Md. Jewel Rana

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Codeforces LeetCode Kaggle GeeksforGeeks

EDUCATION

Pabna University of Science & Technology, Pabna, Rajshahi **2020 – 2025**
B.Sc. in Computer Science and Engineering - ***CGPA: 3.37*** *(Last Semester:* ***3.71****)* *Pabna, Rajshahi,Bangladesh*

Gangni Government Degree College **2017 – 2018**
Higher Secondary Certificate (HSC (2019)) - Science - ***GPA: 4.50/5.00*** *Gangni,Meherpur, Bangladesh*

Gangni Pilot High School and College **2015 – 2016**
Secondary School Certificate (SSC (2017)) - Science - ***GPA: 4.55/5.00*** *Gangni, Meherpur, Bangladesh*

EXPERIENCE

Research and Development Engineer **September 2025 – Present**
Brain Computer Interface, AIMS Lab, UIU

- Focusing on EEG-Based Machine Learning Models for Mental Health and Artificial Intelligence applications.
- Working with advanced neurotechnology tools including **BrainVision Professional Recorder**, **BrainVision Analyzer**, and **PsychoPy** for experimental design and data acquisition.
- Developing and implementing ML algorithms for real-time EEG signal processing and mental health assessment.
- Conducting interdisciplinary research combining neuroscience, machine learning, and clinical psychology applications.

Mentor, Gangni Gonit Poribar **2017 – Present**

- Provided guidance and support while fostering analytical and problem-solving skills.

Kaggle Contributor **Present**

- Completed **Basic Python** and **Intro to Machine Learning** courses on Kaggle.
- Actively participating in Kaggle competitions as a contributor.

Contributor, TorchEEG GitHub Repository **Present**

- Contributed to **SSVEP-related dataset preprocessing** for EEG signal analysis.
- Added new EEG datasets to expand the repository's usability.
- Identified and fixed critical bugs to improve framework stability and performance.

CO-CURRICULAR ACTIVITIES

Participant, BCI & Neurotechnology Spring School 2025 **2025**

- Successfully completed 140-hour training at the BCI & Neurotechnology Spring School 2025. Participated in hands-on projects, including SSVEP Data Analysis for Brain-Computer Interface applications.

Champion, IEEE Day Programming Competition **2024**

- Won the Champion title in the IEEE Day Programming Competition 2024.

Runner-up, IEEE Day Idea Competition 2024 **2024**
Idea: Microplastics Detection using AI Camera

- Achieved Runner-up position in IEEE Day Idea Competition 2024 Organized by IEEE PUST Student Branch. The project idea: Microplastics Detection using AI Camera.

Champion, Intra Department Programming Contest 3.0 **2024**
Department of CSE, PUST, Team: "Restart"

- Won the Champion title in Intra Department Programming Contest 3.0 at Department of CSE, PUST.

Champion, PUST CSE Intra Department Programming Contest 2.0 **2023**
Team: Team_Restart

- Won the Champion title in PUST CSE Intra Department Programming Contest 2.0 with team Team_Restart.

Champion, IEEE Day Idea Competition 2023 **2023**

Idea: Digital Health Record System in Bangladesh

- Won the Champion title in the IEEE Day Idea Competition organized by IEEE PUST Student Branch.

2nd Runners-up, PUST IUPC **2023**

Team: PUST_Runtime_Error

- Achieved 2nd Runners-up position in the PUST IUPC competition.

Team Leader, Science Week Projects, Gangni Government Degree College **2018 – 2019**

- **39th National Science and Technology Week and Science Olympiads 2018**
- **Project Name: Dream City**
- Achievements: Sub-district Champion (Senior Category)
- Project Details: LED day/night light system, solar panel with renewable energy supply, Bluetooth-based smart watch security system, metrorail with surrounding wall city design.
- **Science Olympiad – 3rd Position** (Sub-district)
- **40th National Science and Technology Week and Science Olympiads 2019**
- **Project Name: Real Driving Simulator**
- Achievements: Sub-district Champion (Senior Category)
- Project Details: Integration of keyboard, car steering wheel, mobile phone, PC, Driving Simulator Car Game, mobile-to-PC connectivity using Monect PC Remote, and a specialized chair.

Creative Talent Hunt District Champion (Computer and Math, Senior Category) **2018**

- Won the District Champion title in the Senior Category for Computer and Math.

Gangni Pilot High School Cricket Team Member **2016**

- Contributed actively as a team member at Gangni Pilot High School and College; played a key role in achieving the District Runner-Up title.

Gangni Pilot High School Volleyball Team Member **2016**

- Engaged as a dedicated team member at Gangni Pilot High School and College; instrumental in leading the team to a District Runner-Up finish.

