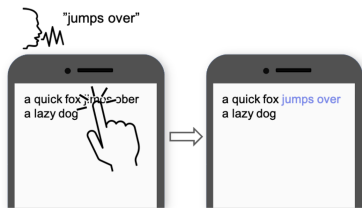

Project experience

LLM-based text correction with voice and touch input on smartphones

Project webpage

Developed an end-to-end Android APP for a new LLM-based text correction method with voice and touch input. Fine-tuned FLAN-T5 LLM on Google colab with a semi-synthetic dataset. Served the LLM on a cloud server that communicates with the Android APP for text correction. Carried out a user study and proved that the proposed LLM-based method reduced 15% text correction time from the state-of-the-art method.


Language model based text correction and text editing with voice and touch input on smartphones

Project webpage

Developed an end-to-end Android APP for a new text correction and text formatting method with voice and touch input. Converted voice input to executable text correction or formatting commands. Implemented a 3-gram language model and word embedding model on Android phones to correct text. Carried out a user study which proved that the proposed method reduced 31% text editing time and 48% text correction time from the iOS Voice Control.
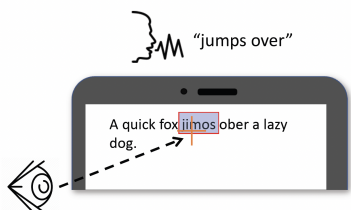

Eye Gaze and voice based text correction on iPad Pro

Project webpage

Developed an end-to-end iOS APP for a new text correction method with eye gaze and voice input on an iPad Pro. Proposed a new eye gaze target selection method using Beyesian theory for noisy eye gaze input. Implemented a 3-gram language model on a cloud server connected with the APP for text correction. Carried out a user study which proved that the Bayesian method reduced up to 23% text correction time from the non-Bayesian method.
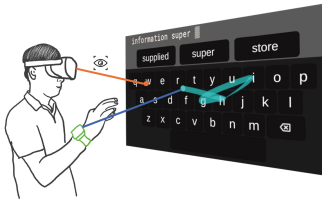
Eye gaze assisted swipe typing in VR

[Project webpage](#)

Developed an end-to-end 3D Unity APP on Meta Quest 2 with C# for a new text input method with eye gaze and wristband input. Reduced 30% hand movement burden from users during swipe typing in VR by utilizing users' eye gaze.
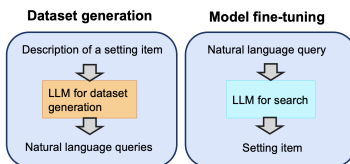
LLM-based Android search for natural queries

[Slides](#)

Enabled Android settings search to understand natural language queries with LLMs. Fine-tuned the LaMDA LLM with a custom dataset, created a synthetic dataset using LLMs, evaluated the fine-tuned model with real user queries. The fine-tuned model significantly outperforms other search methods such as TF-IDF, sentence encoding, and LLM prompt engineering.

Selected Publications

UIST 2021

Zhao, Maozheng, Wenzhe Cui, I. V. Ramakrishnan, Shumin Zhai, and Xiaojun Bi. "Voice and Touch Based Error-tolerant Multimodal Text Editing and Correction for Smartphones." In The 34th Annual ACM Symposium on User Interface Software and Technology (UIST 2021), pp. 162-178. 2021. [Acceptance Rate: 25.05%]

Project webpage, **Paper**

IUI 2022

Zhao, Maozheng, Henry Huang, Zhi Li, Rui Liu, Wenzhe Cui, Kajal Toshniwal, Ananya Goel et al. "EyeSayCorrect: Eye Gaze and Voice Based Hands-free Text Correction for Mobile Devices." In 27th International Conference on Intelligent User Interfaces (IUI 2022), pp. 470-482. 2022. [Acceptance Rate: 24.5%]

Project webpage, **Paper**

CHI 2024 (under review)

Zhao, Maozheng, Nathan Huang, Rui Liu, Shumin Zhai, I. V. Ramakrishnan and Xiaojun Bi. "Beyond Autocorrect: LLM-based Multi-modal Text Correction on Smartphones with Voice and Touch Input."

(Under review) CHI 2024 conference on Human Factors in Computing Systems.

Project webpage, 📄**Preprint**

IUI 2023

Zhao, Maozheng, Alec M. Pierce, Ran Tan, Ting Zhang, Tianyi Wang, Tanya R. Jonker, Hrvoje Benko, and Aakar Gupta. "Gaze Speedup: Eye Gaze Assisted Gesture Typing in Virtual Reality." In Proceedings of the 28th International Conference on Intelligent User Interfaces (IUI 2023), pp. 595-606. 2023. [Acceptance Rate: 24.1%]

Project webpage, 📄**Paper**

CHI 2022

Li, Zhi, Maozheng Zhao, Dibyendu Das, Hang Zhao, Yan Ma, Wanyu Liu, Michel Beaudouin-Lafon, Fusheng Wang, Iv Ramakrishnan, and Xiaojun Bi. "Select or Suggest? Reinforcement Learning-based Method for High-Accuracy Target Selection on Touchscreens." In CHI Conference on Human Factors in Computing Systems (CHI), pp. 1-15. 2022. [Acceptance Rate: 24.8%]

📄**Paper**

GI 2021

Li, Zhi, Maozheng Zhao, Yifan Wang, Sina Rashidian, Furqan Baig, Rui Liu, Wanyu Liu et al. "BayesGaze: A Bayesian Approach to Eye-Gaze Based Target Selection." In Proceedings. Graphics Interface (GI), vol. 2021, p. 231. NIH Public Access, 2021.

📄**Paper**

ICCV 2017

Nguyen, Vu, Tomas F. Yago Vicente, Maozheng Zhao, Minh Hoai, and Dimitris Samaras. "Shadow detection with conditional generative adversarial networks." In Proceedings of the IEEE International Conference on Computer Vision (ICCV), pp. 4510-4518. 2017.

📄**Paper**

PCS 2015

Zhao, Maozheng, Qin Tu, Yanping Lu, Yongyu Chang, and Bo Yang. "No-reference image quality assessment based on phase congruency and spectral entropies." In 2015 Picture Coding Symposium (PCS), pp. 302-306. IEEE, 2015.

📄**Paper**

Teaching Experience

Teaching Assistance for CSE323 human-computer interaction, CSE214 data structures and CSE215 foundations of computer science.