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SMART DRIVERLESS CAR FOR MOVEMENT ACROSS COLLEGE CAMPUS

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Abstract: *The automobile industry is moving towards implementing of smart technology assisted systems. A number of smart systems have been implemented in automobiles to help it easier to assist people in driving. 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 driverless cars to move across the college campus. The developed project can be completely autonomous solution and the developed car can move across college campus without any human aid. The proposed technology is to use the GPS based Geo pointing technology which will help the user to navigate to the selected destination. The developed project concists of an electric car 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. The proposed concept can be used to autonomous travel across the college campus without an human driver autonomously thus contributing to future technologies.*

Keywords: *Waymo, Driverless car, GPS, Geo Pointing, destination, Autonomous, futuristic etc.*

I. 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. The current trend of research is oriented towards development of smart driverless cars. This paper deals with development of such autonomous driverless cars for movement across college campus.

II. CURRENT WORK

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. 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. They start 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. Todd Litman[3], xplores 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.

III. METHODOLOOGY

The entire project is divided into number of phases which are completed step by step as we progress through the project.

Literature Review:

In this phase the brief literature study is done. The brief literature review of currently existing systems is done to arrive at the problem definition. The problem definition is thoroughly analyzed to form the basis for determining the actual scope of the project. The literature review consists of studying a detailed number of research papers on the currently existing topic. A number of research papers as well as the currently existing commercial systems were also studied as a part of literature review.

Material selection

The materials required for the project are surveyed and chosen . This involves extensive study of different materials available in the market and choosing the most suitable materials for the project. The project is completely based on innovative concept so the material survey plays a very important role in this project.

Plan or outline

The plan or outline of the project is done. This includes 3D modeling and laying out the initial plan

Chassis fabrication

To demonstrate this concept, electric vehicle is fabricated. Initially the chassis of the vehicle is fabricated. The chassis is fabricated initially as it forms the structural component of the vehicle and houses all the other parts of the vehicle. The chassis should be strong enough to transfer the entire load to ground as well have adequate amount of space for mounting all the other components.

Drive train implementation

The electric drive train is implemented and assembled in this phase to make completely functional electric car. The drive train should be suitably chosen so that it should be a proper The electric drive train is implemented and assembled in this phase to make completely balance between the speed and power.

Development of smart driverless technology

Smart system are implemented in this phase which help the car to achieve driverless control. The phase involves development of control system to help car achieve driverless control.

Incorporating GEO point navigation in car

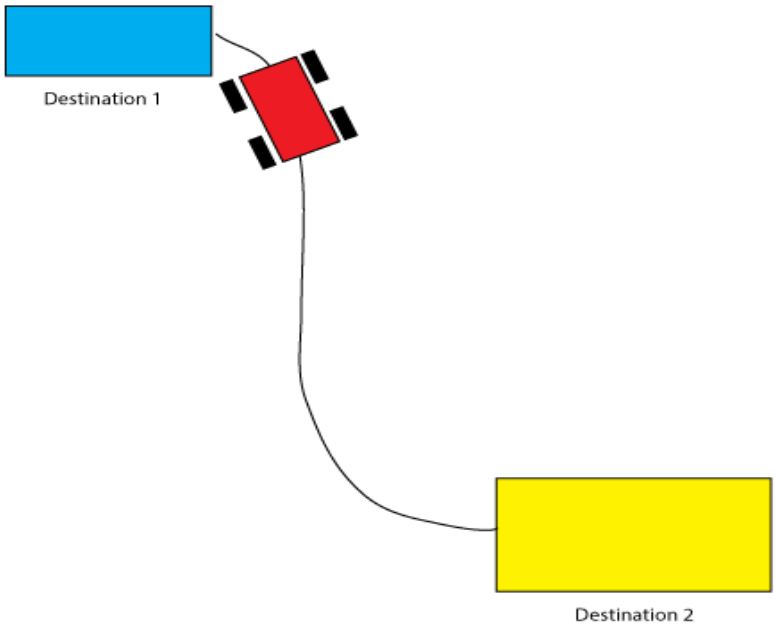
The smart system is incorporated with geo point navigation which helps the car to navigate according to the map set.

Assembly

Finally all the systems are assembled to make it fully functional self driving car.

Testing and optimization

Finally the testing of the car is carried out to evaluate the results. Further modifications are done if required. The figure below shows the working diagram of the project:



Working diagram

IV. COMPONENTS USED

The following components were used for development of this vehicle:

Chassis Material

The chassis forms the integral form of the project as all the components of the project are mounted on the chassis so it is very necessary to select the chassis material properly. 25 mm ERW pipes were used for the same.

