Weiyue(Larry) Li

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EDUCATION

University of California San Diego Jun 2020 - Mar 2024
B.S. in **Data Science** (4.0), B.S. in **Applied Mathematics** (4.0), and B.A. in **Economics** (3.97).
Cumulative GPA: 3.98/4.0.

RESEARCH EXPERIENCE

mlPC Lab at UCSD - Research Intern Apr 2023 - Present
Advisors: Professor Zhuowen Tu and Dr. Yifan Xu.
Project: **BLIVA: A Simple Multimodal LLM for Better Handling of Text-Rich Visual Questions**

- Conducted research on a simple multimodal LLM aimed at improving the processing of text-rich visual questions. Currently under review for AAAI 2024.
- Our model, BLIVA, showcased a significant enhancement in performance across text-rich Visual Question Answering (VQA) benchmarks (up to 17.76% in OCR-VQA task) and standard VQA benchmarks (up to 7.9% in Visual Spatial Reasoning task), compared to previous methodologies.
- Spearheaded the creation of a new VQA dataset featuring YouTube thumbnails, comprising 500 question-answer pairs across 13+ diverse categories, demonstrating the extensive industry applications enabled by BLIVA.

Project: **LLM Science Exam Kaggle Competition**

- Aimed to use small LLMs (less than 10B parameters) to answer difficult multiple-choice scientific questions generated by LLMs with 175B parameters.
- Explored and designed different tricks for context retrieval algorithms. Finetuned different LLMs and LMs, studied the current ability of language models on multiple-choice questions, and proposed solutions for future improvements.

Ongoing Project: **LLM Agent and Decision-Making**

- Proposed initial solutions to improving the LLM's decision-making capabilities and integrating these capabilities into the traditional decision frameworks of the LLM Agent allow for enhanced performance in decision-making scenarios.

TEACHING EXPERIENCE

University of California San Diego - Undergraduate Teaching Assistant Jan 2021 - Present
Mentors: Suraj Rampure, Marina Langlois, Tauhidur Rahman, Truong Son Hy, etc (19 teaching faculties in total).

- Served as an undergraduate teaching assistant 18 times across courses in computer science, data science, mathematics, and economics, covering a broad spectrum of topics from basic calculus and programming to advanced machine learning and probabilistic models.
- Assisted over 3,000 students in their academic journey and offered 800+ office hours to provide tailored assistance. In some data science, mathematics, and economics courses, conducted discussion sessions for over 1000 students. Received 100% recommendation rate for clarity and support in CS and DS courses from both students and instructors.
- Created interactive assignments, exams, and course websites, enhancing learning engagement and student performance. Developed Docker-based autograders in Python, Java, and Stata for fair and efficient assessment, designing graph-based models to uphold academic integrity during remote exams.
- Suggested and implemented effective course policies addressing diversity inclusion and ethical implications of generative AI, leading to an improved educational experience and better learning outcomes.

PUBLICATION

Wenbo Hu*, Yifan Xu*, Yi Li, **Weiyue Li**, Zeyuan Chen, Zhuowen Tu, "BLIVA: A Simple Multimodal LLM for Better Handling of Text-Rich Visual Questions," under review for AAAI 2024.

WORK EXPERIENCE

Qualcomm Institute - Data Science Intern Sep 2022 - Present

- Designed and implemented a neural network architecture to automate spike detection in Magnetoencephalography (MEG) scans, slashing manual detection time from over 10 hours to under an hour. Early results boast over 90% accuracy, significantly accelerating the diagnostic process.
- Engineered a neural network model to enhance the diagnostic speed and precision for PTSD and traumatic brain injury using ECG signals, facilitating earlier interventions and better patient outcomes. Achieved a 70% accuracy rate in distinguishing these conditions from normal signals, providing invaluable insights to medical professionals.
- Collaborated with researchers at Harvard Health and MIT as a dedicated data wrangler for a dementia study initiative. Created an interactive dashboard to showcase statistically significant findings, equipping physicians with data-driven insights for more informed decision-making.

Intel Corporation & Halıcıoğlu Data Science Institute - Student Researcher Jan 2023 - Sep 2023
Intel Advisors: Dr. Moh Haghighat and Dr. Bijan Arbab; HDSI Advisors: Professor Rayan Saab and Professor Jingbo Shang.

- Performed exploratory data analysis on Intel's Device Charging Analytics (DCA) database alongside a two-member team. Utilized the Mann-Whitney U test to scrutinize significant differences in charging duration based on factors like user devices, charging methods, and screen sizes.
- Developed a transformer-based neural network architecture and deployed a linear predictive model to gauge power consumption across diverse web application categories. Innovated two improvement techniques, successfully reducing the Relative Squared Error (a custom loss function) on the linear model from 0.953 to 0.407, marking a 57% enhancement.
- Delved into an in-depth analysis of linear model coefficients for each website category, providing insights that aided in optimizing chip and hardware designs for Intel's research team.
- Assisted Intel's data department in rigorous data validation of the DCA database, utilizing probability models such as Markov chains for data modeling, successfully detecting 5 labeling errors within the database, ensuring data quality and accuracy.

SKILLS, TOOLS & CERTIFICATION

- **Programming:** Python(Numpy, sklearn, Pandas, SciPy, nltk), PyTorch, Shell, LaTeX, Java, R, SQL, HTML, JavaScript, C++, Stata, MATLAB
- **Tools:** Git, AWS, Databricks, OpenAI, BigQuery, Tableau,
- **Certifications:** Google Data Analytics Professional Certificate