ISSN No:-2456-2165

The Issues and the Feasible Solutions for Enforcing Self-Using Motors in India

Aman Yadav
Chandigarh University
Department of Computer Science and Engineering

Abstract:- The main purpose of this study is to find the issues and suggest possible solutions regarding the implementation of Self-driving cars on India roads. A Self-driving car is fairly in its infancy today, but once implemented this can revolutionize our traffic management and transport system. This paper addresses some of the hurdles the technology might face in the country and offers a few measures that can be taken to overcome the downsides.

Keyword:- *Self Driving Cars ,Damaged Streets ,Technology, Traffic, Manually.*

I. INTRODUCTION

As we are moving towards a driverless future, the technology is getting increasingly mature over time. What was once considered science-fiction, is now a reality. In the last couple of years, self-driving car technology has seen tremendous advancement. Many companies have already deployed their own version of driverless cars on the road. India cities, especially the capital and other major cities, are renowned for their traffic jam. Not only traffic congestion is an everyday scenario in the country, traffic rules are seldom enforced properly. With non -standard roads, lack of proper parking facilities and broken traffic system, India cities are a nightmare for self -driving car's progress. Despite these major concerns, it would be foolish to write off the benefits of this inevitable technology in a country like India. While the authorities are taking measures like building flyovers, more roads, the issue is still likely to be persistent in the future given the increasing number of human and car population. An autonomous car system is probably the only solution to the traffic issues in India [8]. In this research, there will be some proposals that can be implemented to mitigate the gap between India roads and the roads of the countries where self-driving cars are already implemented. While some of the proposals are purely theoretical at this point, with proper implementation, these can be proven effective.

II. LITERATURE REVIEW

Some of the issues of India roads are highlighted in a paper published by World Health Organization in 2004 [1]. According to the document, India roads are filled with the non-motorized vehicle that often slows down the steady flow of traffic on major roads. Pedestrian jay-walking and overinvolvement of large vehicles are among the other issues the paper mentioned. A more recent study shows that most of the traffic congestion is caused by mainly three issues: irregular car parking, street dwellers and pedestrian walking on the roads instead of footpaths that have been occupied [2]. Another issue that might become problematic for self -driving cars in India is country's bad roads filled with pot-holes here and there. While all these problems can be solved with proper infrastructure improvisation, traffic mismanagement and lack of enforcement of traffic rules remain to be the biggest problem in the country regarding transportation system [3] . Now have a look how far self-driving technology has come to get some ideas about the potential of the technology in India and possible drawbacks country's troubled transportation system might bring forth. 2017 The breakthrough in the field of self-driving car system came with the inception of modern electric cars from makers like Tesla and the introduction of their Autopilot system [7]. Autopilot can substitute the role of a human driver and operate the car under various circumstances [5]. It is said that the autonomous car industry will only get bigger from here one. According to Zack Kanter, Uber - the US carpooling giant's autonomous car is expected to replace at least 10 million jobs and have a major impact on the country's economy [4]. Perhaps the biggest achievement in driverless car technology is Google Car project [15]. The car is already in deployment, has travelled many miles on itself, and is learning and adjusting itself to new scenarios dynamically [3]. These were possible by the growth of Machine Learning and artificial intelligence in the last decades [9]. Computer hardware makers like Nvidia are now coming with their Ai powered supercomputer platform dedicated to self-driving cars [6]. The Nvidia Drive PX can sense surroundings precisely in a friction of time [10]. Today's self-driving cars can detect other vehicles, pedestrian, traffic lights with great accuracy [4]. The cars use a combination of sensor data and advance machine learning to replicate the driving prowess of a human Driver [6]. Google car

among other things, can calculate the most efficient path, abide local traffic rules, park when necessary and change lane if required [7] .

III. ISSUES

The issues regarding the implementation of a self-driving car in India can be broken down into the following categories [10]. The issues may alter in the future should the situation change for better or worse [11].

