Mohammed Abbas Ansari

+49-17665055318 mohammed-abbas.ansari@student.uni-tuebingen.de LinkedIn Profile
GitHub Profile Personal Website

Education

- **University of Tübingen** — Tübingen, Germany
  M.Sc. Computational Neuroscience. Grade: 1.0/1.0 — *October 2024 - Present*
- **Jamia Millia Islamia University** — New Delhi, India
  B.Tech. Computer Engineering. CGPA: 9.87/10 — *November 2020 - June 2024*

Relevant Courses: *Artificial Intelligence, Data Mining, Machine Learning, Computer Vision, Natural Language Processing*

Research Experience

- **Graduate Research Assistant** — Tübingen, Germany
  Cognitive Neuroscience & Neurotechnology Lab, Max Planck Institute Biological Cybernetics — *Feb 2025 - Present*
  - **Supervisor**: Dr. Romy Lorenz
  - **Description**: Working on understanding the causal mechanisms of the frontoparietal brain networks using Computational modelling and Machine Learning approaches
- **Research Intern (DAAD-WISE Scholar)** — Munich, Germany
  Human Centered Technologies for Learning Lab, Techincal University of Munich — *Jun 2023 - Jul 2023*
  - **Supervisor**: Prof. Dr. Enkelejda Kasneci
  - **Description**: Developed novel self-supervised learning techniques under the BarlowTwins framework for human scanpath datasets. The SSL-pretrained Resnet-LSTMs and ViT-based models were finetuned for the autism classification task, leading to 1.5% improvements in AUC over baselines.
- **Summer Research Intern** — Remote
  Interactive Technologies and Multimedia Research Lab, IIIT-Allahabad — *Jun 2022 - Jul 2022*
  - **Supervisor**: Professor Anupam Agrawal
  - **Description**: Developed novel duration encoding technique in ResNet-LSTM network to detect autism based on fixation patterns on images leading to 11.46% improvement in F1-score over baseline without duration encoding.

Publications

- **JMI at SemEval 2024 Task 3: Two-step approach for multimodal ECAC using in-context learning with GPT and instruction-tuned Llama models**:
  Arefa, **MA Ansari**, C Saxena, T Ahmad. *In Proceedings of the 18th International Workshop on Semantic Evaluation (SemEval-2024), pages 1571–1586, Mexico City, Mexico. Association for Computational Linguistics.*
- **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, Pasadena, CA, USA, 2023, pp. 5154-5157.*
- **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 (B.Tech Major Thesis)**:
  Tackled the challenge of reconstructing music from fMRI brain scans using Meta's MusicGen model and the Map method. Experimented with EnCodec, Chromagram Tokenizer, and T5 encoders, achieving the best performance using the T5 encoder with total averaging (FAD: 8.41, KL: 2.42, MCD: 4.87). Identified the temporal lobe as crucial for music reconstruction, highlighting the importance of auditory processing, language comprehension, and multimodal integration in the neural representation of music. (Feb '24 - May '24) [Thesis Link] [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 (B.Tech 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, MATLAB, C/C++, SQL (MySQL), Bash, JavaScript
Frameworks: SPM, HuggingFace, 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 (National Hackathon) - Aug '22 & Dec '23
- Elected Class Representative for BTech CS Batch of 2024 - August 2022

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 & 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 the basics of machine learning. Interaction with Freshmen to guide them in tech. Invited talks by alumni on how to prepare for campus placements.
- **Class Representative & Vice President**
  Department of Computer Engineering's Subject Association, Jamia Millia Islamia *Nov 2022 - May 2023*
  - **Responsibility**: Acted as a liaison between students and faculty issues. 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.