Rakshit Singhal

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Education

Indian Institute of Technology Jodhpur **Oct' 22 - Mar' 26**
Prefinal year Bachelor of Technology (B. Tech) Student in Electrical Engineering *Jodhpur, Rajasthan*

Relevant Coursework

- Data Structures and Algorithms
- Computer Architecture
- Probability, Statistics, and Stochastic Processes
- Pattern Recognition and Machine Learning
- Deep Learning
- Control System
- Embedded Systems
- Data Communication Network
- Digital Signal Processing

Projects

Physics Simulator | Github **Jun' 24 - Jul' 24**

- Built a high-performance, cross-platform physics simulator with capabilities for 2D and 3D physics simulations, leveraging an optimized OpenGL pipeline to ensure accuracy and performance.
- Enhanced simulation performance through spatial partitioning and efficient collision detection algorithms, minimizing computational overhead.
- Developed a robust telemetry system for real-time logging of function calls, durations, and hierarchical call structures, aiding in performance analysis and optimization.
- Designed an intuitive user interface (UI) alongside a versatile Entity Component System (ECS) using the EnTT library to streamline object management and customization.

ISRO Robotics Challenge **Dec' 23 - May' 24**

- Led a team of three software engineers, collaborating with interdisciplinary teams for seamless integration in developing key Rover components.
- Integrated and Implemented ROS, Gazebo, and Machine Learning algorithms, including Visual SLAM, to elevate navigation precision and robustness.
- Utilized Docker and Kubernetes to optimize resource utilization and expedite development cycles, enabling rapid prototyping and experimentation for project milestones.

Analysis of Traditional Machine Learning Algorithms | Github **Mar' 24 - Apr' 24**

- Led a team of 6 analysts to analyze traditional machine learning algorithms for personalized movie recommendations.
- Implemented and evaluated 9 different models across collaborative filtering and content-based filtering methods using the MovieLens dataset consisting of 2,00,000 Movies and 600+ Users.
- Developed custom scripts utilizing multicore processing to automate analysis, achieving a **75% reduction in execution time**, significantly expediting development cycle.
- Delivered insights on computational efficiency, cold-start handling, and recommendation quality.

Technical Skills

Programming Languages: C/C++, Python, Rust, Shell, Verilog
Libraries and Frameworks: TensorFlow, PyTorch, Gymnasium, PyBullet, MuJoCo
Cloud Computing: AWS, Docker, Kubernetes, CI/CD
Developer Tools: ROS, Gazebo, Blender, SolidWorks, Vivado, KiCad, LaTeX

Achievements

- Achieved All India Rank 19 in the ISRO Robotics Challenge (URSC 2024)
- Ranked 5815 out of 156,000 candidates in JEE Advanced 2022 (top 4% performance)

Extracurricular Activities

Robotics Club **Aug' 23 – Present**
Coordinator | Software Lead *Indian Institute of Technology Jodhpur*

- Led advancements in ISRO Robotics Challenge 2024, overseeing strategic planning and execution to drive team success.
- Mentoring a team of 5 students to develop a ROS bridge for a custom physics simulator
- Mentored juniors on key robotics fundamentals such as ROS, Gazebo, and Docker.
- Contributed to Open Source ROS projects.