

JIATAN(JULIA) HUANG

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Education

University of Minnesota, Twin Cities

Sept 2021 - May 2024

Bachelor of Science in Computer Science; GPA: 3.84/4.00

Minneapolis, MN

Awards: Dean's list, CSE Alumni Society Scholarship

Courses: Operating Systems, Machine Architecture and Organization, Algorithms and Data Structures, Artificial Intelligence, Machine Learning, Program design and development, Databases, Discrete Structure, Applied Linear Algebra, UI/Web design

Research Interest

My research focuses on advancing **Natural Language Processing** in biomedical and clinical domains. I'm particularly interested in developing innovative NLP models for complex **question answering** and **information extraction**, emphasizing weakly supervised and zero-shot learning approaches. My work also explores the integration of **large language models** with knowledge graphs, aiming to enhance **retrieval-augmented generation** and inference in healthcare applications. Through this research, I strive to contribute to AI-driven solutions that can significantly impact patient care and medical decision-making.

Publications

- [1] **Jiatan Huang**, Mingchen Li, Zonghai Yao, Zhichao Yang, Yongkang Xiao, Feiyun Ouyang, Xiaohan Li, Shuo Han, Hong Yu. RiTeK: A Dataset for Large Language Models Complex Reasoning over Textual Knowledge Graphs, 2024. [PDF] (Under review by NAACL 2025)
- [2] Mingchen Li, **Jiatan Huang**, Jeremy Yeung, Anne Blaes, Steven Johnson, Hongfang Liu, Hua Xu, Rui Zhang. CancerLLM: A Large Language Model in Cancer Domain, 2024. [PDF] (Under Review)
- [3] Mingchen Li, Zaifu Zhan, Han Yang, Yongkang Xiao, **Jiatan Huang**, Rui Zhang. Benchmarking Retrieval Augmented Large Language Models in Biomedical NLP: Application, Robustness, and Self-Awareness, 2024. [PDF] (Under review by Science Advances)

Research Experience

University of Massachusetts, Amherst

Aug 2024 - Now

Research Assistant (Supervisor: Hong Yu)

Amherst, MA

- **Question Answering over Textual Biomedical Knowledge Graphs**
 - * We proposed an innovative Monte Carlo Tree Search (MCTS) retrieval method to enhance retrieval-augmented generation (RAG) for question-answering tasks in biomedical textual knowledge graphs.
 - * Developed two new biomedical textual knowledge graph question-answering datasets that encompass a broader range of question types in the medical domain, and conducted benchmarking of several large language models and RAG methods.

University of Minnesota, Twin Cities

Dec 2023 - Aug 2024

Undergraduate Research Assistant

Minneapolis, MN

- **Retrieval-Augmented Generation (RAG) in Biomedical Applications**
 - * Evaluated diverse retrieval methods across multiple biomedical tasks, including triple extraction, link prediction, classification, question answering, and natural language inference.
 - * Designed and implemented a robust evaluation framework to systematically assess model performance in areas such as unlabeled robustness, counterfactual robustness, diverse knowledge handling, and self-awareness.
 - * Enhanced biomedical NLP models' performance by conducting comparative experiments, validating the effectiveness of retrieval-augmented large language models (RALs) in addressing real-world challenges like hallucinations and misinformation in medical data.
- **Large Language Model in Cancer Domain**
 - * We developed CancerLLM, a 7-b parameter Mistral-style model specifically tailored for the cancer domain, trained on over 3 million clinical notes and pathology reports across 17 cancer types.
 - * Achieved state-of-the-art results, improving average F1 score by 8.1% compared to existing medical LLMs in tasks like cancer phenotype extraction, diagnosis generation, and treatment planning.
 - * Enhanced model efficiency by designing a smaller, computationally accessible LLM for healthcare systems, while outperforming other models in robustness testbeds for cancer-related AI applications.

