Aditya Soni

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RESEARCH INTERESTS

The intersection of AI, Data Compression, Information and Coding Theory; Geometric Deep Learning

EDUCATION

Birla Institute of Technology and Science, Pilani   Hyderabad, India
Bachelor of Engineering - Electronics and Instrumentation; GPA: 8.16   *Aug 2019 - July 2023*

RESEARCH EXPERIENCE

Fine-tuning Server Parameters for Workload Performance and Sustainability
Research Intern, Microsoft Research, Advisors: Dr. Mayukh Das and Dr. Alok Kumbhare.   *Jan 2023 - June 2023*

- Finding the correlations and anti-correlations between their behaviours and the conditions they run under, the logical and functional dependencies that influence their output and resource demands, and the numerical dependencies that affect their power consumption and performance.
- Tuned server parameters using Reinforcement Learning to reduce a server's power consumption by 11.3% while maintaining the workload's latency.

Graph Machine Learning to detect students' stress 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.
- Distinguished students with an increase in stress levels from the students with no change in stress levels with an accuracy of 93.75% and a ROC AUC score of 0.875.
- Advised by Dr. Tzyy-Ping Jung. Collaborated with experts from Microsoft Research.

SELECTED PROJECTS

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 and achieved 95% accuracy.

Action Recognition using Convolutional Neural Networks
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.

SKILLS SUMMARY

Languages:	Python, C++, Java, Kotlin, C#, C, SQL, Ruby
Frameworks:	PyTorch, TensorFlow, NumPy, Pandas, NetworkX, StellarGraph, scikit-learn, Matplotlib
Tools:	Git, Docker, KQL, Cosmos, MATLAB, GNURadio, OpenCV, LaTeX

TEAM AND COMPETITION EXPERIENCE

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

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