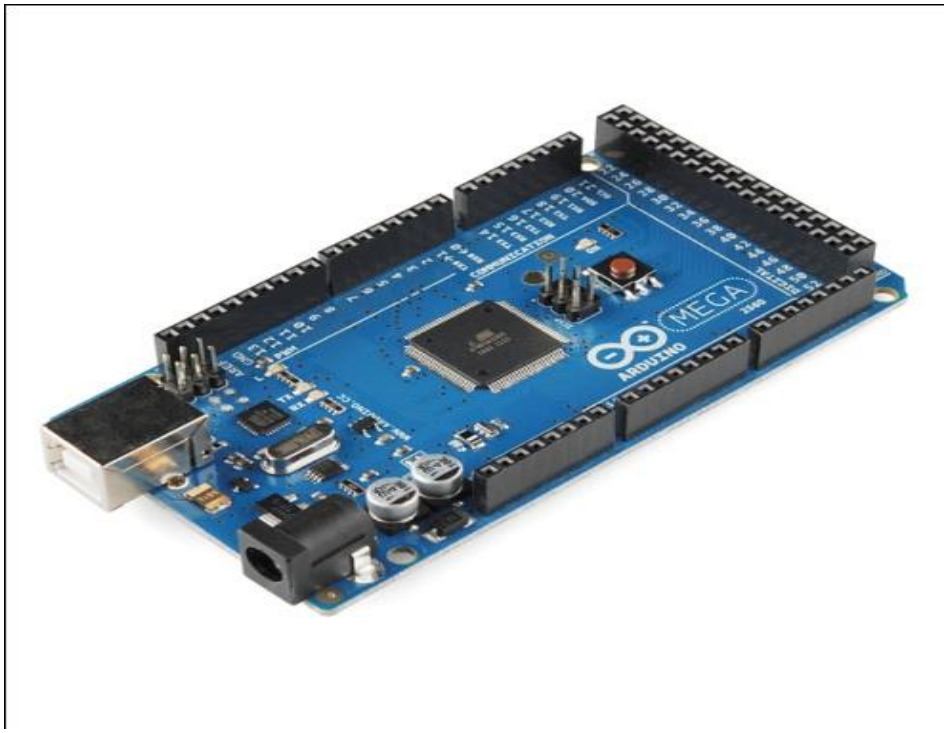
ERW pipes

Wheels

The keep the project costs economical the scooters wheels were chosen for the purpose of the project.

Controller

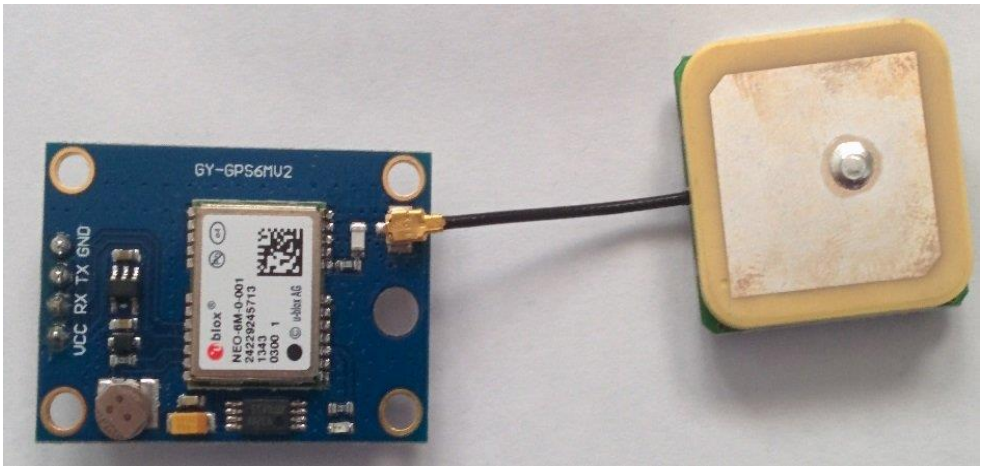
Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems. Arduino Mega 2560 was chosen in this case.



