Abhiroop Sarkar

Mail LinkedIn GitHub Scholar Website

Education

Institute of Engineering & Management, Kolkata **Oct. 2022 – July 2026**

BTech in Computer Science & Engineering (Artificial Intelligence & Machine Learning) *–MAKAUT*

- **GPA**: 9.46 (upto 4th semester)
- **Relevant Coursework**: Design and Analysis of Algorithms, Discrete Mathematics, Data Structures & Algorithms

Research Interests

Cryptology, Machine Learning

Experience

Presidency University, Kolkata — Summer Intern **May 2024 – present**

- Learning and implementing various visual cryptography schemes in Python under supervision of Prof. Dr. Avishek Adhikary.

IEM Centre of Excellence for Cloud Computing & IoT — Research Assistant **Feb. 2024 – present**

- Building an Intelligent System for Precision Agriculture with Machine Learning and Internet of Things.
- Working on enhancing the security of the historic ADFGVX Cipher.

Conference Presentations

An Overview of the Discrete Logarithm Problem in Cryptography —
presented at the 3rd International Conference on Advanced Computing and Applications (ICACA-2024) with Deepsubhra Guha Roy, Piyali Datta

AgroGenie: A smart approach to Agriculture using Machine Learning —
presented at the 3rd International Conference on Intelligent Systems and Applications (ICISA 2024) with Kinshuk Ganguly, Snehal Ghosh, Debayan Ghosh, Subhajit Saha, Piyali Datta, Deepsubhra Guha Roy

Projects

Review of the Discrete Logarithm Problem **August 2023 - December 2023**

- Explored the significance of Discrete Logarithm Problem in modern cryptography, analyzing its role in protocols such as Diffie-Hellman, ElGamal, and Elliptic Curves.
- Investigated the historical development, discussed the theoretical foundations and, equations, analyzed the algorithms, and security aspects of the DLP.
- Guided by Dr. Deepsubhra Guha Roy, and Dr. Piyali Datta.

AgroGenie | *Python (Scikit-learn, Numpy, Pandas)* | **GitHub** **July 2023 - January 2024**

- Worked in a team of 5 to implement a Crop Recommendation System.
- Preprocessed the dataset, applied K-folds cross-validation and used RandomForest Classification with K-means Clustering to achieve 99.6% accuracy.
- A novel approach to recommend a cluster of crops instead of single crops to make the system more practical for farmers.
- Guided by Dr. Piyali Datta, and Dr. Deepsubhra Guha Roy.

Password Management System with Stream Cipher | *Python* | **GitHub** **June 2023**

- Developed a Password Management System with robust security using Stream Cipher algorithms and PBKDF2 key derivation function in command line interface.
- Ensured secure storage of encrypted passwords and sensitive data in a binary file.
- Users have the option to update their saved passwords.

IoT based CO_2 level monitoring system | *NodeMCU, MQ135, DHT11* | **arXiv** **April 2023**

- Worked in team of 6 in designing an IoT-enabled CO_2 monitoring system using components such as NodeMCU-esp8266, mq135 (gas sensor), & dht11 (temperature & humidity Sensor). Used ThingSpeak to plot data from the device.
- Worked on writing the code and calibrating mq135.

Skills

Languages: Python, C, Matlab, Java (Basics)
Subjects: Cryptography, Discrete Mathematics, Supervised Machine Learning
Tools: LaTeX, GitHub, Canva

Certificatioms

NPTEL :The Joy of Computing using Python, Discrete Mathematics, Programming, Data Structures And Algorithms Using Python, Design and Analysis of Algorithms (Top 2%), Foundations of Cryptography (Top 5%)
Coursera: Cryptography I, Supervised Machine Learning: Regression and Classification