International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 02 | Feb 2019 www.irjet.net p-ISSN: 2395-0072

AUTONOMOUS SELF DRIVING CAR WITH FLIGHT PROPULSION SYSTEM

Miss. Pinki S. Mane[1], Miss. Ashwini S. Samudre[2], Mr. Shekhar S. Chougule[3], Prof. G.R. Desai[4]

At - Manewadi, Post -Vaghave Tal- Panhal, Dist- Kolhapur, Pin Code 416230
At –Shahapur, Post -Borpadale, Tal- Panhala, Dist- Kolhapur
Dept. of Electronic and Telecommunication Engg., Sanjeevan Engineering and Technolodgy Institute, Panhala.

Abstract - *The automobile industry is moving towards implementing of smart technology assisted systems. However the major problem is the systems require humans to drive and cannot be completely autonomous. An attempt to implement driverless car Waymo by Google has been successful to much extent and is in final stage but the car will cost more than $2,50,000 which is approximately 1.6 crore rupees. This project deals with the development of low cost self driving flying car prototype. The developed project can be completely autonomous solution and the developed car prototype can autonomously navigate without any driving aid. The proposed technology is to use the GPS based Geo-point navigation technology which will help the car to autonomously navigate to the selected destination. The developed project consists of an electric car prototype with the option to set the destination. Once the destination is set the car will automatically navigate to the selected destination with the help of smart system developed. In addition to GPS based Geo-Point Navigation system. The Proposed project prototype works on smart algorithm developed which works on the data provided by GPS, Compass and Encoders to achieve driverless navigation. The proposed prototype also has flying capability which permits the car prototype to be put in flying mode in case of poor driving conditions. Additionally the proposed project also involves development of automatic collision detection and avoidance system to prevent accidents and manual override system thus making it a future proof economic self driving technology.*

Key Words: Waymo, Driverless car, GPS, Geo-Point Navigation, destination, Autonomous, futuristic, Flying, Compass, Algorithm, Manual override, accidents etc.

1. INTRODUCTION

For generations, the automobile industry has been a source of innovation and economic growth. The ability to drive is a symbol of mobility and independence that spans generations. Clearly, automobiles play a significant role in our lives and afford many benefits to society. Yet for all the benefits conferred on society, no other invention in the history of civilian technology has caused as much harm as the automobile. Every 30 seconds, someone dies in a traffic accident, adding up to well over 1 million deaths each year. In the world, automobile accidents are the leading cause of death for people between the ages of 3 and 34. Moreover, human error is the cause of over 90% of automobile accidents. 2 In addition, the inefficiencies related with the automobile usage is staggering. Most automobiles sit unused more than 95% of their lifespan, and a freeway operating at maximum efficiency has automobiles on only 5% of its surface. In congested urban areas, 40% of all gasoline used is spent when cars circle to look for parking spaces.

Autonomous (also called self-driving, driverless, or robotic) vehicles have long been predicted in science fiction and discussed in popular media. Recently, major corporations have announced plans to begin selling such vehicles in a few years, and some jurisdictions have passed legislation to allow such vehicles to operate legally on public roads. There is much speculation concerning autonomous vehicle impacts Advocates predict that soon affordable self-driving vehicles will greatly reduce traffic and parking costs, accidents and pollution emissions, and chauffeur non-drivers, reducing roadway costs, eliminating the need for conventional public transit services Under this scenario, the savings will be so great that such vehicles will soon be ubiquitous and virtually everybody will benefit. However, it is possible that their benefits will be smaller and their costs greater than these optimist predictions assume.

