Shravan S. Chaudhari

Email: *shravan25.chaudhari@gmail.com* | Mobile: *+91-9130091125* | Github: *https://github.com/Shra1-25*

Education

Birla Institute of Technology and Science (BITS) Pilani — Goa, India
Bachelor of Engineering (Hons.) in Electronics and Instrumentation — August 2017 - July 2021
CGPA: 8.35 / 10.0

Experience

Research Assistant — European Organization for Nuclear Research, **CERN**
Current - June 2021

Undergraduate Researcher — Center for Artificial Intelligence Research, **BITS Pilani, Goa**
August 2020 - Current

Research & Open-Source Software Intern — Google Summer of Code 2020, **Google**
May 2020 – August 2020

Research Intern — Starlite Lighting Limited
May 2019 – August 2019

Skills

- **Domains:** Big Data Science, Applied and Large Scale Machine Learning, High Performance Computing, Computer Vision, Natural Language Processing, Signal and Image Processing, Time Series Analysis, FPGA
- **Programming Languages:** Python, C++, C, Java, MATLAB, Kotlin, Octave, Solidity for Ethereum
- **Frameworks Libraries:** Pytorch, Tensorflow, Keras, Horovod
- **Libraries:** Numpy, Pandas, Matplotlib, Scikit-learn, OpenCV, Pytorch-Lightning & Geometric, Tensorflow-Lite,
- **Cloud Platforms & Development Tools:** Google Colab Notebook, Docker, Singularity, Git, Android Studio
- **Operating Systems:** Ubuntu, MacOS, Windows

Publications Under Review

- *M. Andrews(CMU), B. Burkle (Brown),* ***S. Chaudhari (BITS Pilani)****, D. Dicroce (UA), S. Gleyzer (UA), U. Heintz (Brown), M. Narein (Brown), M. Paulini(CMU), E. Usai (Brown),* Accelerating End-to-End Deep Learning for Particle Reconstruction at CMS, 25th International CHEP Conference (2021).
- *M. Andrews(CMU), B. Burkle (Brown),* ***S. Chaudhari (BITS Pilani)****, D. Dicroce (UA), S. Gleyzer (UA), U. Heintz (Brown), M. Narein (Brown), M. Paulini(CMU), E. Usai (Brown),* End-to-End Jet Classification of Boosted Top Quarks with CMS Open Data, 25th International CHEP Conference (2021).

Key Accomplishments

- **Winner** at the national *TechExpo Startup Hackathon 2020* organized by IIT Guwahati (Indian Institute of Technology)
- **Runner's up** at the national level *Data Science Hackathon 2020* organized by IISc Bangalore (Indian Institute of Science)
- **Ranked among Top 8** at the international *Nvidia Helmholtz GPU Hackathon* organized by Nvidia
- **Ranked among Top 10** at the international *Nvidia CSC GPU Hackathon* organized by Nvidia
- **Achieved 100% grade** in several online Machine Learning courses conducted by Coursera
- **Organized an International Hackathon Challenge** sponsored by Brown University and University of Alabama.
- **Won State Level Merit Scholarship** at Secondary school.

Academic Courses

Computer Programming	Object Oriented Programming	Microprocessor & Interfacing	Digital Image Processing
Digital Design	Analog & Digital VLSI Design	Neural Network & Fuzzy Logic	Linear Algebra
Signals & Systems	Mobile Telecommunication Nw	Probability & Statistics	Calculus

Online Courses

- Deep Learning Specialisation, Convolutional Neural Networks, Sequence Models, Machine Learning, Data Analytics with Python, Python for Data Science & AI, Improving Deep Neural Networks with Hyperparameter Tuning/Regularisation/Optimisation

PROJECTS

High Energy Physics Particle Classification *Duration: 3 months*

Advisor: Dr. Sergei Gleyzer (University of Alabama, CERN), Dr. Amalin Prince (BITS Pilani)

- Developed an end-to-end algorithm from particle detectors at the Large Hadron Collider using calorimetric energy deposit images & innovative Deep Learning approaches applying convolutional neural network architectures VGGs, ResNets & graph neural networks. (Report)
- Made several contributions to the official github repository & software framework of CERN (CMSSW)
- Optimized & validated inference timing & memory performance.

