**Markov decision processes**

**Markov decision processes (MDP) is a mathematical frame used to model decision-making scenarios where outcomes a random and under control of a decision maker. This project implements MDP in dynamic programming method to find a path for a robot from start state to end state in a grid with obstacles.**

**Formulation of MDP:**

**A grid size of 6x6 was used that included obstacles and allowed movements were up, down, left and right. A reward function was also used giving a +10 for reaching the goal stat and -1 for each other step. Along with a discount factor of Gamma it was used to encourage the robot by giving it small rewards, in this case 0.9.**

**Implementation details:**

**The visualization was made using Pygame. It helped in visualizing the states obstacles and start and end state and path taken. The optimal path taken was calculated based on maximizing the value function at each state.**

**Testing and results:**

**Different size grids were used with varying obstacles start and end states in each case the program correctly found the optimal path also tested that the visual path is correct.**