Work Experience

University of Minnesota, Twin Cities

Jan 2024 - May 2024

Teaching Assistant

Minneapolis, MN

- Assisted in the instruction of a **Java** Programming course, focusing on **data structures** and **algorithms**.
- Facilitated hands-on learning experiences for over **60 students** and provided personalized tutoring sessions for struggling students.
- Implemented innovative coding workshops, enhancing students' problem-solving skills and leading to a 15% increase in average exam scores

Student Tech Support

- Contributed to the enhancement of MyStrengths MyHealth™ (MSMH), a comprehensive, strengths-based mobile application designed to empower individuals, families, and communities.
- Redesigned patient-facing UI, creating an accessibility-focused assessment system that increased user engagement.
- Integrated advanced **data visualization** for physician portal.

AtriCure, Inc.

May 2023 - Dec 2023

Software Engineer Co-Op

Minnetonka, MN

- Crafted dynamic surgical interfaces using HTML, CSS, and JavaScript, elevating user experience and data precision.
- Established a real-time data pipeline via CAN bus and SQL. Utilized Chart.js and Node.js for immediate graphical data representation, offering both logarithmic and linear displays.
- Optimized multi-page transitions and interactions using Python Flask, enhancing MAG system's responsiveness.
- Integrated diverse font libraries to flawlessly support scripts like Chinese, Japanese, and Korean, ensuring optimal display accuracy.

Projects

Budget Tracker - Web/Mobile Application | React, MongoDB, Tailwind CSS, Azure

Mar 2024 - May 2024

- Engineered an **AI-powered** finance management web app featuring receipt scanning with computer vision, custom budgeting, and advanced spending analysis.
- Implemented a responsive mobile interface and **progressive web app** architecture, enabling cross-platform accessibility and offline functionality.
- Integrated advanced data visualization using **amCharts** and developed a machine learning-based transaction categorization system, providing users with intuitive insights and automating expense organization with 95% accuracy.

EventFinder - Web Application | Flask, PostgreSQL, JavaScript, CSS, Azure

Jan 2024 - Mar 2024

- Empowered users to create/publish personalized events, fostering community engagement and enhancing overall event experience.
- Integrated **Auth0**, **PostgreSQL**, **Google Maps API**, and **Google Calendar API** for secure authentication, robust data storage, intuitive location mapping, and seamless calendar integration.
- Implemented intelligent **search/filtering** and dynamic content display, boosting user satisfaction through personalized event discovery and real-time updates.

Drone Simulation System | C++, Git, Docker, Agile, HTML/CSS, JSON, Scrum, Doxygen

Feb 2023 - Apr 2023

- Led a 4-member team to design a **C++** drone simulation system, achieving efficient robot pickups, shorter navigation routes, and real-time movement visualization.
- Implemented effective development processes, including **version control**, **code reviews**, **project management**, **documentation**, and **software testing**, ensuring a streamlined and high-quality development workflow for the Drone Simulation System project.

Spring Boot Microservices for E-Commerce Platform | Spring Boot, Spring Cloud, Kafka, Kubernetes

Nov 2022

- Developed a microservices-based e-commerce platform using **Spring Boot**, focusing on modular services for product listings, order processing, notifications, and inventory management.
- Engineered a resilient system architecture integrating **Netflix Eureka** for service discovery, **Spring Cloud Gateway** for **API management**, and **Keycloak** for secure authentication.
- Implemented **Kafka** for event-driven architecture and ensured service reliability with circuit breaker patterns. Deployed the application on **Kubernetes** for scalability.

Technical Skills

Languages: Python, C, C++, JavaScript, SQL, Rust, Java, R, HTML, CSS, Ocaml

Frameworks: TensorFlow, Pytorch, Transformers, Pandas, Node.js, React, Express, Angular, Spring Boot, Django, Flask, Bootstrap

Developer Tools: GitHub, Linux, Docker, Git, AWS, Microsoft Azure, SSH, MongoDB, JSON, VS Code, IntelliJ, PyCharm, Agile, Doxygen, Scrum, JIRA, Postman