M Rifat Hossain

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Research Interests

✓ Optoelectronic Devices
✓ System on Chip
✓ Nano-electronics
✓ FPGA
✓ VLSI
✓ Power-electronics

Education

Shahjalal University of Science and Technology, Sylhet Jan 2019 – Apr 2024
B.Sc. in Electrical and Electronic Engineering

- CGPA: 3.52/4.00
- **Focus:** Optoelectronics

Research Work

- Design and Simulation of PIN Double Heterostructure GeSnC LED (Undergraduate Thesis)
  - Simulating LED with new material GeSnC and determining its usage
  - Completion date: Mar 2024
- Design and Implementation of a Light-duty Electric Vehicle Incorporated with Wireless Charging System
  - Wireless Power Transfer using induction technology
  - Building a basic light-duty EV
  - Completion date: Nov 2023
- Wireless Communication System over N-Byte AES Encrypted Channel
  - Audio encoding and decoding
  - Encryption-Transfer-Decryption systems
  - Completion date: Jan 2023
- Enigma Encrypted Wireless Communication Device (ongoing)
- Atmospheric Oxygen Meter determining the oxygen level from the amount of infrared (580-1270 nm) light absorption (ongoing)

Funding

- **Research Fund** Aug 2022 – Nov 2023
  Funded by SUST Research Council - 150k BDT total funding received
  Role on the project: Research Student
  Brief description of the research: Made a prototype of a light-duty electric vehicle that is capable of being charged wirelessly. The experimental prototype of the vehicle was created in the university's power electronics lab.

Projects

- EESMS: Enigma Encrypted SMS & Group Chat (ongoing)
- PSystem Library: A C++ library for determining power system properties (i.e., Z-bus, Y-bus, Load flow)
- Guitar Tuner using Arduino
- hugeMath.JS: A calculator in which any datatype's value range does not bound operations.
- A game company website development
- Patient DBMS for Ayesha Homeo Clinic

Publications

- M. R. Hossain, M. A. A. Chowdhury, and M. S. Hossain, “Digital data encryption and decryption following the Enigma Machine technology and designing of a Cipher IC” in International Conference on Electrical and Computer Engineering (ICECE 2024) (Submitted Conference Paper)
- R. Zakaria, A. Mahmood, **M. R. Hossain**, et. al., "Design and Implementation of a Light-duty Electric Vehicle Incorporated with Wireless Charging System" (Ongoing)

Experience

Undergraduate Research Assistant, Aug 2022 – Nov 2023
Shahjalal University of Science and Technology, Sylhet

- Project Completion: Design and Implementation of a Light-duty Electric Vehicle Incorporated with Wireless Charging System
- Reaching to media personnel
- Confronting TV interview

Industrial Trainee, Training Institute for Chemical Industries (TICI), Narshingdi Sep 2023

- Hands-on experience in the fields of Instrumentation and Control Engineering
- Gaining in-depth knowledge of common power-plant equipment

Technical Skills

COMSOL Simulation Having experience in creating photodiode, phototransistor, and LED using custom-made semiconductor material (for example GeSnC); Building 1D, 2D, Axisymmetric, and 3D geometry on various complexity; Custom meshing that helps to reach an optimal state (on both the required time and quality) in simulation.	***Xilinx Vivado*** Coding on an FPGA (i.e., designing a cipher IC that mimics the properties of the enigma machine) using Verilog and their performance analysis (size, power consumption, etc.).
Circuit Simulation (LTSpice, Simulink) Being used to simulate various analog circuitries.	***Programming Languages*** C++, Python, Java, Verilog, Assembly (8086), MATLAB, SQL, PHP, Godot
PCB Design (KICAD) Able to design PCBs with preset components along with custom symbols and footprints.	***Frameworks*** Arduino, .NET, Android, Bootstrap, Mkdocs, Tkinter, Pandas, Scikit-learn

Standardized Test Scores

GRE: Overall - 305 (Quant - 166)
TOEFL: Overall - 98 (R-27, L-27, S-23, W-21)

Language Proficiency

Bangla	Native
English	Advanced (CEFR Level: C1)

Awards/Achievements

- Certificate of Appreciation: for fulfilling all the requirements to complete the industrial training from ULKASEMI Pvt. Limited on Analog Design, IC Mask Design, and IC Physical Design - Dec 2024
- Secured CGPA 4.00 (A+) in industrial training at Training Institute for Chemical Industries (TICI), Narshingdi - Sep 2023
- Certificate of Appreciation: for serving as the Vice President of Shahjalal University Speakers Club (SUSC) - (Mar 2022 - Nov 2023)
- Silver Medalist in National Olympiad in Software Innovation (NOSI) - 2014