National University
of Computer & Emerging Sciences

Self-Driving Car

(A visualization of Reinforcement Learning)

Course: Machine Learning

Submitted To: Dr. Mohammad Nauman

Group Members:

M. Hamza (P156148)

M.Faseeh (P156025)

Section: BSCS (A)

Self-Driving Car

ABSTRACT:

The reinforcement learning (RL) is an efficient and popular way for solving problems that an agent has no prior knowledge about the environment. Reinforcement Learning has two characteristics: trial-and-error and delayed rewards. An RL agent must derive an optimal policy by directly interacting with the environment and getting the information about the environment through rewards. Self-Driving car is an initiative to learn how the reinforcement learning works.

INTRODUCTION:

- In Self-Driving car we are going to use a simulation of a car and will let it learn how to drive in stochastic environment through reinforcement learning.
- At start the environment will be unknown to the car but with time and experience it will learn its environment by exploring it.
- The main idea of the project is to visualize the working of reinforcement learning to get a better understanding.
- Main technologies to be used are:
    - Artificial Neural Networks
    - Reinforcement Learning
    - Q Learning

METHODS:

The research work was done through several resources i-e YouTube, Google, Artificial Intelligence A Modern Approach. The research work contains finding different solutions for tackling the problem and their implementation perspective.

The tools which we have found up till now which are useful for our project are:

- Environment:
    - Spider

- Libraries:
    - PyTorch
    - Kivy
    - Numpy
    - Ai

FINDINGS:

Following issues were faced during the implementation:

1. Implementation of Deep Neural Network
   REMEDY: Used AI library for deep networks

2. Making Simulation of car
   REMEDY: Used Kivy Framework

3. Installing Libraries
   REMEDY: Virtual Environment

RESULTS:

Summing up, our self-driving car was able to learn dynamically created paths for going from source to destination after exploring its environment for a while. As the project motivation was to visualize reinforcement learning so the project in real life is not applicable but it demonstrates the concept well enough.