Research Papers

Real-time Driver Activity Detection Using Advanced Deep Learning Models

Published in: *Cognitive Neurodynamics, 2025* ***DOI:*** *10.1007/s11571-025-10*

- This study proposes deep learning-based real-time driver activity detection using multiple CNN architectures and a Hybrid CNN–Transformer with Efficient Channel Attention, achieving outstanding generalization performance.

Schizophrenia Detection Using fusion Common Spatial Pattern and Riemannian Geometry

Status: *Machine Learning with application, under review*

- This paper presents a novel method for detecting schizophrenia (SCZ) using EEG signals by combining Common Spatial Patterns (CSP) and Riemannian Geometry (RG), achieving classification accuracies up to 99.99%.

Conference Papers

Real-Time EEG Dynamics in Females: A Comparative Analysis of Eyes-Open and Eyes-Closed

NCIM, DUET, 2025 *[IEEE Xplore] [DOI]*

- Analyzed EEG indicators in females aged 60–80 across eyes-open and eyes-closed resting states using Stanford OpenNeuro dataset. Applied band-pass filtering, statistical feature extraction, and Random Forest classification (97% accuracy, EO recall: 99%). Demonstrated real-time detection within 2.2s execution time, suitable for cognitive and neurological research applications.

An Ensemble Machine Learning Approach for Cardiovascular Disease Prediction Using Feature Sel

QPAIN 2025 *[IEEE Xplore] [DOI]*

- Developed an ensemble machine-learning framework for cardiovascular disease prediction using optimized feature selection with Gradient Boosting, Random Forest, and XGBoost. Achieved robust performance across multiple evaluation metrics, demonstrating the effectiveness of hybrid ensemble strategies in clinical risk prediction.

An Explainable EEG Framework for Alzheimer's and Frontotemporal Dementia Diagnosis Using Pairwise CSP and Random Forest
Presented, ICAST 2025 (to be published in IEEE CPS, IEEE Xplore, EI/Scopus)

- Proposed an explainable EEG framework using pairwise Common Spatial Pattern (CSP) with Random Forest for differential diagnosis of Alzheimer's and Frontotemporal Dementia. Applied SHAP and LIME for channel importance interpretation, ensuring transparency in biomarker discovery. Demonstrated potential for clinical decision support in dementia diagnosis.

Multi-Class Classification of EEG Motor Execution Using Riemann Geometry Deep Learning
Presented, COMPAS 2025 (to be published in IEEE Xplore, Scopus index)

- Investigated EEG-based motor execution classification using Riemann Geometry (RG) features and hybrid deep learning models. Evaluated five classifiers, with CNN-LSTM achieving highest accuracy (82.28%). Proposed approach improves adaptive brain-computer interfaces for neurorehabilitation and assistive technology.

EEG-Based Biomarkers for Early Detection of First Episode Psychosis Using Riemannian Geometr
Presented, COMPAS 2025 (to be published in IEEE Xplore, index Scopus)

- Developed an EEG-based biomarker framework for first-episode psychosis detection. Combined Riemannian geometry-based covariance features with Support Vector Machines (SVM), and incorporated topological data analysis for enhanced classification robustness. Results highlight the clinical potential of RG-SVM in early psychiatric diagnosis.

PROJECTS

Helping Farmer | Android Studio, Java, TensorFlow Lite, Machine Learning, FastAPi,Google CS. **Jan 2023**

- Developed an AI-powered solution using TensorFlow Lite to help farmers identify crop diseases through real-time image processing.
- Integrated a weather forecasting system to provide farmers with timely agricultural insights.
- Utilized Google Cloud services for efficient data storage and processing, ensuring scalability and reliability.

Student Admission Form | HTML, CSS, PHP,SQL **Jan 2024**

- Developed an automated student admission form using PHP and Oracle Database to streamline the application process.
- Implemented secure authentication and data validation to ensure data integrity.
- Designed a responsive user interface using HTML and CSS for seamless user experience.
- Integrated email notifications to confirm successful application submissions.

TECHNICAL SKILLS

Languages: Python,C, C++,Java, JavaScript, VBScript, SQL,Assembly
Technologies/Frameworks: Deep Learning, Pytorch,Tensorflow, HTML5, CSS3, React, MongoDB, Express, Javascript, Bootstrap
Developer Tools: MNE, Torcheeg, Brainsignal, SSVEP Analysis Toolbox, colab, kaggle api, VS Code, PyCharm, IntelliJ, Canva

CODING PLATFORMS

Solved **600+** Problems on **Codeforces** with a max rating of **1311**.

Solved **60+** Problems on **GeeksforGeeks** (Coding Score: 105).

Solved **37+** Problems on **LeetCode**.

CERTIFICATIONS

- Basic Python - Kaggle
- Comprehensive Deep Learning Practice Test: Basic to Advanced - Udemy