

# Ashwin Sateesh Kumar

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## EDUCATION

### Northeastern University

Boston, MA | December 2023

Master of Science in Data Science (GPA: 3.8/4)

- **Courses:** Machine Learning, Data Mining, Algorithms, Database Management Systems, Deep Learning

### PES Institute of Technology

Bengaluru, India | July 2019

Bachelor of Engineering in Electronics and Communications (GPA: 8/10)

- **Courses:** Linear Algebra, Artificial Neural Networks, Pattern Recognition, Image Processing, Signal Processing

## TECHNICAL SKILLS

- **Programming Languages:** Python, R, MATLAB, SQL (SQLite, MySQL, NoSQL), Java, C++, PHP
- **Frameworks and Libraries:** Scikit-Learn, TensorFlow, Keras, PyTorch, OpenCV, Pandas, NumPy, Matplotlib, NLTK, tidyverse, MXNet
- **Tools & Technologies:** Jupyter, RStudio, Git, Tableau, MS Excel, Spark, Hadoop, Docker, MongoDB, AWS (Sagemaker, EC2, S3), GCP
- **Skills:** Statistical Analysis, Data Analysis, Visualization, Optimization, NLP, Computer Vision, Agile (Scrum, Jira, Confluence)
- **Certifications:** Deep Learning Specialization, AI Engineer Master's Program, Generative AI with LLMs

## WORK EXPERIENCE

### Research Assistant - Khoury College of Computer Sciences

Boston, MA | July 2023 – November 2023

- Led the development of a **multi-modal variational autoencoders (VAE)** with convnets, transformers and **LLMs (BERT, GPT2)** effectively **capturing complex image-text relationships** in political social media (Instagram) data with 400,000 records
- Facilitated **disentangled representation learning** and **discovered generative factors, enabling controlled robust image and text reconstruction** and provided a nuanced understanding of political narratives as portrayed through social media imagery
- Deployed the model on GCP, achieving remarkable **generative capabilities and generating results in images from text and vice versa**. Utilized **quantization techniques, resulting in a 30% boost in processing and enhancing multi-modal data analysis workflows**

### Machine Learning Research and Development Intern - Signify Research (Phillips Lighting)

Boston, MA | June 2022 – December 2022

- Designed and integrated an **AR-based system** in Unity 3D, utilizing REST-API calls to activate dynamic shows on Phillips lighting devices, **enhancing user interaction**
- Enhanced **household lighting scenes** of 18 homes and **plant growth strategies** of medical cannabis cultivars with optimal lighting strategies using **SARIMAX and Xgboost forecasting models**, achieving 97 percent accuracy
- Demonstrated the potential of **personalized lighting in smart homes** to stakeholders by Implementing **User Re-Identification proof of concept** using omniscala feature learning, achieving a mean average precision (mAP) of 0.95

### Graduate Teaching Assistant - Khoury College of Computer Sciences

Boston, MA | September 2021 – April 2022

- Collaborated with faculty to develop coursework and conducted office hours for over 90 graduate students in Machine Learning (CS6140 and DA5030), including comprehensive assessment of quizzes and assignments

### Trainee Automotive Software Engineer - KPIT Technologies Ltd

Bengaluru, India | July 2019 – November 2020

- Developed a custom **U-Net-based semantic segmentation** model for **precise spatial detections in traffic scenes** with **0.89 IoU**
- Improved annotation of 1 million images for a BMW Autonomous vehicle's model using **Transfer Learning and HIL** methods
- Devised an object detection prototype of **Vision and Radar Sensor Fusion** for Advanced Driver Assistance System and deployed the model design in Simulink

## PROJECTS

### HealthBot: Intelligent Healthcare Assistant using LLMs

December 2023

- Boosted chatbot's **disease classification capability** to 96 percent accuracy using **Bi-RNNs and GloVe** embeddings, **retrieved relevant medical information** from a knowledge graph by **detecting entities through fine-tuned BERT** with a F1 score of 0.84
- Enhanced **GPT-2 performance** via **fine-tuning, utilizing engineered prompts** aligned with detected medical entities, yielding accurate responses with an **semantic similarity score of 0.78**, and **improved contextual understanding** using **reinforcement learning (RLHF)**

### Video Speech Detection and Caption Generation

April 2023

- Orchestrated **end-to-end processing pipeline** for MIRACL-VCI dataset: face detection, lip region extraction (Haar cascade, Fast R-CNN), **feature extraction (RESNET50/VGG16)**, and sequential modelling with **attention-based LSTM and Transformers**
- Successfully implemented a **lip reading and the caption generation system** utilizing the developed pipeline to achieve classification and **text generation for words and phrases in the video** frame with 91.3 percent accuracy

### Amazon E-commerce Modelling and Recommender System

September 2021

- Performed Sentiment analysis of Amazon customer reviews. **Found main topics** of the reviews using **Latent Dirichlet Allocator (LDA)**, and reviewed text to build a **product recommender system** using **collaborative filtering**
- Utilized **Word2Vec** for **word embeddings** and built a **LSTM model to predict the sentiments** of reviews and boosted the performance to 95 percent accuracy