SARKER SAFAT MAHMUD
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EDUCATION

MS in Computer Science Jan 2025 – Present
Montana State University (MSU) Current CGPA: 3.83 (Grade scale 4)
B.Sc. in Mechatronics & Industrial Engineering Feb 2017 – Aug 2022
Chittagong University of Engineering & Technology CGPA: 3.09
Undergraduate Thesis Work: *Multi-Robot Task Allocation for Autonomous Robots.*

- Developed a simulation system with ROS and Gazebo for multi-robot task allocation.
- Investigated and compared the performance of vacancy chain and auction-based strategies in a dynamic and distributed environment for exploration and destruction tasks.

PROFESSIONAL EXPERIENCE

Junior Software Engineer, TechnoNext Ltd (Concern of US-Bangla Group) Feb 2023 – Jun 2024
Major Responsibility: Backend development

- Research and development for Payment Service Operation based on micro-service architecture
- Integrated 3rd Party APIs from Airfare Distribution and Payments settlement platform on OTA project.
- Contributed to Applicant Tracking System project's backend development.

Tech: Java, Spring Boot, Go, Gin, JPA, MySQL, PostgreSQL, Kafka, gRPC

Software Engineer Intern, Square Health Ltd. Nov 2022 - Jan 2023
Major Responsibility: Backend development using Java Spring Boot framework

- Developed an Inventory Management System's architecture from requirements analysis.
- Designed the ER diagram and developed all the Rest APIs according to the architecture.

Tech: Java, Spring Boot, JPA, MySQL, Git

Software Engineer, Tecognize Solutions Limited` Jan 2022 - Jun 2022
Major Responsibility: Backend development using Python Flask framework

- Designed and implemented Restful APIs and deployed them on AWS and different VMs for different web-app-based projects.
- DurbinX: Developed over 50 APIs and implemented third-party service integrations (SMS, Email, etc.) for this React and Flask-based web application, which is a parcel delivery courier service.

Tech: Python, Flask, PostgreSQL, Git, Docker, AWS EC2, Redis

TECHNICAL SKILLS

Programming Languages: Java, Python, C, Go, MATLAB, SQL
Frameworks: Spring Boot, Spring Cloud, Flask, Django, Gin, ROS
Drafting and Design Software: Fusion 360, TinkerCAD, Proteus
Libraries: NumPy, Pandas, Matplotlib, OpenCV, Scikit-Learn, TensorFlow, BeautifulSoup
Microservices and Security: gRPC, Spring Security, JWT, Kafka, Microservices
Databases: MySQL, PostgreSQL, MongoDB, Google Firebase, Redis
Operating Systems: Linux, Raspberry Pi OS, Windows
Containers and Orchestration: Docker
Developer Tools: Google Colab, AWS (EC2), VS Code, IntelliJ, Postman
Version Control: GitHub, Gitea

NOTABLE PROJECTS

1. **OpenCV-based Self-Driving Car:** A Raspberry Pi-based autonomous robot. (GitHub | Video)
2. **Sleep Stage Classification with CAP Sleep Database**: Deep CNN-based automatic sleep stage classifier for NFLE patients. (GitHub)
3. **Mechanical Vibration Analysis of a Car body with MATLAB:** Measured unknown vibrations using ADXL335, a 3-axis accelerometer, and analyzed with MATLAB and Excel. (GitHub | Video)

4. **Audio Classification with UrbanSound8k Dataset:** MLP, CNN-based sound classifier, can classify between the 10 classes sounds of UrbanSound8K dataset. (GitHub)
5. **Health AI Receptionist Backend:** Microservice based web-application including face-recognition and other services (Ongoing). (GitHub)
6. **NodeMCU-based IoT-box:** An embedded IoT system with full PCB to remotely monitor DHT11 sensor data and control 4 relays over the internet using Google Firebase. Developed a web interface with JavaScript and mobile app via MIT App Inventor. (GitHub | Conference Paper | Video)
7. **Deep CNN-based Pedestrian Detection:** VGG16, VGG19, and ResNet50 were used. (GitHub)
8. **Deep CNN-based Emergency Vehicle Detection:** YOLO, VGG16, and VGG19 were used. (GitHub)

RESEARCH EXPERIENCE

Graduate Research Assistant, Montana State University Jan 2025 – August 2025
Project: Protein Scaffold Gap Filling Problem
Major Responsibilities:

- Research work of Protein Scaffold Gap Filling Problem with Probabilistic and Machine Learning Algorithms
- Literature Review on Genome Clustering and Protein Clustering Algorithms

Currently working on band reduction and different 3D CNN based models and semi-supervised learning approaches for classification in hyperspectral spatial data.

