Noman Ali

alinoman.1424@gmail.com | Noman Ali

Education

- **Panjab University** *Aug 2020 - July 2024*
  Bachelor of Engineering in Electronics and Communication Chandigarh, India
  - Percentage: 82.3 (With Hons.)/100
  - Relevant Coursework: **Programming for Problem Solving, Linear Algebra & Complex Analysis, Signals and Systems, Probability and Random Processes, Data Structures and Algorithms, Embedded System Design**

Experience

- **Indian Institute of Technology Jodhpur (IIT J)** *July 2024 - Present*
  Senior Project Assistant (Full-Time) Jodhpur, India
  - Utilize deep learning techniques to analyze EEG data collected during the exploration of tactile properties and predict human perception of surface similarity.
  - Develop multiplexing mechanisms with priority for haptic-visual transmission in haptic robot teleoperation.
- **Center for Cognitive Computing - IIIT Allahabad** *Dec 2023 - June 2024*
  Research Intern Prayagraj, India
  - Implemented novel deep learning and fuzzy logic approaches to enhance emotion recognition accuracy in EEG and engineered a genetic algorithm-based framework for automated neural network architecture optimization.
  - Achieved 96.09% accuracy in classifying 24 emotions using spatial and temporal features from EEG spectrograms
  - Developed cross-subject emotion prediction model with 78.37% accuracy, demonstrating potential for real-world applications in affective computing and mental health monitoring.
  - Implemented GA-optimized CNN-LSTM hybrid model for EEG-based emotion recognition, achieving 93.28% accuracy across 24 emotions without fuzzy logic.
- **Center for Cognitive Computing - IIIT Allahabad** *May 2023 - July 2023*
  Summer Research Intern Prayagraj, India
  - Developed Fuzzy Ensemble Learning framework for Facial Emotion Intensity Classification using FER2013 dataset
  - Integrated EfficientNetV2B0, InceptionResNetV2, and MobileNetV2 models to enhance classification robustness
  - Achieved f1-scores of 80% and 76% for 'High' and 'Low' intensity emotions, respectively, in binary classification
- **Indian Institute of Technology Roorkee (IIT R)** *May 2022 - Aug 2022*
  Summer Research Intern Remote
  - Developed hybrid deep learning prediction model combining CNN and LSTM for multivariate time series regression to forecast particulate matter.
  - Identified optimal spatial resolution using hexagonal tessellations of varying sizes over the study area.
  - Automated data preprocessing pipeline for incoming API data, improving efficiency and accuracy.
- **Indian Institute of Technology Indore (IIT I)** *April 2022 - July 2022*
  Research Intern Remote
  - Conducted research on "Forest Above-Ground Biomass and Forest Height Estimation over a Sub-Tropical Forest using Machine Learning Algorithm and Synthetic Aperture Radar Data".
  - Demonstrated potential of combined retrieval of AGB and forest height using time-series L-band backscatter data.
  - Presented findings at the American Geophysical Union Conference 2022; published in ISRS Journal, Springer.

Skills

- **Technical:** Python, Java, C, Flask, Vue, Machine Learning, Deep Learning, Tensorflow, Pytorch, SQL, Git
- **Research Skills:** Electroencephalogram (EEG), Electrocardiogram (ECG) Data Analysis, Tactile Perception Analysis, MNE-Python, Computer Vision
- **Software:** Psychopy, Net Station, Matlab, EEGLab, Fuzzy Logic Toolbox

Publications

1. **Noman Ali**, Unmesh Khati, et al. (2024). **Forest Aboveground Biomass and Forest Height Estimation Over a Sub-tropical Forest Using Machine Learning Algorithm and Synthetic Aperture Radar Data**. *Springer, Journal of the Indian Society of Remote Sensing*, Vol. 52, pp. 771–786. DOI: 10.1007/s12524-024-01821-5 (Published)
2. Mohammad Asif, **Noman Ali**, Sudhakar Mishra, Anushka Dandawate, Uma Shanker Tiwary, et al. (2024). **Towards Generic Emotion Representation with Type-2 Fuzzy VAD Space: Deep Fuzzy Multimodal Fusion Framework for EEG Analysis of Emotions**. (Manuscript submitted to *IEEE Transactions on Affective Computing*)
3. **Noman Ali**, Mohammad Asif, Uma Shanker Tiwary, et al. (2024). **Advancing Facial Emotion Intensity Classification through Fuzzy Ensemble Learning with Variable Intensity Levels: A Deep Dive into Model Dynamics.** Manuscript accepted for publication in *8th International Conference on Information System Design & Intelligent Applications (ISDIA)* (🏆 **Best Paper Award**) (in press)
4. **Noman Ali**, Mohammad Asif, Anshul Kaushal, Uphar Singh, Uma Shanker Tiwary, et al. (2024). **Optimizing Emotion Recognition in EEG Data: A Genetic Algorithm Approach with XAI Insights**. *15th International IEEE Conference on Computing, Communication and Networking Technologies (ICCCNT)*. (Published)
5. **Noman Ali**, A. S Kang, Saurabh Himral, et al. (2024). **Integrated Modeling for In-Depth EEG Based Emotional State Analysis via Convolutional-Transformer Fusion**. Manuscript submitted for publication in *Springer, The Journal of Supercomputing* (in revision)

Projects

- **Satellite Image Segmentation with Explainable AI**
  Tools: [Pytorch, Python, Transfer Learning]
  - Designed and implemented an advanced EfficientNetV2-XL U-Net model for high-precision satellite image segmentation, specifically targeting the detection of buildings and roads.
  - Attained mean Intersection Over Union (IOU) scores of 87.64% for building segmentation and 96.13% for road segmentation, surpassing benchmarks set by models like Residual U-Net, CloudXNet, Swin Transformer, and EfficientNetB4.
  - Leveraged GradCam++ to provide detailed insights into model decision-making.

- **Multimodal Emotion Classification Using EEG and ECG Data**
  Tools: [TensorFlow, Keras, Python, MNE-Python]
  - Developed a multimodal deep learning model combining EEG and ECG data to classify 24 emotion categories.
  - Utilized LSTM layers for sequential data processing and Multi-Head Attention to capture relationships between different brain regions and modalities.
  - Achieved 94.05% test accuracy, showcasing the model's effectiveness in emotion recognition.

Certifications (Courses, Workshops and Conferences)

- **Diploma in Data Science - IIT Madras** *Duration: 2 Years*
- **Foundational Level in Programming and Data Science - IIT Madras** *Duration: 1 Year*
- **Conference Presentation - AGU (2022), ISDIA (2024) and ICCCNT (2024)**
- **Workshops - Data Science and Machine Learning, CPU and GPU Parallel Computing, Reinforcement Learning**

Volunteer Experience

- **Applied Intelligence (Springer)**, Reviewer
- **CODS-COMAD (ACM)**, Reviewer