MD SADMAN KABIR

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EDUCATION

BOSTON UNIVERSITY

- **Bachelor of Science in Computer Engineering**. May 2025
  Concentration in **Machine Learning.**

Relevant Coursework:

Robotics, Embedded Systems, Signals and Systems, Digital Logic Design, Deep Learning, Machine Learning, Computer Organization, Electric Circuits, Probability and Statistics, Software Engineering & Design, Cybersecurity.

EXPERIENCE

Research Intern

Boston University, China Historical Christian Database (CHCD) (Sept 2024 – Present)

- Served as backend technical intern on **migrating backend** from **neo4j database to PostgreSQL.**
- Translated portions of legacy codebase from Cypher & Neo4j to SQL, integrated into **REACT** frontend for **stack-wide compatibility.**
- Developed Express.js-based RESTful API for improved **maintainability and backend access.**

Software Engineering Teaching Assistant (May 2023 – August 2023)

Giant Machines Software (now part of Deloitte Digital)

- Mentored and instructed externs and fellows representing **Citadel Securities, Bank of America and MasterCard.**
- Lectured students on **Python, and web development using HTML, CSS, Flask, cloud databases, and Bootstrap.**
- Fostered good interview etiquette, taught essential **algorithms, data structures, and computer science theory.**

PROJECTS

Semi-Autonomous Robotic Ground Convoy

Capstone project for Boston University and The Charles Stark Draper Laboratory.

- **Co-led the robotic perception team responsible for real-time detection and tracking field targets.**
- **Programmed ROS2** perception modules implementing SLAM for obstacle avoidance and **autonomous navigation**.
- **Achieved <8% convergence in validation loss** for object detection model, enabling precise **real time target seeking.**
- Retrained object detection models **by transfer learning** a curated and annotated dataset **of 20K+ samples.**

Songbird: A generative AI model for expressive blues and jazz composition.

- Architected **19 million parameter generative model** in TensorFlow and PyTorch with team of three people.
- Implemented **intelligent optimization and regularization techniques** to maximize training efficiency and reduce over-fitting.
- Utilized Monte Carlo based **reinforcement learning** fine tune via REINFORCE algorithm to force generated sequences to conform to good music theory standards.
- Optimized training using **CUDA** and **high-performance compute clusters**.

FPGA-Implementation of Two-Player Boardgame

- Designed and implemented a two-player strategy game on **FPGA via RTL design in Verilog HDL.**
- Authored **Verilog** firmware for **direct hardware control of 7-segment displays, push buttons, and toggle switches.**
- **Achieved 100% test pass rate on hardware and simulation using comprehensive testbenches in Xilinx Vivado.**

RISC-V Based 5-Stage Pipelined CPU

- Constructed a 5-stage (IF, ID, EX, MEM, WB) pipelined RISC-V CPU in **Verilog** with complete data path and control logic.
- Wrote comprehensive **unit tests** for each module, from **individual components to full top-level integration.**
- Integrated hazard detection and forwarding units **to handle data and control hazards** and ultimately reduce CPU stalls.

SKILLS

Programming/Hardware Description: C, C++, C#, Java, Verilog, Assembly, Python, Lua, JavaScript, TypeScript, Git.
Machine Learning & Scientific Computing: TensorFlow, PyTorch, OpenCV, MATLAB, Jupyter Notebooks, CUDA.
Hardware & Embedded Systems: ROS2, Xilinx Vivado, Altium, KiCad, Onshape, Linux, Driver Development.
Web & Application Development: Node.js, Express.js, MongoDB, PostgreSQL, SQLite, Bootstrap, React Native, Electron