Key Achievement: Improved ROC AUC score from the current benchmark of 0.788 to 0.814 for electron vs photon.

Complex Scientific Computation & Analysis *Duration: 2 months*

Advisor: Dr. Sergei Gleyzer, Guiseppe Fiameni (Nvidia)

- Optimised & parallelized the training & inference of deep learning algorithms with Nvidia computing nodes & GPU clusters using Python Tensorflow, Keras, Pytorch frameworks for different algorithms.
- Integrated inference code with software framework of CERN to facilitate end to end inference using CERN GPU clusters.

Key Achievement: Reduced training time by 93% on single GPU & by 97% with two GPUs for 4 million data samples. Gained 2X speed in inference using TensorRT optimisation.

Optimising and Deploying Convolutional Neural Networks on FPGA *Duration: 6 months*

Advisor: Dr. Amalin Prince (BITS Pilani)

- Designed a pipeline for implementation of computer vision algorithms on FPGA
- Developed the inference code in python & the corresponding VHDL code using MATLAB and Simulink. Verified the workflow using MNIST digit classifier. Frameworks used: Tensorflow, Keras. Languages used: Python, MATLAB, VHDL, Verilog.

Computer Vision based ECG Report Analysis *Duration: 5 months*

Advisor: Ayeshwarya Mahajan (Intel)

- Developed Android based mobile application for interpreting printed ECG/EKG reports using machine learning to predict heart rates, heart diseases, detect anomalies
- Developed algorithms using Tensorflow & LightWAVE ECG data set recorded by 20 patients by Physionet

Key Achievement: Demonstration at Indian Institute of Science Bangalore, Indian Institute of Technology (Guwahati)

Surface Mount Technology Pick & Place Optimization *Duration: 2 months*

Advisor: Ravi Bharati (Managing Director,, Starlite Lighting Ltd.)

- Implemented electronic component recognition using OpenCV
- Developed approach for tool movement optimization by applying clustering algorithms

Key Achievement: Demonstrated 60% improvement in manufacturing efficiency & 70% reduction in error rate by eliminating manual operations.

Meme Sentiment Analysis *(Course Project)* *Duration: 2 months*

Advisor: Prof. Tirtharaj Dash (BITS Pilani)

- Implemented algorithms for sentiment analysis techniques using image preprocessing strategies, text embedding techniques (BERT Embedding), sklearn classifiers (XGBoost & LightGBM) & image feature extractors (ResNet50 & VGG). Project Report & Project description

Key Achievement: Demonstrated results at university competition & secured third rank out of 85 students.

Atmospheric correction of Satellite data using Haze removal techniques *(Course Project)* *Duration: 2 months*

Advisor: Dr. Ashish Chittora (BITS Pilani)

- Implemented dark channel prior method, color attenuation prior method, LCM-CLAHE algorithms on images provided by FRIDA (Foggy Road Image Database) & compared their performance against image quality metrics MSE, SSIM, Brisque, Niqe, PSNR.

Visual Question Answering (*Study Project)* *Duration: 6 months*

Advisor: Prof. Tirtharaj Dash (BITS Pilani)

- Implemented & combined Object Detection algorithms with text recognition techniques to solve the Visual Question Answering Problem.

Current Deep Learning Projects using Tensorflow, Keras, OpenAI Gym**:** *Duration: 5 months*

Advisor: Dr. Ashwin Srinivasan (BITS Pilani) Sponsor: ABB Automation Company

- Reinforcement Learning using Winnow algorithm
- Web break prediction using Time Series Analysis, anomaly detection & root cause analysis