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Summary/Overview

An aspiring machine learning engineer with a deep understanding of the field of AI/ML, statistical pattern recognition, and mathematical analysis. A motor and desire to find solutions to complex problems, and eager to join a software engineering team to learn and apply my expertise to improve solutions. With a background and working knowledge in Power systems, Control systems, and Robotics, I can apply Artificial Intelligence, Machine Learning, and Deep Learning principles in a variety of applications and industries.

Education

Master of Science: Machine Learning Engineering
Drexel University, Philadelphia, PA
August 2024

Bachelor of Science: Electrical and Electronics Engineering
Bradley University, Peoria, IL
May 2020

Professional Experience & Research

Machine Learning Engineer
M3 Learning**,** Philadelphia, PA
January 2024 - present

- Designed and trained large-scale neural network models and optimized them using HLS4ML and knowledge distillation techniques to improve scalability.
- Containerized different processes of a machine learning model with Docker and Kubernetes to improve resource allocation and processing efficiency.
- Deployed models using CI/CD pipelines using the Nvidia-Triton Server.
- Developed Large Language Models (LLMs) to be able to generate and recommend efficient, high-speed deep-learning model architectures based on functional requirements.
- Utilized Streamlit framework to build web-based applications to house our deployed Machine Learning algorithm.

Computer Vision Engineer Co-op
Drexel University – iMaple Lab, Philadelphia, PA
June 2023 – December 2023

- Collected data at the site with fish-eye camera and annotated the images with labelImg.py to feed into the YOLO algorithm.
- Investigated different image preprocessing pipelines on the data to find the best way to optimize object detection.
- Trained a yolov5s network on our annotated data, extracted the weights, and ran inference from a Raspberry Pi 4 for real-time object detection.
- Engineered and trained a lightweight neural network model, achieving efficient performance on limited-resource platforms, analogous to optimizing financial models for high-frequency trading environments.
- Applied knowledge distillation (SimKD) to compress the yolov5s “teacher” model to a smaller one with similar performance for the limitations of the Raspberry 4 hardware.
- Extracted bounding box information from the compressed computer vision algorithm to send to the control system through serial communication to an ESP32.

Electrical Power Systems Engineer
Ghana Grid Company (GRIDCo), Tema Metropolitan Area, Greater Accra, Ghana
June 2020 – August 2022

- Investigated the impact of the relocation of Aboadze Ameri Power Plant to Kumasi on the Ghana grid system for commissioning.
- Conducted the Grid Impact Study to investigate the impact of a 60MWp Photovoltaic generator installed at Bongo (Northern Region of Ghana), on the Grid during the off-peak hours.
- Simulated Grid cases on PSS/rE, to inform on the best locations to install 250MW of hydroelectric power based on their impact on meeting demand and contribution to systems losses, as well as the improvement of voltage levels in and around the area.
- Developed an end-to-end Machine Learning pipeline for prediction on load and demand forecasting.
- Created and developed a Python algorithm to analyze transformer performance, ensuring overall system improvements.

Control Systems & Automation Internship
Process and Plant Automation (PPA)**,** Spintex, Greater Accra, Ghana
May 2019 – August 2019

- Interfaced multiple platforms for building automated systems, including a comprehensive worker tracking system leveraging GPS and server-side data.
- Interfaced platforms like "Alexa" for smart home systems, demonstrating the ability to work with complex systems—a skill essential for collaborating on software and mobile app projects in financial environments.
- Programmed and deployed a real-time worker identification and tracking system, reflecting the capacity to handle real-time data processing and automation, skills beneficial for developing and maintaining algorithmic trading systems.

Machine Learning and Data Science Projects

Predictive Analytics for Chronic Condition Management

MATLAB

- Developed and deployed scalable machine learning models to predict health outcomes for individuals managing chronic conditions.
- Conducted extensive data analysis, collaborating closely with healthcare students to tailor algorithms to specific medical needs.
- Implemented best practices to optimize existing machine-learning infrastructure, resulting in a 20% improvement in model accuracy.
- Maintained comprehensive technical documentation, ensuring transparency and knowledge sharing within the team.

