Ferdous Wahid Anik

Dhaka, Bangladesh | ferdous.1495@gmail.com | Website | LinkedIn | Google Scholar

RESEARCH INTEREST

Health Informatics, Digital Signal Processing, Computational Modeling, Machine Learning.

ACADEMIC PROFILE

B.Sc. in Biomedical Engineering | ***CGPA: 3.30 out of 4.00*** 2019 – 2023

Military Institute of Science and Technology (MIST), Dhaka, Bangladesh

Thesis: Development of a Dual Signal Acquisition of Seismocardiography (SCG) and Electrocardiogram (ECG).

Final Year Project: Gestational Diabetes Mellitus in Women prediction using Different Machine Learning Classifiers.

Significant Courses: Biomedical Instrumentation and Measurements, Biomechanics, Digital Signal Processing, Bioinformatics, Medical Imaging, Probability and Statistics.

RESEARCH EXPERIENCE

- **AI-Based Prescription Audit System** Jul, 2023 - Present
  - **Formulation of Audit Protocol:** Created a robust protocol for auditing prescriptions, starting from input data verification to anomaly detection.
  - **Development of a Comprehensive Knowledge Base:** To develop a personalized medication guideline in structured format, I meticulously constructed a knowledge base by gathering medication information of drugs from various reputable clinical guidelines and pharmaceutical websites.
  - **Model Development:** Developed hybrid model (CDSS with ML) aimed at identifying and correcting common prescription errors.
  - **Validation Using Real-World Clinical Data:** Associated the model and knowledge base with real-world clinical data patterns by conducting an exploratory analysis of the dataset containing real prescriptions.
  - **Interdisciplinary Collaboration and Ethics:** Collaborated with healthcare experts for clinical validation of knowledge base, model validation and secured ethical approvals for data usage, ensuring compliance with clinical research protocols.

- **Signal Acquisition and Preprocessing for Further Research on Detecting CVD (Thesis)** Mar, 2022 - Feb, 2023
  - **Hardware Integration:** Designed and developed a dual-signal acquisition system that utilizes Microelectromechanical Systems (MEMS) interfaced with a versatile, user-friendly microcontroller.
  - **Signal Processing:** Utilized MATLAB for preprocessing the acquired signals, applying noise reduction techniques such as filtering and baseline correction to improve signal quality.
  - **Interdisciplinary Approach and Collaboration:** Integrated knowledge from physiology, electronics, and digital signal processing to design and conduct the experiments.

- **Early GDM Prediction using ML Models (Final Year Project)** Jun, 2022 – Dec, 2022
  - **Data Collection and Preprocessing:** Handled missing values and outliers through data cleaning techniques, ensuring a high-quality dataset for model training.
  - **Feature Engineering and Selection:** Explored data to identify relevant features, applied statistical tests to identify GDM predictors, then scaled and normalised features to improve model performance and provide consistent input data for machine learning algorithms.

PROFESSIONAL EXPERIENCE

Research Engineer Jul, 2023 – Present

Institute of Research, Innovation, Incubation & Commercialization (IRIIC)

- Lead the design and development of AI models for **healthcare innovation**.
- Apply machine learning and clinical decision support system for **automation** in tradition healthcare process.
- Proficient in proposal writing, presentation delivery, and managing ethical approval procedures for successful **grant submissions**.
- Handle **requisitions and fund management** for multiple expenses related to the project.

- Conduct **survey**s to assess user requirements and acceptance of systems to guide the development and implementation of solutions.
- Develop protocols for **collect data** in real-world healthcare settings in accordance with project methodology.
- Organize and facilitate **consultative workshop**s for the project's process verification and methodology to gather essential feedback for refinement.
- Ensure the accuracy and reliability of healthcare solutions by applying rigorous testing and **clinical validation** protocols in real-world clinical settings.
- Coordinate efforts to convert ideas from research to **commercialization** by finding key opportunities and creating business models.
- Contribute to **research paper writing and publishing**, supporting the overall process from drafting to submission in multiple projects.

Intern Feb, 2022 – March, 2022

JMI Hospital Requisite Manufacturing Ltd. (JHRML) [Certificate]

- Developed a strong appreciation for the importance of precision and attention to detail in **medical device manufacturing**.
- Gained a strong understanding of the importance of **quality control and safety** procedures in pathological product manufacturing.

SUPERVISION EXPERIENCE

Final Year Design Project – Data-Driven Diabetes Medication Optimization Dec, 2023 – Jun, 2024

Department of Computer Science & Engineering, United International University(UIU)

- Conceptualized the core project idea for the final year undergraduate design team, focused on building a data-driven prescription optimization system for diabetes treatment.
- Provided strategic and technical supervision on protocol design, dataset construction, and model structuring aligned with clinical guidelines.
- Guided students throughout the research and implementation process, ensuring methodological soundness and project deliverables.

