MOHAMED FOFANAH

AI Engineer | ML Engineer | IoT Engineer | Mobile App Developer | Web Developer | System Analyst | Electronic Engineer | Data Analyst | Engineering Modeling & Simulation Enthusiast

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PROFESSIONAL SUMMARY

I am a progressive software development, data centric and electronic design team member skilled at optimizing designs based on current and expected demands. Works effectively in high-pressure environments to meet challenging design standards and schedule targets. Expert in programming languages and design tools. Masterful Software Developer provides technology solutions to allow business units to achieve objectives and goals. Strong understanding of object-oriented programming and design principles. Successful in all phases of software development, including design, coding, testing, debugging, implementation, and source management. Willing to take on any task to support the team and help the business succeed. Offers strong Artificial Intelligence and Internet of Things abilities. I am also an Electronics Engineer with adept knowledge in circuit design using analog design, digital design and mixed signal design methodologies. I enjoy working with signal processing algorithms in code and implementing them on a microcontroller as well as integrating these with data analysis pipelines. Working with sensors at both the primary level of voltage signals as well as building signal conditioners is a fantastic experience I enjoy doing in the lab. Recording, Filtering and Analyzing biosignals to gain insight into body functions is one of my greatest interests. My inner desire of understanding human consciousness from the abstract notion of the brain as a computing machine is the greatest motivation that keeps me going being that it greatly influenced the decision of my Bachelor's thesis research. My passion for building intelligent devices that can be integrated with living systems has been partly experienced being that my extensive theoretical research has been turned into a practical experimental work with appreciable result and I hope to continue further in this domain to see what will definitely be realized in terms of the impact my research and development will have on humanity.

EXPERIENCE

Backend, Database, and AI/ML Engineer - *2023 (Current)*

Peculiar Labs | Freetown, Sierra Leone

- Develop data-enabled products for corporate and government agencies.
- Elicit database requirements and design data models for applications using database design principles and techniques.
- Write REST APIs and configure deployment servers for seamless data communication and application deployment.
- Collect, preprocess, and prepare data for analysis and predictive modeling using AI pipelines. - Build and deploy AI/ML pipelines on the cloud using cloud computing services like AWS EC2, AWS Sagemaker, and Hugging Face.

AI and IoT Engineer - April 2022 to December 2022

Bandawa Intelligence Consultancy and General Merchandise (BICUGeM) | Freetown, Sierra Leone

- Built and deployed AI models to provide data-driven insights and intelligent decision-making capabilities. - Developed APIs to enable seamless integration of AI models with other systems and applications. - Designed complete IoT systems from the physical layer of sensors and actuators to communication using microcontrollers such as Arduino, ESP32, Raspberry Pi,

ZigBee, SIM800/900 GSM/GPRS, and WiFi modules, as well as Geolocation modules integration.
- Developed front-end interfaces for IoT systems, including mobile apps and admin dashboards with interactive charts and graphs to visualize and display data, along with providing real-time suggestions.

System Analyst - January 2022 to June 2022
MeDomot Inc. | Freetown, Sierra Leone

- Analyzed and documented software requirements, ensuring clear and detailed specifications for development teams.
- Designed system architectures and models, optimizing software solutions for enhanced performance and scalability.
- Modeled databases, ensuring efficient data storage and retrieval in alignment with project requirements. - Developed REST APIs to facilitate seamless communication and data exchange between various software components.

Android Mobile Developer - November 2019 to September 2020
Visionary System Technologies | Freetown, Sierra Leone
- Avoided unnecessary complexities with straightforward, elegant designs.
- Enhanced performance by tuning applications based on customer feedback and testing.
- Completed common development tasks within open-source Android ecosystems and available libraries. - Managed the complete development lifecycle with a team of 5 developers.
- Designed, wrote, and maintained high-quality software.