Microcontroller

GPS

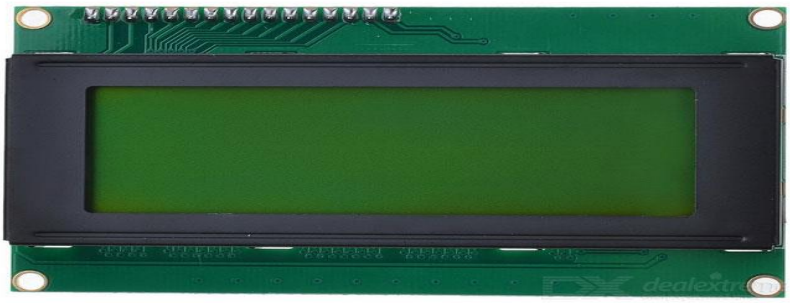
Ublox Neo 6M (Ublox NEO6MV2) is a I2C compliant GPS module. This post discusses details on wiring Ublox Neo 6M with Arduno or an USB to Serial/TTL adapter, basic interactions with module using serial communication, using u-center GUI in visualizations, as well as using TinyGPS library to extract fine grained results from the module output.



GPS

LCD

The LCD display is used to display the destinations and current status of the car. 2004 LCD display is used in the project. The selected LCD display can print on 20 columns and 4 rows



LCD

Motor

The 250 watt DC geared motor is used for the purpose of drive train. The two motors are used in skid steer. Configuration which will be helpful in precise steering of the developed driverless car.

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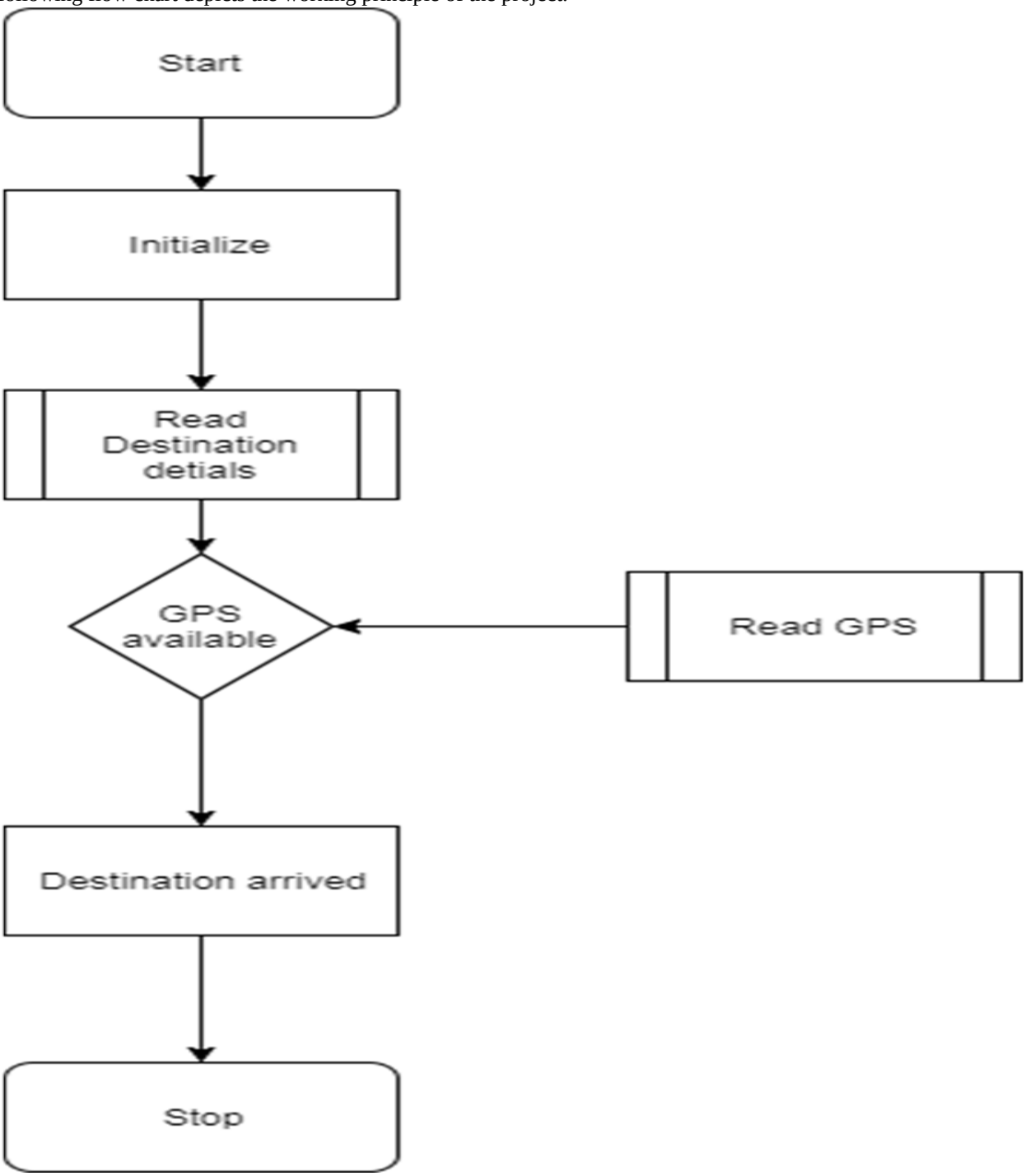
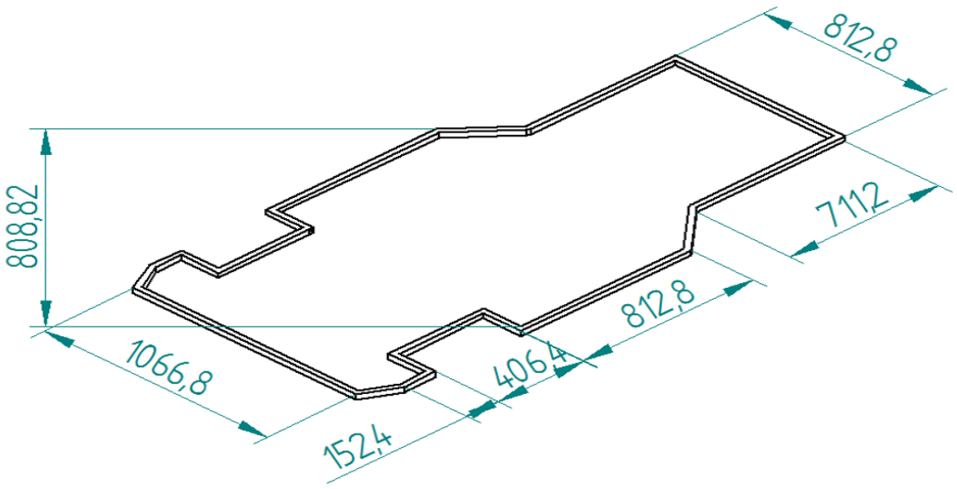
Motor

