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Personal Statement

I design, develop, test, and maintain software systems and applications. I have experience as a software engineer with a strong background in full-stack web development, particularly React and NodeJs, and backend applications. I am conversant with collaborating with team mates across the software development life cycle. Experienced in building scalable and user-friendly applications with a focus on front-end technologies. I have done some work on embedded programming using C/C++ and my machine learning (ML) projects are mostly built with python (pytorch,Keras). I have knowledge of deploying ML systems on AWS and Google Cloud.
I graduated from Carnegie Mellon University with MSc Electrical and Computer Engineering where I focused on data science, internet of things and Air quality research.

Education

- **MSc Electrical Computer Engineering — Carnegie Mellon University** July 2022 - May 2024

  Courses: Introduction to Deep Learning, Computer Vision, Internet of Things, Autonomous Driving, Data Analytics, Data structures and Algorithms, Introduction to Information Security, Cognitive Robotics, Wireless Networks

- **BSc Computer Engineering — University of Ghana** November 2021
  Electives: Software Engineering and Computer Graphics

Experience

- **Research Associate — Carnegie Mellon University** July 2024 - Present
  - **Environmental Sensor Development:** Responsible for the design and development of low-cost sensor nodes for measuring temperature, humidity, wind speed and environmental parameters using innovative AI-driven approaches.
  - **Data Storage and Management:** Collaborate with the project's principal investigators and external researchers to design a data storage and management framework, ensuring the collected environmental data is stored securely and made accessible to project stakeholders.
  - **Sensor Testing and Calibration:** Participate in the testing and calibration of the sensor nodes using machine learning techniques to improve the accuracy and reliability of the low-cost sensors.
  - **Academic Paper Preparation:** Collaborate with the research team to prepare and publish academic papers documenting the project's findings and methodologies.
- **Research Assistant — Carnegie Mellon University** January 2024 - May 2024
  - **Interdisciplinary Research:** Working with the mechanical engineering department to research alternative ways of predicting biomass pollutants in the air using a combination of sensor data from aethalometers.
  - **Air Quality Prediction:** Improving existing low-cost means of predicting black carbon pollutants using RGB pictures of filters to be able to distinguish pollution from wood from fossil fuels.
  - **Data Analysis and Experimentation:** Conducting data analysis with datasets collected for more than 2 years and verifying experiments to measure black carbon pollutants.
- **Graduate Intern — AfriqAir- Kigali Collaborative Research Center** May 2023 – August 2023
  - **Web Dashboard Development:** Developed a web dashboard using ReactJs for visualization and interpretation of air quality data with Typescript.
  - **System Design:** Designed system specifications and architecture for an IOT wireless data logging unit.
  - **Prototype Development:** Built a prototype IOT system to automate the diagnostic and data collection process from the Thermofisher TEOM™ air quality system. Built with Python and C++ for Raspberry Pi and Arduino.
- **Intern — Sorphise GH Ltd (Ghana)** July 2020 – January 2021
  - **Web Application Development:** Web application development and deployment using JavaScript, PHP, React (GatsbyJS), Netlify NetlifyCMS
  - **Task Management** Used task management software to track project timelines, define requirements, build mock-ups for client feedback, and communicate with managers about challenges.

- **Scalable Static Site Architecture:** Implemented a scalable static site architecture by decoupling code from content, utilizing Netlify CMS to manage site content and GitHub repositories for code management. This separation of concerns enabled faster website development with continuous integration (CI), increased project efficiency, and allowed for more projects to be completed within a given timeframe. By keeping code and content separate, we were able to streamline our workflow to use the benefits of static site generation.
- **Site Deployment and Management:** Deployed sites on Netlify site-hosting, configured the Netlify content management system (CMS), to integrate with site content, fixed DNS errors and checked status; performance and errors, on deployed websites.
- **DNS Configuration:** Configured DNS settings and domain names/URLs for custom-hosted websites, enabling secure HTTPS connections and ensuring seamless redirects from HTTP to HTTPS.
- **Cloud-Based CMS Migration:** Pushed for migration of developed websites to a cloud-based Content Management System (CMS) via GitHub enabling seamless continuous deployment (CD) and automated website updates. This integration allowed changes to website content to trigger automatic rebuilds and deployments, eliminating the need for manual intervention by administrators or developers and less manual effort.
- **Custom CMS Development:** Worked on Content Management System (CMS) for website administrators which separated website content from code. This allowed website administrators to update content such as posts; title, body and images for websites without changing the web application code.
- **In-House CMS Development:** Made changes to in-house CMS application using PHP, AJAX, JavaScript for websites not using cloud CMS.

