Raj Budhathoki

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Summary

Motivated Computer Science student Results-oriented Computer Science student at Youngstown State University, minoring in Mathematics, with a passion for architecting intelligent and robust software solutions. Combines deep full-stack engineering expertise in Java and Spring Boot with specialized project experience in AI/ML and low-level systems programming. Developed a neural network from scratch to power an autonomous vehicle simulation and engineered a C++ application for direct Ext2 file system manipulation. Possesses a strong command of data structures, algorithms, and object-oriented design to build efficient, scalable systems that address complex real-world challenges at Youngstown State University, minoring in Mathematics. Passionate about developing full-stack applications and exploring AI/ML solutions. Skilled in Java, Python, C++, and SQL, with a strong foundation in Data Structures and Algorithms. Eager to leverage technology to build efficient, scalable software that solves real-world problems.

Skills

Programming Language: Java | Python | C | C++ | SQL | HTML | CSS | JavaScript | C#

Frameworks & Tools: Pandas | NumPy | Scikit learn | Neural Network | Pytorch | Unity Engine | React.js

Databases & Big Data: SQL | NoSQL

Operating System: Windows | Linux | MacOS

DevOps: Git | GitHub | VDI Disk Image Manipulation

Concepts & Methodologies: AI/ML | OOP | Scrum | Agile | SOLID | Automation

Soft Skills: Problem-Solving | Team Collaboration | Adaptable | Project Planning | Code Documentation

Projects

Ext2 File System Explorer | C++, Linux, File Systems

- Architected a custom C++ application to directly read, write, and navigate VirtualBox VDI disk images, implementing core Ext2 file system structures like inodes and superblocks to enable low-level disk exploration.
- Engineered an interactive shell with a suite of 7 commands (ls, cd, read, write), providing a user-friendly interface for raw disk interaction and reducing the complexity of manual hex editing for file operations.
- Developed a robust file import/export feature (read/write commands) that reliably transfers data between the host system and the VDI, achieving 100% data integrity for cross-environment file management.
- Automated the parsing of complex binary disk data structures, translating raw sector data into navigable directories and file metadata, which streamlined the file system analysis process and enhanced educational understanding.

Autonomous Vehicle Simulation

- Engineered a neural network from scratch using JavaScript to process real-time sensor data and autonomously control a vehicle's steering, acceleration, and braking within a custom 2D simulation environment.
- Implemented a collision detection system and ray-casting sensor array, allowing the vehicle to perceive its environment and make navigation decisions, successfully completing complex tracks without human intervention.
- Developed and trained the neural network using a genetic algorithm, optimizing the model over multiple generations to achieve a 90%+ success rate on unseen tracks, demonstrating robust generalization and learning capabilities.
- Built an interactive visualization using HTML5 Canvas, providing real-time rendering of the vehicle, sensor data, and neural network decision pathways, which accelerated the debugging and model optimization process.

Awards

- **Dean's List:** Raj Budhathoki of Youngstown, Ohio, Computer Science major, has been named to the Dean's List at Youngstown State University for Fall Semester 2023.
- **Dean's List:** Raj Budhathoki of Youngstown, Ohio, majoring in computer science, has been named to the Dean's list at Youngstown State University for spring semester 2025.

Education

Bachelor of Science **Youngstown State University** (*Youngstown, OH)* **December 2025**

- Major in Computer Science
- Minor in Mathematics

Course

- **Computer Science:** Data Structure and Algorithm | Data Structure and Object | Advance Object-Oriented Programming | Data Science and Machine Learning | Computer Organization | Discrete Structure | Development of Database | Information Assurance
- **Mathematics:** Calculus I | Calculus II | Calculus III | Linear Algebra and Matrix Theory | Probability and Statistics