

# Adwitya Chakraborty

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## Education

### Banasthali Vidyapith

2022 – 2026

*B.Tech in Computer Science*

- **CGPA:** 7.24/10

- **Coursework:** Database Management Systems, Operating System, Object Oriented Programming

## Experience

### Research Intern

Jul 2025 – Nov 2025

*Scientific Analysis Group (SAG), DRDO*

- Conducted **ML-based cryptanalysis** on **LED** and **SPECK** lightweight block ciphers by generating and analyzing  $\approx 393,000$  ciphertext samples, training ANN, 1D-CNN, and Transformer models to classify cipher variants with up to  $\approx 55\%$  accuracy, validating near-pseudorandom behavior.
- Implemented **Explainable AI (SHAP, LIME)** to analyze **64-bit ciphertext feature importance**, demonstrating absence of strong learnable biases in SPECK and identifying limited influential bit positions in LED, supporting cipher robustness against ML-based distinguishers.

## Projects

### Disease Subtype Classification for Breast Cancer Detection

April 2024 – May 2025

- Developed a **Flask web application** for live model evaluation, displaying **EDA** visuals, **SMOTE** impact charts, convergence curves, and performance metrics dynamically using **JavaScript** and **Matplotlib**.
- Achieved classification accuracy up to **99.75%**, F1-score of **0.9975**, and ROC AUC of **1.00** using SMA-selected features with Random Forest on the "vital.status" binary outcome.

### Rate Limiter Service

July 2025

- Architected and implemented a distributed **Redis-based rate limiter service** in **Go** processing **1000+** requests/second with sub-**20ms** response times, supporting **99.9%** accuracy through sliding window log algorithms with nanosecond precision across multiple application instances
- Built comprehensive **Redis** integration layer with **15+** custom interfaces supporting 3 identification strategies (IP, token, custom headers), enabling horizontal scaling across 5+ application instances with shared rate limit state and **99.95%** uptime

## Activities and Achievements

- Secured a position in the **Top 100** contributors in Social Summer of Code 2025.
- Contributed to open source with **13 merged pull requests** (**6 in GirlScript Summer of Code, 3 in Social Winter of Code, 4 in Social Summer of Code**) accepted on GitHub.
- Served as a **Campus Ambassador for GirlScript Summer of Code**, driving campus-wide outreach and engagement by promoting the program, onboarding participants, and strengthening the open-source community presence.
- Secured **2nd rank** in "Sahitya Ke Rang" (3rd National Level Online Poetry and Essay Writing Competition) organized by the HULAHUL Foundation.

## Skills

**Programming Languages:** Python, Golang, C++, C, Java, Bash, HTML5, CSS3, JavaScript

**Databases:** SQL, MongoDB, Redis

**Tools/Technologies:** Git, Postman, VS Code, Windows Subsystem for Linux, Kali Linux