SADMAN KABIR

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EDUCATION

BOSTON UNIVERSITY

- **B.S**, **Computer Engineering**. May 2025
  Concentration in **Machine Learning.**

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.
- 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 of field targets.**
- Developed ROS2 perception modules implementing SLAM for obstacle avoidance and autonomous navigation.
- **Achieved <8% convergence in validation loss** for object detection model, enabling high-precision **real time target recognition.**
- 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.
- Integrated **reinforcement learning based** fine-tuning through REINFORCE algorithm to tune weights for human preferences.
- Optimized training using CUDA and high-performance compute clusters.

FPGA-Based Two-Player Video Game

- Designed and implemented a two-player game on **FPGA using RTL circuits in Verilog.**
- **Integrated physical I/O (7-segment displays, buttons, switches).**
- **Achieved 100% test pass rate on hardware using comprehensive testbenches in Xilinx Vivado.**

RISC-V Based 5-Stage Pipelined CPU

- Designed and implemented **a 5-stage pipelined RISC-V CPU** (IF, ID, EX, MEM, WB) in Verilog with full datapath and control logic.
- Implemented hazard detection and forwarding units **to handle data and control hazards** and ultimately reduce CPU stalling.

SKILLS

Programming/Hardware Description: C, C++, C#, Java, Verilog, Assembly, 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.