ShopSmartly using reinforced learning:

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Overview of the ShopSmartly using reinforced learning

- Several stores are available to us with varying prices and availability when it comes time to buy our monthly groceries. Transporting yourself to the stores comes with a price. To determine the optimal approach for acquiring all the desired items, we employ reinforcement learning to model these variables.

Objectives:

- Offering a list of things to be purchased along with a list of stores, each with varying prices and item availability schedules, will help make grocery shopping easier.
- Finding the best order of stores to visit in order to purchase every item on a given list in the shortest amount of time will be our agent's main objective.

Approach to the reinforced learning:

- Technologies used in this project are Python using libraries like NumPy, SciPy, matplotlib etc. and jupyter notebook.

- We will be using different distributions along with reinforcement learning techniques in this project.
  - Item availability model we will be using Bernoulli Distribution method.
  - For price of item model we are using Gaussian distribution method.
  - Distance travelled model we are using poisson Distribution method.

Deliverables:

- Creating the environment from scratch.
- Implementing value iteration.
- Implemented Q learning.
- Implemented representation Policy Iteration(approximation method)

Evaluation methodology:

- The size of the state space becomes 10*210 = 10240 states for quantity of shops = 10 and quantity of items = 10. We obtained an approximate value function by using Representation Policy Iteration.
- To create the basis vectors, we are using PVF, which applies the Laplacian operator to after which one finds the eigenfunctions using the state graph representation.
- We possessed vectors with 20 basis. To get the parameter vector, we applied the Least Squares Projected Equations method.
- we are using Least Squares Projected Equations method to obtain the parameter vector r.

Thank you