

Moway

Virtual self-driving car using reinforcement learning

FEASIBILITY STUDY

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TABLE OF CONTENTS

1. Introduction
 - 1.1. Overview of the Project
 - 1.2. Objectives of the Project
 - 1.3. The Need for the Project
 - 1.4. Overview of Existing Systems and Technologies
 - 1.5. Scope of the Project
 - 1.6. Deliverables
2. Feasibility Study
 - 2.1. Financial Feasibility
 - 2.2. Technical Feasibility
 - 2.3. Resource and Time Feasibility
 - 2.4. Risk Feasibility
 - 2.5. Social/Legal Feasibility
3. Considerations
4. References

Introduction

1. **Title of the project:** Virtual self-driving car using reinforcement learning (Moway)

2. **Overview of the Project:**

The project is about designing and developing a virtual self-driving car using reinforcement learning to mimic the behavior when it is running with a set of another self-driving car or human cars. This can be used to observe the impact that the self-driving car can have on damping the traffic bottlenecks caused by manned vehicles. This framework can be simulatable in a different traffic situation and different phenomena.

3. **Objectives of the Project**

The objective of the project is

- The main objective of this project is to design and implement a virtual car in a virtual environment.
- This framework can be simulatable in different traffic situation and phenomena.
- Learning from the input in the designed virtual environment and drive autonomously.
- This is able to detect the obstacles (2D environment pixels) in the pathway of the virtual environment and travel throw the path safely.

4. **The Need for the Project**

There are more type of autonomous vehicles in this new technology. But there are only a few simulating frameworks to test those autonomous vehicles and lack of tools to simulate different traffic phenomena in the presence of autonomous cars.

5. **Scope of the Project**

Here are two type of car the first one is manned vehicles. Another one is the self-driving car. Manned vehicles run along the path with some conditions. The self-driving car should learn from environment and manned vehicles. The virtual car can be modified as some type of modes. They are shortest path driving mode, fuel efficiency driven mode and time efficiency driven mode. It can be simulatable in different traffic situations like driving on straight road, curved road, junction and traffic with manned vehicles.

6. **Deliverables**

The deliverable of the project will be a computer-based software system which act as a 2D GUI framework platform which can be simulatable in a different traffic situation and different phenomena.

Feasibility Study

- ❖ **Financial Feasibility:** The framework will be developed such that it consumes a very low cost. There are no payable development platforms, thus that cost can be neglected. Moreover, the technologies used to build the framework which are free of charge. There are no hardware accessories required to be installed, there will be no expenditure due to hardware. In the users' perspective, they need just a computer to use this framework. They are not required to spend anything else to use the framework.
- ❖ **Technical Feasibility:** Python will be used to develop this framework while Pygame and Gym libraries will be used to develop the system. These technologies are commonly used and free of charge, thus it will be feasible to use these to develop the system. Moreover, the software should be well documented and easily configurable.
- ❖ **Resource and Time Feasibility:** The technologies to be used to develop this system are Python application with Pygame and Gym libraries. These are free of charge and commonly used technologies. Thus it will be feasible to use these technologies to build the system. The time period allocated to complete this system is nearly three months. Considering the project scope and deliverables, it will be feasible to complete the system within that time.
- ❖ **Risk Feasibility:** Since the training through the dataset is computationally exhaustive at times the training get interrupted and hence it slows down the development of the system. So to mitigate it exploit the different system to develop and simulate.
- ❖ **Social/Legal Feasibility:** Since all the resources used are open source, there won't be any issues raised against the fact that the project using an existing code base. So that copyrights or patents won't have an effect on this.



Considerations

❖ **Performance:**

The virtual self-driven car was get training from the environment. Here different kind of possibilities is provided to drive a car. Rather than generating a single car at a time multiple cars are created so as to train a car quickly.

❖ **Usability:**

The system should be user-friendly. Thus, users can add a collision object or manned vehicles in the environment. Auto-generation to train a car.

❖ **Reliability:**

The aim of the project is to avoid the collision for the trained data. Thus the system has to make sure that the data will not be deleted or lost.

References

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