**Project Proposal**

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

1. **Overview of the Project:**

The project is about designing and developing a virtual self-driving car using reinforcement learning to mimic the behaviour when it is running with set of another self-driving cars 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 rule-based cars. It could be able to travel with another rule-based cars. Training autonomous driving vehicle is done with reinforcement learning in virtual environment.

1. **Objectives of the Project**

The objective of the project are

* The main objective of this project is to design and implement a virtual car in a virtual environment which could function automatically
* Learning from the input in the designed virtual environment and drive autonomously
* This is able to detect the obstacles (2D environment pixels) in the path way of the virtual environment and travel throw the path safely

1. **The Need for the Project**

Since the life is valuable, in order to safeguard the lives from the accidents happening due to various circumstances.

1. **Scope of the Project**

Here are two type of car the first one is rule based car. Another one is self-driving car. Rule based car run along the path with some conditions. Self-driving car should learn from environment and rule-based cars. 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. Implement unit test and usability test for the system

1. **Deliverables**

The deliverable of the project will be a computer-based software system which act as a 2D GUI platform which receive data from virtual environment, hold them using a database and send controls to the virtual car.

1. **Overview of Existing Systems and Technology**

There are many kinds of self-driven virtual and real car available. They use a Q-learning, neural networks, Pygame and also reinforcement learning.

* Flow: Architecture and Benchmarking for Reinforcement Learning in Traffic Control

Flow is a new computational framework, built to support a key need triggered by the rapid growth of autonomy in ground traffic: controllers for autonomous vehicles in the presence of complex nonlinear dynamics in traffic. Leveraging recent advances in deep Reinforcement Learning (RL), Flow enables the use of RL methods such as policy gradient for traffic control and enables benchmarking the performance of classical (including hand-designed) controllers with learned policies (control laws). Flow integrates traffic microsimulator SUMO with deep reinforcement learning library rllab and enables the easy design of traffic tasks, including different networks configurations and vehicle dynamics.

1. **References**

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Virtual to Real Reinforcement Learning for Autonomous Driving

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[2] Journal STILGOE, J.

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[3]WU, C., KREIDIEH, A., PARVATE, K., VINITSKY, E. AND BAYEN, A. M.

Flow: Architecture and Benchmarking for Reinforcement Learning in Traffic Control In-text: (Wu et al., 2019)