PLATOON DELIVERY SYSTEM

Under the Guidance of

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***Abstract*—Platooning on a highway is a method for improving energy and transport efficiency .Platooning is linking of two or more vehicles in convoy.These vehicles in the convoy have the capability of accelerating or braking simultaneously. This represents the basic steps for further analysis of platoon's behaviour and more advanced techniques.It also improves the highway capacity.This research proposes a framework which combines recognition of driving states with platoon operations and risk-predicition in order to reduce disturbances of platoon operation resulting driving state jitters. The concept of Truck platooning reduces energy consumption, risk of accidents, manpower, whereas improving delivery time, traffic efficiency, and safety.**

Keywords—Vehicle platooning.

I. INTRODUCTION

Over years there is lot of road accidents and major cause of death and injury in India.The increase in vehicle numbers has resulted in the growth of traffic jams in cities and highways, thereby raising various issues on fuel consumption, environmental pollution, and traffic safety. Platooning is an Intelligent Transport System (ITS) application which has emerged as a promising solution for the traffic management in highways. The main idea of vehicle platooning suggests that a set of vehicles travel together while maintaining a small distance between each other. This can lead to an increase in traffic capacity and then an improved traffic management and a reduced travel time. Moreover, the comfort and the safety of passengers are enhanced since the scenarios of extreme acceleration or deceleration are eliminated and the platoon vehicles are considered as a single unit.

Furthermore, the emission performance and the fuel economy are significantly improved. A vehicle platoon (also called "convoy") can be seen as a group of vehicles that travel in close coordination through a headway control mechanism. These vehicles maintain a short spacing between them and a relative velocity. The vehicle in the front position, called leader, represents the trajectory and velocity reference. It controls all the following vehicles in the platoon. Each vehicle of the platoon receives orders from the leader that may be communicated either directly or by the preceding vehicle.These vehicles can drive themselves, communicate to other vehicles, connect to the Internet, and provide value-added services to the drivers and passengers. With the advent of such technology, it is possible to form a "platoon" of autonomous vehicles on the road, where they follow a common leader vehicle in the same lane on the highway and maintain close proximity to improve road capacity and passenger comfort.In addition it is noted that it is not practical to maintain a platoon driving system with a fixed platoon-length considering time-invariant control strategies together with complex driving behaviour.Accordingly, multiple vehicle platoons with different driving strategies can be used to reduce the platoon interferences with bad driving behavior.One such strategy is ;using fewer platoons to maintain constant distance among platoon leaders that result in enhanced stability to the system .

II.LITERATURE SURVEY

The basic control algorithms that are addressed to a flexible multi-featured prototype model vehicle designed for vehicle platooning research.The sample vehicle to act as a follwer vehicle and to have enough space to accommodate all the sensors and devices necessary for studying the platoon vehicles.The vehicle mechanical parts and other part of

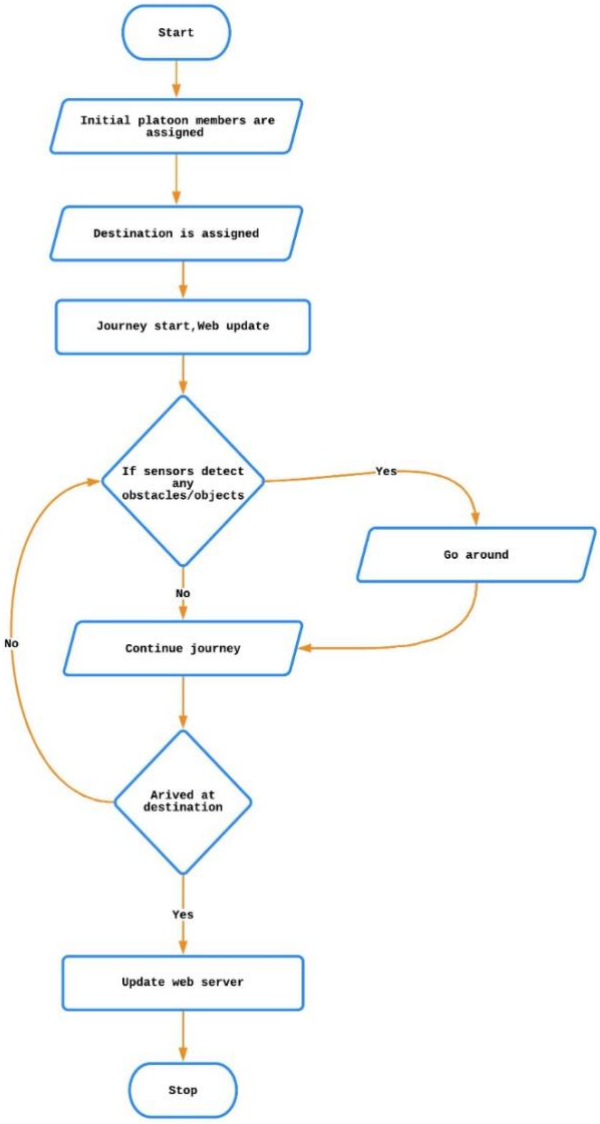
vehicle were designed in normal 3D application.This allowed to create few more vehicles which are identical and have similar behaviour.The vehicle employ a human presence in the first vehicle steering that acts upon the front wheels by means of a servo motor and back wheels are driven by DC motor.In order to act as a follower, the sample vehicle make use of a sensor.The distance of the front vehicle information is informed by a range infrared sensor.The structure of vehicle platoon composed by n vehicles is present with its control panel.The vehicle is equipped and allows V2V communication through wireless network to communicate and share data with other platoon members to be implemented .The vehicle is powered with a battery.Having the sensor in front of the vehicle we can get to know the distance between first vehicle and follower vehicle .Usually vehicle platooning means that each vehicle, member in platoon, has a control over its velocity and relative distance to the front vehicle.This is achieved by communicating with other platoons.The result of this vehicle platooning are road safety improving , fuel consumption reducing, road capacity increasing and emission decreasing.Low cost implementation of vehicle platoons can make the future of platooning vehicles on highway more efficient and cost-effective.A low cost but efficient implementation of a platooning system was designed for two vehicles and the longitudinal control was realized using the distance information available from infrared sensor and ultra sonic sensors.

