ROUNAK MUKHOPADHYAY

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SUMMARY

Machine Learning professional at BITS Pilani, Goa Campus, specialising in applied machine learning with a focus on engineering multimodal emotion recognition and human-centred AI systems. Experienced in developing and deploying end-to-end machine learning models that integrate physiological and behavioural data for emotion inference and engagement analysis. Proficient in Python, TensorFlow, Scikit-learn, and Flask, with a strong foundation in data preprocessing, feature engineering, and deep learning model development.

EXPERIENCE

Project Associate – Human-Computer Interaction Dec 2024 – Present
BITS Pilani K. K. Birla Goa Campus — Sponsored by AI4ICPS, IIT Kharagpur
e-Monitor: AI System for Detecting Low Student Engagement in Online Learning

- Addressed the challenge of detecting student disengagement during online learning sessions without frequent manual feedback, reducing self-report dependency by ∼60%.
- Designed and optimised multimodal ML models integrating physiological (GSR, HR) and eye-tracking signals (pupil dilation, gaze) to infer engagement levels; improved F1-score from 72% → 88% and achieved 95.8% accuracy under active learning and 78.6% under personalised calibration.
- Built and deployed a **Python–React–Flask based solution** that collects multimodal sensor data, aligns labels automatically, and visualises engagement prediction in real time — reducing processing time per session by ∼35%.
- Improved model scalability across users by incorporating active-learning and personalised calibration strategies, reducing manual annotation load while maintaining high reliability.

Research Intern – Bioinformatics Jan 2024 – Jun 2024
University of Kalyani, West Bengal
In-silico identification and characterization of virus-associated circular RNAs

- Conducted computational analysis of RNA-seq datasets to identify and characterise circRNAs potentially associated with virus-induced cancers.
- Automated alignment, annotation, and reporting workflows using Python and R to improve reproducibility and reduce processing time.

PROJECTS

Multimodal Emotion Recognition – Developed ML models to infer emotions from physiological (GSR, HR) and ocular data; implemented full pipeline for collection, preprocessing, and annotation. **Tools:** Python, Scikit-learn.

Lumbar Spine Degenerative Classification (RSNA 2024) – Built 2D/3D CNNs on MRI scans to assess spinal degeneration; applied weighted loss and calibration for performance gains. **Tools:** TensorFlow, Scikit-learn.

SKILLS

- **Machine Learning & AI:** Supervised & Unsupervised Learning, Deep Learning, 2D/3D CNNs, Model Evaluation, Feature Engineering, Statistical Analysis, Signal Processing
- **Programming Languages:** Python, R, SQL, JavaScript, HTML, CSS
- **Frameworks & Libraries:** TensorFlow, Scikit-learn, Keras, XGBoost, OpenCV
- **Data Science & Visualization:** NumPy, Pandas, Matplotlib, Plotly, Seaborn
- **Databases & Storage:** PostgreSQL, MySQL
- **Tools & Platforms:** Flask, Git, GitHub, Linux

EDUCATION

Master of Science in Bioinformatics Oct 2022 – Jul 2024
Maulana Abul Kalam Azad University of Technology

Bachelor of Science in Data Science and Applications Jan 2022 – Present
Indian Institute of Technology, Madras

Bachelor of Science (Hons.) in Microbiology Jul 2019 – Aug 2022
West Bengal State University — Minor in Chemistry and Zoology