Zaid Bulbul

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Education

University of Louisville
M.S, Computer Science — May 2026
B.S, Neuroscience & Neural networks — December 2024

Skills

- Python, SQL, R, C++, C#, TypeScript, JavaScript, CSS3/HTML5
- Data Mining, Pandas, NumPy, Data Analytics, RStudio, Jupyter, GCP, AWS, Data Modeling, Power BI, Tableau, Flask, Machine Learning, Artificial Intelligence, LLMs, Next.js/React, Excel, Oracle, Vercel, Cloudflare, Web Scraping, Playwright, MySQL, PostgreSQL
- PyTorch, Scikit-learn (Applied ML, Predictive Models, NLP & Vision)

Experience

Data Operations Analyst — Louisville, KY
Norton Research Institute — Nov 2024 - Present
- Designed and implemented automated ETL workflows that improved data integrity and reduced manual handling.
- Leveraged PowerBi and query programming to boost data accessibility and visualization, enabling faster, data-driven decision-making. Utilized SQL and M
- Automated comprehensive dataset reviews and record verification in the Clinical Trials Management System, minimizing errors and ensuring secure, accurate, and up-to-date information.

Software Engineer Fellow — Louisville, KY
Headstarter Ai — May 2024 – Aug 2024
- Collaborated with a team of experienced FAANG engineers and students in a competitive fellowship program, leading the designing and development of seven user-friendly projects over a 7-week period.
- Contributed to full stack development, implementing efficient python backends across projects to deliver responsive, intuitive user experiences, overall improving user satisfaction for the customers using our apps.
- Developed and deployed a highly efficient, user-friendly Medical Chatbot using React and OpenAI integrations, which allowed for quick and accurate substance interaction information relayed in natural language.

Projects

Project OpenEye – Geolocation Framework with Street View & Deep Learning – 1st Place @ HackKentucky — Feb 2025
- Engineered an end-to-end geolocation pipeline that automates image ingestion from open-source databases (≈20k images, 2.5k data points over 1.21 km²) and developed a custom PyTorch regression model with an equirectangular distance loss for campus-scale latitude/longitude prediction (accuracy within ~5–25 m). [Current research lags behind]
- Optimized model performance via multi-stage training techniques including partial layer unfreezing, advanced data augmentation, learning rate scheduling, and multi-head attention to reduce overfitting.
- Deployed the model as a Flask microservice integrated with a Next.js frontend to deliver a modern user-friendly interface.

Automated Business Complaint Categorization System through Machine Learning – Hackathon semi-finalist — Aug 2024
- Developed an AI-integrated analysis system that categorizes multimodal inputs (text, voice, image, video) into specific sub-categories, identifies whether they are complaints, and automatically retrieves similar past complaints to generate summaries and potential solutions.
- Leveraged advanced NLP techniques, a Retrieval-Augmented Generation (RAG) pipeline, and vector databases to process and categorize extensive user data, enhancing customer service efficiency significantly.
- Utilized Python and associated libraries in developing machine learning models to categorize multimodal inputs and predict complaint categories with high accuracy.

Drug Interaction Medical Chatbot — Jul 2024
- Deployed and fine-tuned a Medical AI Chatbot model using a tuned model based on llama 3.1 to analyze drug inputs and deliver accurate responses checked against a database of substance interactions via a RAG pipeline in natural language.
- Managed deployment on an AWS EC2 instance with MySQL backend, offering a scalable and secure environment, while optimizing model performance for efficient data processing and interaction.

Leadership

YM Midwest – Nonprofit — Louisville, KY
VP & Financial, Merch lead — Jan 2021 - Present
• Established and lead a merchandise division, coordinating manufacturing and distribution of products both locally and nationally generating a new source of income with an ROI at nearly 50%.
• Increased year-over-year budget 40-fold by establishing new revenue streams, including fundraising, opening doors for a plethora of higher budget events, including low-cost travel trips for participants.
• Lead a group of 8 board members, structuring meetings and improving efficiency saving an average of ~30 min per session.