Rajdeep Singh

(475)-292-9261 | rajdeepsingh9613@gmail.com |www.linkedin.com/in/rajdeepsingh13 | https://rs1ngh13.github.io/

EDUCATION:

Master of Science in Data Science   September 2024- May 2025
Boston University College of Computing and Data Science, Boston, MA
GPA: 3.85/4.00; Dean's Circle

Bachelor of Science in Neuroscience   January 2021- May 2024
Boston University College of Arts and Sciences, Boston, MA
GPA: 3.57/4.00; Dean's Circle

WORK EXPERIENCE:

Computational Neuroscience and Vision Lab, Boston, MA   December 2023 – May 2024
Research Assistant
- Conducted a computational neuroscience project analyzing the impact of multiple sclerosis on neural signaling, focusing on transmission speed and size differences between healthy and affected neurons.
- Researched schizophrenia literature, examining its effects on brain function and vision across temporal/spatial scales.
- Collaborated with team members on a review paper, refining a manuscript that explores the complexities of schizophrenia's impact on visual perception.

RELEVANT PROJECTS:

Equity Analysis in Congressionally Directed Spending (CDS) – *Boston University x Senator Ed Markey's Office*   Fall 2024
- Lead a team of 4 Master's-level Data Science students in collaboration with Senator Markey's office to assess equity in federal earmarking funding allocation.
- Served as the primary client liaison, presenting analyses and recommendations to the Senator's Office during biweekly meetings.
- Discovered structural flaws in CDS forms that led to a misrepresentation of funding as favoring wealthy areas.
- Proposed intake form revisions and built a reproducible analysis framework using Python and Looker Studio to examine disparities by race, income and geography.
- Delivered detailed visualizations (radial bar charts, demographic heatmaps) and an interactive dashboard to inform policy decisions and CDS process improvements.

Alzheimer's Disease Detection with 3D MRI and CNNs   Spring 2025
- Designed and implemented a custom 3D CNN architecture from scratch to classify Alzheimer's stages (CN. MCI, AD) using 3D T1-weighted MRI scans from the ADNI database.
- Engineered a scalable preprocessing pipeline to isolate hippocampus and amygdala regions by deriving slice depths using ±2 standard deviation thresholds across diagnosis and sex.
- Compared performance of custom CNN to VGG-16, ResNet18, and ResNet50 on 2D and 3D versions of the data.
- Achieved 93.27% validation accuracy with the custom CNN and ~93% accuracy with ResNet18, significantly outperforming VGG-16 and ResNet50 which suffered from overfitting and poor generalization on 3D inputs.
- Used activation maps from ResNet18 to guide model refinements and re-tuned input slice selection, leading to improved spatial focus in the Custom CNN.
- Tuned hyperparameters using Weights and Biases sweeps and standardized inputs with min-max normalization, optimized training with small batch sizes and 3D convolutions.

Multi-Task Reinforcement Learning for Atari Games   Spring 2025
- Trained and evaluated DQN, PPO, and A2C agents across Atari games (Pong, Breakout, Beamrider) to explore policy generalization through multi-task learning.
- Implemented a Multi-Head DQN architecture with a shared convolutional trunk and game-specific output heads, achieving strong performance in Pong and Beamrider
- Conducted zero-shot evaluations on Space Invaders and River Raid; observed partial generalization with improved behavior over random baselines, but limited reward performance.
- Ran ablation studies comparing single-task and multi-task setups, confirming that multi-task agents retained comparable performance while reducing retraining needs.

SKILLS/QUALIFICATIONS:

Programming & Scripting: Python (NumPy, Pandas, Pytorch, TensorFlow), R, SQL, Bash, MATLAB, Git/Github
Data Engineering & DevOps Tools: Azure (Data Factory, ML Studio, Blob Storage), Google Cloud Platform (GCP), Docker, REST APIs, Event Hubs, Power BI, Looker Studio
Machine Learning & Modeling: Supervised Learning, CNNs, DQN, PPO, A2C, Transfer Learning, Hyperparameter Tuning, Model Evaluation, Time Series Forecasting
Data Analysis & Visualization: Exploratory Data Analysis (EDA), Geospatial Analysis, Matplotlib, Seaborn, Plotly, Power BI, Looker Studio
Databases & Pipelines: SQL, NoSQL, ETL/ELT Pipelines, Data Cleaning, API Integration, Data Warehousing (BigQuery)
Soft Skills: Team Leadership, Client Communication, Technical Writing, Agile Workflows, Stakeholder Presentations