# 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, Program Design Patterns, Algorithms and Data Structures, AI for HCI
**Master of Technology in Information Security | National Institute of Technology** | ***Warangal, India*** June 2017
**Bachelor of Technology in Computer Science | Government Engineering College** | ***Kottayam, India*** June 2014

## TECHNICAL SKILLS

**Languages:** Python, C++, Perl, Java, JavaScript, Shell, C#, Matlab, HTML **Databases**: MySQL, Postgre, MongoDB, Redis, DynamoDB
**Libraries:** PyTorch, TensorFlow, Keras, MxNet, OpenCV, Scikit-Learn, Pandas, NumPy, Matplotlib, MLflow, Huggingface, XGBoost, PyCaret
**Tools:** GitHub, AWS (S3, EC2, Sagemaker, IAM, Lambda, QuickSight), Apache (Spark, Airflow, Hadoop), Azure, Tableau, Kubernetes, Docker
**Domains:** Predictive Modeling, Data Mining, MLOps, DevOps, Time Series Analysis, Data Modeling, Generative AI, Diffusion Models, Cloud Computing, Clustering, Autoencoder, Sequence Models, Recommender System, Explainable AI, Pattern Recognition, Image Processing
**Soft Skills:** Communication Skill, Problem-Solving, Project Management, Critical Thinking, Creativity, Leadership, Adaptability, Teamwork

## 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 to achieve model **accuracy** of **97%** and **recall** of **0.95**. Explored quantization aware training technique.
- 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, utilized AWS Sagemaker for running multiple experiments.
- Orchestrated **end-to-end** machine learning **model development pipeline** (CI/CD), data processing, dataset generation, hyperparameter tuning, model training. Reduced model experimentation and development time by **60%**, adopted GitHub for model version control.
- Optimized data ingestion with **ETL data pipeline,** Apache Airflow to integrate images from diverse repositories, using AWS lambda, S3.
- Designed **Drift Detection** system using **statistical hypothesis** testing, monitoring pixel intensity variation of devices after deployment.
- Developed model prototypes, leveraging conditional **Generative Adversarial Networks** (GANs) to generate synthetic terahertz images.
- Designed multivariate time series model for demand forecasting, optimized supply management and cutting production time by 20%.
- 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

- Spearheaded 7-member team in IoT developing and designing automation architecture following Agile methodology and integrating **machine learning** into various tasks. Enabled cross-functional collaboration with stakeholders for successful strategy execution.
- Built novel Code Maintenance tool using reinforcement learning (**Q-learning)**. Reduced UI automation code maintenance time by **70%**.
- Enhanced chatbot experience with **NLP** microservices using Scikit-learn with **TF-IDF** and **Naïve-Bayes**, reduced querying time by **60%**.
- Designed **NLP** based tool using **word2vec** and **cosine similarity** to detect duplicate tickets in Jira, improved estimation accuracy by **20%**.
- Developed **LSTM** based tool, trained on open data source, for **product feedback analysis**, improving product testing coverage by **5%**.
- Implemented log parser workflow data pipeline for **text analytics** for initial root cause analysis, reducing manual intervention by **25%**.
- Designed robotic arm system using stepper motor, implementation substantially expanded functional testing coverage, saved **$40,000**.
- Developed **data visualization dashboards** with Logstash, Elasticsearch, Kibana to analyze **key performance indicators** of automation. Led to **70%** reduction in time spent on **data analysis** and facilitated **data-driven** decision-making during group huddles.
- Developed automation pipeline to validate **object detection, motion tracking, classification** algorithms on SNPE and TFlite engines for **embedded systems** (edge devices), focusing on call stacks and benchmarking performance, reduced manual test time by **33%**.

## PROJECTS

**Social Media Profile Classifier** [Deep Learning, Object Detection, Classification, Natural Language Processing, Flask]

- 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 with **TF-IDF** vectorization.
- **A/B testing** with randomized output and model classification output, aided in understanding user preferences and hypothesis testing.

**Churn Prediction** [Python, Business Analysis, Classification, Feature Engineering, Backend, Clustering, Ensemble Learning]

- Conducted extensive exploratory data analysis and **feature engineering** for credit card churn and hotel cancellation prediction.
- Performed data analytics with PyCaret and trained classification model **Logistic Regression**, **Random Forest, Decision Trees, XGBoost.**
- Increased churn prediction accuracy by 19%, using **cost-sensitive learning** with adjusted weights on various machine learning models.

**Virtual Teaching Assistant chatbot** [LLM, Google Palm, Langchain, Streamlit, HuggingFace, Chatbot, Prompt Engineering]

- Designed **Conversational AI** chatbot instructor using **RAG** with Google PaLM, reduced student wait time by 90% for historical questions.
- Utilized HuggingFace Instructor embeddings and stored Historical Q&A in vector database for efficient semantic similarity search.
- Architected full-stack application, incorporating Streamlit for front-end chatbot interface, facilitating user-friendly input of questions.

**Connactify – Connect introverts through activity** [Collaborative Filtering, Recommender System, Ranking, UI/UX Design, Figma]

- 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.

**Data Processing of Big Data with AWS** [ETL Development, Data Visualization, Data Pipeline, Dashboard]

- Constructed and automated Python-based ETL process using **Apache Airflow** on EC2 instance to process data from the Zillow Rapid API.
- Leveraged **Amazon S3** and **Redshift** for data loading and transformation with **AWS lambda**, used **QuickSight** for dashboard building.