Chironjeet Das Joy

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Research Focus
Autonomous Dexterous Robotic Manipulation System, Computer Vision, Sensory Infusion.

Education

BRAC University, Dhaka, Bangladesh ***May 2020-Present***
Bachelor of Science in Electrical and Electronic Engineering
Graduation: October 2024(Expected)
Specialization: Electronics, (With focused on Robotics and Intelligent System)
Current CGPA: 3.6/4 (As of Spring 2024)

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
September 2023 - Present

- **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 batter stabilization.
- 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 a remote data logger by incorporating all the sensors from compressor, solar panel and controller using ESP32 for data processing purpose.
- ***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

EEE383 Electronic System Design with Abdulla Hil Kafi ***Fall 2023***

- Partnered with five graduate 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 subsystem.

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)

Key Skills

Designing Tools: Fusion 360, Altium, Simulink, Proteus, EasyEDA.

Programming: Python, OpenCV, Robot Operating System (ROS) [1&2], MATLAB, C/C++, Arduino.

Machine Learning/Data Analysis: Deep Learning, including CNNs, RNNs; Machine Learning including SVM, KNN, Decision Trees.

Awards

- 2023 LASSET Research Grant (RAVEN)– $800
- 2024 LASSET Research Grant (RAVEN)– $1,700
- 2020 BRACU Student Assistant Fund – $400
- 2021 BRACU Student Assistant Fund – $300
- Dean's List & VC's List (Spring 2021, Spring 2022, Spring 2023, Fall 2023) – Awarded for academic excellence across multiple terms

Reference

Abdulla Hil Kafi
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PhD candidate at Kyushu Institute of Technology, Kitakyushu, Fukuoka (Japan).
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