

TAWFIQ MAHMUD KHAN

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SUMMARY

Mechatronics Engineering graduate and Certified SOLIDWORKS Associate (CSWA) with hands on experience in electro-mechanical product development, from 3D CAD modeling and simulation through prototyping and testing. Combines mechanical design with machine learning, applied in autonomous robotic systems and different ML-based IoT projects, with two IEEE conference publications. Industrial exposure at Walton Hi-Tech Industries, with experience leading technical workshops and mentoring junior engineers. Focused on designing reliable, high performance products that bridge mechanical, electrical, and intelligent systems.

EDUCATION

Rajshahi University of Engineering & Technology (RUET)
B.Sc. in Mechatronics Engineering | CGPA: 3.62/4.00

Rajshahi, Bangladesh
2022 – 2026

TECHNICAL SKILLS

Design Tools: SolidWorks (CSWA Certified), AutoCAD, Fusion 360, Blender

Simulation: Unity Engine, Ansys, MATLAB/Simulink

Languages: Python, C/C++, C#

Embedded Systems / Dev Tools: PLC, Arduino, Raspberry Pi, ESP32

Frameworks & Libraries: PyTorch, TensorFlow

AI/ML: YOLO, DeepSORT, Monocular Depth Estimation, PID Control, Extended Kalman Filter, NLP, quantization

Data & Reporting: MS Office (Word, Excel, PowerPoint), Power BI, Adobe tools

PORTFOLIO

Solidworks Portfolio: [its-eshan.github.io/Solidworks-Portfolio](https://github.com/its-eshan/Solidworks-Portfolio)

EXPERIENCE

Outlier / Remotasks

November 2024 – March 2025

AI Model Evaluator & Testing Engineer

Remote

- Performed quality assurance testing and evaluation of Large Language Model (LLM) outputs across diverse reasoning and language tasks.
- Assessed AI-generated responses for accuracy, relevance, reasoning quality, and factual consistency; delivered structured feedback used to improve model performance and reliability.

Walton Hi-Tech Industries PLC | Battery Department

March 2024 – April 2024

Industrial Internship

Gazipur, Bangladesh

- Observed end-to-end battery production, from raw material handling through assembly, testing, and finished goods dispatch, within a high volume Battery manufacturing plant.
- Reviewed manufacturing and assembly processes for compressors, batteries, PCBs, refrigerators, air conditioners, and other consumer appliances, gaining exposure to quality and process-control practices at industrial scale.

PUBLICATION

“Self-Navigating Fire Detection and Extinguishing Robot: A PID-Based Proximity Control Approach”.
28th International Conference on Computer and Information Technology (ICCIT 2025), Cox’s Bazar, Bangladesh, IEEE Conference Proceedings, 2025. DOI: 10.1109/ICCIT68739.2025.11490485

- Focus:** PID-based proximity control strategy and machine Learning enabling autonomous navigation, fire detection, and suppression for a mobile robot.

“Towards Real-Time Anomaly Detection in Robotic Manipulators Through Multi-Sensor Fusion with Machine Learning”. *28th International Conference on Computer and Information Technology (ICCIT 2025)*, Cox’s Bazar, Bangladesh, IEEE Conference Proceedings, 2025. DOI: 10.1109/ICCIT68739.2025.11491493

- **Focus:** Multi-sensor fusion and machine learning techniques for real-time anomaly detection in robotic manipulator systems.

PROJECTS

Visual Servoing Autonomous Robot System | *YOLOv26, DeepSORT, EKF, Monocular Depth Estimation*

- Developed an autonomous robotic system integrating YOLOv26 object detection, DeepSORT tracking, monocular depth estimation (MiDaS & Depth Anything v2), and multi-sensor fusion for vision-guided manipulation.
- Designed SolidWorks chassis and camera mounts, produced manufacturing drawings, fabricated prototypes via 3D printing and laser cutting, and integrated YOLO-based autonomous tracking

Self-Navigating Fire Detection and Extinguishing Robot | *YOLOv11, SolidWorks, Arduino, PID Control*

- Developed an autonomous mobile robot for real-time fire detection using YOLO-based computer vision and a PID-based proximity control approach.
- Designed the complete mechanical structure in SolidWorks and integrated embedded motor control for autonomous navigation and fire suppression.

Mars Rover Robotic Arm Design | *SolidWorks, CAD, Forward & Inverse Kinematic Analysis*

- Designed a robotic manipulator for planetary exploration with emphasis on reachability, payload capacity, and joint constraints.
- Performed CAD modeling and kinematic analysis in SolidWorks to validate arm motion, workspace, and mechanical feasibility.

Driver Drowsiness Detection System | *Python, OpenCV, Machine Learning*

- Developed an AI-based system for real-time driver fatigue detection using computer vision and facial feature analysis.
- Implemented machine learning models for continuous monitoring and automated alert generation to improve driving safety.

Automatic Robot Cleaner System | *Arduino, Embedded Systems, Sensors integration*

- Developed an autonomous floor-cleaning robot capable of obstacle-aware navigation in indoor environments.
- Integrated sensors and embedded control algorithms for obstacle detection and path planning.

ACHIEVEMENTS & ACTIVITIES

- **Certified SOLIDWORKS Associate (CSWA):** Professional certification in 3D CAD modeling and mechanical design (Dassault Systèmes).
- **Line Follower Robot Competition (Tech-Mayhem 2023): 1st place;** Organized by the Robotic Society of RUET (RSR); awarded for robotics design and embedded control implementation.
- **Robotic Society of RUET (RSR):** Served as the Joint Secretary (Technical), organizing technical workshops, robotics competitions, and hands-on training sessions while mentoring members in robotics and embedded systems development.
- **Team Ogrodut, RUET:** Served as a team member, contributing to the design, development, and testing of autonomous robotic systems, including mechanical design, embedded systems, and computer vision integration.

REFERENCES

Md. Firoz Ali

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