Arjun

551-233-3480 ax2119@nyu.edu Linkedin Github Google Scholar Portfolio

Education

New York University, Courant Institute of Mathematical Sciences **September 2023 – May 2025**
Masters of Science in Computer Science *New York, United States*

Indian Institute of Technology Palakkad **September 2018 – May 2022**
Bachelor of Technology in Electrical Engineering ***8.06/10 GPA*** *India*

Skills

Languages/Tools: C++, Python, Java, C, HTML/CSS, JavaScript, SQL, Slurm, Blender, Rhino for 3D Modelling
Technologies/Frameworks: Pytorch, Tensorflow, Numpy, Pandas, React.js, Node.js, Kubernetes, AWS, MongoDB, Git
Technical Skills: Proficient in Machine Learning, Deep Learning, Large Foundational Models, Statistical Modelling, Computer Vision, Predictive Analytics, Data Science and Engineering, Large Language Models, Natural Language Processing, Reinforcement Learning, Full-stack development, Data structures & algorithms, GPU, Distributed Systems

Experience

New York University Grossman School of Medicine **December 2023 – Present**
Research Associate, Advisor: Dr. Leon Axel and Dr. Dimitri Metaxas *New York, NY, USA*

- Collaborating on a project to address the critical shortage of high quality annotated medical data by developing synthetic cardiac MRI datasets using Generative Modeling techniques, such as GANs and Diffusion based models
- Enhanced dataset generation speed by ***2-3X*** over conventional methods, utilizing GPU parallelization

Serre Lab, Brown University **July 2021 – July 2023**
Research Assistant, Advisor: Dr. Thomas Serre *Providence, RI, USA*

- Leveraged HMAX-inspired Convolutional Neural Networks to enhance Object Recognition at unseen scales during training, surpassing traditional computer vision models like ResNet and VGG with a ***30-40%*** accuracy improvement
- Generated high-quality synthetic data for color constancy tasks leveraging Blender, achieving State-Of-The-Art results on the Color Checker Dataset with a Recurrent Convolutional Neural Networks based model, ***10x*** more efficient in size
- Developed Scale Invariant Convolutional Neural Networks, securing ***4th*** place in the NeurIPS 2022 Sensorium Challenge

Center for Computational Imaging, IIT Palakkad **August 2020 – June 2021**
Undergraduate Researcher, Advisor: Dr. Mahesh R Panicker *India*

- Implemented LSTM-based Autoencoding with Channel Attention to expedite feature retrieval from EEG data by ***2.5x***. Utilized Convolutional Neural Networks for classifying these features, enabling robust Emotion Recognition
- Leveraging an Autoencoder-based approach for feature extraction, we eliminated manual feature engineering for EEG data, rendering our deep learning model task-agnostic and achieving a ***17%*** boost in accuracy for seizure detection

Publications

- Arjun et al., **"Introducing Attention Mechanism for EEG Signals: Emotion Recognition"**, IEEE Engineering in Medicine Biology Society (EMBC), 2021. [Link]
- Arjun et al., **"CoGraph: Mapping the Structure of the Cognitive Sciences, Neurosciences, AI"**, Conference on Cognitive Computational Neuroscience (CCN), 2022. [Link]
- Arjun et al., **"Subject Independent Emotion Recognition using EEG Signals Employing Attention Driven Neural Networks"**, Elsevier Biomedical Signal Processing and Control (BSPC). [Link]

Projects

Geo-Notes: Geographical Memory Anchor Web App | *React.js, Node.js, MongoDB, Heroku* **Website** | **GitHub**

- Designed a user-centric web platform that allows users to associate and retrieve notes linked to precise geographical locations, notably enhancing the overall experience of travel and aiding in memory recall

Advanced Music Synthesis using Transformer Architectures | *Python, Colab* **GitHub**

- Developed an advanced Transformer-based model for generating multi-instrument novel music compositions
- Integrated a Hierarchical Vector Quantised Variational Autoencoder with Transformer-XL into the model, achieving high-fidelity, diverse music generation. This integration enabled a nearly lossless ***6x*** compression of raw audio wavefiles, facilitating direct manipulation and synthesis

Leadership & Achievements

- **Coordinator**, Carrier Development Cell, *IIT Palakkad* (2019-2021).
- Ranked in the top **0.006%** of **1.2 million** aspirants, *IIT JEE Advanced Entrance Examination*, 2018.