PUBLICATIONS

- Tanvir Hasan Riyed, Tasnia Nabi, Aishwariya Dutta, Md. Kamrul Hasan, **Ferdous Wahid Anik**, & Akid Ornob (2023). *Gestational Diabetes Prediction in Pregnancy: A Machine Learning and Data Preprocessing Approach.* In 26th International Conference on Computer and Information Technology (ICCIT), IEEE DOI: 10.1109/ICCIT60459.2023.10441112
- Fardeen Ahmed, **Ferdous Wahid Anik**, Farhana Sarker, Ahmedul Kabir, & Khondaker A. Mamun, (2023, Sept). *Feasibility of Automated Prescription Audit Systems for Better Patient Care.* Poster presentation at the International Health Economics Conference 2023: Progress Towards Universal Health Coverage DOI: 10.13140/RG.2.2.24756.87683
- **Ferdous Wahid Anik**, Fahmid Al Rifat, Marzia Zaman, Farhana Sarkar, & Khondaker A. Mamun, (2024, Nov). *The Importance of Prescription Audits: Navigating Complexities and AI-Driven Advancement.* 2024 IEEE International Conference on Biomedical Engineering, Computer and Information Technology for Health (BECITHCON), IEEE. DOI: 10.1109/BECITHCON64160.2024.10962770

Submitted (Under Review):

- **Ferdous Wahid Anik**, Fardeen Ahmed, Fahmid Al Rifat, Marzia Zaman, Farhana Sarkar, & Khondaker A. Mamun. *Evaluation of Automated Prescription Audit Systems and the Utilization of Artificial Intelligence - A Systematic Review* Journal of Drug Safety, Springer Nature. Manuscript Number: DRSA-D-25-00365
- **Ferdous Wahid Anik**, Marzia Zaman, Tahmina Foyez, & Khondaker A. Mamun. *DOSAGE: Dataset for Optimized Safe Antibiotic Guidelines and Estimates* Nature Scientific Data, Springer Nature. Manusript Number: SDATA-25-01798
- **Ferdous Wahid Anik**, Fahmid Al Rifat, Marzia Zaman, Farhana Sarkar, & Khondaker A. Mamun. *Evaluation of a Knowledge-Driven System for Detecting Antibiotic Dosage Errors in Prescriptions.* Heliyon, Elsevier. Manuscript Number: HELIYON-D-25-06506

RESEARCH PROPOSALS

- **An AI-powered intelligent system for safe antibiotic dispensing, falsified medicine detection, and antimicrobial stewardship in LMICs.**
  MIT SOLVE x The Trinity Challenge: Community Access to Effective Antibiotics, 2025
- **SmartAMR: Advancing Digital Healthcare with AI-driven Intelligence to Strengthen Medical Adherence, Minimize Prescription Errors, and Reduce Antimicrobial Resistance in Bangladesh**
  Higher Education Acceleration and Transformation (HEAT) Project, 2024
- **AI Based Prescription Audit System**
  Research and Innovation Center (RIC), 2024
- **Explore the feasibility of prescription audit and develop the methodology**
  Institute for Advanced Research (IAR), 2023

ACADEMIC PROJECTS

- **IoT-Based Real-Time Posture Monitoring System:** Created a system for monitoring posture in real time, utilizing a rubber band and hardware integration to identify the sitting posture angle. We integrated this system with a decision-making algorithm to categorize postures and implement immediate user feedback on the IoT platform. link
- **Modeling of a Cost-Efficient Prosthetic Leg:** Utilised 3D modelling software to design a prosthetic limb, carefully combining all components to satisfy both practical and cosmetic requirements. link

KEY SKILLS

- **Programming Languages:** Python, C, MATLAB, R
- **Libraries:** NumPy, Scikit-learn, NLTK, TensorFlow, OpenCV, Pandas.
- **Research Paper Writing Tools:** LaTeX, OriginPro
- **Application Software:** MS Office

LEADERSHIP ACTIVITIES

- **President, MIST Einthoven Club, MIST, Bangladesh** [Certificate] 2021 - 2022
  MIST Einthoven Club consists of a group of enthusiasts, who are eager to work collectively in the biomedical field, to develop ground-breaking solutions to the modern problems in the health sector of Bangladesh. From the MIST Einthoven Club and under the overall supervision of the Department of Biomedical Engineering, it is a pleasure for me as a president to organize the first such large national biomedical event called ANURONON'22.
- **General Secretary, IEEE MIST Student Branch, MIST, Bangladesh** 2021 - 2022
  Actively organized in various events and workshops like guest lectures, organizing technical competitions throughout the year organized by IEEE MIST SB as General Secretary.
- **General Secretary, MIST Literature and Culturer Club, MIST, Bangladesh** 2021 - 2022
  Coordinated club activities, organised events, managed communications, and fostered a vibrant environment through the planning and hosting of workshops, cultural programs, and collaborative events with other clubs.
- **Administrative Lead, IEEE CS Bangladesh Chapter, Team SPARK, Bangladesh** [Link] 2020 - 2021
  Served as the Administrative Lead for Team SPARK and had the opportunity to work with the IEEE Computer Society Bangladesh Chapter and gathered knowledge about managing the administrative operations of a department or organization

REFERENCES

Akid Ornob
Assistant Professor
Dept of Biomedical Engineering
Military Institute of Science and Technology
Email:akid.ornob@bme.mist.ac.bd

Dr. Khondaker Abdullah -Al-Mamun, PhD
Professor, Dept. of Computer Science and Engineering
Director, Institute of Research, Innovation, Incubation & Commercialization
United International University
Email: mamun@cse.uiu.ac.bd