

Shanmugha Balan

*M.Sc. Physics and B.E. Electrical and Electronics Engineering
Birla Institute of Science and Technology, Pilani - 8.1/10.0*


Passionate about Astronomy and Machine Learning. Avid blogger, loves to teach and share knowledge!

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 sbalan7



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EXPERIENCE

Undergraduate Research Scholar

 Astrophysics and Cosmology Research Group, Dept of Physics  Dec 2020 – present  BITS Pilani, Rajasthan

- Working on star cluster data from the Gaia Mission by the European Space Agency
- Studied structural properties and stability of clusters using unsupervised learning algorithms

Machine Learning Intern

 Army Base Workshop  May – Jul 2021  Pitharogarh, Uttarakhand

- Built a machine learning model to determine servicing status of army equipment and added location visualization
- Integrated the above with a Flutter interface to make a highly user friendly UI

Junior Research Scholar

 Raman Lab, Computational Systems Biology Lab  Apr – Jun 2018  IIT Madras, Chennai

- Analysed protein networks for *E. coli* using data from the STRING database
- Made a protein network graph with NetworkX to identify potential drug targets

PERSONAL PROJECTS

SEU Detection for CASSIOPE

Trained a random forest model to protect the CASSIOPE satellite from solar disruptions with a highly unbalanced dataset and got 87.6% accuracy

Traffic Sign Classifier

Trained a custom CNN on the German Traffic Sign Benchmark dataset of around 50000 images with 92% accuracy and made a GUI to deploy the model

SKILLS

Machine Learning

TensorFlow, PyTorch, Scikit-Learn

Data Science

Numpy, Pandas, Matplotlib

Scientific Computing

C/C++, MATLAB, Python (Anaconda)

COURSES

University Courses (Math)

Math 1 (Calculus) | Math 2 (Linear Algebra+Complex Analysis) | Math 3 (Differential Equations) | Probability and Statistics

University Courses (Physics)

Classical Mechanics | Electromagnetic Theory | Optics | Quantum Mechanics | Nonlinear Dynamics and Chaos

MOOCs (Certified)

Deep Learning Specialization (5 courses, deeplearning.ai) | Applied Data Science Specialization (5 courses, U Mich) | TensorFlow in Practice (4 courses, deeplearning.ai)

MOOCs (Audited)

Intro to DL (MIT OCW) | CNNs for Visual Recognition and NLP for DL (Stanford Online) | Deep Reinforcement Learning (UC Berkeley) | Data Driven Astronomy (University of Sydney)

EXTRA CURRICULAR ACTIVITIES

Microsoft Learn Student Ambassador

Conducted games for APOGEE and paper discussions with the ML student interest group

FreeLunch

Senior Editor of the Science and Technology section of a research oriented blog

The Radio Astronomy Club

Manage the blog and perform data analysis of gravitational wave signals

Physics Association

Made educational posts and conducted talk series to promote physics