V. MODELLING AND LOGIC

The following flow chart depicts the working principle of the project.



Flow chart



VI. FABRICATION AND ASSEMBLY

The following fabrication activities are performed through the process to make the completely working driverless car. The fabrication activities involved are:
Cutting: The cutting is done via chop saw
Welding: arc welding is implemented
Drilling
Grinding: For finishing work
Turning : For turning various operations involved in the project

VII. CONCLUSION

The paper briefly outlines the concept of driverless car for movement across college campus. The proposed project ca effectively move across the college campuses using way point navigation and reach the destination without any manual driving aid. The developed car prototype also has the system for training the car to move across various paths in college campus where GPS is not available. Thus this forms an completely effective solution for implementing the driverless methodology in comparison to the commercially available technologies which cost too much and are not economical.

VIII. REFERENCES

1. Ratan Hudda Clint Kelly Garrett Long Jun Luo Atul Pandit Dave Phillips Lubab Sheet Ikhlaq Sidhu, Fung Technical Report No. 2013.05.29, College of Engineering University of California, Berkeley
2. Pascale-L. Blyth , Miloš N. Mladenović , Bonnie A. Nardi , Norman M. Su3 , Hamid R. Ekbia, Driving the Self-Driving Vehicle, 2015 IEEE International Symposium on Technology in Society (ISTAS) Proceedings ISBN: 978-1-4799-8282-0
3. Todd Litman, Autonomous Vehicle Implementation Predictions, Victoria Transport Policy Institute
4. http://www.forbes.com/sites/chunkamui/2013/03/01/googles-trillion-dollar-driverless-car-part-5-howautomakers-can-still-win/3/
5.http://articles.chicagotribune.com/2012-12-09/business/ct-biz-1209-confidential-uber-20121209_1_travis- alanick-simon-garber-taxi-operators
6. http://googleblog.blogspot.com/2010/10/what-were-driving-at.html
7. http://www.extremetech.com/extreme/149045-take-that-google-oxford-university-sees-self-driving-as-a- 150-option-in-future-cars

