

Autonomous Car Simulation using Machine Learning

Proposal

Submitted in the partial fulfillment for the award of the degree of

**BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE WITH SPECIALIZATION IN
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

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PUNJAB

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DEPARTMENT OF APEX INSTITUTE OF TECHNOLOGY

Project Proposal

Project Title:- Autonomous Car Simulation using
Machine Learning

Project Scope:-

The scope of this project encompasses the design, development, and evaluation of an autonomous car system with a specific emphasis on three critical aspects: bullock cart prediction, abnormal speed vehicle identification, and unfamiliar vehicle prediction. The project involves the integration of advanced machine learning methodologies and computer science principles to achieve a robust and intelligent autonomous driving system. The bullock cart prediction component entails the utilization of computer vision techniques, particularly deep learning models like Convolutional Neural Networks (CNNs), for the accurate detection and classification of bullock carts within the vehicular environment.

The abnormal speed vehicle prediction aspect involves the implementation of anomaly detection algorithms, leveraging unsupervised learning approaches to identify deviations from normal speed patterns. Additionally, sensor data fusion techniques are employed to enhance the system's ability to effectively discern abnormal speed behaviors in real-time scenarios. The unfamiliar vehicle prediction component utilizes transfer learning, where pre-trained models are fine-tuned on a diverse dataset containing examples of unfamiliar vehicles, thereby enhancing the system's adaptability to novel vehicular entities.

The project's scope extends to rigorous data preprocessing, feature engineering, and model training/validation stages to ensure the reliability and generalizability of the developed autonomous car system. The experimentation and validation phases involve testing the system's performance in diverse real-world scenarios to demonstrate its effectiveness and potential contributions to the advancement of autonomous driving technology. The overarching goal is to contribute valuable insights to the field of intelligent transportation systems, fostering the development of autonomous vehicles with enhanced predictive capabilities.

Requirements

Hardware Requirements

- ❖ High-Performance GPUs (Graphics Processing Units)
- ❖ Sufficient RAM (Random Access Memory)
- ❖ Multi-core CPU
- ❖ Sensors of Simulation
- ❖ Dual Monitors or High-Resolution Displays

Software Requirements

- ❖ ROS (Robot Operating System)
- ❖ Sensor Simulation (CARLA)
- ❖ Development IDEs (Integrated Development Environments)
- ❖ Linux-based OS (Ubuntu)

STUDENTS DETAILS

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APPROVAL AND AUTHORITY TO PROCEED

We approve the project as described above, and authorize the team to proceed.

Name	Title	Signature (With Date)
Mr. Prabhajot Singh	Supervisor	