Mohammed Abbas Ansari

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Education

- **Jamia Millia Islamia University** — New Delhi, India
  Bachelor of Technology in Computer Engineering. CGPA: 9.69 — *November 2020 - June 2024*
  Relevant Courses: *Artificial Intelligence, Data Mining, Machine Learning, Computer Vision, Natural Language Processing*

Research Experience

- **Research Intern (DAAD-WISE Scholar)** — Munich, Germany
  Human Centered Technologies for Learning Lab, Techincal University of Munich — *Jun 2023 - Mar 2024*
  - **Supervisor**: Prof. Dr. Enkelejda Kasneci
  - **Description**: Worked on novel self-supervised learning techniques for free-viewing scan path data to create models that can be fine-tuned for scan path classification tasks such as Autism detection, Toddler Age detection, etc.
- **Summer Research Intern** — Remote
  Interactive Technologies and Multimedia Research Lab, IIIT-Allahabad — *Jun 2022 - Jul 2022*
  - **Supervisor**: Professor Anupam Agrawal
  - **Description**: Experimented with novel duration encoding techniques in a CNN-LSTM framework for autism diagnosis from visual scan path data.

Publications

- **Master GAN: Multiple Attention is all you Need: A Multiple Attention Guided Super Resolution Network for Dems**:
  A Mohammed, M Kashif, MH Zama, **MA Ansari**, S Ali. *IGARSS 2023, IEEE International Geoscience and Remote Sensing Symposium*
- **Revisiting TextFuseNet: Text Context Enhanced Attention Networks For Scene Text Localization**:
  H Hinduja, **MA Ansari**. *International Organization Of Scientific Research (IOSR) Journal of Computer Engineering 25 (1), 37-49.*

Projects

- **Music Generation from Brain Scans (BTech Major Thesis)**:
  Working on decoding the music listened to by a subject based on their fMRI scans. Using Nakai et al's dataset of 5 subjects' fMRI scans while listening to 540 music pieces. Implementing MusicGen, a conditional music Language model by Meta, for music generation conditioned on fMRI scans similar to the Brain2Music framework. (Feb '24 - Present) [Slides Link]
- **Multimodal Emotion-Cause Analysis in Conversations using in-context learning and instruction-tuned LLMs (SemEval 2024 Workshop Task 3 Competition)**:
  Developed an efficient video captioning technique for conversational videos using GPT-4-Vision. Used Demonstration learning through retrieved examples for emotion recognition and cause prediction using GPT-3.5 for SemEval Task 3. Also implemented instruction-tuned Llama-2 model using QLoRA tecnique. Our approach **won rank 4** in the competition. Tech: Python, PyTorch, OpenAI APIs, Langchain, Llama, Accelerate (Dec '23 - Feb '24) [Paper Link] [Repo Link]
- **Multimodal Emotion-Cause Pair Extraction using Graph Neural Networks (BTech Minor Thesis)**:
  Developed a graph neural network for emotion-cause pair extraction from multimodal conversational data. Utilized CLIP, BERT, and HTS-AT audio encoder for diverse modality features. Explored multimodal fusion in transformers. Modeled conversational structure with graph attention networks. Tech: Python, PyTorch, Weights and Biases, HuggingFace (Aug '23 - Dec '23) [Thesis Link]
- **Real-time Indoor Video Dehazing using Knowledge Distillation (Smart India Hackathon Grand Finale, 2023)**:
  Proposed to modify MAPNet, a UNET-based dehazing network for outdoor environments by replacing some of the blocks with TAM-Net, a 2D convolutional variant for videos. Experimented with distillation by creating a smaller student network for dehazing. Experimented with Dark Channel Prior and Boundary Contrainst Regularization approaches for benchmarking. (Dec '23) [Slides Link] [Proposal Link]
- **Improved Scanpath Classification with Self-Supervised Learning (DAAD-WISE Research Project)**:
  Conducted research on enhancing visual attention modeling through self-supervised learning. Developed novel scanpath augmentation techniques, applied Barlow Twins Loss, and explored various encoder architectures. Tech: Python, PyTorch, Weights and Biases (Jun '23 - Jul '23) [Slides Link] [Repo Link]
- **Super-Resolution of Digital Elevation Models (ISRO Grand Finalist, SIH 2022. IGARSS 2023 Publication)**:
  Led a team in developing a U-Net based convolutional network with attention for DEM super-resolution in ISRO's Smart India Hackathon. Proposed MASTER GAN architecture achieving state-of-the-art results (PSNR 31.024, SSIM 0.908). Published a research paper on using multiple attention for accurate DEM super-resolution. Tech: Python, PyTorch, Weights & Biases. (Apr '22 - Jan '23) [Paper Link] [Repo Link] [Slides Link]
- **Improved Visual Attention Classification for Autism Spectrum Disorder through Time-Dependent Representations. (IIIT-Allahabad Research Internship Project)**:
  Trained a deep learning network on Saliency4ASD dataset using ResNet-50 and LSTM for time-dependent representations. Encoded embeddings with duration via time-masking and joint embedding. Tech: Python, PyTorch, Weights and Biases (Jun '22 - Jul'22) [Slides Link] [Repo Link]