A. Broken Roads

As mentioned in the paper published 2004, many roads in India cities are the victim of waterlogging problem. As result, the roads get broken after a few months of inception, leaving potholes and fractured spots everywhere. The drivers in the country often change their lanes, brake unexpectedly to avoid running over these spots [2]. This is very problematic for current self- driving cars since they are not used to these types of roads [5]. The cars might run over these spots and cause damage to it and its passenger [16] in the process. Not to mention the unexpected lane changing and braking might confuse the cars that could lead to accidents.

B. Lane Changing

Most self-driving cars that are in deployment today can change lane efficiently if required. But their ability is untested in an adverse situation like India's. Most cars in the country do not maintain lanes. The cars are all over the road despite there being laws against it [1]. This is particularly tricky for a self driving car to comprehend [8]. Current self-driving cars are designed to oblige the lane maintenance rules in the streets. But when almost every other car is breaking the rules, it becomes harder for the car to be the only one abiding.

C. Parking

Unlike most developed countries, India lacks the proper amount of parking spots in the country [1]. Unsurprisingly, most drivers will try to park their cars in the streets, blocking the steady flow of traffic. As our self-driving car needs to park at its destination, it must have prior information about designated parking spots. India roads will become a hard nut to crack for self-driving cars in this regard [3].

D. Manual Traffic Control

Although the government has tried to enforce automatic traffic control several times in the past few years, the huge amount of traffic and the inconsistency made it harder to maintain an automated system. Almost every traffic section in the cities is controlled by traffic officials manually [5] . They use hand gestures and voice to control traffic. This is very hard for a self-driving car to comprehend unless a proper adjustment is made to the said area[9]. If the car is deep in the queue, it becomes worse for the car to understand traffic signal.

IV. SOLUTIONS

A. The Prototype

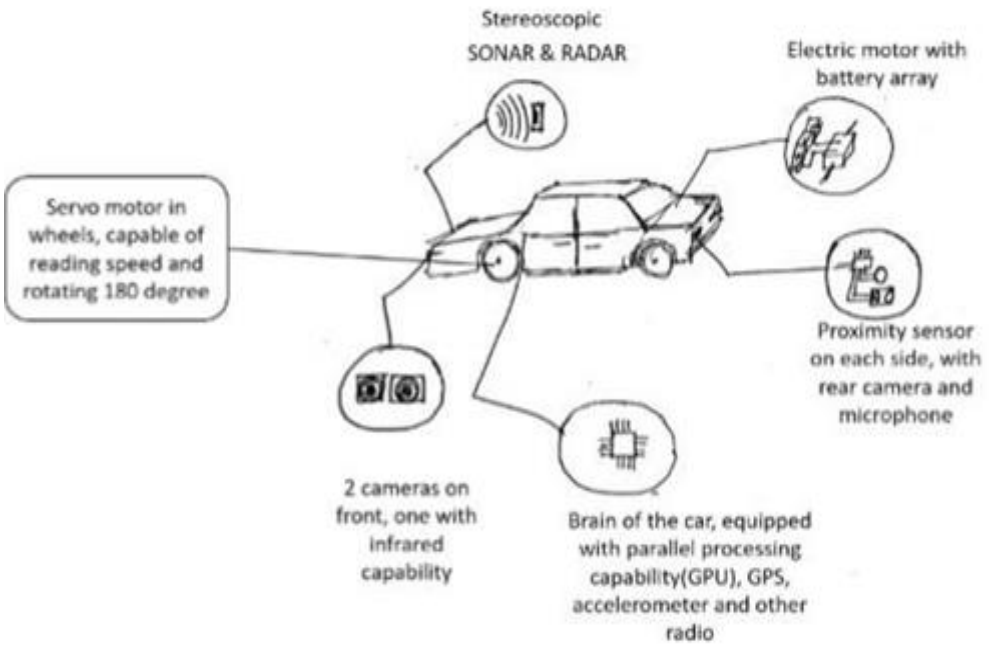

Fig 1:- The Proposed Prototype

ISSN No:-2456-2165

Our proposed prototype has an array of sensors embedded in it. The mind of the gadget is an ARM CPU able to exchanging records with the sensors and fast sufficient for calculate thousands and thousands of data in line with second. Since our vehicle will use device learning, it will want heavy parallel computing power, for that reason, the CPU will be followed by way of a more powerful GPU [2]. The car may be controlled via Servo motor controller, able to reading its rotational velocity and rotate the wheel a hundred and eighty degrees. Instead of using rotating cameras on top, we will be the usage of 2 cameras at the front and one on the rear [6]. One of the front cameras is able to infrared imaging, they may be placed in such a way that a stereoscopic 3D picture of the environment may be produced [2].

