

Sam Clastine Jesumuthu

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ABOUT

I'm an AI engineer with passion for building complete, innovative solutions—from data scraping to deployment. With extensive experience in agentic AI and end-to-end software development, I specialize in fine-tuning large language models (LLMs), Building Agentic AI and engineering machine learning systems that solve real-world problems. Whether it's designing scalable full-stack architectures or integrating advanced AI capabilities into dynamic applications, I thrive on transforming complex challenges into impactful, high-performance products.

WORK EXPERIENCE

Founding Engineer, Kirfu

Jan 2024 - Jan 2025

- Developed the MVP, an admin dashboard, and spearheaded mobile app for android and IOS.
- Developed and deployed NEMO, an innovative AI voice assistant acting as a driver's copilot. Utilizing a multi-agent framework with Langraph and Langsmith, NEMO strategically optimized route planning—enhancing per-delivery efficiency by 2.5% and adding significant value to overall logistics operations.
- Led full-stack development by designing scalable architectures for both front-end and back-end systems.
- Integrated DeepGram's Text-to-Speech and Speech-to-Text APIs to facilitate seamless voice interactions.
- Deployed applications on AWS using EC2 instances managed with Docker Compose, while leveraging AWS Lambda and Cognito for serverless functions and secure authentication.
- Built responsive front-end interfaces using technologies such as Next.js, TypeScript, FastAPI, Node.js, and React Native (Expo), and integrated APIs like OpenAI and Google Maps.

Research Assistant, City University of London

Oct 2023 – Sept 2024

- Conducted extensive literature reviews on state-of-the-art language model applications for data visualization task.
- Spearheaded research on leveraging LLMs to generate Vega-Lite Specification with 100% Valid JSON.
- Implemented Python for data visualizations and experimented various prompt techniques including RAG using LLMs (GPT-4 Turbo, Mistral 7B, Deepseek Coder V2).
- Developed a custom GPT evaluator to score JSON outputs based on subjective criteria, enabling more comprehensive evaluation of generated visualizations.
- Experimented with quantized and non-quantized models to explore trade-offs between performance and accuracy.
- Enforced custom outputs and constraints to better align with desired visualization specifications.
- Utilized libraries like llama-cpp and vllm for faster inference and improved efficiency during model testing.

Software Developer Intern, Halleyx

Feb 2022 - Aug 2022

- Designed UI/UX wireframes to plan application layout and user flows.
- Developed full stack application with NoSQL databases, OpenCV, Tesseract OCR engine, and Vue.js frontend.
- Led core feature development of document text highlight extraction using OpenCV and Tesseract.
- Utilized Agile methodologies, version control (Git), and CI/CD tools to iteratively build, test, and improve the document highlight extractor throughout the project lifecycle.
- Designed and deployed RESTful APIs and microservices for application features, utilizing cloud platforms like AWS for scalability.
- Implemented containerization technologies (Docker) to streamline the deployment process.

PROJECTS

Data visualization (visual information) mediated through language | [LINK](#)

Jul 2023 - Sep 2023

- The main goal of the research is to help user to visualize and analyse datasets through natural language.
- Employed state-of-the-art language models GPT-3.5 and GPT-4 to interpret text prompts and output Vega-Lite JSON specifications for the visualizations.
- Optimized model performance through prompt engineering techniques including zero-shot-CoT, few-shot-CoT, chain-of-thought and baseline prompting.
- Achieved 96% accuracy on the nvUtterances benchmark dataset using GPT-4 with zero-shot prompting, outperforming other techniques.
- Built a custom JSON Comparator evaluation metric based on Jaccard similarity to numerically assess output quality against ground truth.
- Implemented an intuitive frontend UI with Vue.js and Flask that allows users to easily create visualizations powered by the backend large language models.

ESG Sentiment Analytics: Correlating News with Market Trends

Aug 2023

- Integrated a finance news dataset from Hugging Face with corresponding Tesla and Apple stock price data (and related news) over a defined time window, Pre-processed the data using NLTK and spacy.
- Utilized FinBERT-ESG model which is fine-tuned on 2,000 manually annotated ESG reports to classify each news article and generate detailed sentiment scores.
- Constructed a sentiment time series using moving averages and exponential smoothing, then conducted Pearson and Spearman correlation analyses to quantify how ESG-annotated news sentiment scores influence Tesla and Apple stock price movements, with insights visualized via Matplotlib.

Classifying Machine Reading Comprehension using SQUAD | [LINK](#)

Jun 2023 - Aug 2023

- The goal of this study is to predict the passage and the question is answerable or not, this helps MRC models to verify or evaluate the correct answers.
- We had used Logistic regression and state-of-the-art models such as BERT, ROBERTA-Base, and ROBERTA-XLM-Base for feature extraction and training.
- The Best model was ROBERTA with Test Accuracy of 55% and F1 score of 35% for unanswerable questions.

Fake (Deceptive) Review Detection | [LINK](#)

May 2023 - Jul 2023

- Spearheaded an in-depth study on fake review detection by assessing linguistic and structural characteristics of online reviews, using supervised learning algorithms such as Logistic Regression and Random Forest.
- Implemented extensive data preprocessing and feature engineering techniques including tokenization, lemmatization, and TF-IDF vectorization, enhancing the predictive accuracy of the models.
- Developed and refined machine learning models to distinguish deceptive reviews, achieving an accuracy of up to 80%. This involved rigorous testing and validation using advanced analytics to optimize performance.
- Uncovered significant trends in verified purchase data, revealing that 82% deceptive reviews are from unverified users, indicating key difference between deceptive and truthful reviews in terms of verification status.

KEY SKILLS

Programming Language: C, JavaScript, Python, R, Typescript; **Database:** SQL, MongoDB (serverless); **Libraries:** Pandas, NumPy, Matplotlib, Seaborn, Scikit Learn, NLTK, Spacy, TextBlob, OpenCV, Tesseract, Plotly; Pytorch, Tensorflow, Pyspark, Darts, Transformers, skorch, skimage, langchain, langgraph, langsmith, llama-cpp, openAI, VLLM

Web Frameworks: Flask, Django, Vue.js, React.js, React-Native, Next.js, FastAPI

Cloud Platforms: AWS (EC2, Lambda, SageMaker, S3, CloudWatch, Amplify, Cognito, API Gateway, Route 53), Azure, GCP, IBM Watson Studio

Other: Node.js, HTML, CSS/SCSS, Linux, Tableau, Qlik Sense, GitHub, Docker, Anaconda, Nginx

EDUCATION

City, University of London

MSc Data Science; Distinction

Karpagam College of Engineering,

BEng Automobile, First Class Distinction

London, UK

Sep 2022 - Oct 2023

Coimbatore, India

Jul 2019 - Jun 2022

CERTIFICATION

- Qlik Sense Business Analyst Qualification | [LINK](#)
- Deep Learning Specialization by Coursera | [LINK](#)
- Self-Driving cars Specialization by Coursera | [LINK](#)
- Advanced Machine Learning and Signal Processing | [LINK](#)