

Emerald Henry

Fullstack A.I Engineer | LLM + GNNs

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EXPERIENCE

Covenant University | Lagos,

B.S. in Mechanical Engineering | September 2017 - July 2022

Background: Carried out Multiple Machine Learning and Deep Learning Projects.

Stanford University, Online

Stanford: Machine Learning with graphs (CS224W)

EXPERIENCE

TechWave | Remote

Fullstack AI Engineer (LLM) | March 2024 – July 2024

- Spearheaded the development of TechWave's groundbreaking Autonomous Course Generator, revolutionizing the process of skill acquisition.
- Developed an AI agent capable of autonomously curating comprehensive courses, encompassing beginner to expert levels, based on user inputs, up to 70% completion.
- Orchestrated the integration of multiple AI modules, including a course structure generator, learning video transcript generator, and sample assignment creator, streamlining the course development process.
- Developed a Django-based backend application to support AI agents, including designing and implementing RESTful APIs for agent communication, managing data storage and retrieval, and ensuring system scalability and reliability.

LCA | Remote

Data Science & ML Tutor | October 2023 – March 2024

- Created and executed end-to-end machine learning applications with a specialization in Natural Language Processing (NLP). Proficient in leveraging Language Models (LLMs) from HuggingFace, Google, and OpenAI and utilizing frameworks like Langchain, Llama-Index and Crewai developing diverse AI Agents (LLMOps).
- Utilized the OpenAI API and open source models from Ollama to run RAG applications, develop AI Agents and build chatbots with a chainlit interface, as well as a HTML and CSS initial interface page.
- Developing comprehensive training materials, including notebooks and files, for Data Analysis using R, Database Management (MySQL), and MLOps practices (Docker, FastAPI, CLI scripts, CI/CD, and deployment with Azure and AWS technologies).

Clinton Health | Hybrid

Data Scientist | January 2023 – October 2023

- Spearheaded the development and management of Healthcare Databases tailored for the Nigerian National Healthcare Sector.
- Conducted exploratory data analysis (EDA) to extract meaningful insights and designed Dashboards to facilitate data-driven decision-making within the Nigerian National Healthcare Sector.
- Innovatively crafted HTML-based tools to streamline the collection of healthcare data from both patients and healthcare facilities.

Covenant University | Lagos, Nigeria

A.I Researcher | August 2022 - January 2023

- Investigated Fine-tuning Foundation CNN Models for automated diagnosis of lesions and cancer from various medical images (MRI, CT, Ultrasound, WSI).
- Explored the application of State-of-the-Art Hybrid Vision Transformers for efficient classification, segmentation, registration, and reconstruction in medical imaging.
- Explored additional techniques such as Federated Learning, Contrastive Learning, and Knowledge Distillation, leveraging Vision Transformers, culminating in a published work on their application in Medical Imaging.

TEE Research Group | Lagos, Nigeria

A.I Research Intern | October 2021 - August 2022

- Conducted Exploratory Data Analysis (EDA) on extensive wind turbine operational data, laying the groundwork for model development.
- Engineered multiple Machine Learning and Deep Learning Models for wind turbines, focusing on energy forecasting, prediction, performance monitoring, and fault detection.
- Innovatively devised a filtering technique based on quantile range to enhance the accuracy of wind turbine data by removing faulty entries.
- Developed a comprehensive statistical technique for detecting faulty wind turbines, integrating Kolmogorov-Smirnov's test with three deep learning models, contributing to improved fault detection accuracy.

COMPUTATIONAL PROJECTS ([more](#))

Training Base LLM Model

- Built base LLMs of various parameter sizes, up to 124M, utilizing features such as flash attention, mixed precision training, torch compile and DDP.

Comprehensive AI Agent/Chatbot/RAG

- Built a Robust AI Agent comprising multiple tools such as RAGs, web scraping and browsing tools, along with automatic tool routing based on user query using the Langchain framework.
- Built a Robust AI master agent for multiple sub agent orchestration, for solving complex reasoning problems such as system 2 thinking, using the Crewai framework.
- Build a comprehensive RAG application with multiple customized tools for specific retrieval operations such as summarizing part-or-whole text, itemizing facts etc using the Llama-Index framework.
- The entire project's page is built using HTML, CSS and Flask.

Open Source LLM Framework Contribution

- A contributor to a few open source LLM frameworks such as CrewAI

DL & LLM with C/CUDA

- Ongoing, Attempting to replicate the previous LLM project and a few Deep Learning techniques in pure C and CUDA.

Graph Representation Learning Projects

- Completed a robust project comprising the implementation of numerous graph neural network research for graph generation, classification and traversal, with very useful applications in recommender systems.

PUBLICATIONS

Vision Transformers in Medical Imaging: A review. ([link](#))

Conditional Monitoring and Fault Detection of Wind Turbines Based on Kolmogorov-Smirnov's Non-Parametric Test and Machine Learning. ([link](#))

A Neural Network-Based Wind Turbine Power Curve Model Using Several Wind Farm's Influencing Parameters and Topography. ([link](#))

SKILLS

Language:

Python, C, C++, SQL, HTML, CSS

Frameworks:

Pytorch, Tensorflow, PyG, Django, Flask, FastAPI

LLM Skills:

Langchain, Llama-Index, Crewai, VectorDB, HuggingFace

Other Skills:

Linux, AWS, GCP, git

Soft Skills:

Leadership, Communication, Teamwork, Presentation