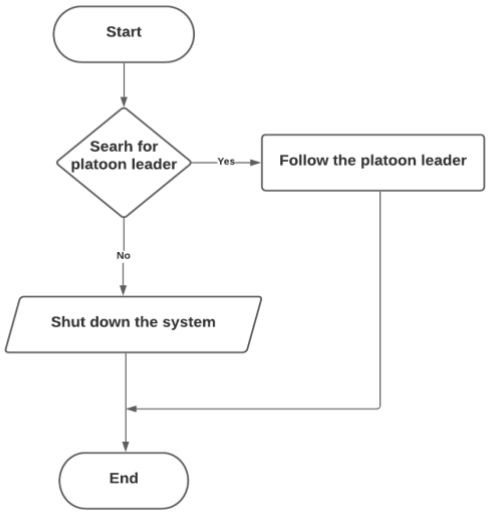
. III.Methodology

The linking of two or more vehicles in convoy is done using connectivity technology and automated driving support systems. These vehicles automatically maintain a set, of close distance between each other when they are connected for certain parts of a journey, for instance on highways. The vehicle at the head of the platoon acts as the leader, with the vehicles behind reacting and adapting to changes movements– requiring little to no action from drivers. The users starts and search for the platoon leader via sensor assigned from webserver if found it will follow the found platoon leader or it will shut it down and ends its search.

Once the user start it searches for the number of initial platoon members assigned from the web server.The departure and destination coordinates are assigned from the web server.If the vehicles at front sense or detect any obstacle/object in front, it will check if the object is stationary or in motion if its is in motion, it will tail merge with the platoon system in front until it shares the same route or destination else it will classify it as a obstacle/object and go around the obstacle.Once the destination is arrived it will be updated to web server and end the system.When the obstacle has sensed which is stationary it will stop and go around the obstacle and become the new leader and update this in server and the system.

The platoon member is connected with two motor driver.Two infrared sensor and one ultra sonic sensor are connected to the servo motor,which ca calculate the distance and the direction of the platoon leader movement.with the values received from the three sensors, the Arduino is capable of giving commands to the motor driver to follow the platoon leader.





IV.Conclusion

This paper presents the basic working of a platoon prototype system that implements adaptive cruise control technology.For this, a prototype vehicle was constructed especially for this research.The basic control algorithm was written to incorporate further navigation systems for path control.The model is equipped with a pair of infrared sensors and an ultra sonic sensor to keep the platooning vehicle in close proximity .The two vehicles are built using different boards and similar components and were individually programmed for their functionality.The follower vehicle combining the various sensors can follow the leading vehicle close enough without colliding. where as the leader can update the web server about the journey and will be the first vehicle of the [platoon.The leader can also detect the obstacle in the path and can judge the safety of platoon.Besides the study of control of the platoon of vehicle the future work includes the V2V communication protocol, Iot control more over navigation algorithm for lateral control of the margin and splitting of the platoon.

V.Result

In order to evaluate the working and performance of the prototype of platoon system in travelling from point A to point B.We've considered a rectangular track of dimension 60 cm and 25 cm in length and width respectively.The starting point position is designated by the letter A. To reach destination B, the prototype must travel 60cm forward, then turn right again and travel 25cm forward, finally turn again and travel 60 cm forward.During our study, we discovered
That the prototype successfully arrived at its destination 7out of 10 times,with minor variations in the path to be followed.The first three cases where the left-hand side motor was faster than the right-hand side motor,changed the entire course of the prototype,hence failed to reach its destination.To gain a better understanding of the platoon prototype a layout of obstacles where laid to reduce the performance error rate close to zero to avoid collision of the prototype vehicle to achieve the safety (I.e. collision avoidance). A Number of tests were taken with different cases and following results where concluded.

Case A: During the experiment the vehicle and the obstacles where 20 cm's to 30 cm's apart, it was observed that the vehicle stopped its journey or it collided with the obstacle it could not deviate itself from the obstacle.It was also observed that there was 80% chance of collision.

Case B: In second case the vehicle and the obstacles were 40 cm's to 45 cm's apart, it was observed that the collision of vehicle with the obstacle was low compared to "Case A".The collision of vehicle error rate was reduced from 80% to 60%.

Case C:In case c the vehicle and the obstacle where50 cm's to 60 cm's apart and observed that the collision of vehicle was very low compared to "case A" and "case B" the error
and got positive response from the experiment.The collision of the vehicle was reduced from 60% to 5% and error rate was almost reduced to zero compared to other cases.As observed from experiment from experimenting on different cases we concluded that case 3 was more reliable than other cases.

VI.Reference

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