- **Intern — Promasidor GH Ltd, North Industrial Area, Accra, Ghana** June 2019 – August 2019
  - Assisted network professionals in the company's IT department with troubleshooting on switches and routers.
  - Provided hardware and software support to employees of the company and enrolled new users onto the company network in factory and corporate spaces.
- **Intern — Inlaks GH Ltd, Accra, Ghana** June 2018 – August 2018
  - Assisted engineers to conduct maintenance and install applications on ATMs across banks.
  - Tested hardware modules and sensors on new and existing ATMs.
  - Troubleshooted problems with faulty ATM modules such as keypads and sensors.

Skills

- **Web Development:** React.js, Node.js, PHP Express.js, RESTful APIs, WebSockets, Ruby
- **Cloud & Machine Learning:** Google Cloud (Computer vision, Vertex AI, BigQuery), fastai, pytorch, model deployment (Hugging face)
- **Languages:** JavaScript (ES6+), Python, Java, C++, Dart(Flutter)
- **Tools & Practices** Git, Test-Driven Development, CI/CD, Agile methodologies
- **Cloud & Deployment** Google Cloud Platform, Hugging face, Netlify
- **Others:** PWAs, Performance Optimization, IoT (Raspberry Pi), Satellite Image Processing

Leadership Experience

- **Club President:** Internet of Things (IoT) club Carnegie Mellon University Africa
  - Led a team of 6 committee members to organize campus events enhancing student knowledge of IoT and embedded systems, fostering a culture of innovation and technological exploration.

  - Orchestrated field trips to Zipline, a company pioneering autonomous drone delivery of medical supplies to remote areas of Rwanda, providing students with real-world exposure to cutting-edge IoT applications in humanitarian technology.

  - Served as a technical advisor for student projects, offering expertise in data collection, GPS integration, and various microcontrollers, thereby supporting practical application of IoT concepts.

Projects

- **Background Removal and Image Segmentation on Hugging Face** Aug 2024

  -Skills used: Git · Python · Computer vision · Gradio · CI/CD

  - Deployed a machine learning model for background removal leveraging the 'rembg' library.

  - Deployed the model into a production-ready Gradio interface, enabling users to upload and process images directly through an intuitive web-based platform.

  - Allowed users to select different models and add image processing features, such as post processing the mask, returning only the images mask correction, focusing on optimizing performance and usability for various image types.

- **Countdown Progressive Web Application (PWA)** Dec 2021

  Skills: JavaScript · Git/Github · PWAs · User-Centered Design · Continuous Development (CI/CD)

  - Developed a feature-rich countdown PWA using just HTML, CSS and JavaScript with offline support and caching of resources using service workers.

  - Led user-centered design process, prioritizing features based on user feedback (90+ pull requests, many resolved github issues, multiple iterations).

  - Implemented responsive design, dark/light modes, user data persistence, and social media sharing.

- **IoT Security System** Nov 2022 - Dec 2022
  Skills: Node.js · Raspberry Pi · WebSockets · Real-time Systems

  - Engineered an IoT security system using Raspberry Pi, sensors, and Node.js for real-time monitoring.

  - Implemented a WebSocket-based server for instant alerts and data visualization.

  - Demonstrated skills in embedded systems, real-time data processing, and IoT security.

- **Job Search and Career Development Web Application** Oct 2018 - Nov 2018
  Skills: PHP · AJAX · Cascading Style Sheets (CSS)

  - Built a web application using HTML5, CSS, AJAX, and PHP to keep employers informed about students' skills.

  - Implemented messaging functionality for correspondence between employers and job seekers.

  - Developed a cross-platform mobile app for user access from any device.

  - Focused on showcasing students' skills to employers before graduation.

  - Aimed to bridge the gap between job seekers and employers, providing a platform for skill showcase.

- **University Application Management System built with Java and JavaFx** Apr 2020 - Jun 2020
  Skills: SQL · Java · JavaFx · JDBC

  - Developed a desktop application to simplify the admission process for prospective students.

  - Designed features for user registration, course and residence hall applications, and status tracking.

  - Implemented an admissions dashboard for users and an administrator control panel for application management.

  - Built with Java and JavaFX using OOP principles. Utilized JDBC and SQL for database connectivity.

  - Created a user-friendly interface, making it an excellent tool for managing university admissions.

- **2D game- Escape the Covid Maze**

  Skills used: C · Unity3D · Path-finding

  - 2D game using Unity3D that challenges players to navigate a maze while avoiding Covid-19 blob villains.

  -To keep the game interesting, the villains move through the maze and even climb over barriers and make it harder for players to escape.

  -To build the villains' paths and make them more strategic, I used A* search algorithm to help the villains find the player in the maze. With two levels of increasing difficulty, players must use their keyboard skills to avoid their character being caught by the villains and successfully escape the maze.