ASHWIN UNNIKRISHNAN

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EDUCATION

Master of Science in Artificial Intelligence | Northeastern University | ***Boston, MA*** (GPA – 3.97/4.0) Dec 2023

Courses: Machine Learning, Computer Vision, Deep Learning, NLP, AI for Human-Computer Interaction, Algorithms (Teaching Assistant)

Bachelor of Technology in Computer Science | Government Engineering College Kottayam | ***India***

TECHNICAL SKILLS

Languages: Python, C++, Java, JavaScript, Bash, R, SQL, MySQL, DynamoDB, PostgreSQL, MongoDB, Snowflake, Pinecone, JSON, HTML
Libraries: Huggingface, TensorFlow, Keras, Scikit-Learn, Pandas, NumPy, spaCy, Matplotlib, OpenCV, PIL, Flask, MLflow, Faiss, Langchain
Frameworks: GitHub, PyTorch, PySpark, AWS, Kubernetes, Docker, Tableau, MxNet, Streamlit, AutoML, BigQuery, Hadoop, QuickSight, Jax
Skills: Machine Learning, Data Science, Predictive Model, Deep Learning, LLM, Generative AI, Data Analytics, Statistics, MLOps, Chatbot, Recommender System, Multivariate Time Series, Natural Language Processing, Prompt Engineering, Data Mining, Sequence Models

WORK EXPERIENCE

Machine Learning Engineer Intern at Raysecur | Boston, USA Jan 2023 - Aug 2023

- Fine-tuned **Convolutional Neural Network** MobileNetV2 for detecting abnormal items for terahertz imaging. Leveraged CUDA and used cross validation and class weighing, achieved model accuracy of 97% and recall of 0.95. Explored quantization aware training techniques.
- Improved accuracy of abnormal item detection by 12% through research and exploratory data analysis on terahertz imaging, focusing on pixel intensity distribution and advanced image processing techniques, used AWS Sagemaker to run multiple experiments.
- Orchestrated end-to-end machine learning **model development pipeline**, including dataset generation, hyperparameter tuning, model training. Reduced the overall model experimentation and development time by 60%, used GitHub for model version control.
- Streamlined data ingestion with **ETL data pipeline,** Apache Airflow to integrate images from diverse repositories using AWS lambda, S3.
- Implemented **Data Drift Detection** System using **statistical hypothesis** testing to monitor pixel intensity variation ensuring robustness.
- Developed **object detection** system using Faster R-CNN to detect abnormal item mail, achieving Intersection over Union (IoU) score 0.40.
- Researched use of conditional **Generative Adversarial Networks (GANs)** to generate synthetic images to handle data imbalance.
- Developed **multivariate time series model** using **VectorARIMA** to accurately forecast sales, enabling effective inventory management.
- Models were dockerized and deployed on AWS EC2 cloud infrastructure, with Apache Kafka for real time streaming and rapid scalability.

Senior Software Engineer at Qualcomm | Hyderabad, India July 2017 - Feb 2021

- Developed NLP microservice using Scikit-learn to interpret chatbot queries with **TF-IDF** and **Naïve-Bayes**, improving chatbot experience.
- Built novel Code Maintenance tool using reinforcement learning(**Q-learning)**. Reduced UI automation code maintenance time by 70%.
- Developed tool to help detect duplicate bug tickets using NLP, utilizing **word2vec** word embedding and **cosine similarity** to assess **semantic similarity**. Helped testers searching bug tickets faster and streamlined tasks, improved work estimation by **20%.**
- Developed machine learning model using **BERT and LSTM** for product feedback analysis. Helped improve testing coverage by 5%.
- Designed robotic arm system using stepper motor, implementation substantially expanded functional testing coverage, saved $40,000.
- Deployed web application with Python, FastAPI to schedule night runs for optimal device usage. Built dashboard using **Elasticsearch, Logstash, Kibana** to visualize quality metrics, KPIs and conduct **data analytics** on performance, helped making informed decision.
- Used **Hidden Markov Modelling** in command management tool, enhanced user experience and efficiency reducing test time by 20%.
- Spearheaded 7-member IoT Automation team, architected rigorous automation protocols, following Agile methodology. Facilitated cross-functional collaboration with stakeholders to collectively devise and successfully executed production strategies.

PROJECTS & RESEARCH PAPERS

Churn Prediction *(Northeastern University)* [Data Analysis, Regression, Analysis, Feature Engineering, Machine Learning]

- Conducted extensive exploratory data analysis and **feature engineering** for credit card churn and hotel cancellation prediction.
- Increased churn prediction accuracy by 19%, using **cost-sensitive learning** with adjusted weights on various machine learning models.

Battery Remaining Useful Life *(Northeastern University)* [Machine Learning, PyTorch, Regression, PyCaret]

- Conducted **data analysis** and exploration on battery dataset, uncovering **key insight** and **correlations** to the Remaining Useful Life (RUL).
- Implemented predictive model using **XGBoost, Random Forest** and **Extra Tree regressors**, later performed best, achieving **RMSE** of 30.8.

LLM-Optimized Student Q&A chatbot *(Northeastern University)* [LLM, Google Palm, Langchain, Streamlit, Hugging Face, Chatbot]

- Designed **Conversational AI** chatbot instructor using **RAG** with **Google PaLM,** reduced student wait time by 90% for historical questions.
- Historical Q&A stored in vector databases, context retrieved using **similarity matching**, used **prompt engineering** for querying LLM.

Connactify – Connect introverts through activity *(Northeastern University)* [Collaborative Filtering, Recommender System, Survey, Interview]

- Built **recommender system** using memory-based **collaborative filtering** for personalized activity suggestions and matching users.
- Administered **user survey** and **interview**, providing valuable insight for business requirement, helped **feature engineering** from scratch.

Scuba Sign Classification *(Northeastern University)* **[**PyTorch, MediaPipe, OpenCV, Deep Learning, Image Classification, Data Pipeline]

- Established end-to-end data pipeline to collect dataset, incorporated MediaPipe for **image processing** and region of interest extraction.
- Employed the ResNet50 **convolutional neural network** architecture achieving impressive accuracy rate of 92% for 15 different signs.

Social Media Profile Classifier (*Northeastern University)* [Deep Learning, Object Detection, Machine Learning, Classification, NLP]

- Trained **Convolutional Neural Network** models Resnet50, MobileNetV2 to detect objects in images and create user profile documents.
- Developed **Naïve Bayes, Random Forest** classification to classify the documents into predefined profile types used **TF-IDF** vectorization.
- Conducted **A/B statistical testing** with randomized classification and model driven classification, aiding in understand user preferences.