Chironjeet Das Joy

https://chironjeetjoy.github.io/
Badda, Dhaka, Bangladesh
chironjeet87@gmail.com

Research Focus

Multi-Robot Manipulation, Stochastic control, Deep Reinforcement Learning, Haptics, Embedded Systems & Sensor Fusion.

Education

BRAC University, Dhaka, Bangladesh (2020–2024)
Bachelor of Science in Electrical and Electronic Engineering
Specialization: Electronics (With focus on Robotics and Intelligent System)
CGPA: **3.6/4.0**

Publications

- T. Mahmud*, T. U. Wara, and **C. D. Joy**, *Risk Factor Identification and Classification of Malnutrition Among Under-Five Children in Bangladesh: Machine Learning and Statistical Approach.* (Under Review at *Heliyon*).
- **C. D. Joy**, A. H. Kafi, "Design and Optimization of Propeller-Based Thrust Vector Control Mechanism Using PID and Sensor Fusion Techniques," in *Proc. 76th International Astronautical Congress (IAC-25).*
- N. A. Shihab, **C. D. Joy**, M. Rahman, M. M. Chowdhury, P. M. Golpa, F. N. Showrov, R. S. I. Antara, and A. H. Kafi, "A low-cost satellite kit to bridge the educational and technological gap in developing countries," in *Proc. 76th International Astronautical Congress (IAC-25).*
- M. M. Chowdhury, M. Rahman, K. A. Rahim, H. H. Jui, A. Nawrin, M. T. A. Tonmoy, **C. D. Joy**, R. S. I. Antara, and A. H. Kafi, "BRACU Diganta: An affordable and inclusive CanSat kit for hands-on training of introductory level students in developing countries," in *Proc. 76th International Astronautical Congress (IAC-25).*
- A. H. Kafi, **C. D. Joy**, P. M. Golpa, and R. S. I. Antara, "Optimizing soybean production with ground sensor terminal-based monitoring system," in *74th International Astronautical Congress (IAC)*, Baku, Azerbaijan, Oct. 2–6, 2023.
- **C. D. Joy**, T. U. Wara, P. M. Golpa, J. Uddin, R. S. I. Antara, and A. H. Kafi, "Navigating the challenges of inflation and material scarcity in space programmes," in *74th International Astronautical Congress (IAC)*, Baku, Azerbaijan, Oct. 2–6, 2023.

On-Going Work

- **Flight Control System by Optimizing PID Control Algorithms for Enhanced Thrust Vectoring in Hybrid Rocket Engines – with Abdulla Hil Kafi.** (Current)
  Working as a Research assistant to build the test bench, TVC mechanism and control algorithm.
- **Biomimetic Passive Rotor-Assisted Descent Control with Vision-Guided Precision Landing – with Abdulla Hil Kafi.** (Current)
  Working as a Research assistant to build the vision-guided control algorithm and biomimetic blades.

Research Experience

- **Laboratory of Space System Engineering & Technology (LASSET)** with Abdulla Hil Kafi & Raihana Shams Islam Antara. (Fall 2022 – Current)
  Satellite Ground Sensory Terminal Project. Developed and implemented a time series data collection system for the Satellite Ground Sensory Terminal Project, utilizing multiple sensory inputs to monitor crop fields in rural areas via the KITSUNE Satellite. Designed a compact and easily deployable system, contributing significantly to project ideation and execution.
  RAVEN - Research on Aerial Vehicle with Enhanced Neural network. Inspired by real-world problems with drone stabilization in complex aerodynamics during rescue scenarios, built an IMU-based stabilization system. Constructed a controlled room with infrared tracking camera from scratch to simulate aerodynamics and capture drone 3D position data.
  BRACU Diganta - A Multipurpose CanSat Kit. Developed a low-cost, can-sized satellite system for multipurpose applications. Created an educational version for high school and college students. Currently mentoring a team preparing for CanSat Competition 2026.
- **Control & Application Research Center** - with Dr. A.K.M. Abdul Malek Azad. (Summer 2022)
  Solar Powered DC Compressor & High Voltage Switching. Built an experimental solar-powered fridge and later designed a high-voltage solid-state relay switching system for multipurpose applications.

- **FYDP/Capstone Project** - with Dr. Abu S.M. Mohsin
  7 DoF Robotic Arm Solution for Automated Medicine Inventory Control.
  Project Lead: Led the design of a low-cost robotic arm with 7 DoF for automated medicine shelving, stacking, and retrieval. Integrated stereovision cameras and 12-bit encoders for precise motion control.

Course and Other Projects

- **High Performance Flight Controller for Hybrid Rocket Engine - with Abdulla Hil Kafi.** (2025)
  Designed and developed a custom flight controller for a hybrid rocket engine using Teensy 4.1, programming in C/C++ to integrate accelerometers, gyroscopes, and pressure sensors, and implementing custom algorithms for real-time flight control, achieving reliable performance during simulated tests.
- **SwarmSync Controller Board for Modular Robotic Assembly.** (2025 – Current)
  Designed a Wi-Fi-enabled circuit with servo control and power-sharing connectors to facilitate autonomous robotic swarm assembly for dynamic structural formations.
- **SafeFall: A Multimodal Human Fall Dataset Captured via IMU, RGB, and Depth Camera Sensors - with Md. Mehedi Hasan Shawon.** (2025)
  Developed data processing for SafeFall, a multimodal dataset from 30 participants, enhancing fall detection with synchronized RGB, depth, and IMU data, advancing ambient intelligence and activity recognition.
- **Epileptic Seizure Detection and Classification Using Machine Learning Algorithms.** (2024)
  Developed and implemented a machine learning framework to classify three stages of epileptic seizures (normal, pre-seizure, and seizure) using EEG signals from the Physionet dataset, leveraging YOLOv8 for superior accuracy.
- **EEE383 Electronic System Design with Abdulla Hil Kafi.** (2023)
  Partnered with five undergraduate students and worked on a NANO Satellite designing project to collect data from multiple ground station to send back the data to a centralized ground control system. Designed and implemented the payload and communication.
- **Flying Raijin -**
  Developed a STM32 based FPV drone equipped with custom stereo-vision camera built from scratch. The drone achieved ∼150 km/h in 0 to 2 seconds (as verified by the on-board GPS module).
- **Digital Braille –**
  Developed a 6-letter refreshable Braille display using solenoid-driven tactile pins controlled via a Raspberry Pi and shift registers, enabling dynamic text-to-Braille conversion for visually impaired users.

Awards

- BRAC University Research Grant (RAVEN) – 2024, 2023.
- BRACU Student Assistant Fund – 2021, 2020.
- Dean's List (Spring 2021, Spring 2022, Spring 2023, Fall 2023).

Community Involvement

- LASSET, Outreach Team Lead – (2023 - Current)
- BARCU EEE Club, Mentor – (2021 - 2023)
- BARCU Computer Club, Mentor – (2021 – 2022)
- University Student Parliament, General Secretary - (2020 – 2024)

References

- **Abdulla Hil Kafi**
  Senior Lecturer, BRAC University.
  Doctoral Student, Space Robotics Laboratory, Kyushu Institute of Technology.
  Email: `abdulla.kafi@bracu.ac.bd`
- **Raihana Shams Islam Antara**
  Senior Lecturer, BRAC University.
  Doctoral Student, Space Robotics Laboratory, Kyushu Institute of Technology.
  Email: `raihanashams.antara@bracu.ac.bd`
- **Taiyeb Hasan Sakib**
  Senior Lecturer, BRAC University.
  Doctoral Student, Swinburne University of Technology.
  Email: `taiyeb.sakib@bracu.ac.bd`