There has recently been a flurry of news about self-driving cars in the media. As of the end of 2017, most of the biggest car manufacturers have been building their own versions of self-driving cars. Google has moved its focus from highway-oriented autonomous driving to driving on local streets. Companies such as Baidu, a Chinese web services corporation, have announced their intention to enter the self-driving car market. Everyone seems to have realized that self-driving cars are the future of automotive industry. This new prospect, however, is elucidating the major split that is occurring in the self-driving industry. This separation originates in the approach that companies are taking to achieve the goal of fully autonomous driving. On one side, auto manufacturers are adopting the incremental approach; cars are becoming more and more autonomous over the years. On the other side, Google is aiming to release a fully autonomous vehicle straight to the market. This split is best articulated in the words of Carlos Ghosn, CEO of Nissan Motor Co., Ltd.: “Autonomous drive is about relieving motorists of everyday tasks, particularly in congested or long-distance situations. The driver remains in control, at the wheel, of a car that is capable of doing more things automatically. Self-driving cars, by comparison, don’t require any human intervention

– and remain a long-way from commercial reality. They are suitable only for tightly-controlled road environments, at slow speeds, and face a regulatory minefield." Mr. Ghosn speaks on behalf of all car manufacturers to lay out their vision of achieving fully autonomous vehicles. In his vision, drivers will remain behind the vehicle steering wheel, ready to take over control of the vehicle whenever the driving conditions are not conducive to autonomous driving. Initially, for example, cars may drive themselves only on highways and under good weather conditions. Over the years, however, cars will be self-sufficient under more and more conditions and will eventually relieve the driver entirely of the need to steer, thus achieving the fully autonomous status. Mr. Ghosn is implicitly comparing his approach to Google, which aims to release a fully autonomous car straight to the market. The difference in approach is best exemplified in the concept car Google recently unveiled: the car does not have a steering wheel or gas and break pedals. In Google's vision, there is no driver to take over the control of the vehicle; the vehicle has to drive itself regardless of the conditions. As Mr. Ghosn states, Google's approach is not only technically difficult, it also faces a number of regulatory issues.

This project focuses on development of autonomous self driving driverless car prototype which can autonomously move across the college campus without the aid of any driving assistant. The developed project concept can be used to set the destination form one place to another and the car will navigate autonomously without the requirement of controller to the above said location. Further the project also has the feature to manually override the autonomous systems to take control to train the vehicle in gps absent locations and ability to take flight when required.

2. LITERATURE REVIEW

Since this is a completely new subject the amount of research work available on this project is very less. So it was hard time going through the implementation of literature review and arrive at the problem definition. Currently existing systems and their drawbacks are studied as a part of this literature review.

Ratan Hudda et.al.[1] presented a detailed report on self driving cars. This report begins by describing the landscape and key players in the self-driving car market. Current capabilities as well as limitations and opportunities of key enabling technologies are reviewed, along with a discussion on the impact of such advances on society and the environment. This report also reviews legal and regulatory uncertainties. Finally, predictions about changes in the car-industry are made, including potential industry winners and losers. In conclusion, there are many strong socio-economic motivators for the adoption of autonomous vehicles. Human safety, infrastructure efficiency, quality of life and a ready customer base are just a few of the key factors that will help make self-driving cars a reality. Technology is converging rapidly, both incrementally from existing vendors and from new entrants. A car equipped with existing systems can take in more information quickly and reliably, and then process it to implement a correct decision about a complex situation. Yet to be solved are the complex issues associated with the legal and liability infrastructure. Gradual introduction of these features combined with strong economic motivators are sure to overcome such obstacles. The future will surely include autonomous vehicles; the only question is how quickly.

Pascale-L. Blyth et al. [2] published a paper on driving the self driving car. This paper examines the promises and challenges in the development of self-driving vehicle (SDV) technology. Theystart with the premise that the combination of different computing technologies embedded in SDVs is a powerful tool for efficiency in communications, information gathering, processing, and storage. However, by focusing on efficiency, SDVs provide a new mode of industrialized transportation whose users can only choose between transportation services, but have little or no say about the broader social implications of the technology. We argue that perspectives from social justice and ethics show that SDVs have implications beyond transportation, with profound consequences for users and societies. In particular, values such as privacy, security, and responsibility may be changed for good or bad, in both the short and long-term. The examination of these changes, while the technology is still under foundational development, is as urgent as it is needed.

