**VISHWAKARMA INSTITUTE OF INFORMATION TECHNOLOGY, PUNE**

**COMPUTER ENGINEERING DEPARTMENT**

**APRIL-MAY 2018**

**Synopsis**



**Group number: PRJ/18-19/40**

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**Title : Collision Avoidance System**

**Objective :**

* System which will able to detect collision prone conditions and help prevent damage to life of the person driving the car and the car as well.
* System which will take decision at runtime on the basis of dynamically generated data.
* System which will have higher accuracy and it will help the user under dangers conditions.

**Abstract :**

Collision Avoidance System (CAS) is an autonomous system that is designed to avoid collisions of vehicle with prediction. This system provides an automated control over the vehicle’s braking system that responds to potential collisions while minimizing loss order to return to original speed after avoiding collision. We follow system implementation in three phases mainly vehicle detection, distance estimation and applying breaks and notification. Requirements are dataset, simulation environment, sensors, camera, algorithm like convolution neutral network, R-CNN, Hough transform, etc.

To sum up, CAS is designed to provide additional safety to the driver and notify before collision occur. Specifies maintain safe distance with front object and avoid collision. The system will help to avoid accident takes place due to human mistakes. The system will assist the driver of vehicles so that collisions won't occur. The system will help to reduce the count of accident on highways and other places where the vehicles are in speed.

**Briefs about Contents:**

1. **Introduction :**

Traffic accident has posed a threat to the safety of human life. The collision detection system comes in picture when the vehicle is in situation where it is going to collide with other objects which will result into undesirable event and the driver of vehicle is not aware of applying brakes. So under such condition the collision detection system, gives a warning to the driver way before collision may occur and if the safety measures are crossed like safe distance. Then the system will apply the brakes on its own.

Collision Avoidance System is an autonomous system that is designed to avoid collisions of vehicle with prediction. This system provides an automated control over the vehicle’s braking system that responds to potential collisions while minimizing loss avoiding collision.

The system will help to avoid accident takes place due to human mistakes. The system will help to reduce the count of accident on highways and other places where the vehicles are in speed.

1. **Technical Details :**

Software Requirements :

Operating System : Windows 10 64-bit

Simulator : Unity/UnReal engine

Language : C++/C# based on Simulator and Python

Hardware requirements :

GPU : Graphics Card with DX9 support

CPU : 2Ghz

Harddisk : 1 TB

Ram : 8GB

1. **Working :**

Model flow of Collision Avoidance System :

1. The simulator will create dynamic input which it records through its camera.

2. This input will be broken down in frames and image processing will take place.

3. Using CNN and object detection to classify the vehicles ahead.

4. If any possible accident is about to happen warn the driver.

5. Feeding these parameters to the machine learning algorithm to predict accident crash.

6. Calculating the distance between the vehicles , the current speed and other such parameters.

1. **Applications:**

1. Self-Driving Vehicles

2. Lane keeping assist

**References/Bibliography:**

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