

Project Pre-Proposal

Team Members

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Project Option 1: DRL-RecSys

We are considering developing a list-wise recommendation system using deep reinforcement learning (DRL) techniques. Unlike traditional recommender systems that focus on individual item relevance, our approach conceptualizes recommendation as a sequential decision-making process aimed at optimizing entire lists of recommendations over time. Drawing inspiration from "Deep Reinforcement Learning for List-wise Recommendations," we plan to implement an Actor-Critic architecture that learns optimal recommendation policies through simulated user interactions.

We are currently evaluating several datasets for their suitability, including MovieLens, Amazon product reviews, Goodbooks-10k, Last.fm, and KuaiRec, with our final selection depending on the quality of sequential interaction data available. At this preliminary stage, we are focused on designing a framework that not only predicts item relevance but strategically ranks recommendations to maximize long-term user engagement and satisfaction.

Project Option 2: Self-Driving Car Simulation

As an alternative, we are exploring the development of a self-driving car simulation using the CarRacing-v2 environment from OpenAI Gym. The objective would be to train an autonomous agent to navigate a 2D racing track by learning optimal control over steering, acceleration, and braking through the Proximal Policy Optimization (PPO) algorithm.

This environment provides continuous control challenges and visually rich inputs, enabling the agent to learn directly from raw RGB image frames. We would design a reward function that incentivizes staying on the track while penalizing off-road behavior or collisions. The implementation would utilize Stable-Baselines3 for model training, along with tools for performance visualization and video recording of the agent's behavior.

Request for Guidance

We are currently weighing these two project options and would greatly appreciate your guidance on which direction would be most suitable for our masters course project. Both projects involve reinforcement learning but in different application domains. We welcome any advice regarding the scope, complexity, and educational value of each option, as well as any suggestions for refinement or alternative approaches that might better align with the course objectives. Your input will be invaluable as we finalize our project proposal.