Todd Litman[3], explores the impacts that autonomous (also called self-driving, driverless or robotic) vehicles are likely to have on travel demands and transportation planning. It discusses autonomous vehicle benefits and costs, predicts their likely development and implementation based on experience with previous vehicle technologies, and explores how they will affect planning decisions such as optimal road, parking and public transit supply. The analysis indicates that some benefits, such as independent mobility for affluent non-drivers, may begin in the 2020s or 2030s, but most impacts, including reduced traffic and parking congestion (and therefore road and parking facility supply requirements), independent mobility for low-income people (and therefore reduced need to subsidize transit), increased safety, energy conservation and pollution reductions, will only be significant when autonomous vehicles become common and affordable, probably in the 2040s to 2060s, and some benefits may require prohibiting human-driven vehicles on certain roadways, which could take longer.

3. OBJECTIVES

The main objectives of the project is to develop a fully autonomous self driving car prototype which can autonomously travel to the set destination using the smart systems incorporated in the car.

The objectives of the project are:

- To fabricate an electric car prototype which is capable of driving autonomously without any driver to the set location
- To implement the facility of geo point navigation which will help the car to drive to the set destination without the need to drive manually.
- To implement automatic collision detection and avoidance system which helps the car to automatically detect the obstacles in its path and apply brakes when necessary.
- To implement manual override system which permits to control the car manually at any moment of time
- To incorporate flying mechanism in the car so the car should be able to alert the users regarding the poor road conditions and able to take the flight by retracting the wheels whenever required.
- To implement the user notification system where the smart car assists the users to select the mode accordingly as per the required situation.

1. Further modifications are done if required.

4. BlockDiagram:

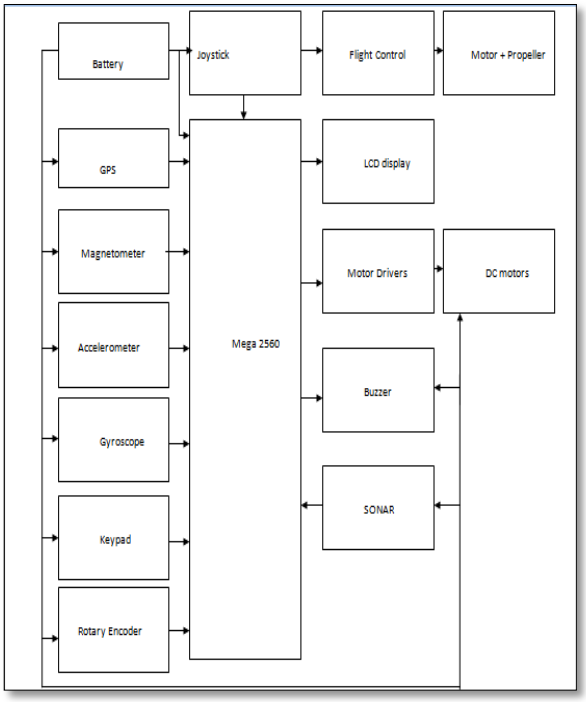

Fig.1. block digram

4.1 Working Principle:

The illustrations below explain the working principle of the project. As shown the project involves development of Autonomous self driving mobility with inbuilt flight systems. The proposed project contains a prototype of Car with Geo-Point navigation algorithms which permit the car to autonomously navigate to the desired destination. Inbuilt flight systems permit the car to be capable of flight where the roads are worst.

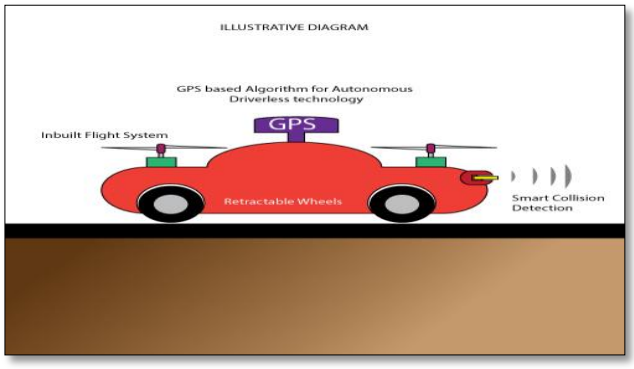

Fig1.working principle

The project consists of driverless car which can easily navigate using geo point navigation system.

