Jinda Zhang

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OBJECTIVE

I am an experienced software engineer with 7 years of coding expertise and 3 years of Research and Development experience. My Interest focuses on developing assistive technologies that provide adaptive support, balanced proactivity, and transparent design to enhance trust by making system actions explainable and understandable.

SKILLS

Python, Java, C++(OpenCV), R, Web Development (JavaScript, TypeScript, Node.js, Express.js, React, React Native, Redux), MongoDB, SQL, Android, Google Cloud Platform, AWS, Git, Unix, Linux, Bash, Docker, Distributed Systems, Speech Processing, Natural Language Processing, Computer Vision, Statistics, Generative AI, Testing

PROJECTS

- **Voice Collector**
  Tools: Flask, React.js, Docker, AWS S3 [O]
  ◦ Developed robust **Speech Recognition** and Voice Conversion tool, utilizing **Flask** and **React.js**, to capture valuable audio data from users with unique speech patterns, promoting accessibility and inclusivity in speech technology.
  ◦ **Containerized** backend functionalities using Docker, orchestrated with **Docker** Compose for easy deployment and management, incorporated **Minio** for secure storage of audio recordings with **AWS S3** compatibility.

- **ELLMA - Embodied AI Agent in VR**
  Tools: Flask, React, Virtual Reality, API [O]
  ◦ Developed and integrated a memory system using **MongoDB** for AI avatar interaction storage and retrieval. Utilized **OpenAI's Whisper** and **Text-to-Speech APIs** for auditory comprehension and verbal communication.
  ◦ Implemented **CV** and **OCR** technologies to enable observational skills in AI avatars. Employed **prompt engineering** and **RAG** with **ChatGPT** and integrated **auto-correct models** and **voice detection** to enhance system performance and user engagement.

- **Speak Ease (Native App)**
  Tools: React Native, WebRTC, SQLite, react-native-voice [O]
  ◦ Developed a **React Native** application, **SpeakEasy**, focused on improving voice-related functionalities for users.
  ◦ Integrated **voice recording** features using **react-native-voice** and worked on UI like dropdown menus and task bars. Utilized **WebRTC** and **SQLite** to enhance app performance, managing real-time communication and storage.

Side Projects: Financial Analyzer (NLP, OCR), Firelook (Android), Around (GoLang, ElasticSearch), Ticket (Java, EC2, MySQL), Titan (MapReduce, MongoDB), Shiny-Instagram (Java), Sparking-Memos (Java), HairSalon (JS)

RESEARCH AND INDUSTRIAL EXPERIENCE

- **Software Engineer Intern**   *24 - Present*
  One Community Global
  ◦ Designed and developed key UI elements for the BM dashboard, including navigation, project details, and comprehensive tracking pages using **React.js** and **Node**, enhancing user experience and optimizing performance.
  ◦ Developed and executed unit tests for key components using **Jest**, reviewed and managed **pull requests**

- **Freelance Software Engineer**   *SU 22*
  UDEVU
  ◦ Designed and developed engaging 3D web applications using **Three.JS** for client: Josh Struve (Udevu.dev).
  ◦ Provided consultative support on **search engine optimization**, optimizing web presence for better visibility.

- **Software Engineer Intern**   *SP 22*
  RoarPanda
  ◦ Developed research tools and algorithms in **Python** to analyze 30,000 malware software gene samples.
  ◦ Utilized **Python** and **Django** to analyze and display results of malware software genes and collaborated with the research team to test and debug antivirus software modules for improved user experience.

- **Research Development Intern**   *Oct 23 - Present*
  SLangLab, Manager: Prof. Aanchan Mohan
  ◦ Conducted research on Unified-Modal Speech-Text Models and developed robust Speech Recognition and Voice Conversion tools, using **Flask**, **React.js**, **Docker**, and S3, promoting accessibility for users with atypical speech.
  ◦ Designed and implemented error correction algorithms using BART **LLM**, **G2P** frameworks, and fine-tuned Wav2Vec for transcribing atyAdvisorcal speech, integrating a phoneme n-gram language model with CTCDecoder for improved accuracy in ASR.