Conversational Agent Development for Clinical Applications

Python, PyTorch, PyTorch Lightning, Large Language Models, Masked Language Models, and Causal Language Models

- Led the development of conversational agents using natural language processing (NLP) and deep learning algorithms to enhance clinical interactions.
- Improves conversational interfaces and response accuracy with Large Language Models such as MLMs, and CLMs like GPT.
- Implemented machine learning-powered web applications using frameworks like Streamlit, emphasizing user-friendly experiences.
- Stayed updated on industry developments in machine learning and artificial intelligence, contributing insights to project strategy.

Generative Model for Synthetic Data Generation for Autonomous Vehicle Testing

Python, TensorFlow, Generative and Adversarial Neural Networks (GANNs)

- Developed an adaptable generative model to create realistic sensor data (LiDAR and camera images), simulating various scenarios encountered by autonomous vehicles in real-world environments.
- Ensured the generated data captured a diverse range of driving conditions, anomalies, and edge cases for high complexity to challenge the perception and decision-making algorithms.
- Improved practicality and usability by allowing the customization of parameters for simulation of specific testing requirements.

Personalized Patient Care Recommendation System

Python, AWS, Docker, Nvidia-Triton Server

- Implemented recommendation systems with a deep understanding of collaborative filtering, content-based filtering, and hybrid methods to enhance personalized patient care.
- Leveraged cloud services (AWS) and containerization technologies (Docker) for efficient deployment of machine learning models, ensuring seamless integration with healthcare workflows.
- Developed and maintained CI/CD pipelines for automated model deployment, reducing deployment time by 30%.
- Collaborated with cross-disciplinary teams to integrate AI-powered coaching solutions into healthcare analytics platforms, improving user engagement and program effectiveness.

Machine Learning-Based Market Prediction Project

Python, Pandas, NumPy, TensorFlow, sci-kit learn.

- Developed and validated a predictive machine learning model using Python with TensorFlow and sci-kit learn, applying time series analysis and neural networks to historical market data for trend identification.
- Enhanced model accuracy through advanced feature engineering, leveraging macroeconomic indicators and market sentiment, and employed rigorous cross-validation and back-testing for performance assessment.
- Authored a detailed project report documenting the model development lifecycle, from conceptualization to validation, demonstrating the synthesis of technical acumen and effective communication of complex analyses.

Personal Finance Software Development Project

Python, Java, Pandas PowerBI, Mathematical Modelling, Algorithm Development.

- Developed a personal finance management application using Python, Java, and PowerBI, focusing on budgeting, investment tracking, and data visualization.
- Integrated financial APIs to fetch real-time market data, allowing for the simulation of stock trading and portfolio management.
- Implemented rigorous unit testing and debugging procedures to ensure the accuracy and reliability of financial calculations in the app.

Certifications, Relevant Courses, and Hard Skills

Certifications and Relevant Courses: Data Structures and Algorithms, Natural Language Processing, Deep Learning, Machine Learning, Statistical Pattern Recognition, Statistical Modeling, Geospatial Analysis, Feature Engineering, Computer Vision, Time Series, Data Analysis, Software Development Lifecycle, and Cloud Computing.

Hard Skills: Python, C++, Arduino, MATLAB, Pandas, NumPy, Sci-kit learn, TensorFlow, PyTorch, Keras, Matplotlib, PSS/E, PowerBI, SQL, Large Language Models(MLM, CLM), Raspberry Pi, Linux, Docker, Kubernetes, Nvidia-Triton, GPT, REST APIs, LATEX, Git, AWS, GANNs.

Soft Skills and Other Assets

Soft Skills: Communication Skills, Problem-Solving, Collaboration, Flexibility, Adaptability, Continuous learning, Proactive, Resourceful, Documentation, Time Management, Teamwork, and Attention to Detail.

Professional Association: NSBE, IEEE

Language: French