

Emerald Henry

A.I Engineer | MLOps Engineer (LLM)

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RELEVANT WORK EXPERIENCE

LCA | Remote

Data Science & ML Tutor

OCT 2023 - Present

- 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.
- Ran the fine-tuning of the llama2 model for in-domain use case, performed using Kubeflow for pipeline orchestration, JSONL data format and the Vertex AI SDK for fine-tuning and generating the REST API.
- 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

JAN 2023 - OCT 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.

SKILLS & TOOLS

- Python
- C/C++
- R
- SQL
- Pytorch
- Tensorflow
- Langchain
- OpenCV
- Docker
- Linux
- AWS
- Azure
- Vertex AI
- BigQuery
- Kubeflow
- Llama-Index
- Crewai
- TruLens
- chainlit
- Vector Database
- FastAPI for backend engineering
- HuggingFace
- Deep Learning Research
- Natural Language Processing
- Computer Vision
- LLM Operations
- Github Actions
- HTML/CSS

SOFT SKILLS

- Leadership

Covenant University | Onsite

A.I Researcher

AUG 2022 - JAN 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.
- Implemented 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.

- Communication
- Teamwork
- Presentation

TEE Research Group | Onsite

A.I Research Intern

OCT 2021 - AUG 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.

EDUCATION

Covenant University, Nigeria

B.S. Mechanical Engineering

- For my final year project, I worked on exploring multiple approaches to modeling the power curve of a wind turbine. This work yielded the development of a state-of-the-art deep learning model that achieved remarkable performance and resulted in a published work. ([link](#))

Stanford University, Online

Machine Learning

2023

- I took a few Stanford University Master's level machine learning courses namely: Natural language processing (CS224N), Reinforcement Learning (CS234), Graph ML (CS224N).

COMPUTATIONAL PROJECTS ([more](#))

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.
- Each backend comprises a chainlit interface, the entire project's page is built using HTML and CSS, the user then selects the backend to be used based on the task at hand.

RAG Application of Mental Health Therapists

- I developed a POC RAG solution for a Mental Health startup using Langchain and Streamlit. The solution allows therapists to chat with their therapy session recording, improving their efficiency.

Food Classification App (CV)

- Independently constructed a Vision Transformer (ViT) model from scratch for accurate food type classification.
- Deployed the ViT model on Hugging Face via the Gradio web interface to create an efficient and user-friendly food classification application.

FastAPI-ML microservice

- It involves the containerization of a Machine Learning API and deployment using Amazon Elastic Container Repository (ECR) and Amazon Elastic Container Service (ECS) respectively

RELEVANT PUBLICATIONS

1. Vision Transformers in Medical Imaging: A Review. ([link](#))
2. Conditional Monitoring and Fault Detection of Wind Turbines Based on Kolmogorov-Smirnov's nonparametric test and Machine Learning. ([link](#))
3. A Neural Network-Based Wind Turbine Power Curve Model Using Several Wind Farms' Influencing Parameters and Topography. ([link](#))