- ○ Designed a novel **multimodal LLM** architecture for augmentative communication, integrating phoneme information into existing MLLMs to support individuals with impaired speech, leveraging **Linux HPC** Clusters.

- • **Research Development Intern** *Nov 24 - Present*
  MOD Squad Lab, Advisor: Prof. Yvonne Coady, University of Victoria
  - ○ **BC Museum Library Data Integration**: Curated data sources to create QA pairs, fine-tune LLM models, and utilize **RAG** to ensure accurate, non-hallucinated responses from integrated museum resources.
  - ○ **Conversational AI**: Developed a factual QA system with generated voice capabilities, leveraging **LLM** and **RAG** to deliver reliable and engaging user interactions.

- • **Research Development Intern** *Jan 24 - Apr 24*
  Human-AI Collaboration Lab, Advisor: Prof. Mirjana Prpa
  - ○ Conducted research on integrating **LLMs** for AI avatars in **virtual reality**, designing a memory system in **MongoDB** to store interactions and improve user experience through voice detection, and expressive behaviors.
  - ○ Developed **RAG** algorithms and applied **prompt engineering** for context-aware AI avatar responses, integrating Vision, OCR, and Deepgram **API** for enhanced functionality.

- • **Research Intern** *Jan 24 - Apr 24*
  Khouy College of CS (Collaborate with Spexi)
  - ○ Integrated **RPAS** and **Computer Vision** to manage Canada's natural resources, focusing on forests by designing and implementing a sliding window technique to process large georeferenced maps.
  - ○ Applied object detection models for tree type identification and used SORT model variations like **YOLO**, **DETR**.

- • **Mentor, Research Capstone** *Jan 24 - Dec 24*
  Research Mentor
  - ○ **Led** a team of 40 student researchers and 8 ML **research** groups, worked as a project lead, conducted weekly research check-in meetings, revised research papers, and provided weekly research agendas and feedback.

EDUCATION

- • **Northeastern University** *Jan 2023 - Aug 2024*
  Master in Computing Vancouver, Canada

AWARDS

UVic Research Fellowship (Top 10%), **Khoury SEED Grant** (FA24, $10k$), **Research Assistant** (SU24, $10k$), **Teaching Assistant** (SU24, $5k$), **West Coast Research Grant** (SP24, $10k$), **Khoury Research Apprenticeship** (SP24, $6k$, **Top 1%**), **Research Assistant** (23, $5k$), **Teaching Assistant** (23, $5k$), **Teaching Assistant** (19)

PATENTS AND PUBLICATIONS $\quad$ C=Conference, J=Journal, P=Patent, S=In Submission, T=Thesis

[C.1] H Wan, **J Zhang**, AA Suria, B Yao, D Wang, Y Coady, M Prpa (2024). **Building LLM-based AI Agents in Social Virtual Reality**. In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI LBW '24)*

[C.2] M Hui, **J Zhang**, A Mohan (2024). **Enhancing AAC Software for Dysarthric Speakers in e-Health Settings: An Evaluation Using TORGO**. Manuscript submitted for publication.

[C.3] **J Zhang** (2024). **Enhancing Tree Type Detection in Forest Fire Risk Assessment: Multi-Stage Approach and Colour Encoding with Forest Fire Risk Evaluation Framework for UAV Imagery**. *arXiv Preprint*, arXiv:2407.19184.

[C.4] H Wan, **J Zhang**, AA Suria, B Yao, D Wang, Y Coady, M Prpa (2024). **ELLMA: LLM-Powered Conversational AI Chat Agents in VRChat with Social Intelligence**. Manuscript submitted for publication.

[P.1] **J Zhang**, A Mohan (2024). INV-24058: **Error-correction methods for correction of text transcriptions derived from atypical speech**. Patent submitted.

OUTREACH

Inside the Spring 2024 Khoury Research Apprenticeship Showcase $\quad$ June 24
Northeastern University Researchers Present Research Findings, Receive Honors at ACM CHI $\quad$ May 24