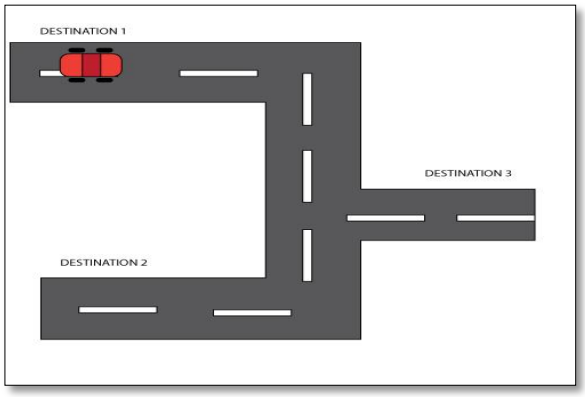

Fig2.working principle

To understand the working principle let us take an illustration above as an example. Suppose the car is at destination 1. The user willing to use the car will use the keypad provided in the car dashboard to select the target. One the Current Destination and target destination is entered the car will start navigating autonomously towards the target destination using the smart system developed in the car. The On Board sensors help to car to navigate to the correct destination using the proper heading as well as distance and direction. For example if the destination is entered as destination 3, the car will navigate to destination 3 as shown below.

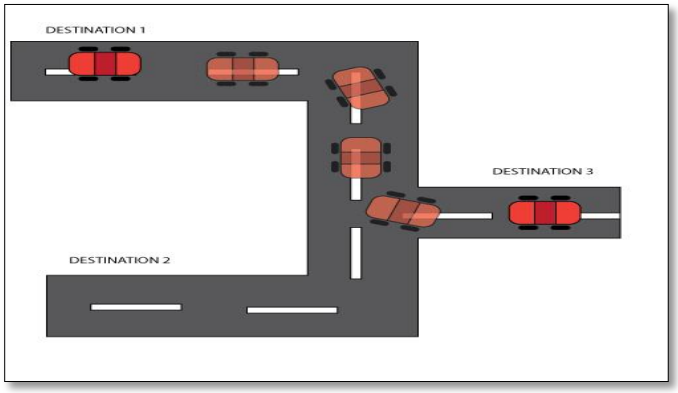

Fig3.working principle

Else if the user enters the destination as 2 the car will determine the path automatically and navigate to destination 2 as shown below.

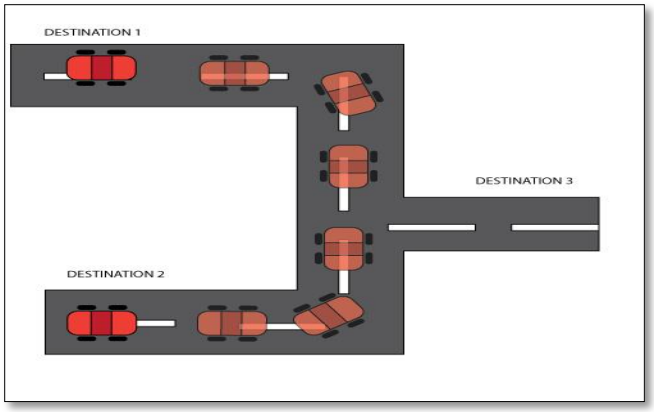

Fig.4.working principle

In addition the proposed system also alerts the user in case of poor roads and the car prototype itself can fly when required. Also the proposed system has the ability to automatically detect the collisions in its path while navigating and apply brakes.

Advantages and Applications:

1. This is a futuristic approach and can have a number of applications. The developed driverless car can be used for driverless navigation in following places but not limited to a. School Campuses b. College Campuses c. Hospital campuses d. Corporate e. Air Ports

2. Can be useful for Medium of transport for handicapped people who cannot Drive

3. Can be A future mode of transport

4. The inbuilt Flight system permits the car to fly off the ground, making easier to move on poor roads or any crossing or river or lake of such sort.

5. It can prevent accidents as it is equipped with smart collision detection avoidance and braking system

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