

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. Fine-tuning pre-trained LLMs to specialize in educational **document analysis**.
- Conducting rigorous evaluation of the **LLM-enhanced RAG system** using performance metrics such as precision, recall, and F1 score. Documenting the entire development lifecycle, including model architecture, training parameters, and performance outcomes, to provide comprehensive support for the ECE department at NCSU in their application review process.

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 to ensure high-quality datasets for developing analytics models.
- 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

Jun 2016 – Sep 2016

- **Skills:** Biomedical Signal Processing | Machine Learning | Python3 | Healthcare | PyTorch | SciPy
- Developed and deployed a **neonatal seizure detection** system utilizing a scalable machine learning architecture based on **ProtoNN**, achieving high sensitivity and compact model deployment optimized for ultra-edge devices. Achieved a sensitivity of **87%** and inference time of **243.92 milliseconds** with a model size as small as **4.84 KB**, ensuring rapid and accurate seizure detection on resource-constrained 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.