- **Text Localization using Efficient Attention (IOSR 2023 Publication)**:
  Modified Mask R-CNN Architecture with efficient attention for improved text localization accuracy on SynthText dataset. Tech: Python, PyTorch, Detectron2. (Aug '21 - Feb '22) [Paper Link] [Repo Link]
- **Robust Face Recognition Security System (ML Security, Hack-JMI Hackathon runner-up)**:
  Developed a robust face recognition security system using MTCNN, VGGFace, and inception-resnet siamese network capable of detecting spoof faces. Tech: Python, OpenCV, TensorFlow, Keras (Oct '21) [Repo Link]
- **Novel Bible Verse Generator (First Deep Learning Project, 2021)**:
  Trained a character-level neural language model on Bible (KJV) using LSTM. Built a loop to generate 1000 characters from the seed text which was the fake Bible verse quote from pulp fiction (1994) Tech: Python, Keras (Jun '21) [Notebook Link] [Description Link]

Technical Skills

Languages: Python, C/C++, SQL (MySQL), Bash, JavaScript
FrameworksHuggingFace, LangChain, OpenAI, Flask
Developer Tools: Git, Google Colab, VS Code, Kaggle, Jupyter, Weights and Biases
Libraries: pandas, NumPy, Matplotlib, Keras, PyTorch, Transformers, OpenCV, Scikit-learn, NLTK

Honors and Awards

- Merit Scholarship awarded for Second Rank in the Third Year of BTech CS - March 2024
- DAAD-WISE Scholarship awarded by German Government - June 2023
- Merit Scholarship awarded for Third Rank in the Second Year of BTech CS - March 2023
- Smart India Hackathon 2022 & 2023 Grand Finalists (All India level Hackathon) - Aug '22 & Dec '23
- Elected Class Representative for BTech CS Batch of 2024 - August 2022
- Hack-JMI Hackathon Runner Up (University level) - October 2021

Leadership Experience

- **Machine Learning Team Lead**
  Google Developers Student Club, Jamia Millia Islamia *Aug 2021 - May 2023*
  - **Responsibility**: Led the core Machine Learning Team of GDSC JMI to foster a strong ML community at Jamia Millia Islamia.
  - **Events**: Managed a data science competition end-to-end hosted on Kaggle. Taught a session: "Introduction to Machine Learning Algorithms" as part of Google ML Study Jam.
- **Vice Chairperson and ML/AI Head**
  IEEE Computer Society JMI - Student Chapter *Jun 2021 - May 2023*
  - **Responsibility**: Led teams of different domains such as Web, Android, DSA and ML/AI to conduct events and workshops to improve the technical acumen and enthusiasm of students on campus.
  - **Events**: Conducted a Break into AI camp where I coordinated a talk by an alumnus and then taught basics of machine learning. Interaction with Freshmen to guide them in tech. Invited talks by alumnus on how to prepare for campus placements.
- **Joint Secretary**
  Department of Computer Engineering's Subject Association, Jamia Millia Islamia *Nov 2022 - May 2023*
  - **Responsibility**: Conducting and managing events by the department such as competitions and invited-talks. Organized and Managed the annual fest of the department: "Genesis", involving multiple competitions. Managed Sporting Events held by the Faculty of Engineering and Technology.