Aditya Soni

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Research Interests

Pattern Recognition, Artificial Intelligence, Information and Coding Theory, Graph Machine Learning

Education

Birla Institute of Technology and Science, Pilani — Hyderabad, India
Bachelor of Engineering - Electronics and Instrumentation; GPA: 7.92 — *Aug 2019 - July 2023*

Research Experience

Improving Cloud Sustainability using Artificial Intelligence
Research Intern, Microsoft Research, Advisors: Dr. Mayukh Das and Chetan Bansal. — *Jan 2023 - Present*

- Working on significantly reducing Scope 2 emissions in data centers using data-driven techniques.
- Exploring approaches such as Carbon-Aware Scheduling and request resource optimization using GNNs.

Graph Machine Learning for feature extraction from EEG signals
Research Intern, Swartz Centre for Computational Neuroscience, UCSD — *June 2022 - Dec 2022*

- Explored the viability of graph-based transfer learning techniques for stress detection using EEG data.
- Advised by Dr. Tzyy-Ping Jung. Collaborated with experts from Microsoft Research.

Selected Projects

Developing Interpretable Vision Transformers for Medical Image Classification
Advisor: Prof. Rajesh Kumar Tripathy, BITS Pilani — *Jan 2023 - Present*

- Performing medical image classification tasks using interpretable vision transformers and comparing its performance to baseline methods.

Empirical Analysis of NIST Standardized Post-Quantum Cryptography Algorithms [Report]
Coding Theory Course Project, Advisor: Prof. Runa Kumari, BITS Pilani — *Sept 2022 - Dec 2022*

- Compared the security and performance of three NIST standardized PQC algorithms for common tasks such as performing TLS handshakes and using digital certificates.

Classifying upper extremity movements for BCI applications using Deep Learning [Report]
Advisor: Prof. Rajesh Kumar Tripathy, BITS Pilani, Hyderabad Campus — *Dec 2021 - May 2022*

- Classified upper-extremity movement tasks from a multimodal signal dataset using a combination of several signal processing techniques and graph neural networks(GNN).

Dynamic Hand Gesture Recognition using Graph Convolutional Networks
Digital Image Processing Course Project, Advisor: Prof. Sudha Radhika, BITS Pilani — *Jan 2022 - April 2022*

- Classified dynamic hand gestures from videos using Graph Convolutional Neural Networks (GCN) trained on the 20BN-Jester dataset.

Action Recognition using a novel CNN Architecture
Remote Sensing and Image Processing Project, Advisor: Prof. K Rajitha, BITS Pilani — *Jan 2021 - April 2021*

- Combined optical flow and motion history images to capture spatio-temporal data from gesture videos in a single image which was then fed to a CNN for classification.

Professional Experience

Communications Engineering Intern [Code] [Report]
Military College of Electronics and Mechanical Engineering, Hyderabad, India — *June 2021 - July 2021*

- Designed and simulated Tx and Rx for secure and high data rate transmission of videos.
- Analysed parameters such as diversity order, OFDM channels, data rate and latency. tech

Skills Summary

Languages: Python, C++, Java, Kotlin, C#, C
Frameworks: NumPy, Pandas, NetworkX, TensorFlow, Keras, StellarGraph, scikit-learn
Tools: Git, Docker, Azure, KQL, MATLAB, GNURadio, Solidworks, EagleCAD, Ansys, LaTeX

Team and Competition Experience

Avionics Engineer at SEDS, BPHC Chapter — Hyderabad, India
Worked on the avionics of the rocket to be launched in the 10,000 feet category — *July 2020 - June 2021*

- Contributed to the Kalman filter implementation of the rocket's altimeter
- Implemented quaternions instead of Euler angles to counter Gimbal locking

Structures Engineer at SEDS, BPHC Chapter — Hyderabad, India
Designed components of the rocket to be launched in the Spaceport America Cup — *Jan 2020 - July 2020*