Manan Mrig

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EDUCATION

University of Minnesota, Twin Cities

Minneapolis, MN

Bachelor of Sciences, Computer Science; GPA: 3.5 / 4.0 — *Sep 2020 - May 2024*

- CSE Dean's List recognition for exceptional academic performance in Fall 2020 and Spring 2022.
- Research Interests: Human-centered AI, Context-Aware Systems, Language Models, and Intelligent Interfaces.

WORK EXPERIENCE

Software Engineer

June 2024 - July 2025

Target Corporation - Demand Forecasting Engine, Inventory Insights Acquisition — *Minneapolis, MN*

- Collaborated cross-functionally with data science, operations, and business teams to build applications enabling human overrides in forecasting applications and flexible physical inventory processes, contributing to data-driven interventions that improved inventory reliability and system accuracy across 1,900+ stores.
- Developed and maintained end-to-end forecasting pipelines leveraging GAMM models and distributed systems to generate item and chain-level demand forecasts for 100K+ SKUs across Target's network.
- Engineered and deployed automated inventory correction systems improving inventory accuracy, enabling proactive out-of-stock prevention, and ensuring seamless data flow between physical and upstream systems.

Software Engineer Intern

June 2023 – August 2023

Target Corporation - Paystack, Core Commerce — *Minneapolis, MN*

- Extended backend APIs to collect and manage real-time data, contributing to business-critical payments infrastructure used by thousands of customers daily.
- Increased system performance by 40% through unit testing and velocity-powered performance optimization, ensuring efficient data processing under heavy load conditions.
- Worked within the Paystack Team and learned intricacies of payment infrastructure of a Fortune 40 company used every day by target guests.

Software Engineer Intern

May 2021 – July 2021

Centrl Inc. — *Mountain View, CA*

- Assisted in translating legacy BNCF Customer Admin system based in PHP to Java and Springboot, increasing speed and accuracy by 30%.
- Designed and Implemented an upgraded authentication system using Google's OAuth2 Authorization Framework in a Springboot application that outperformed the original.
- Aided the deployment process of internal application used by 30+ users on a day to day basis.

Instructional Technology Support

Jan 2021 – December 2021

Carlson School of Management, University of Minnesota — *Minneapolis, MN*

- Automated attendance, populating classes in canvas with Google Scripts/JavaScript reducing faculty administration time by 15 hours per week on average.

TEACHING EXPERIENCE

Teaching Assistant

Jan 2022 – May 2024

University of Minnesota, Twin Cities — *Minneapolis, MN*

- Supported instruction across multiple computer science courses:
  * **CSCI 2021: Machine Architecture and Organization**
  * **CSCI 2081: Software Design for Data Scientists**
  * **CSCI 2011: Discrete Mathematics**
- Maximized student learning in labs by reinforcing concepts taught in lectures, covering material from Virtual Memory, Compilers, C and System calls, to Computer Architecture and Low-level organization.
- Revised, validated, published, and graded assignments written in C, Python, Java, and Assembly as well as solve student's conceptual questions about Computer Organization, Software Design, and Programming Concepts.

Technical Skills

Languages: Python, C++, Java, Kotlin, SQL, JavaScript, TypeScript, C, Bash, Verilog
Frameworks: Micronaut, Spring Boot, LangChain, PyTorch, NumPy, Matplotlib, Flask, TensorFlow, Java RMI
Developer Tools: Git, Docker, Jira, LaTeX, Hadoop/HDFS, Hive, PostgreSQL, Kafka
Platforms: Linux, MacOS, Windows, Arduino, FPGA

Projects

Personal AI Assistant Ecosystem | *SwiftUI, Kotlin, Python, RunPod, LangChain, & Postgres* 2025
- Engineered a personalized AI assistant ecosystem integrating serverless LLMs deployed on RunPod with a native SwiftUI iOS front-end and Kotlin/Python microservices.
- Implemented contextual long-term memory via LangChain-PG vector database and designed multimodal workflows enabling natural language, visual, and cross-app interactions.
- Optimized inference latency and memory footprint across distributed endpoints, improving response times by over 40% through custom handler orchestration.

Spotify Bot | *Python, Spotipy, Flask, JSON, REST API, & OAuth2* 2023
- Developed a Flask-based web application using Spotify's Web API and OAuth2 for secure user authentication and data retrieval.
- Processed and visualized user listening data (top artists, genres, and track frequency) through Spotipy and JSON endpoints.
- Built RESTful routes to serve personalized music analytics dashboards and recommend playlists based on recent activity patterns.

Simulating RISC-V Rocket Chip | *RISC-V, FPGA, Verilog, Vivado* 2022
- Simulated RISC-V microarchitectures to reproduce Spectre-style speculative-execution and timing side-channel attacks, characterizing exploit vectors and attack windows.
- Synthesized Rocket and BOOM core implementations with Xilinx Vivado and performed on-board validation on FPGA (hardware testing, waveform analysis, and timing measurements).

Emulating Various Matrix Decomposition Methods | *Linear Algebra, Python, Numpy, Jupyter* 2021
- Emulated various Matrix decomposition methods and explored their uses in real world like natural language processing and ML.

Community Involvement

Code The Gap | *Instructor* Aug 2023 – Jan 2024
- Taught computer science fundamentals (algorithms, loops, conditionals) to underrepresented middle school students through interactive, hands-on coding activities that fostered curiosity and confidence in STEM.

Beta Chi Theta | *Vice President* Sep 2022 – Aug 2023
- Organized Men's Mental Health Week and other campus-wide initiatives to promote wellness and inclusivity; coordinated inter-fraternity and multicultural collaborations across student organizations.

Asian Student Union | *Events Coordinator* Aug 2021 – Sep 2022
- Planned and executed large-scale social and cultural events, strengthening community engagement and collaboration within the Asian student body.

Awards

CLA Ignition Award 2022
Scott Jacobson Writing Award 2020