B. Broken Road Problem

The car will deal with broken roads by using any combinations of total avoidance and/or slow run over in damaged streets. The car will first detect a damaged area by using its front camera(s) and its infrared and Sonar capabilities. Once detected, the car will make a virtual rectangle of the damaged part so that the rectangle contains the damaged portion in its vicinity. The car will then calculate the amount of space left in its current lane, if there's enough space for it to move through, the car will simply avoid the potholes [14]. If it's not the case, there are two possible outcomes [13]. The car will either change its lane or run over the area with causing as fewer damages possible by slowing down its speed.

Fig 2:- Damaged Road Avoidance

C. Lane Changing Problem

Path changing will be activated if any of the mix of the accompanying triggers is distinguished: 1.Car requirements to accelerate yet is in a more slow path. 2.The vehicle needs to back off and is in a quicker path. 3.The vehicle is in an inappropriate path 4.Car needs to stop/leave. The vehicle will initially decide the path it needs to change [13]. It will at that point ascertain the path separation and decrement the separation with every path switch. The vehicle will possibly switch path if no vehicle in the focused on path is drawing closer or gets any opportunity of being while the vehicle is evolving path. It will likewise check whether path changing is permitted in the road. On the off chance that these conditions are met [14], the vehicle will keep on changing its path until the objective path is accomplished.

D. Parking

The vehicle should be in the leaving mode for this to work. Leaving mode is activated when the vehicle needs to stop for a crisis, has shown up at the goal or is asked by the traveler to stop [3]. Right now, vehicle will search for assigned parking spaces in the zone, if no such region found, the vehicle will go in to "Free leaving mode." Right now, will search for an expansion of the street that may be a potential parking space [12]. On the off chance that the width of the augmentation is equivalent or greater than the vehicle's width, it will leave itself in the spot, if it's free [3]. To what extent it will remain in the spot relies upon client's arrival and spot's inhabitance.

