# SYED ABDUL HANNAN

Pittsburgh, USA | syedabdulhannan00@gmail.com | +1 201 895 9180 | www.linkedin.com/in/syed-abdul-hannan/

## EDUCATION

**Carnegie Mellon University: MS in Mechanical Engineering – AI Research Track *(GPA: - 3.90/4.0)*** **December 2024**

Relevant Courses: Deep Learning (Ph.D.), Visual Learning and Recognition, Machine Learning in Production, Trustworthy AI, Engineering Computation, Machine Learning for Signal Processing, Intermediate to Deep Learning.

**Heriot-Watt University: BE in Mechanical Engineering (University Rank: 2) *(Overall GPA: - 4.0/4.0)*** **July 2021**

The Eric Gibb Prize (2020-2021): - Awarded to the BEng student taking the highest place in the final year examinations.

Deputy Principal Award (2020-2021 and 2018-2019**):** - Awarded to undergraduate students for excellent academic performance.

## ACADEMIC AND RESEARCH PROJECTS

**CoLMbo: Speaker Language Model for Descriptive Profiling** **July 2024 – September 2024**

- Designed and developed a novel Speaker Language Model combining a speaker encoder with Finetuning LLM (GPT-2).
- Creates descriptive captions for the speaker embeddings by capturing elements such as dialect, gender, and age.
- Outperforms current audio language models such as QwenAudio, GAMA, Pengi, and LTU in Descriptive Profiling.

**AVIS: Generalized Speaker Verification Framework** **June 2024 – September 2024**

- Developed a versatile speaker verification framework adaptable to a wide range of cutting-edge models, datasets, augmentation techniques, feature extractors and different evaluation metrics such as EER, accuracy, etc.
- Leveraged Pytorch Lightning Framework for a faster training time and to incorporate distributed multi-GPU support.
- Found to be 30% faster in training different SOTA models compared to using Pytorch training framework.

**Generalized Audio Language Model (GALM)** **January 2024 – August 2024**

- Collaborated with a 25-member team of researchers and engineers to develop an LLM for multilingual audio tasks.
- Used different encoder and decoder transformer architectures to find the most optimal combination for finetuning LLM.
- Optimized and curated multiple different datasets to ensure they were in the same format to do our initial training.

**Movie Recommendation Service in Production** **January 2024 – May 2024**

- Collected data from multiple sources (Kafka stream, API logs, etc.) and further engineered features for learning.
- Leveraged various machine learning algorithms like SVD, KNN, and Collaborative Filtering, to identify the optimal model.
- Developed and Developed a Docker-based infrastructure for continuous integration and continuous deployment.

**Robot Visualizer: Robotic Arm Kinematic Solver** **September 2023 – December 2023**

- Developed a C++ software for solving forward and inverse kinematics of robotic arms with varying structures.
- Built a full-stack implementation using OpenGL, integrating interactive front-end visualization with robust back-end kinematic computations for robotic arms.

## PUBLICATIONS

- CoLMbo: Speaker Language Model for Descriptive Profiling - In Review in IEEE ICASSP 2025.
- CoLMbo-SV: A Speaker Language Model for Explainable Voice Comparison – In Review in NAACL 2025.

## SKILLS

Python, PyTorch, NumPy, Scikit-Learn, Pandas, Dockers, MLFlow, Kubernetes, PyTest, Matplotlib, MATLAB, SQL, C++, OpenCV, Hugging Face, GitHub, PyTorch Lightning, Scikit-Surprise, Torchvision, Torchaudio, Librosa, LLM, Linux, AWS, GCP, Azure, Flask.

## WORK EXPERIENCE

**Carnegie Mellon University – Language Technologies Institute *(Research Assistant)*** **January 2023 - Present**

- Worked on speaker language model for descriptive profiling with the encoder being a phoneme debiasing attention framework while the decoder was a GPT-2.
- Created a Speaker Language Model for Explainable Voice Comparisons using LLM as Decoder and SV model as Encoder.
- Developed a speaker profiling prototype using multiple models to predict environment and emotions from audio.

**Carnegie Mellon University – Language Technologies Institute *(Teaching Assistant for 11785)*** **January 2024 - Present**

- Supporting CMUs' flagship deep learning course with over 250 students
- Teaching students through weekly recitations, hackathons, Piazza Q&A forum, and office hours.
- Concepts include MLPs, CNNs, RNNs, LSTMs, transformer models, GANs, LLMs, and diffusion models.

**Transnet General Trading LLC *(Sales Manager)*** **September 2021 – December 2022**

- Coordinated closely with sales, inventory, and analytics teams, achieving a 30% improvement in sales and purchase.
- Optimized inventory through sales forecasting, balancing stock levels and sales performance using data-driven strategies.

## HONORS AND AWARDS

**UAE Golden Visa for Academic Excellence** (2022-2032): - Received the prestigious UAE Golden Visa for academic excellence.

**CERN WebFest Finalist Certificate** (2020-2021): - Awarded to shortlisted finalists in the CERN WebFest Hackathon.