TAHFIZUL HASAN ZIHAN

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PROFESSIONAL SUMMARY

IoT and embedded-systems engineer with 5+ years of hands-on prototyping, **ten peer-reviewed publications**, and leadership of well-reputed CanSat and AUV teams. Experienced in end-to-end sensor-to-cloud pipelines, data analytics, and cross-disciplinary collaboration to turn environmental data into actionable intelligence.

EDUCATION

Independent University, Bangladesh (IUB)	*December 2025*
B.Sc. in Computer Science and Engineering	GPA: 3.45/4.0
English Proficiency: IELTS Academic Overall 7.0 (W:7.5, L:7.5, R:7.0, S:6.0)	*Dec 2025*

Shaheed Ramiz Uddin Cantonment College, Dhaka	*2018*
Higher Secondary Certificate (Science)	GPA: 4.25/5.0
Govt. Science High School, Dhaka	*2016*
Secondary School Certificate (Science)	GPA: 4.89/5.0

TECHNICAL SKILLS

Programming	Python, C/C++, Java (Desktop & Android App), Flutter, JavaFX
Data & AI	Machine Learning, Computer Vision (OpenCV, YOLO), Embedded ML (TinyML), Data Analysis (Numpy, Pandas), TensorFlow
IoT & Embedded	ESP32, STM32, Raspberry Pi, Arduino, BLE, Sensor Fusion, IoMT
Web & Cloud	Node.js, PHP, Laravel, HTML/CSS/JavaScript, MQTT, Cloud Data Management
Hardware & Tools	MATLAB, Eagle CAD, Web Scraping, Git & GitHub

RESEARCH EXPERIENCE

Smart Shuttle Management and Tracking (ShuttleNav)　　　　*Sep 2024 – Present*
Lead Researcher • Funded by IUB Vice Chancellor's Fund 2024
• Developed a GPS tracking platform for university shuttle buses ($\approx$ 70 users); developed RFID-based passenger authentication and **Full-Stack Shuttle Management WebApp** with NodeJS/MQTT data pipeline.

IoT-based Indoor Air Quality Monitoring in Classroom Settings　　*Feb 2023 – Present*
• Built low-cost CO2/PM/Temp/Humidity sensor nodes across classrooms.

• Compared eight ML models (SARIMA, Prophet, LSTM, etc.) to forecast 7-day CO_2 levels, achieving high-accuracy predictions ($<5\%$ error); analysis informed strategies for ventilation improvements.

IoT-based Realtime Monitoring for Recirculating Aquaculture Systems *Mar 2024 – Present*
Collaborative project with Sher-e-Bangla Agricultural University (SAU)
• Designed a multi-sensor edge node (pH, DO, ORP, EC, temperature, turbidity, tds) with cloud-based alerting to maintain optimal water quality.

AAS Cansat Competition (Miniature Satellite) — Team IUB FabSat *Jan 2023 – Jun 2024*
Lead, Electrical, Power, & Communication/Data Handling (C&DH) Subsystems

- Architected the power, sensor, and C&DH subsystems for the NASA-sponsored American Astronautical Society CanSat Competition, leading the team to **Global Finalist** status in two consecutive years (2023 & 2024). • Achieved **perfect scores on all Preliminary Design Reviews (PDR) and Critical Design Reviews (CDR)** submitted to competition organizers, demonstrating high-quality, professional-grade design and documentation.

Autonomous Underwater Vehicle (AUV) — Team IUB Bongomarine *Nov 2023 –Mar 2025*
Team Lead (Captain)
- As Team Lead, guided team to **Global Finalist** status (2024, **Bongomarine Alpha**) and qualification for the 2025 competition (**Bongomarine Beta**). • Architected the AUV's core control system; served as the lead engineer for the electrical, power, communication, and sensor (IMU, depth, camera fusion) subsystems on a Teensy controller.

IoT-Based Industrial Fire Prevention & Health Surveillance System *Mar 2023–Oct 2023*
- Led sensor fusion algorithm for early fire-risk detection; system deployed in a garment factory pilot.

OTHER NOTABLE TECHNICAL PROJECTS

- **Medicine List Generator** (2026) — Built a Django-based web app for managing medication regimes. Features include AI-powered prescription OCR (Gemini API), time-based scheduling, and color-coded, easy-to-read, printable file generation for patient adherence.

- **Nursing Robot** (2021) — PID Controlled Autonomous path-following wheeled robot delivering meals & medicine during COVID-19

- **Ineedblood** (2017) — Web platform connecting blood donors with patients.

PUBLICATIONS

- N. -E. Sadman, N. Islam, **T. H. Zihan**, M. M. Kabir Peyal and M. Hasan, "An Automated Cost-effective IoT-based Industrial Fire Prevention and Health Surveillance System," 2023 IEEE 13th International Conference on Consumer Electronics - Berlin (ICCE-Berlin), Berlin, Germany, 2023, pp. 1-6, doi: 10.1109/ICCE-Berlin58801.2023.10375653.