Artificial Intelligence (AI) and Internet of Things (IoT) Systems Developer - August 2016 to March 2021
Ingenium Technology SL | Bo, Sierra Leone
- Built AI/ML models using an end-to-end approach.
- Developed strategies for deploying AI models on a variety of platforms.
- Implemented AI on edge devices like Arduino, ESP32, and Raspberry Pi.
- Built REST APIs that serve machine learning models.
- Developed full-stack applications that utilize AI.
- Created Frameworks and Libraries using well-established mathematical models and AI algorithms. - Developed IoT Systems using Micro-Devices.
- Demonstrated familiarity with all layers of the IoT stack.
- Engaged in electronic design.

PROJECTS

1. Epileptic Seizure Detection using EEG and AI
Developed an innovative system that leverages Electroencephalography (EEG) data and Artificial Intelligence (AI) algorithms to detect epileptic seizures accurately. The project aimed to provide early seizure prediction and timely intervention for individuals with epilepsy, improving their quality of life and safety.

2. Customer Support AI Assistant Chatbot for providing Extension Services to Farmers
Designed and implemented an AI-driven chatbot tailored to provide personalized customer support and extension services to farmers. The chatbot utilized Natural Language Processing (NLP) and Machine Learning techniques to address farmers' queries, offer agricultural advice, and deliver real-time information on weather, crop management, and market prices. The responses generated are from a LLM prompted to in a dialogue tuned conversational style to emulate an extension worker.

3. Fingerprint Biometric Attendance Taker
Developed a robust fingerprint-based biometric attendance system for streamlined and secure attendance management. The project employed advanced fingerprint recognition algorithms to accurately identify individuals, enhancing time-tracking efficiency and minimizing unauthorized access to sensitive areas.

4. AI-Based Android App for Plant Disease Detection
Created an Android mobile application that utilizes Artificial Intelligence to detect and diagnose plant diseases accurately. The app provides farmers with real-time information about plant health, enabling timely action and improved crop yield.

5. IoT Smart Home
Developed a smart home system using Internet of Things technology to automate and control various household devices and appliances. The project integrated smart sensors and actuators to enhance energy efficiency and user convenience.

6. Ictal Sense - Epileptic Seizure Detection Using Deep Learning and 8 Channel EEG
For my BEng. Hons in Electrical and Electronics Engineering Thesis work, I Built an EEG device with 8 channels featuring precision amplifiers, a microcontroller(ESP32) an AI inference server for detecting epileptic seizures using frequency based features(Fourier Transforms and Spectrograms) as well as time domain features like Hjorth Parameters. The device also works with a mobile app which I developed for visualizing the various channel signals in both time and frequency domains. It also displays the state of a NORMAL or SEIZURE based brain activity on the mobile device in addition to audible and visual signs on the device. It combines AI and IoT in a seamless way so as to build realtime and smart systems. I am passionate about this project because it is the first time I brought my greatest early day dreams into light by interfacing brains with computers

7. IoT Smart Garden
Designed an IoT-based smart garden system that monitored and controlled watering, temperature, and humidity levels for optimized plant growth. The project aimed to promote sustainable gardening practices and reduce water wastage.

8. Artificial Intelligence Library in Javascript
Developed a comprehensive AI library in Javascript, providing developers with a collection of powerful AI algorithms and tools to integrate AI capabilities into web applications.

9. IoT System with Speech-Enabled Virtual Assistant
Built an IoT system featuring a speech-enabled virtual assistant that responded to voice commands and performed various tasks, such as controlling smart devices, monitoring and providing weather updates.

EDUCATION

Bachelor of Engineering (BEng) Hons. Second Class First Division in Electrical and Electronic Engineering - *April 2022*
Fourah Bay College USL, Freetown, Sierra Leone.
- Scored a distinction in Dissertation and Final Year Project

West African Senior School Certificate Examination (WASSCE) -
December 2016 Christ the King College (CKC) Senior School, Bo, Sierra Leone

- Scored 4 A1s (Distinctions), 4 B2s, and a B3.
- Best Science pupil nationwide and overall second-best pupil nationwide.

Basic Education Certificate Examination (BECE) - *November 2012*
Christ the King College (CKC) Junior School, Bo, Sierra Leone
- Scored an aggregate of 8.
- Best pupil in the Southern region.

