

Meghna Roy Chowdhury

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EDUCATION

PURDUE UNIVERSITY

2nd YEAR Ph.D. CANDIDATE , ELECTRICAL AND COMPUTER ENGINEERING
Graduate Research Assistant at SPARC Lab (Advisor: Prof. Shreyas Sen)

WEST LAFAYETTE, USA

2021 to 2026 (anticipated)

VELLORE INSTITUTE OF TECHNOLOGY , TAMIL NADU, INDIA

BACHELOR OF TECHNOLOGY, ELECTRONICS AND COMMUNICATION ENGINEERING
GPA: 9.24/10 (Top 4% in Batch of 2020)

CHENNAI, INDIA

2016 to 2020

RESEARCH INTERESTS

- Embedded Systems and IOT (preferably in applications related to Biomedical and Security Applications)
- Machine Learning/ Deep Learning (preferably in applications related to Biopotential Signals)

TECHNICAL SKILLS

PROGRAMMING LANGUAGES : Java, C, C++, Python , Embedded C, MicroPython, MATLAB, Verilog, HTML, CSS, JS

SOFTWARE/TOOLS : Keil, Ansys HFSS, Vivado, Photoshop, Ansys HFSS

HARDWARE: Basic electronics, 8051 Microcontroller, Arduino, NodeMCU, FPGA(Xilinx), PSoc, NRF, Adafruit Featherboard, RasPi

WORK EXPERIENCE

TATA CONSULTANCY SERVICES LTD,

RESEARCH AND INNOVATION – ANALYTICS & INSIGHTS

MUMBAI, INDIA

August 2020 – 2021

1. **Analytics in a Box**- An automated prediction system for classification and regression problems on structured data using GAN, Auto ML, and Adaptive ML (September-November)
2. **CogniExtract** - ML-based solution for extracting information from Unstructured data to automate the manual process (November –April)

RESEARCH EXPERIENCE

PURDUE UNIVERSITY, WEST LAFAYETTE (Ongoing Research)

1. **APPLICATION OF HUMAN BODY COMMUNICATION**
 - Developed code for transmission and decoding of biopotential signal communicated via HBC
 - Optimised power to allow perpetual operation of the system.
2. **DETECTION AND ANALYSIS OF FREQUENCY EMANATION**
 - Assisted in **data collection and analysis** of rogue frequency emanations from unintended sources like USB/HDMI Cables/Power Cables/Monitors/SDRs

YUAN ZE UNIVERSITY, TAIWAN

DEEP LEARNING VIA ECG AND PPG SIGNALS TO PREDICT DEPTH OF ANAESTHESIA (May 2020 – July 2020)

Worked under the guidance of Prof Jiann-Shin Shieh to predict the depth of anesthesia via continuous signal data of ECG and PPG acquired during surgery. The 1D signals were pre-processed in MATLAB and 2D heatmaps of the signals were generated; which in turn were fed as inputs to various deep learning models. **The best accuracy was 82%** which was achieved with a **10-convolution layered model using inputs as ECG & PPG subplots**.

INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

GENERATION OF TRNG FOR HARDWARE SECURITY (May 2019– June 2019)

Worked under the guidance of Prof. Rajat Subhra Chakraborty in the domain of Hardware Security to design and **implement a True Random Number Generator on Xilinx FPGA (Artix 7 Nexys-4 DDR) using Variable-precision phase encoding and Repetitive sampling**. The randomness was tested and verified using NIST Test suites. **The software used was Vivado and the language used was Verilog**.

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

REAL-TIME WEIGH SCALE (May 2018 – July 2018)

Worked under the guidance of Prof Virendra Singh as a part of a project to create an IOT based robust weigh scale. A relation between weights and their corresponding voltages were determined. Using this relation, a robust system was generated to determine weights based on the voltage value. **The accuracy was 89%**. This was deployed in the cloud using **ThingSpeak**. The microcontroller used was and IIT Bombay produced **microcontroller - AT89C5131A**. The software used was **Keil (Assembly Language Programming)**.

OTHER PROJECTS

TRANSPORTATION AND LOGISTICS OPTIMIZATION USING IOT AND MACHINE LEARNING

(IN COLLABORATION WITH TATA CONSULTANCY SERVICES LTD.)

January 2020 – April 2020

Worked with Mr. Meghraj Nalge (Analytics and Insights Dept.) to predict the lifetime of Li-ion batteries used in Electric Vehicles. Various machine learning models were used to predict the lifetime of an EV battery based on different information collected. The accuracy achieved in predicting lifetime was 95%. The model also suggests its user as to how long the vehicle can travel with the existing battery life on different terrains and also the charging time required for a particular travel destination. The language used was Python.

GESTURE VOCALISER FOR THE DEAF AND MUTE

This project aimed to deploy an inexpensive technology to ease the communication between the disabled (deaf and mute). It is a gloved technology that converts the hand action of the wearer into text. A circuit consisting of various sensors were integrated with an Arduino Board. Bluetooth was used to display the corresponding text on an LCD and mobile phone. The model was tested in Ajay Higher Secondary School for The Deaf, Chennai, India.

(For more projects and current work, please visit my [website](#) or [email me](#))

PUBLICATIONS

- **Chowdhury, M. R.**, Madanu, R., Abbod, M. F., Fan, S. Z., & Shieh, J. S. (2021). Deep learning via ECG and PPG signals for prediction of depth of anesthesia. Biomedical Signal Processing and Control, 68, 102663. [\[Link\]](#)
- Bari, M. F., **Chowdhury, M. R.**, Chatterjee, B., & Sen, S. (2022). Detection of Rogue Devices using Unintended Near and Far-field Emanations with Spectral and Temporal Signatures. In International Microwave Symposium-IMS 2022. [\[Link\]](#)
- Bari, M. F., **Chowdhury, M. R.**, & Sen, S. (2022). Long Range Detection of Emanation from HDMI Cables Using CNN and Transfer Learning. In Design, Automation & Test in Europe Conference & Exhibition (DATE) 2023. [\[Link\]](#)