Research Assistant Jun 2023 - Jan 2024
Directorate of Research and Extension, CUET *Advisor: Dr. Sajal Chandra Banik*
Project: Multi Robot Path Planning for Cooperative Tasks
Major Responsibilities:

- Conducted comprehensive literature reviews on multi-robot path-planning
- Analyzed various latest algorithms for multi-robot systems
- Designed experiments for multi-robot systems on simulation environments and applying case studies.

PUBLICATIONS

- **Mahmud, S.S.**, Prince, M.R.I., Shamim, M., Mahmud, S.S. (2022). "A Deep Convolutional Neural Network Based Classification Approach for Sleep Scoring of NFLE Patients". *In: Vasant, P., Zelinka, I., Weber, GW. (eds) Intelligent Computing & Optimization. ICO 2021. Lecture Notes in Networks and Systems, vol 371. Springer, Cham*. https://doi.org/10.1007/978-3-030-93247-3_35
- Banik, S., Banik, S. C., **& Mahmud, S. S.** (2024). "Path Planning Approaches in Multi-robot System: A Review". *Engineering Reports*, *Wiley*. https://doi.org/10.1002/eng2.13035
- Nuva, T. J., Ahmed, M. I., & **Mahmud, S. S.** (2022). "Design & Fabrication of Automatic Color & Weight-Based Sorting System on Conveyor Belt". *Journal of Integrated and Advanced Engineering (JIAE)*, *2*(2), 147-157. https://doi.org/10.51662/jiae.v2i2.87

RESEARCH PRESENTATION

- **Safat, S.**, Das, A., Mahmud, S. S., & Rashid, R. (2021). "Development and Optimization of a Real-time Server-based IoT Box for Smart Home Automation". Paper presented at the *International Conference on Big Data, IoT, and Machine Learning (BIM 2021),* Cox's Bazar, Bangladesh.

TEACHING EXPERIENCE

Graduate Teaching Assistant, Montana State University Jan 2025 – Present

- Assisted in instruction, lab supervision, and grading for undergraduate and graduate courses:
  - ESOF 422 – Advanced Software Engineering: Secure Software Practices
  - CSCI 232 – Data Structures and Algorithms
  - EMEC 361 – Measurement & Instrument Lab

Other Mentoring Experiences

- Participated in a day-long paid workshop on 'Industry 4.0' at the Bangladesh Industrial Technical Assistance Center (BITAC) in August and January 2022.
- Trained freshman year students at our university in a five-day workshop on Arduino and basic electronics, March 2020.

- Instructor at a two-day workshop on Line-Follower and Obstacle Avoider Robot at Cantonment Public Collegiate School, Chittagong, 2018.

LEARDERSHIP EXPERIENCE

Robo Mechatronics Asso*ciation*, Bangladesh (RMA) | *Vice President* Feb 2021 - Aug 2022

- Organized various seminars, workshops and competitions to enlighten the university students with state-of-the-art mechatronics technology and industry level automation.
- Led chapter of 150+ members to work towards goals that improve and promote community service, academics, and unity.
- Participated in a total of 17 inter and intra-university national robotics competitions and hackathons.

IEOM CUET Student Chapter | *Research & Publication Secretary* (details) Feb 2021 - Aug 2022

- Assisted the team in arranging an online Inter-University Scientific Poster Presentation Competition.
- Awarded with "IEOM Outstanding Student Chapter Award-GOLD" during our tenure.

Volunteer for Bangladesh | *Institute Representative* Mar 2019 - Jul 2019

- Acted as a liaison, connecting campus volunteers with initiatives supporting underprivileged children's health, education, and well-being.
- Promoted environmental cleanliness and actively participated in volunteer activities to support the community.

CUET Chess Club | *Founding Technical Secretary* Oct 2021 - Sep 2022

- Established a network for campus chess enthusiasts to facilitate idea exchange and organized online and offline tournaments.

ACHIEVEMENT AND OTHER CREDENTIALS

- Crawford Wildlife Habitat Scholarship (2025): Awarded a $10,000 inaugural scholarship for research on protein scaffold gap filling using probabilistic and machine learning methods at MSU.
- Best Volunteer Award (2019): Awarded by Volunteer for Bangladesh for "*Shopner-Shoishob*" Season 8, an annual children's program in Chittagong.
- 2nd Runners Up (2018): Robotics Competition (Line Following Robot), Makers Fest, IEEE Student Branch CUET.
- 2nd Runners Up (2018): *Formula 1 RC Race*, ASRRO, CUET.
- 2nd Runners Up (2017): *Inter-University Robo Fight*, International Islamic University Chittagong.
- Technical Scholarship (2017): Awarded to the top 15 students in each department at CUET

REFERENCES

Mr. Carson Gross
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