Anna Sims

tesims@umich.edu | www.meetinganna.com

EDUCATION

University of Michigan — **Ann Arbor, MI**
Bachelor of Engineering in Data Science, Minor in Business — May 2025
Coursework: Data Structures & Algorithms, Probability & Statistics for Engineers, Machine Learning, Numerical Analysis, Integrated Product Development

SKILLS

Languages: C++, Python, R, SQL (SQLite, PostgreSQL), UNIX
Big Data: Pandas, NumPy, SciPy, Apache Kafka, Spark, Airflow
ML & AI: TensorFlow, PyTorch, HF Transformers, vLLM, Whisper, Tacotron2
Cloud & DevOps: AWS, Runpod, Model Deployment (Flask, Docker)

WORK EXPERIENCE

ByteDance — **San Jose, CA**
Innovator Fellow — *May 2024 - Present*
- Led the deployment of a cutting-edge multimodal data masking system, capable of processing text, images, audio, and video for comprehensive PII identification and replacement.
- Optimized video processing performance via parallel processing and distributed computing using the Babit Multimedia Framework
- Deployed a self-hosted, fine-tuned open-source LLM onto the cloud
- Integrated advanced computer vision algorithms to improve accuracy in facial recognition and object detection within video frames by 25%.
- Implemented sophisticated audio processing techniques, including voice modulation and speech synthesis, to enhance audio PII masking.
- Developed customizable PII detection and replacement rules, allowing end-users to define specific PII types for enhanced data privacy.
- Engineered secure data handling protocols to align with GDPR and CCPA standards, ensuring compliance in global data protection.
- Launched the full-stack web application and API into production

Emerging Technologies Group — **Ann Arbor, MI**
XR Developer and Lab Manager — Oct. 2022 - Present
- Trained and mentored two new hires, significantly boosting lab productivity and accommodating a surge in demand for XR resources.
- Taught faculty and PhD students to leverage Motion Capture technology, resulting in higher-quality research data and substantial time savings.
- Managed and maintained the lab's XR systems and equipment, implementing troubleshooting measures that reduced technical issues
- Collaborated with interdisciplinary teams across academic departments to conceptualize, design, and deploy VR games and simulations
- Developed and implemented best practices for XR project development, including planning, execution, and evaluation
- Contributed to positioning the lab as a national leader in academic XR technology by hosting educators from universities across the country

Strategic Reasoining Group — **Ann Arbor, MI**
Research Assistant — *June 2022 - Aug 2022*
- Redesigned and modernized a trading market simulator used to test trading strategies, transitioning it from Java to Python. This update improved the efficiency and functionality of the simulator, allowing for more accurate testing and analysis.

Digital Currency Group — **New York, NY**
Quantitative Trading Intern — *June 2022 - Aug 2022*
- Identified a solution framework to achieve lower latency in the trading system architecture by addressing hybrid-cloud connectivity requirements
- Built three parameter estimation models: MoM and MLE fitted to a variance-gamma distribution, and a Bayesian parameter estimation model
- Remodeled Bühler's Deep Hedging framework using Imaki's no-transaction band network to identify optimal hedging strategies in incomplete markets using neural network architecture
- Built a gamma volatility backtesting model using the Ornstein-Uhlenbeck model under risk neutral measures to capture realized volatility and Heston (adjusted to Girsanov's theorem), Variance-Gamma, and Ornstein-Uhlenbeck process simulations to predict future volatility
- Optimized portfolio performance by comparing the four different models using Sharpe's ratio

Nexamp — **Boston, MA**
Design Engineer Intern — *Jan 2021 - June 2021*
- Created and optimized conceptual design layouts and schematics for grid-tied photovoltaic power plants and battery storage systems
- Designed 36 AC and DC electrical single-line diagrams for solar power plants using AutoCAD
- Performed medium voltage design work in support of utility interconnection and permitting application processes

ASSET Lab — **Ann Arbor, MI**
Research Assistant — *June 2020 - Feb 2022*
- Analyzed large emissions datasets. Built emission comparison models to compare performance of diesel and solar powered motorcycles.
- Co-authored academic publication "Emissions impacts of electrifying motorcycle taxis in Kampala, Uganda"

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University of Michigan **Ann Arbor, MI**
Instructional Aide *June 2022 - Aug 2022*
- Taught weekly workshops and tutoring sessions for a calculus-based undergraduate course

