JOACHIM ASARE

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Portfolio: https://www.joachimasare.com | Github: https://www.github.com/joachimasare

EDUCATION

Harvard University – Cambridge, MA, USA **Aug 2023 - Exp. May 2025**
Master in Design Engineering (MDE), AI/ML Engineering & Human-Centered Design concentration
Honors: Harvard MDE Merit Scholarship, Ghana Presidential Scholar, MIT-Google Product Hackathon 3rd Place Winner
Relevant Coursework: Advanced Data Science II – Deep Learning architectures

Massachusetts Institute of Technology – Cambridge, MA, USA **Sept 2024 - Exp. May 2025**
Cross-registered Graduate Student **Coursework:** TinyML & Efficient Deep Learning, AI, Decision Making & Society Clinical Data Learning & Deployments,

Ashesi University – Berekuso, Ghana **Sep 2016 - May 2020**
Major: BSc. Electrical and Electronic Engineering
Honors: Class of 2020 Valedictorian, Dean's List, Mastercard Foundation Scholar

EXPERIENCE

Graduate Teaching & Research Fellow – Harvard School of Engineering and Applied Sciences **Jan 2024 – Present**
- Facilitating and coaching Machine Learning, Data Engineering and Machine learning projects for graduate students in the 'Collaborative Design Engineering Studio' and 'ES138 - Computing, Spatial Design and Human Values'. class at the Harvard School of Engineering and Applied Sciences.

Machine Learning Engineer - Winter Program – IA Collaborative, Chicago **Dec 2023 – Jan 2024**
- Designed and deployed a generative AI tool for scraping customer insights from Reddit, using Python (Flask) for backend processing and React.js for the frontend, hosted on Microsoft Azure. Implemented and optimized large-scale data processing, handling over 100,000 rows per batch for real-time analysis of online conversations.

Data Science and Machine Learning R&D Engineer – Translight Solar Limited **Aug 2021 - Aug 2023**
- Built LSTM time series machine learning models to analyze energy consumption trends across 100+ building facilities, enhancing analytics and visualization tools that guided solar power system designs.
- Developed and integrated Machine Learning-driven embedded systems for remote control and monitoring of solar power inverters, enhancing customer interaction and increasing conversion rates by 40%.

Software Research Assistant – Ashesi University **Aug 2020 - Jul 2021**
- Researched on and built user autonomous software frameworks for Big Data handling from Internet of Things Systems.
- Created a user web interface for real-time data management, empowering users to control multimodal data collection.

Full Stack Software Engineer – Freelance **Jan 2017 – Aug 2021**
- Built over 40 web applications independently and collaboratively using languages and frameworks such as React.js, Next.js, Node.js, JavaScript, Flask, CSS, SQL and MongoDB. View sample websites at **https://linktr.ee/joachimasare.**

PROJECTS & RESEARCH

Retrieval-Augmented StreamingLLM **Ongoing**
- Working on extending StreamingLLM to overcome limitations in retaining long-term context by integrating it with the Retrieval-Augmented Generation (RAG) framework, such as LlamaIndex to intelligently retrieve and reintroduce evicted tokens into the attention window. Enhances coherence by accessing past database information for context-aware responses.

Investigating LLM-Induced Language Bias in Clinical Decision Support Systems **Ongoing**
- Investigating language bias in clinical decision support LLMs (e.g., mBERT, XML-R) for MedQA in non-English, low-resource languages, using a multilingual medical dataset and metrics like BERTScore and cosine similarity to enhance diagnostic accuracy in multilingual healthcare system.

Interactive Attention Weights Visualization Tool for LLM Models **Project Link**
- Created a debugging LLM tool, by integrating Hugging Face's Transformers library with Flask for enabling researchers to intuitively analyze and refine LLM model behaviors for education and debugging.

Responsible Use of Publicly Scraped Big Data to Train and Fine-Tune LLMs **Project Link**
- Developed a framework to responsibly fine-tune LLMs using publicly scraped Reddit data, implementing data anonymization, bias mitigation, and leakage prevention to ensure privacy, transparency, and fairness in deployment.

AI-Powered Maize Streak Disease (MSD) Control in Farms | Computer Vision, Robotics **Project Link**
- Developed a CNN model on 50,000+ images for early detection of Maize Streak Disease and built an LLM-based robotic interface allowing natural language control of a precision camera system for automated MSD detection..

SKILLS

- **Programming Languages**: Python, C++, R, Flask, React, Node.js, Typescript, HTML, CSS, SQL, MongoDB, MATLAB.
- **Technical Skills**: Deep Learning, Model Pruning & Optimization, LLMOps, Machine Learning, Data Visualization, Web app development, Computer Vision, Data Analysis, Electronics and Circuit Design, AWS, Microsoft Azure App Services.
- **Machine Learning Toolkits:** TensorFlow, PyTorch, LangChain, OpenCV, Scikit-Learn, Hugging Face Transformers, XGBoost