Musa Azeem

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Education

University of South Carolina Columbia, SC
Bachelor of Science in Computer Engineering May 2024
University of South Carolina Honors College | President's Honor List, All semesters
Overall GPA: 4.000

Experience

University of South Carolina Columbia, SC
Research Assistant *Dec 2021 – Present*

- Researched machine learning techniques to develop and improve deep learning models in PyTorch (LSTM, CNN, Autoencoders) for human activity recognition and to predict the sleep status of rodents.
- Worked with large SQL data sets of rodent neural activity and developed a pipeline to extract the data from the database, transform it for data analysis and prediction, and reformat the processed data.
- Designed and implemented software engineering strategies to build software for university research, including an Android WearOS app to live feed accelerometer data into an edge neural network model and a web application in Flask to allow clients to interactively utilize a deployed deep learning model.

SIOS Technology Corporation Columbia, SC
Software Engineer Inten *May 2023 – Dec 2023*

- Gained experience working with AGILE methodology, planning with Jira, and collaborating with a team in the software engineering industry.
- Developed a python library to parse through log files from users and extract key customer information, detect error patterns, sync information with an online database of customer cases, and display results through an interactive web interface.
- Created and set up AWS subnets and EC2 instances to install, develop, and test software. Worked on coding tasks to assist the L3 team (scripting, data visualization, api integration)
- Reviewed and updated training materials and created sustainable online courses via a Learning Management System (LMS) for onboarding and product training.

Capgemini Houston, TX
Rise Intern *Aug 2023*

- Led a rapid-turnaround case study resulting in a comprehensive mobile app launch strategy, prototype, and business model to present to a panel of judges, highlighting teamwork and problem-solving skills.
- Engaged in the RISE leadership program, collaborating with peers from across the nation.
- Explored Capgemini's resources, met their people, and learned their processes, gaining valuable insights in the field of software engineering and global technology consulting.

Skills

Programming Languages: Python, C/C++, JavaScript, R, Kotlin, Java, MATLAB, SQL, Bash, SystemVerilog

Tools/Libraries: PyTorch, TensorFlow, Pandas, NumPy, Flask, Matplotlib, Scikit, React, Express, Android SDK

Machine Learning: Reinforcement Learning, Decision Trees, K-Means Clustering, Model Evaluation & Diagnostics

Deep Learning: MLP, CNN, LSTM, Residual Networks, AutoEncoder Architecture, Model Regularization

Data Analysis: Data Cleaning, Data Visualization, Exploratoy Data Analysis (EDA) SQL Querying, ETL Pipelining

Other: Git, Linux, AWS, Docker, Embedded Systems, Microcontroller, Circuit Design

Projects

Deep Learning Eating Detection; github.com/musa-azeem/eating-detection Jul 2023 – *Present*
Researched machine learning techniques to recognize the gesture of a person eating to assist in human activity recognition research. Neural networks were developed in PyTorch and consist of LSTM, CNN, Residual, and Autoencoder networks.

Delta WearOS App; github.com/smithandrewk/delta Jul 2022 – *Present*
Developed an Android watch app for medicinal research in Kotlin and Android Studio to record, annotate, and process data from the watch's accelerometer. The data is live fed into an edge neural network to detect smoking and recorded for later research. The app's UI was built using Jetpack Compose and allows users to record time periods in which they are smoking, affirm or deny detected smoking gestures by the model, and record other research-relevant data.

SleepyRats Web App; github.com/smithandrewk/aurora Jan 2021 – Jan 2022
Designed and implemented a web application for the UofSC School of Medicine using the Flask microframework, Pandas and TensorFlow for data processing, Javascript, html, bootstrap CSS, and an SQL database. The app consists of a concise user interface and data pipeline for users to upload files of rodent EMG/EEG recordings, classify them to different stages of sleep with trained models, download files in the required format, and view past activity on the web app.

Log Analytics Prototype May 2023 – Dec 2023
Developed a python library for the Customer Experience team at SIOS Technology to parse through customer product log files and extract key customer and system information, detect error patterns, sync information with an online database of customer cases, and display results through an interactive web interface. Extensive use of Pandas and Regex were utilized to parse data and detect patterns, and the web interface was developed with Flask.

Portfolio Website; github.com/musa-azeem/portfolio | portfolio.musaazeem.com Jan 2023
Built a full stack MERN website to showcase the projects I have worked on and provide a UI and backend to add new projects to the portfolio. The frontend is built in React and html/CSS, which is hosted on Github pages. The backend is hosted by an AWS lambda function and is built in Express connecting to a Mongo Database.

K-Means Clustering; github.com/musa-azeem/K-Means-Clustering Nov 2022
Built a C++ program from scratch to perform k-Means-Cluster analysis on a given set of data, with a focus on object-oriented programming and algorithmic design.

Smart Cat House Aug 2022 – Dec 2022
Worked with a team to design and build a "smart cat house" featuring temperature-controlled heating, light-sensitive lighting, and a motorized door activated by a pressure pad. Utilized electrical engineering skills to build the necessary circuits and embedded programming skills in C++ to program a micro-controller and control the functionality of the house.

CPU Design; github.com/Musa-Azeem/csce611 Aug 2022 – Dec 2022
Designed a 3-stage pipelined CPU to run RISC-V assembly instructions in SystemVerilog and synthesized it on a FPGA board.

Awards & Engagement

NASA STEM Outreach Award Aug 2023 – May 2024
Received funding to conduct research and participate in 8 outreach events, in which I taught highschool students from across the state of South Carolina an introduction to web programming. The research for this grant consisted of the development of a universal smartwatch application to record sensor data and faciliate annotation of events.