University of Michigan, Department of Astronomy **Ann Arbor, MI**
Research Assistant *Sept 2017 - Apr 2018*
- Engineered a computational model using Python and VPython to process and analyze large-scale datasets for exoplanet property prediction
- Collaborated with faculty and graduate students to refine the model, resulting in more accurate predictions of exoplanet characteristics

LEADERSHIP EXPERIENCE

National Society of Black Engineers
- ***President*** - Oversaw the professional development of over 120 engineers and led 9 executive board members, ensuring the collective goals of the board were achieved. Resulted in our chapter being selected as the best in the region
- ***Finance Chair*** - Established 21 strategic partnerships with Fortune 500 companies, generating $63k in annual revenue and creating employment opportunities for chapter members

B3
- ***President, Co-founder*** - Coordinated campus-wide career programs, bringing over 40 local high school students from underrepresented communities to the university to learn about academic majors and resources

optiMize
- ***Core Team Member*** - Co-organized the annual Social Innovation Challenge, managing logistics for over 200 participating teams and coordinating with 50+ mentors and judges. Led a diversity recruitment initiative that increased participation from underrepresented groups by 40% in the Social Innovation Challenge

PROJECTS

AI Party DJ | HackMIT*, In-progress*
- Developed an AI party DJ system that uses computer vision and sentiment analysis to curate personalized playlists and optimize party atmosphere
- Implemented a Progressive Web App (PWA) frontend using HTML, CSS, JavaScript, and Tailwind CSS, ensuring a responsive and user-friendly interface for both hosts and guests
- Created a backend using Flask, integrating with Spotify API for music data and playlist management
- Designed a real-time video processing system using BMF framework and WebSocket streaming from ESP32 cameras for crowd analysis
- Trained a custom YOLOv9 model for crowd density detection and tracking, incorporating deep sort for object tracking to analyze crowd movements
- Developed machine learning models for body language and facial expression analysis, enhancing the system's ability to gauge crowd sentiment
- Engineered a music recommendation system that adjusts playlists based on real-time crowd sentiment analysis and host-defined atmosphere goals

Context Preserving Data Mask | Google x MHacks AI Hackathon, *4th Place Winner*
- Developed a data anonymization solution using self-hosted hosted language model, Gemma, to identify and replace sensitive personal information while preserving context and analytical value in text
- Implemented a two-stage AI processing pipeline using Minstrel AI for contextual analysis and Gemini for synonym generation, ensuring culturally and contextually appropriate data masking
- Utilized Django framework for backend development, integrating various AI tools including Langchain, LlamaIndex, and VertexAI to create a scalable application
- Incorporated NLTK (Natural Language Toolkit) and Presidio for enhanced natural language processing and PII detection capabilities

AI Memory Companion for Elderly | HackHarvard*, Best First-time Hack Award*
- Developed a platform to combat loneliness and support dementia patients using Next.js for the main application and Angular for the caregiver interface.
- Implemented AI-driven conversation capabilities using OpenAI and Langchain.js, enabling lifelike interactions with personalized AI companions through web browsers, SMS, and voice calls
- Integrated Twilio for text and call functionalities, enhancing user accessibility and engagement for seniors preferring traditional communication methods
- Utilized Pinecone for vector database management and Upstash for conversation history storage, enabling AI companions to learn and improve with each interaction
- Incorporated voice cloning technology using ElevenLabs, creating more realistic and personalized AI interactions for users
- Implemented user authentication and data management using Clerk and Firebase, ensuring secure access and efficient data handling
- Leveraged cloud technologies including Firebase and Ngrok for deployment, ensuring reliable and scalable service delivery

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Real-time Alerts for New Research Papers | PennApps, *Wolfram Award*

- Developed a digital platform to streamline research processes for commercial and academic researchers using Flutter for the user interface and Python with Django for the backend API.
- Implemented real-time web monitoring for new research articles using Metaphor's API, enabling instant notifications to users based on their specific research interests.
- Integrated Twilio for efficient notification dispatch, enhancing user engagement and reducing time spent on manual searches.
- Utilized PostgreSQL and Firebase for robust database management, handling complex data structures to support tailored content delivery.
- Applied technologies including Django, Firebase, Flutter, Metaphor API, PostgreSQL, Python, SQL, and Twilio to create a comprehensive tool for researchers

AWARDS AND RECOGNITION

LocalHost Fellow, *Present*
Willie Hobbs Moore: Aspire - Advance, Achieve, *2019*
MLK Student Spirit Award, *2019*
Founder University, *2023*
Leadership Engagement Scholar, *2019*