

Dan Zhang

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Research Interests

My expertise lies in Human-AI interaction, data science and accessibility, with a primary focus on intelligent text entry techniques. I am dedicated to developing AI systems that enhance usability and promote inclusivity in digital environments.

Education

- **Stony Brook University** Stony Brook, NY, USA
Ph.D. Computer Science *Sep. 2019 - present*
– GPA: 3.8/4.0
- **Stony Brook University (SUNY Korea campus)** Incheon, Korea
M.S. Computer Science *Sep. 2014 - May. 2017*
– GPA: 3.8/4.0
- **University of Electronic Science and Technology of China (UESTC)** Chengdu, China
B.Eng. in Computer Science and Technology *Sep. 2010 - Jul. 2014*
– GPA: 3.5/4.0
– Yingcai Experimental School (School of Honor for top undergraduates)

Professional Experience

- **Decoder for Braille Keyboard on Touchscreens** CS Dept. in Stony Brook Univ.
Doctoral Advisor: Xiaojun Bi & I.V. Ramakrishnan *Spring 2023 - Fall 2024*
Mobile text entry is a common yet challenging task for people with visual impairments. The main scope of this project is to develop a powerful decoder for touchscreen Braille keyboard users. I have implemented an algorithm to interpret the braille input to readable text on the touchscreen which makes use of the touchpoint locations and language models. This work is in submission.
- **LLM Powered Flexible Typing on Smartphones** CS Dept. in Stony Brook Univ.
Doctoral Advisor: Xiaojun Bi & I.V. Ramakrishnan *Fall 2023 - Summer 2024*
LLMs have shown exceptional performance in various language-related tasks. However, their application in keyboard decoding, which involves converting input signals (e.g. taps and gestures) into text, remains under-explored. In this work, we implemented a fine-tuned FLAN-T5 model for decoding. It achieves 93.1% top-1 accuracy on user-drawn gestures, outperforming the widely adopted Shark2 decoder. This work was published in CHI 2025.
- **Games for Clearflow Keyboard** CS Dept. in Stony Brook Univ.
Human-AI Interaction Lab *Fall. 2024 - Spring. 2025*
ClearFlow is a high-performance soft keyboard layout designed for accurate and fast glide typing. We developed FlowGames Apps for both iOS and Android using Unity. This app has mobile games for learning ClearFlow and will be released soon.
- **Gesture Typing for Low Vision People** CS Dept. in Stony Brook Univ.
Doctoral Advisor: Xiaojun Bi & I.V. Ramakrishnan *Spring 2021 - Spring 2023*
Although gesture typing is now available on major touchscreen keyboards and has gained wide adoption among smartphone users, it poorly supports people with low vision. In this project, I designed and developed two keyboard prototypes to enable gesture typing for people with low vision. Furthermore, I proposed a kinematics-based decoding algorithm to accommodate the typing behavior of people with low vision. This work was published in UIST 2024.

- **Computer Science Department, Stony Brook University** NY, USA
Supervised by: Fusheng Wang & Tim Duong Aug. 2019 - Aug.2020
 Worked on deep learning for medical image analysis. Advanced CNN models are adopted and optimized to deal with image datasets. Main Work involves progression analysis for Alzheimer's Disease patients, survival analysis for brain tumor patients, Iron content classification inside organs, and analysis of chest X-rays for COVID-19.
- **Real Time Air Quality Monitoring and Prediction** CS Dept. in SUNY Korea
Supervised by Professor Simon S. Woo Sep. 2018 - Jan.2019
 This proposed research concentrates on modeling the air quality pattern in a given space by adopting both static and mobile sensors which are placed on vehicles patrolling around. A full picture of how the air quality varies in nearby regions is visualized. This work was published in IEEE Access 2020.
- **Large-scale Financial Text Data Visualization** Chinese Academy of Sciences, China
Research Intern Sep. 2017- Mar. 2018
 Worked on large-scale financial text data visualization based on Deep Learning. I optimized the neuron network structure and training algorithms, then designed a visualization system that can bridge the deep learning models with the end users in the application of large-scale financial data analysis.
- **Personalized Augmentations of Data Visualizations** CS Dept. in SUNY Korea
Advised by Professor Klaus Mueller Jan. 2016- Aug. 2016
 We designed a framework that empowers people to view personal, private, or classified data through a casual head-mounted augmented reality device such as Google Glass. This work was presented in the poster session of IEEE Visualization 2016.

Publication and Presentations

1. **Dan Zhang**, Yan Ma, Glenn Dausch, William H Seiple, Xianfeng Gu, IV Ramakrishnan, and Xiaojun Bi. *Intelligent Braille Keyboard on Smartphones*. (In Submission).
2. Yan Ma, **Dan Zhang**, IV Ramakrishnan, and Xiaojun Bi. *LLM Powered Flexible Typing on Smartphones*, In Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI 2025).
3. **Dan Zhang**, Zhi Li, Vikas Ashok, William H Seiple, IV Ramakrishnan, and Xiaojun Bi. *Accessible gesture typing on smartphones for people with low vision*, Proceedings of the 37th Annual ACM Symposium on User Interface Software and Technology (UIST 2024), Pittsburgh, PA, USA, Oct. 2024.
4. **Dan Zhang**, and Simon S. Woo. *Real Time Localized Air Quality Monitoring and Prediction Through Mobile and Fixed IoT Sensing Network*, IEEE Access (2020): 89584-89594.
5. **Dan Zhang** and Simon S. Woo, *Poster: Predicting Air Quality using Moving Sensors*, In The 17th ACM international Conference on Mobile Systems, Applications and Services (MobiSys 2019).
6. **Dan Zhang**, Darius Coelho and Klaus Mueller, *Google Glass for Personalized Augmentations of Data Visualizations*, IEEE Visualization Conference (Poster), 2016.
7. Shenghui Cheng, Yue Wang, **Dan Zhang**, Zhifang Jiang and Klaus Mueller, *StreamVisND: Visualizing Relationships in Streaming Multivariate Data*, IEEE Visualization Conference(VAST 2015 Honorable Mention Poster).
8. Kui Fu, **Dan Zhang**, Peng Tang, Zhongliang Tang, Wei He, *Adaptive Extended Kalman Filter for a Red Shift Navigation System*, The 34th Chinese Control Conference (CCC), 2015.
9. **Dan Zhang**, Kui Fu, Shuzhi Sam Ge, Zhong-Liang Tang, Wei He, *Analysis of Filtering Methods for the SINS/CNS Integrated Navigation System of Missile Motion*, Proceeding of the 11th World Congress on Intelligent Control and Automation (WCICA), 2014.

Skills

1. **Domains:** Full Stack Software Development, Mobile Development, Machine Learning, Deep Learning, Large Language Model, Visualization
2. **Programming:** Python, Java, Javascript, C#, C, C++
3. **Frameworks:** PyTorch, Keras, Hugging Face
4. **Tools:** Visual Studio Code, Android Studio, Unity, Pycharm, Git, R Studio, Matlab, Latex

Honors and Awards

- Annual Research Fellowship (ICTCCP) for three years, SUNY Korea (2014-2017)
- Third-class of People fellowship (Top 30%), University of Electronic Science and Technology of China (Sep. 2011)
- Freshmen Scholarship (Top 3%), University of Electronic Science and Technology of China (Sep. 2010)