

Raju Molla

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Research Interests

Artificial Intelligence for Cybersecurity, Agentic AI, Federated Learning, Explainable AI (XAI), Adaptive Intrusion Detection Systems, Adversarial Machine Learning, Trustworthy and Robust Machine Learning, Edge-Cloud-IoT Security, Concept Drift Adaptation, Privacy-Preserving Machine Learning, Anomaly Detection, Distributed Cyber Defence

Education

University of Wales Trinity Saint David

June 2025 – June 2026

MSc in Cybersecurity and Digital Forensics

London, United Kingdom

Dissertation: Hybrid Intrusion Detection System for IoT and Cloud Environments

Research Areas: AI for Cybersecurity, Intrusion Detection Systems, IoT Security, Cloud Security, Explainable AI

Eastern University

Oct 2018 – Feb 2023

BSc in Computer Science and Engineering (GPA: 3.74/4.00)

Dhaka, Bangladesh

Research Topic: Cardiovascular Disease Prediction Using Machine Learning

Relevant Areas: Machine Learning, Data Mining, Software Engineering, Algorithms

Research Experience

Adaptive Intrusion Detection for Edge-Cloud-IoT Environments (MSc Research)

2025–2026

- Designed and implemented a hybrid intrusion detection framework integrating Random Forest, XGBoost, and LSTM Autoencoder-based anomaly detection for heterogeneous edge-cloud-IoT environments
- Developed **IoT-CloudSec**, a multi-context synthetic cybersecurity benchmark containing IoT telemetry, edge metrics, cloud infrastructure indicators, orchestration telemetry, and streaming-system features for leakage-aware intrusion detection evaluation
- Published the **IoT-CloudSec** benchmark dataset on IEEE DataPort for reproducible cybersecurity and intrusion detection research
<https://iee-dataport.org/documents/iot-cloud-sec>
- Conducted temporal evaluation, robustness analysis, anomaly detection experiments, and explainable AI analysis using SHAP for adaptive cyber threat detection
- Investigated challenges related to concept drift, evolving attack behaviour, unseen attack detection, telemetry corruption, scalability, and real-time adaptability in distributed infrastructures
- Proposed a privacy-preserving adaptive federated intrusion detection architecture for trustworthy cyber defence across distributed edge-cloud ecosystems
- Achieved strong experimental performance using hybrid machine learning and anomaly-aware sequence modelling techniques across combined IoT and enterprise network environments

Research Publications

2025–Present

- Hybrid Intrusion Detection System for IoT and Cloud Environments**
Preprint available on *Research Square*.
DOI: 10.21203/rs.3.rs-10144004/v1
- Beyond Permissions: Multi-Layer Monitoring and Forensic Behaviour Graph Analysis for Detecting Hidden and Collusive Chrome Extensions**
Submitted to *Forensic Science International: Digital Investigation* (Elsevier)

Cardiovascular Disease Prediction using Machine Learning (BSc Research)

2022–2023

- Conducted comparative analysis of multiple machine learning algorithms for cardiovascular disease prediction
- Performed data preprocessing, feature engineering, feature selection, and model evaluation on healthcare datasets
- Evaluated classification performance using multiple statistical and machine learning evaluation metrics
- Developed practical understanding of predictive modelling, model optimisation, and applied machine learning workflows

Professional Experience

Qtec Solution Limited <i>Software Engineer</i> - Designed and implemented scalable and secure backend systems for financial and healthcare applications - Developed distributed systems and APIs with emphasis on data integrity and system reliability - Collaborated with international teams to deploy systems across multiple regions	Mar 2024 – Jun 2025 <i>Dhaka, Bangladesh</i>
Bimafy Limited <i>Software Engineer (React Native)</i> - Developed cross-platform mobile applications with integrated cloud services and OCR functionality - Implemented secure API integrations and real-time application features	Oct 2023 – Feb 2024 <i>Dhaka, Bangladesh</i>
Bangla Institute <i>Backend Engineer Intern</i> - Built backend services and secure authentication systems using Node.js and Express.js - Optimized database performance and designed scalable data models	Dec 2022 – Jun 2023 <i>Remote</i>

Projects

IoT-CloudSec Research Framework <i>Python, Scikit-learn, TensorFlow, SHAP</i> - Implemented a hybrid intrusion detection framework integrating supervised learning and anomaly-aware sequence modelling - Developed telemetry processing pipelines for IoT, edge, and cloud security datasets - Performed explainability analysis using SHAP together with robustness and temporal evaluation experiments	2025–Present
UMIS-v2 Distributed Microfinance System <i>Asp.net, Razor Page, SQL Server</i> - Developed scalable backend services for a distributed multi-country microfinance platform deployed across East Africa - Designed secure APIs and transaction-processing workflows for financial operations - Improved reliability and scalability of distributed financial services infrastructure	2024–2025
Secure Healthcare API System <i>Node.js, Express.js, MongoDB</i> - Developed secure RESTful APIs for healthcare data management and protected patient information workflows - Implemented authentication, authorization, and secure data-access mechanisms - Focused on API security, privacy protection, and backend reliability	2024

Technical Skills

Cybersecurity: Intrusion Detection Systems (IDS), Network Security, Cloud Security, IoT Security, Browser Security, Threat Detection, Threat Analysis, Digital Forensics, OWASP Top 10

Machine Learning & AI: Random Forest, XGBoost, LightGBM, LSTM, Autoencoders, Classification, Anomaly Detection, Explainable AI (SHAP), Feature Engineering, Data Preprocessing

Programming: Python, JavaScript, TypeScript, C, C++, C#

Frameworks & Libraries: Scikit-learn, TensorFlow, Pandas, Node.js, Express.js, React, Next.js, ASP.NET

Tools & Platforms: Kali Linux, Burp Suite, Nmap, Metasploit, SQLMap, FTK Imager, Git, Docker

Databases: MongoDB, SQL Server, MySQL

Achievements

- Top 3% globally on TryHackMe cybersecurity platform
- Completed 130+ hands-on labs in offensive and defensive security
- ICPC Dhaka Regional 2023 participant
- Champion, Eastern University Programming Contests (37th & 38th)