

ASHWINI MURALIDHARAN

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SUMMARY

A graduate from North Carolina State University actively pursuing full-time opportunities as a **Data Scientist/Machine Learning Engineer**. Proficient in **Python, R, SQL**, and skilled in frameworks like **Scikit-learn, TensorFlow, Keras, PyTorch, PySpark, OpenCV** etc. Specialized in **Computational Intelligence**, and adept at applying sophisticated data analytics and machine learning algorithms across any domain.

EDUCATION

North Carolina State University

Raleigh, NC, United States

Masters in Electrical Engineering: GPA: 3.38/4.0

Aug 2022 - May 2024

Academic Achievements: Recipient of the **Graduate Student Support Plan (GSSP)**, a highly competitive support package providing standard tuition coverage for one semester, in recognition of academic excellence.

Relevant Coursework: *Neural Networks, Topics in Data Science, Automated Learning and Data Analysis, Digital Imaging Systems, Internet Protocols, Cloud Computing, Computer Vision*

SKILLS

- **Languages**: Python, SQL, Matlab, C++, SQL, Tableau, R
- **Frameworks and Platforms**: PyTorch, TensorFlow, Keras, Scikit-learn, Numpy, Pandas, OpenCV, AWS, Docker, Kubernetes

WORK EXPERIENCE

Department of Electrical and Computer Engineering

North Carolina State University, Raleigh, USA

Natural Language Processing Engineer

Jun 2024 - Present

- **Skills**: Natural Language Processing | Retrieval-Augmented Generation (RAG) | Python3 | PyTorch
- Presently engaged in engineering a **Retrieval-Augmented Generation (RAG)** system using **large language models (LLMs)** to perform **semantic analysis of application resumes**, accurately extracting and summarizing key achievements of applicants with the ECE department at NCSU.
- Executing extensive **data preprocessing and annotation pipelines**, leveraging natural language processing techniques to prepare training datasets.

The Vazquez Research Group

North Carolina State University, Raleigh, USA

Biomedical Deep Learning Engineer

Jun 2023 - Dec 2023

- **Skills**: Biomedical Signal Processing | Deep Learning | Time-series data | PyTorch | Transformers | LSTM | SciPy
- Developed and integrated **biomedical signal processing pipeline** for cuff-less blood pressure estimation using **ECG signals**. Implemented **filtering, segmentation, hand-crafted feature extraction, data augmentation**. Developed Deep Learning algorithms using LSTMs and Transformer technologies to automate blood pressure estimation for deployment on mobile edge-devices to facilitate real-time prediction.

Native Nibbles

Bengaluru, India

Data Science Intern - Predictive Analytics

May 2021 - Jul 2022

- **Skills**: Data Analytics | Customer Analytics | Python Developer | SQL | Database Management | pandas | scikit-learn
- Conducted data extraction from various sources, performing comprehensive **cleaning, transformation, and aggregation** of customer and sales data for savories and snacks. Designed a **clustering-based approach using DBSCAN** to decompose the customer behavior prediction task, developing tailored models for each cluster that improved prediction accuracy and processing speed for large datasets.
- Developed and optimized a **COWRF (COA-optimized Weighted Random Forest)** model, achieving a **39.17% increase in processing speed** and a **97.2% accuracy rate**, marking a **4.7% improvement over previous models** to evaluate the impact of promotional activities for snacks and savories, enhancing marketing strategy effectiveness for the products.

Biomedical Engineering Department

SSN College of Engineering, Chennai, India

Machine Learning Engineer - Undergraduate Research Assistant

Jul 2021 - Dec 2021

- **Skills**: Biomedical Signal Processing | Machine Learning | Python3 | Healthcare | PyTorch | SciPy
- Developed and deployed a **neonatal seizure detection** system using a scalable **ProtoNN**-based machine learning architecture. Achieved **87%** sensitivity and a **243.92 ms** inference time with a model size of **4.84 KB**, enabling rapid and accurate detection on **ultra-edge devices**.
- Presented the research outcomes titled “**Scalable Machine Learning Architecture for Neonatal Seizure Detection on Ultra-Edge Devices**” at the Second International Conference on Artificial Intelligence and Signal Processing (AISP 2022), in collaboration with IEEE. [[code-link](#)][[paper-link](#)]

SELECTED PROJECTS

Real-time Stress Classification using Deep Learning [[code-link](#)]

Biomedical Signal Processing | Deep Learning | Python3 | Healthcare | PyTorch | SciPy

- Developed a **real-time stress monitoring system** for drivers using **VGGNet architecture**, that classifies ECG signals collected real-time from a sensor. The **signal processing, feature extraction, training and testing of the VGGNet architecture** were personally carried out by me, resulting in an **82.45% training accuracy**.
- Implemented a system that integrates a real-time ECG sensor with a **Jetson Nano** for inference using the trained **VGGNet architecture** with the results being conveyed through a user-friendly Flask application in real-time.

Self-supervised Image Classification [[code-link](#)]

Image Processing | Self-supervised Learning | Python3 | PyTorch

- Developed a **self-supervised SimCLR model** using PyTorch Lightning, employing a **ResNet-18 encoder** and a two-layer **MLP projection head**. Implemented advanced data augmentation and adjusted color jitter parameters to enhance training stability and speed on the STL10 dataset.
- Achieved a **92.06% test accuracy** by optimizing with **cosine annealing, SGD, and InfoNCE loss**. Implemented Logistic Regression on feature representations learned from SimCLR on the CIFAR10 dataset to demonstrate robust transferability of learned representations, with a 81% accuracy.

AWS Chatbot [[code-link](#)]

AWS Chatbot | Cloud Computing | Deep Learning | Flan-UL2 | Kubernetes

- Architected a cloud-based chatbot using **Flan-UL2** model for real-time, automated customer support, ensuring 24/7 availability, high scalability, and security, and reducing operational costs.
- Implemented and managed an **AWS Elastic Kubernetes Service (EKS)** cluster to support a scalable, high-performance chatbot infrastructure, handling elastic scaling from 4 to 20 pods to maintain seamless user interactions and optimal resource utilization.