RL-BASED SYSTEM FOR ASSISTING CAB DRIVERS

Under the Guidance of

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PROJECT OBJECTIVE

- The goal of our project is to build an RL-based algorithm/agent which can help cab drivers to maximize their profits by improving agent's decision-making process.
- RL-based system for assisting cab drivers can potentially retain and attract new cab drivers.

ASSUMPTIONS:-

- Cabs are electric cars. It can run for 30 days nonstop.
- Cabs operates only 5 locations across the city
- All decisions are made at hourly intervals.
- Time taken to travel from one place to another place is considered in integer hours only.

APPROACH

In this project, an environment and an RL agent is created, that learns to choose the best request.

Agent is trained using MDP, Deep Q-learning (DQN)

Tools & Technologies used for this project are

Python packages NumPy ,Matplotlib and Keras for Deep Q Learning

Jupyter Notebook

Deliverables:-

Environment file

- Env.py is the Environment class, Each method (function) of the class has a specific purpose
- like generate random num of requests, calculate time duration for destination, next state and rewards for the ride.

Agent training DQN Model

- Build an agent that learns to pick the best request using **Neural Network model** DQN
- **Calculate target Q value for each sample**
- **Update the input state and output Q values**
- **Then fit DQN model using the updated input and output values for optimization.**

Git hub repository link for project code and reports.

Project demonstration YouTube video link.

EVALUATION:-

- **Model continuously update strategies to learn a strategy that maximizes long-term cumulative rewards.**
- **Below 2 are the performance matrices for our model.**
    - **Q-Value convergence.**
    - **Rewards per episode.**
    - **For better understanding using Matplotlib we will visualize**

      Q -Value convergence, Rewards per episode

THANK YOU