Nebiyou Hailemariam

412-251-7954 | nebiyouhailemariam@gmail.com | linkedin.com/in/nebhailemariam | nebhailemariam.github.io/

Summary

I'm a **software engineer** with **4 years of experience** and a deep passion for **Machine Learning** and **Software Engineering**. I specialize in **Python**, **Flask**, **C#**, and **ASP.NET Core** and use these technologies to create robust software solutions. With a solid foundation in **software engineering** and **machine learning**, I leverage **PyTorch** to develop **AI-driven systems**. In my free time, I actively contribute to **open-source projects**, such as enhancing the **Gorse Recommender System**.

Education

Carnegie Mellon University — CGPA 3.93 *Pittsburgh, PA*
Masters in Information Technology, Applied Machine Learning Specialization *Aug. 2022 – May 2024*

Addis Ababa University — CGPA 3.8 *Addis Ababa, Ethiopia*
Bachelor of Science *Sep. 2016 – May. 2020*

Experience

Machine Learning / Software Engineer *Aug. 2024 - Present;*
Go EBN *US, Remote*

- Worked on a retail application using ASP.NET Core Web API, Python, PyTorch, and cloud-based microservices to build scalable, AI-driven solutions.
- Designed and implemented RESTful APIs for inventory management using n-tier architecture.
- Implemented OAuth 2.0 client-credential flow using OpenIddict for secure machine-to-machine communication and ASP.NET Core Identity for user management.
- Employed xUnit to write integration tests for authentication and API microservices using a custom web application factory.
- Designed a messaging system using Kafka and Golang as a message producer.
- Integrated Gorse, a recommender system, and contributed to the open-source recommender systems.
- Employed PyTorch to train hierarchical machine-learning models for classifying retail products into aisles, categories, and subcategories.

Machine Learning Software Engineer II *Jul. 2021 - Jan. 2024; May 2019 - Jul. 2020*
Matrix Information Technology *Remote*

- Built machine learning models and developed scalable microservices, improving product recommendations, system efficiency, and backend operations across various solutions.
- Integrated Gorse, a personalized recommendation system, into an e-commerce platform to enhance product recommendations and deliver customized suggestions based on item similarity and user preferences. This led to a 20% increase in user engagement.
- Wrote unit and integration tests for ASP.NET Core Web API using xUnit and for Python using pytest, helping reduce bugs and ensuring robust, reliable code across services.
- Developed microservices applications for a no-code data and operations management platform using AWS (EC2, RDS, EKS, SES, SQS). Led the development of a subscription management microservice using Stripe, which simplified subscription processes and increased customer satisfaction.
- Digitized a traditional financial communal saving system, by developing backend solutions using ASP.NET Core and PostgreSQL.
- Implemented key features like transaction processing and account management, utilizing ASP.NET Core Identity, Entity Framework, and AWS RDS for scalable and reliable database management.

Software Engineer I *Aug. 2020 – Sep. 2021*
Digital Medarbeider *Oslo, Norway*

- Developed a Cloud-Based School Management System for managing students, employees, and schedules, enhancing administrative efficiency and automation for Norway municipalities.
- Implemented a microservices architecture for student and employee management, and scheduling system enabling scalable and maintainable system components.
- Employed IdentityServer4 for securing microservices and ASP.NET core Identity for user Authentication.

- Leveraged Azure App Service for web hosting, Azure DevOps for CI/CD pipelines, and Azure Key Vault for managing secrets.
- Utilized various databases including Azure Cosmos DB for scalable NoSQL data storage, MongoDB for flexible document-based data management, and Azure SQL Database for relational data needs, ensuring efficient and reliable data handling.
- Wrote unit and integration tests, used Bogus for realistic test data, and documented APIs with Swagger to facilitate integration and maintenance.

