Ferdous Wahid Anik

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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). link

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.

- **Data-Driven Prescription Optimization for Diabetes Treatment** Dec, 2023 – Jun, 2024
  - **Protocol Development:** Defined protocols for creating a comprehensive knowledge base dataset for diabetes medication.
  - **Design Model Structure:** Structured the model for the medication correction tool, enhancing the project's framework by integrating data-driven design principles.
  - **Dataset Creation:** Organized clinical guidelines for diabetes medication into a structured format of dataset according to a defined protocol, aiding in the creation of a comprehensive knowledge base dataset.

- **Signal Acquisition and Preprocessing for Further Research on Detecting CVD** 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** 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.

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. (Accepted but not Published Yet)

Submitted (Under Review):

- **Ferdous Wahid Anik**, Fahmid Al Rifat, Marzia Zaman, Farhana Sarkar, & Khondaker A. Mamun, (2024, Nov). *A knowledge-driven clinical decision support system to recommend corrections by identifying prescription errors for antibiotics.* Journal of Biomedical Informatics, Elsevier.

PROFESSIONAL EXPERIENCE

Research Engineer Jul, 2023 – Present

Advanced Intelligent Multidisciplinary Systems (AIMS) Lab , United International University, Bangladesh

- 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.

SELECTED 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 Tools:** Jupyter Notebook, Colab, 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 Computer Society Bangladesh Chapter Team SPARK, Bangladesh** 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

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Major Md. Ashrafuzzaman, PhD
Former Accociate Professor
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