LANGUAGES
- English
- Krio
- Mende
- Temne

SKILLS
- Critical thinking
- Analytical thinking
- Planning
- Requirements gathering
- Numerical Analysis and Mathematical Modeling
- First Principles Modeling and Implementation of AI Ideas
- Analog Circuit Design
- Digital Circuit Design
- Mixed Signal and FPGA Design (in progress learning)
- Logic
- Board Gaming Enthusiast – Checkers, Scrabble and Chess
- Computational Arts using Processing and P5.js
- Data Analytics and Systems Design Thinking
- Digital Signal Processing for precision hardware design(in progress learning)
- Data Visualization and Multi-modal Sensory Data Analytics
- Computer Vision and Speech Processing
- Natural Language Processing
- Language Modeling and Visual Reasoning AI Systems Design
- Prompt Engineering
- Agent Driven AI Systems Design

Programming Languages:
- Python
- Java
- C/C++
- LISP
- JavaScript & NodeJS
- PHP
- Dart
- HTML/CSS

Frameworks and Libraries
- Tensorflow
- Pytorch
- Firmata Serial Hardware Interface
- Langchain for AI applications built around Large Language Models(LLMs)
- Processing and P5.js

- Keras
- Scikit-Learn
- NLTK and Spacy
- Transformers
- GGML(In Progress Learning)
- Petals
- CTransformers
- Langchain
- LLaMA Index
- ChromaDB Vector Store
-PineconeVector Store
-OpenCV and PIL
-Librosa
-Scipy
-Pomegranate
-OpenAI Gym
- ReactJS & React Native
- Bootstrap 5
- Flutter
- Flask
- NodeJS Express

Cloud Tools:
- AWS EC2 (Elastic Cloud Compute)
- AWS RDS (Relational Data Services)
- Google Cloud AI
- Google Generative AI Studio
- AWS Sagemaker
- Hugging Face AI
- OpenAI Platform of Large Language Models(LLMs) and Embeddings API
- Cohere LLM, Embeddings and Similarity Search Cloud API
- Chroma Cloud Vector Datastore API

Hardware Tools:
- Arduino
- Analog Electronics Toolkit
- Digital Electronics Toolkit
- Raspberry Pi
- ESP32
- Network Communication Modules
- Geo-location Modules compliant with Microcontrollers
- Sensors and Actuators (both digital and analog driven)
- EEG Electrodes and Signal Conditioners
- Digital Signal Processors
- OpenBCI

Engineering Modeling and Simulation Tools
- MATLAB and Simulink
- GNU Octave
- Wolfram Mathematica
- Wolfram Alpha (currently on training)
- Wolfram System-Modeler (currently on training)
- NI Multisim

- NI Ultiboard
- Electronic Workbench
- Autodesk AUTOCAD
- Fritzing

INTERESTS

I love board games such as checkers, chess, and scrabble. While I play chess, I'm better at checkers because I've dedicated more time to it. However, I appreciate chess for its mathematical depth, which often parallels concepts I've learned in my discrete structures courses related to computing systems. I'm skilled at both checkers and scrabble. In the future, I aim to learn Go to further explore game strategies. I also spend a significant amount of time playing video games like FIFA 23 and GTA5 on my PS5. I support Manchester United and also have a soft spot for Bayern Munich in the Bundesliga. On weekends, if I'm free, I hang out with friends at affordable restaurants and bars to relax. Interestingly, during my free time, I often engage in thought-provoking discussions, reminding myself of life's unpredictability and valuing diverse viewpoints. I'm a friendly and humorous person, even though I have my mood swings. I'm always open to positive collaborations, guided by my philosophy of making constructive decisions, regardless of their immediate impact on me.

Referees:

- Dr. Samba Sesay, Head of Department(HOD) Electrical & Electronic Engineering Department; Fourah Bay College(FBC) - +23276323708 | sambasey@gmail.com.
- Prof. Jonas Redwood Sawyerr; President of the West African Federation of Engineers. - +23276670904 |osehsylrs1952@gmail.com
- Prof. Kelleh Gbawuru Mansaray; Deputy Vice Chancellor(DVC) Fourah Bay College, University of Sierra Leone. - +23278476527 | mansaraykg@gmail.com