WAKIL MAHMUD RAHAT

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PROFESSIONAL SUMMARY

Computer Science and Engineering undergraduate pursuing a career in Data Science and Machine Learning. Also builds independent full-stack web projects in React and JavaScript.

TECHNICAL SKILLS

- **Machine Learning / Data Science Pipeline:** Data Cleaning & Integrity Auditing → Feature Engineering → Model Training → Hyperparameter Tuning → Evaluation & Statistical Significance Testing
- **Research Methodology:** Systematic Literature Review (SLR), PRISMA-inspired review protocol, qualitative thematic analysis
- **Programming Languages:** Python, JavaScript
- **Web / Software Engineering:** React, HTML, CSS
- **Tools / Frameworks:** Git/GitHub, Figma (UI prototyping), Vite, Tailwind CSS, DaisyUI
- **Additional Exposure:** Java, C++, C#, PHP, MySQL

EDUCATION

BSc in Computer Science and Engineering 2023 – Expected April 2027
American International University-Bangladesh (AIUB)

RESEARCH WORK

Machine Learning-Based Next-Day National Electricity Demand Forecasting in Bangladesh: A Comparative Study of Random Forest, XGBoost, and LightGBM
Lead Author (1 of 3) *Completed Manuscript (Unpublished)*

- Designed and executed a national-level comparative study of three tree-based ensemble models against a naive persistence baseline for one-day-ahead electricity demand forecasting, using a real-world Bangladesh Power Development Board dataset (2019–2024, via Mendeley Data).
- Built a documented, leakage-free, non-interpolative data-cleaning protocol: identified and resolved missing calendar dates, zero-value extraction errors, and verified retained extreme observations against independent external events (e.g., Cyclone Remal), reducing a **1,850-row raw dataset to 1,664 usable rows**.
- Engineered seven calendar-indexed features (demand lags, rolling mean, day-of-week, month, holiday indicator) and tuned Random Forest, XGBoost, and LightGBM via grid search on a chronological train/validation/test split (2019–2022 / 2023 / 2024).
- Evaluated models using MAE, RMSE, and MAPE, and applied Diebold-Mariano statistical significance testing rather than relying on point-estimate ranking alone; XGBoost achieved the lowest test-set error (**MAE 671.57 MW, MAPE 5.65%**) versus the naive baseline (MAE 749.24 MW), though the improvement was **not statistically significant** at $\alpha = 0.05$.
- Identified the most recent day's demand (1-day lag) as the dominant predictive feature across all three model families via built-in feature importance analysis.

Conceptual Framework for Responsible Artificial Intelligence Integration in Undergraduate Programming Education

Co-Author (1 of 4) *Completed Manuscript (Unpublished)*

- Contributed to a systematic literature review (SLR) following a PRISMA-inspired protocol, screening **56 initial studies down to 20** for detailed qualitative thematic analysis on responsible AI use in programming education.
- Co-developed a **five-phase conceptual framework** (educational inputs, AI-supported learning processes, ethical/governance controls, pedagogical and assessment mediators, and learning outcomes) addressing AI literacy, academic integrity, and governance gaps identified in the literature.

SOFTWARE PROJECTS

Independent (solo) projects.

Customer Support Desk (github.com/Wakil-Mahmud-R/customer-support-desk)

- Built a customer support ticket dashboard using **React, Vite, and Tailwind CSS** (DaisyUI components), rendering ticket records (title, customer, priority, status, created date) fetched from a JSON data source.
- Implemented live ticket-status counts (In Progress / Resolved), toast notifications (react-toastify), and FontAwesome iconography; used React Suspense for asynchronous data loading.
- Deployed and live on Netlify.

GitHub Issue Tracker (github.com/Wakil-Mahmud-R/github-issue-tracker)

- Built a client-side issue-tracking dashboard in **vanilla JavaScript and Tailwind CSS** that fetches and renders live issue data from a **REST API**.
- Implemented status filtering (All / Open / Closed), keyword search, and a detail modal for individual issues; UI designed in Figma prior to implementation.
- Deployed via GitHub Pages.

Job Tracker (github.com/Wakil-Mahmud-R/job-tracker)

- Built a job-application tracker in vanilla JavaScript, Tailwind CSS, and DaisyUI, with views for All / Interview / Rejected applications.
- Used event delegation on a shared card container to handle status updates across dynamically added cards without rebinding listeners individually.

Emergency Hotline (github.com/Wakil-Mahmud-R/emergency-hotline)

- Built an interactive hotline-contact simulator in vanilla JavaScript and Tailwind CSS, featuring a coin-based call-cost system, a running call-history log, and a like/favorite counter.
- Implemented one-click copy-to-clipboard for contact numbers.

UI/Design Practice: Tech Wave, Knowledge Vault, Flower Market, Web Flow

- Four additional static HTML/CSS landing pages built as UI/design practice.

CERTIFICATIONS

Cyber Security: Certificate of Appreciation, Arena Web Security (AWS) Oct 2020
Verification No. V-A27W20123S