BHASITHA DHARMASENA

PhD in Experimental Nuclear Physics,
Machine Learning Engineer,
Mechanical Engineer,

CONTACT

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CHARLOTTESVILLE, VA

434-953-1351

SKILLS

- Machine Learning Skills :
  PyTorch, Scikit-learn, NumPy, Pandas, Graph Neural Networks-GNN, Transformers, CNN, LSTM, Classification, Regression, Clustering
- Data Visualization :
  Matplotlib, plotly, seaborn, ROOT
- Programming :
  Python, C++, MATLAB, Git, UNIX/LINUX, Shell
- Mech Engineering Skills :
  Numerical Simulations, Computational Fluid Dynamics(CFD), Finite Element Analysis(FEA), Microcontroller Programming, SolidWorks, ANSYS, NDT Testing
- Elec Engineering Skills :
  Digital Signal Processing, Field Programmable Gate Array (FPGA), ASIC Application Specific Chip Designing, Verilog

ACHIEVEMENTS

- 22nd place in Mathematics Olympiad (Sri Lanka)
- 4th place in Australian National Chemistry Quiz (Sri Lanka)
- 100th place in GCE Advanced Level Sri Lanka (Mathematics and Physical Science stream)

EDUCATION

- PhD(Ongoing) Experimental Nuclear & Particle Physics - University of Virginia
- B.Sc in Mechanical Engineering - University of Peradeniya, Sri Lanka
- Data Science Bootcamp - Erdös institute

SELECTED PROJECTS

Measurement of Neutron's Electromagnetic Form Factor Ratio

Jefferson Lab (Thomas Jefferson National Accelerator Facility)

- Designed subatomic particle(ex:electron) trajectory detectors for nuclear scattering experiments at Jefferson Lab Hall-A. Performed frontend electronic readout system installations and real-time data acquisition. Carried out Finite Element Analysis(FEA) studies and Computational Fluid Dynamics(CFD) for stable operation of the particle detectors
- Conducting C++ and Python based data analysis for nuclear physics experiment data to extract key insights from data recorded from various readout systems

Graph Neural Networks(GNNs) for Nuclear Particle Tracking

Jefferson Lab (Thomas Jefferson National Accelerator Facility)

- Developed a fully functional Deep Learning pipeline to enhance electron trajectory reconstruction in nuclear scattering experiments. Pipeline incorporates a state-of-the-art link prediction GNN algorithm developed using PyTorch GraphSAGE and LSTM frameworks
- Data engineered from C++ formats of electronics hardware data into pandas dataframes with explicit data cleaning. Performed data restructuring to represent the data as tensors of graphs
- 3D visualizations using plotly and matplotlib to enhance insights from complex data

Deep Learning based RF Signal Detection for Counter Drone Applications

Dedrone by AXON

- Developed an end-to-end deep learning based RF signal detection package for drone communications, enabling real-time identification of drone threats for counter-UAS applications

Segmentation of Mental Foramen using Deep Learning

Faculty of Engineering, University of Peradeniya

- Developed a U-Net Deep Convolutional Neural Network (DCNN) to identify the mental foramen in Dental Panoramic Tomography images to assist dental anesthetics

Effect of Wind Lens on Small wind Turbines under Low Wind Speeds

Faculty of Engineering, University of Peradeniya

- Computational Fluid Dynamics(CFD) simulation investigation on the mentioned topic using ANSYS–CFX packages, MATLAB and SolidWorks

WORK EXPERIENCE

Machine Learning Engineer Intern — May 2024 – Aug 2024
Dedrone by AXON | Sterling | VA

Graduate Researcher (Machine Learning and Data Analysis for Nuclear Physics) — Jan 2023 – Current
Jefferson Lab (Thomas Jefferson National Accelerator Facility) | Newport News | VA

Graduate Research Assistant — Jan 2021 – Jan 2023
University of Virginia | Charlottesville | VA

Graduate Teaching Instructor — Mar 2019 – Oct 2020
Faculty of Engineering | University of Peradeniya | Sri Lanka

Research Engineer — Oct 2017 – Jan 2018
Korea Maritime & Ocean University | Busan | South Korea

OTHER COURSES

Microsoft Azure SQL - Coursera

Developing AI Applications with Python and Flask - Coursera