Chironjeet Das Joy

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Research Focus
Robot Control, Joints, Sensory Infusion, Embedded System and Dexterous Manipulation.

Education

BRAC University, Dhaka, Bangladesh ***July 2020- October 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).

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, A. H. Kafi, and R. S. I. Antara, *"Adaptive Neural Networks for Hexa-Copter Resilience in Extreme Wind Regimes in Mars,"* Submitted at the76th International Astronautical Congress (IAC), 2025.

FYDP/Capstone Project

7 DoF Robotic Arm Solution for Automated Medicine Inventory Control with Dr. Abu S.M. Mohsin

- **Project Lead**: Led the development of a low-cost robotic arm with seven degrees of freedom for an automated medicine shelving, stacking, and retrieval system.
- Designed the system using stereovision cameras for enhanced spatial awareness and 12-bit absolute magnetic encoders for precise motion control, aimed at reducing drug misplacement errors and improving accuracy in pharmaceutical environments.

Research Experience

Laboratory of Space System Engineering & Technology - LASSET with Abdulla Hil Kafi & Raihana Shams Islam Antara ***January 2023 - Present***

Working on Designing Flight Control Systems by Optimizing PID Control Algorithms for Enhanced Thrust Vectoring in Hybrid Rocket Engines. – In progress

- Working as a Research assistant to build the test bench and the rocket electronic system.

Worked on *Satellite Ground Sensory Terminal Project* as the lead system designer & second author and *RAVEN* as the lead researcher and first author.

- 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:** Inspired by real-world problems with drone stabilization in complex aerodynamics during rescue scenarios, an Inertial Measurement Unit on the flight controller provides data about the drone cartesian position. Despite using regular PID controller, a Neural Network approach might lead to batter stabilization. *(Ongoing)*
- Currently building a controlled room with infrared tracking camera completely built from scratch to simulate complex aerodynamics and to take 3D position of the drone for comparing to the IMU data.

Control & Application Research Center with Dr. A.K.M. Abdul Malek Azad

July 2022 - January2023

Worked on Developing *Solar Powered DC Compressor* & *High Voltage Switching.*

- ***Solar Powered DC Compressor****:* Developed an experimental fridge with a DC compressor and Solar panel with graduate students.
- ***High Voltage Switching:*** Designed a high-voltage switching system using solid-state relays for multipurpose applications in collaboration with graduate students

Grad Course and Other Projects

High Performance Flight Controller for Hybrid Rocket Engine - with Abdulla Hil Kafi
(On Going) ***April 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 (***On Going)***

- Designed a Wi-Fi-enabled circuit with servo control and power-sharing connectors to facilitate autonomous robotic swarm assembly for dynamic structural formations.

EEE383 Electronic System Design with Abdulla Hil Kafi ***Fall 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

EEE383 EMBEDDED SYSTEM DESIGN with Nahid Hossain Taz ***Summer 2023***

- Developed a secure lock system using ATMega32 microcontroller, integrated with remote control functionality for enhanced accessibility. The system included real-time control, secure authentication protocols, and low-power operation, ensuring reliability and efficiency in both residential and commercial applications

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 second (as verified by the on-board GPS module)

Epileptic Seizure Detection and Classification Using Machine Learning Algorithms ***Summer 2023***

- 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, with a focus on leveraging transfer learning in YOLOv8 for superior accuracy.

Awards

LASSET Research Grant (RAVEN)– 2024, 2023

BRACU Student Assistant Fund – 2021, 2020

Dean's List (Spring 2021, Spring 2022, Spring 2023, Fall 2023) – Awarded for academic excellence across multiple terms

Community Involvement

LASSET, Outreach Team Lead	March 2023 to Present
BARCU EEE Club, Mentor	February 2021 - April 2023
BARCU Computer Club, Mentor	February 2021 - May2022
University Student Parliament, General Secretary	May 2020 to Present