- Khandaker, U. S., Islam, T., **Zihan, T. H.**, Hossen, I., Munir, M. S., Alam, S., & Hasan, M. (2025). Design and Usability Evaluation of ShuttleNav: A Smart Shuttle App with Real-Time GPS Tracking. In: Wei, J., Margetis, G. (eds) Human-Centered Design, Operation and Evaluation of Mobile Communications. HCII 2025. Lecture Notes in Computer Science, vol 15823. Springer, Cham. https://doi.org/10.1007/978-3-031-93061-4_9

- **Zihan, T.H.**, Chowdhury, H.S., Deap, S.M., Mehedi, R., Alam, F., Shahabuddin, A.M., & Hasan, M. (2026). An IoT-Enabled Real-Time Monitoring, Alerting, and Cloud Data Management System for Optimized Water Quality Control in Recirculating Aquaculture Systems (RAS). In: Iglesias, A., Shin, J., Bhatt, N., Joshi, A. (eds) Information Systems for Intelligent Systems. ISBM 2025. Lecture Notes in Networks and Systems, vol 1756. Springer, Cham. https://doi.org/10.1007/978-3-032-13196-6_40

- Mahir, H., **Zihan, T. H.**, Munir, M. S., Rabbani, K. A., Rouf, R. A., Zahid, F., Hasan, M., & Habib, M. T. (2026). An In-Depth Analysis of IAQ in Educational Settings Using ML. In: Iglesias, A., Shin, J., Bhatt, N., Joshi, A. (eds) Information Systems for Intelligent Systems. ISBM 2025. Lecture Notes in Networks and Systems, vol 1748. Springer, Cham. https://doi.org/10.1007/978-3-032-12990-1_33

- Mahir, H., **Zihan, T.H.**, Munir, M.S., Kamal, M.M., Hasan, M., Habib, M.T. (2026). On-Device Tree-Based IAQ Forecasting on ESP32: A Comparative Evaluation. In: Iglesias, A., Shin, J., Bhatt, N., Joshi, A. (eds) Information Systems for Intelligent Systems. ISBM 2025. Lecture

Notes in Networks and Systems, vol 1743. Springer, Cham. https://doi.org/10.1007/978-3-032-13006-8_41

- N. Islam, **T. H. Zihan**, M. H. S. Chowdhury and M. Hasan, "IoT-based Weather and Dust Level Monitoring System in Context to Bangladesh," 2025 22nd International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE), Mexico City, Mexico, 2025, pp. 1-6, doi: 10.1109/CCE67728.2025.11271976.

- Zihan, T. H. et al. "BongoMarine: A Resource-Optimized, Cost-Effective AUV Framework for Aquatic Monitoring in LMICs." *Accepted at ICCIT 2025 (IEEE Xplore).*

- Zihan, T. H. et al. "IoT-Enabled Low-Cost Adaptive Demand Controlled Ventilation for Classrooms Using Dynamic CO2-PM and Barometric Signatures." *Accepted at MCT4SD 2025 (Springer LNNS).*

- Zihan, T. H. et al. "Dual-Task Real-Time Low-Light Lane and Pothole Detection for Resource-Constrained Environments." *Accepted at ICCIT 2025 (IEEE Xplore).*

- Zihan, T. H. et al. "A Scalable IoMT Platform for Unified Medical Device Monitoring in Resource-Constrained Environments." *Accepted at ICMCSI 2026 (IEEE Xplore).*

ACHIEVEMENTS

- **Global Finalist** (2023, 2024) & **Top-8 Asian Team** (2024) in the NASA-sponsored American Astronautical Society (AAS) CanSat Competition.

- **Global Finalist** in Singapore AUV Challenge (SAUVC) 2024 as Team Lead of IUB Bongomarine.

- IIT Bombay Techfest 2022, Top 7 in Rowboatics(Boat Racing) & Top 10 in Cozmo Clench.

- Champion in multiple National-International Robotics and Tech competitions, including ICAS-ERT, Computenigma, Innobotics, Technocrats V.1, and KUET EEE Day,
  Intra IUB Techfest Champion in Spring 2023, Spring 2024 & 1st Runners up in Autumn 2022.

PROFESSIONAL EXPERIENCE

Robotics & IoT Trainer *Dec 2025 - Present*
Zan Tech (Project Uddipon)

- Led hands-on embedded systems bootcamps (Arduino/ESP32) for rural students, fostering STEM readiness in underserved communities.

IoT Engineer (Remote) *May 2025 - Nov 2025*
IoT Experience (USA-based IoT Solutions Provider)

- Architected and built an ESP32-based BLE gateway (Hub) to integrate and manage a diverse ecosystem of third-party (Govee, SwitchBot, Xiaomi) and custom IoT sensors.

- Developed and maintained firmware features including server-side data persistence, dynamic sensor connection management, and robust OTA (Over-the-Air) updates.

Researcher & Technical Assistant, FabLab, IUB *Mar 2019 - Jan 2025*

- Managed lab equipment and supported students with hardware prototyping and technical projects.

- Organized hands-on workshops on IoT and robotics, while providing technical assistance to faculty.

REFERENCES

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