

Prateek Ganguli

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Research Interests

My research interests are at the intersection of **Formal Verification** and **Machine Learning**. I am particularly interested in 1) developing novel techniques and tools to improve the reliability of Machine Learning-based systems, and 2) leveraging Machine Learning to tackle challenging Verification tasks in the domain of Cyber Physical Systems.

Education

University of Calcutta

Bachelor of Technology in Computer Science and Engineering

○ 9.51 CGPA

○ Consistently ranked first in class.

Kolkata, India

Aug 2020 – Jul 2024

Indian Institute of Technology, Madras

Bachelor of Science in Data Science

○ 8.07 CGPA

○ Distance learning undergraduate certificate course.

Online

Jan 2021 – Dec 2023

Experience

Indian Statistical Institute, Kolkata

Research Intern

○ Researched the selection of Bounded Model Checkers for the verification of safety properties of circuits from the HWMCC competition.

○ Researched the applications of Large Language Model (LLM) based tools for Electronic Design Automation and Formal Verification.

Kolkata, India

Oct 2023 – (ongoing)

Google Summer of Code at Debian

Software Developer Intern

○ Required to compile and update 2 year old Android SDK tools package for Debian to the latest version. Worked in a team of 5 people. See: wiki.debian.org/PrateekGanguli/SummerOfCode2021

○ Wrote build scripts in GNU Make and set up a CI/CD pipeline to automatically build the patched upstream sources from Google, passing all automated test cases.

Online

Jun 2021 – Aug 2021

Research

Bounded Model Checker engine selection

under Dr. Ansuman Banerjee

Indian Statistical Institute, Kolkata

Jan 2024 – (ongoing)

Drone and Cab Based Hybrid Package Delivery Optimization

under Dr. Sunirmal Khatua

University of Calcutta

Nov 2023 – (ongoing)

Verilog Code Generation and Debug Using Large Language Models

under Dr. Ansuman Banerjee

Indian Statistical Institute, Kolkata

Oct 2023 – Dec 2023

Open-Source Projects

Sign Language Recognition

Jun 2023 – Jul 2023

○ Used American Sign Language hand images dataset to train a Convolutional Neural Network (CNN) based on transfer learning of MobileNet v2, using TensorFlow, achieving 95% accuracy.

○ Awarded winner of the IBM SkillsBuild Data Analytics Program.

Student Dropout Prediction

May 2022 – Aug 2022

○ Used Student Dropout dataset from Kaggle to predict susceptibility of dropping out, based on anonymized features.

○ Best performing model trained was Gradient Boosted Decision Tree, using Scikit-Learn, which achieved a F1-score of 0.78, obtaining rank 21 on the public leader-board out of 200 participants.

Mentoring

○ *Jun 2023* – Mentored a cohort of students in Machine Learning Practice and Linux System Commands in the IIT-M BS Degree Program.

○ *Oct 2022* – Teaching Assistant for B.Tech Semester 3 students in Data Structures and Algorithms Lab under Dr. Pritha Banerjee at CU CSE.