

# Chironjeet Das Joy

<https://chironjeetjoy.github.io/>

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## Research Focus

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

## Education

**BRAC University**, Dhaka, Bangladesh

**May 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

## 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**

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 better 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 - January 2023**

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

<b>Grad Course and Other Projects</b>	<b>EEE383 Electronic System Design</b> with Abdulla Hil Kafi <span style="float: right;"><b>Fall 2023</b></span> <ul style="list-style-type: none"> <li>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.</li> <li>Designed and implemented the payload and communication subsystem.</li> </ul>
	<b>EEE383 EMBEDDED SYSTEM DESIGN</b> with Nahid Hossain Taz <span style="float: right;"><b>Summer 2023</b></span> <ul style="list-style-type: none"> <li>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</li> </ul>
	<b>Flying Raijin</b> <ul style="list-style-type: none"> <li>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)</li> </ul>
<b>Key Skills</b>	<p><b>Designing Tools:</b> Fusion 360, Altium, Simulink, Proteus, EasyEDA.</p> <p><b>Programming:</b> Python, OpenCV, Robot Operating System (ROS) [1&amp;2], MATLAB, C/C++, Arduino.</p> <p><b>Machine Learning/Data Analysis:</b> Deep Learning, including CNNs, RNNs; Machine Learning including SVM, KNN, Decision Trees.</p> <p><b>Hardware:</b> Proficient in Shielded Metal Arc Welding (SMAW), Brazing and MIG welding, Lathe machine, Soldering and many Power Tools.</p>
<b>Awards</b>	<p>LASSET Research Grant (RAVEN)– 2024</p> <p>LASSET Research Grant (RAVEN)– 2023</p> <p>BRACU Student Assistant Fund – 2021</p> <p>BRACU Student Assistant Fund – 2020</p> <p>Dean's List &amp; VC's List (Spring 2021, Spring 2022, Spring 2023, Fall 2023) – Awarded for academic excellence across multiple terms</p>
<b>Reference</b>	<p><b>Abdulla Hil Kafi</b>  Senior Lecturer of Electrical and Electronic Engineering at the BRAC University (Bangladesh).  PhD candidate at Kyushu Institute of Technology, Kitakyushu, Fukuoka (Japan).  Email: <a href="mailto:abdulla.kafi@bracu.ac.bd">abdulla.kafi@bracu.ac.bd</a></p> <p><b>Raihana Shams Islam Antara</b>  Senior Lecturer of Electrical and Electronic Engineering at the BRAC University (Bangladesh).  PhD candidate at Kyushu Institute of Technology, Kitakyushu, Fukuoka (Japan).  Email: <a href="mailto:raihanashams.antara@bracu.ac.bd">raihanashams.antara@bracu.ac.bd</a></p> <p><b>Tasfin Mahmud</b>  Senior Lecturer of Electrical and Electronic Engineering at the BRAC University (Bangladesh).  Email: <a href="mailto:tasfin.mahmud@bracu.ac.bd">tasfin.mahmud@bracu.ac.bd</a></p>