Research Assistant in Machine Learning *May 2021 – Jan 2022*

Empathic Computing Lab *Auckland, New Zealand*

- Empathic Computing Laboratory (ECL) is an academic research laboratory directed by Prof. Mark Billinghurst at the University of South Australia in Adelaide, Australia, and the University of Auckland in Auckland, New Zealand.
- Collaborated with Ph.D. students to develop and refine methods for detecting emotions from physiological signals.
- Conducted extensive literature reviews and analyzed the performance of various machine learning and deep learning models, applying rigorous testing to ensure robustness and accuracy. Authored a 14-page paper (IUI - ACM)

Projects

XLM-R Based Extractive Amharic Question Answering with AmaSQuAD Sep 2023 – May 2024

- Completed my final thesis project at Carnegie Mellon University in multilingual question-answering research (NLP).
- Developed a novel framework for translating the SQuAD 2.0 dataset into Amharic, resulting in the creation of the AmaSQuAD dataset. Implemented a translation-based data generation framework valuable for extractive Question Answering (QA) systems, contributing to the advancement of natural language processing (NLP) for low-resource languages. Leveraged XLM-R, a pre-trained language model, and fine-tuned it specifically for Amharic QA tasks, achieving 7% F1 improvements in baseline performance.

Machine Learning Based Rain Gauge Using Acoustic Data Sep 2022 – May 2023

- Addressed the challenges of conventional weather stations such as high setup costs, instrument fragility, and measurement errors by exploring alternative sound sources for making rainfall predictions.
- Used a Convolutional Neural Network (CNN) regression model using PyTorch and TensorFlow to estimate rainfall intensities from MFCCs extracted from acoustic recordings. Employed CNN model and achieved a Mean Absolute Percentage Error (MAPE) of 35.20% and a Mean Squared Error (MSE) of 0.66, outperforming a baseline Support Vector Regression (SVR) model with 152.55% MAPE and 1.73 MSE.

Technical Skills

Languages: Python, C#, C/C++, Python, Go, JavaScript, HTML/CSS, R
Frameworks: ASP.NET Core Web API, Entity Framework, IdentityServer4, OpenIddict, Dependency Injection, Flask, FastAPI, Django, Gin, Express.js, Node.js, Angular, React, Node.js, PyTorch, TensorFlow, Scikit-learn, Pandas, Numpy, RabbitMQ, Kafka
Developer Tools: Git, Docker, Kubernetes, GCP, AWS, Azure, Postman, Jenkins
Web & Frontend Technologies: TypeScript, ReactJS, JavaScript, CSS, Bootstrap, Redux, Angular.js
Cloud Services & Platforms: AWS (EC2, ECS, EKS, RDS, SES, SQS, MQTT), Google Colab (Google Compute Engine, Google Cloud Storage, Google Colab)
Security: OAuth 2.0, JWT, IdentityServer4, ASP.NET Core Identity, Passport.js
Databases & Data Storage: MySQL, PostgreSQL, MongoDB, DynamoDB, Cosmos DB, ElasticSearch, Redis, Postgres, ORM, NoSQL, SQLAlchemy, Entity Framework
Testing & Quality Assurance: xUnit,WebAppl icationFactory, pytest, Mocha, Jest
DevOps & CI/CD: Docker, Kubernetes, Jenkins, GitHub Actions, Containerization
Machine Learning & Deep Learning Skills: Linear Regression, Support Vector Machines, Bagging and Boosting, Neural Networks, CNNs, RNNs, LSTMs, NLP, Graph Neural Networks (GNNs), clustering, Graph Attention Networks (GATs), Hyperparameter Tuning, Transfer Learning, TensorFlow, PyTorch, keras, Scikit-learn, XGBoost, Hugging Face Transformers, Data Preprocessing, Weights & Biases, OpenCV, Computer Vision, predictive models, Derivatives
Data Science: Data Warehousing (BigQuery, Redshift), Data Pipelines (RabbitMQ, MQTT), Data Engineering, Data Mining, Data Visualization, Data Analysis, Scikit-learn, NLP, Pandas, NumPy, PyTorch, NLTK, Anaconda, PySpark, Apache Spark, data analytics, Business Intelligence, Matplotlib, data structures, data modeling, Kafka
Architectures: Event-Driven, Microservices, Serverless, Monolithic Architecture, Test-Driven Development (TDD), Data-Driven