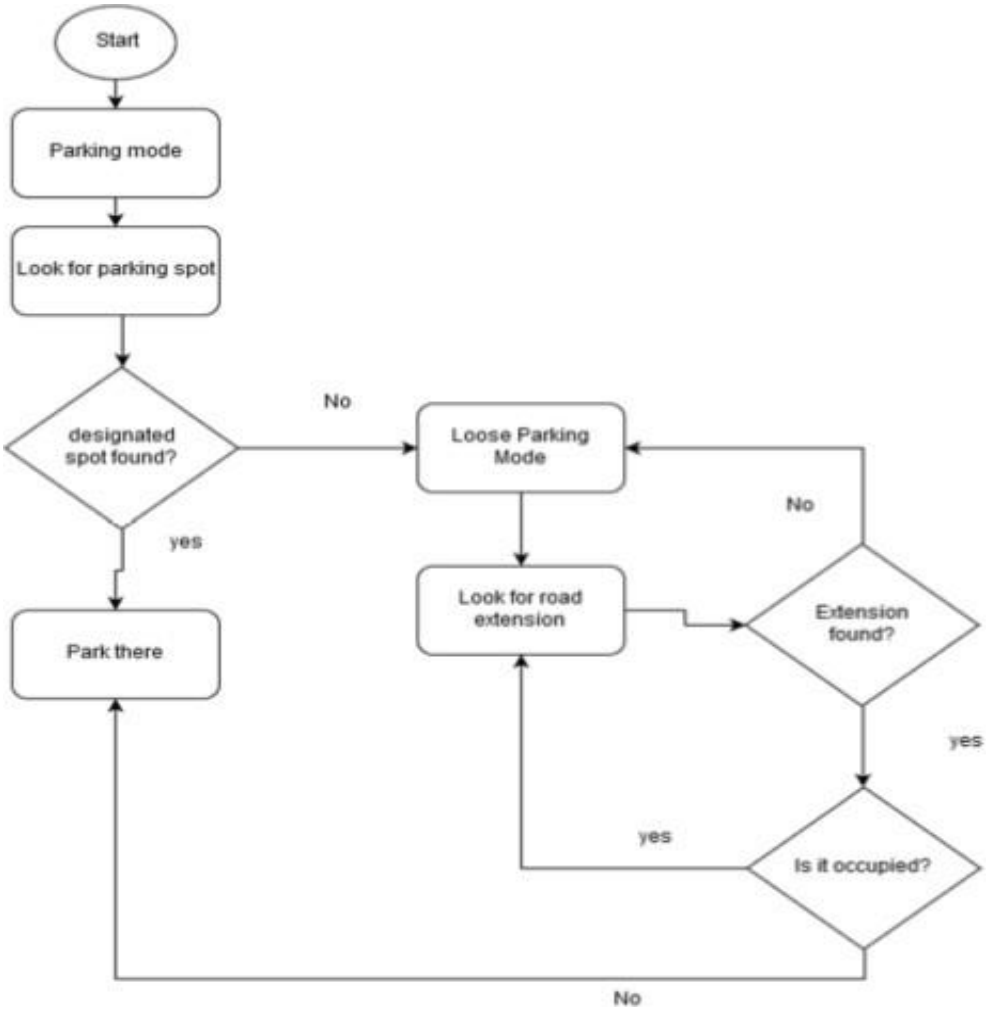

Fig 3:- Loose Parking Mode

V. CONCLUSIONS

Self-driving vehicles can possibly turn into the perpetual answer for India's scandalous traffic issue. Right now, have attempted to accomplish only that by discovering the issues and potential arrangements. In spite of our constraints like not having a real self-driving vehicle and absence of financing for building a model, we accept our examination is a decent way ahead for different scientists to follow. We have made essential modifications by watching our reenactments. In the event that the recreations are any signs, it will be conceivable to fabricate a model on this that will take a shot at India streets. With appropriate execution and change, India can likewise partake right now transformation.

REFERENCES

[1]. Hoque, Md Mazharul. "The road to road safety: Issues and initiatives in Bangladesh." Regional Health Forum. Vol. 8. No. 1. 2004.
[2]. El Faouzi, N.E. and Klein, L.A., Data Fusion for ITS: Techniques and Research Needs, Transportation Research Procedia ,v. 15, 495–512 p., 2016.
[3].] Chris Urmson, Joshua Anhalt, Drew Bagnell, Christopher Baker, Robert Bittner, MN Clark, John Dolan, Dave Duggins, Tugrul Galatali, Chris Geyer, et al. Autonomous driving in urban environments: Boss and the urban challenge. Journal of Field Robotics, 25(8):425–466, 2008.
[4]. American Automobile Association. Your driving costs, 2013 edition. AAA Association Communication, 2013.
[5]. ETSI TC ITS. Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2:
[6]. Specification of Cooperative Awareness Basic Service. Technical Report TS 102 637-2 V1.2.1, 2011
[7].] H.-S. Tan, B. Bougler, J. A. Farrell, and Y. Yang, "Automatic vehicle steering controls: DGPS/INS and magnetic markers," in Proc. Amer. Control Conf., Denver, CO, Jun. 2003, pp. 60 –65.
[8]. A.D. Thierer, R. Hagemann. "Removing Roadblocks to Intelligent Vehicles and Driverless Cars." Wake Forest Journal of Law & Policy , Forthcoming, 2014.
[9]. A. Reschka and M. Maurer, "Conditions for a safe state of automated road vehicles," it - Information Technology, vol. 57, no. 4, Jan. 2015.
[10]. M. Sivak, B. Schoettle. "Road safety with self-driving vehicles: General limitations and road sharing with conventional vehicles." 2015.
[11]. N. A. Greenblatt, "Self-driving cars and the law," IEEE Spectrum, vol. 53, no. 2, pp. 46–51, Feb. 2016.
[12].] H. Surden, M.A. Williams. "Self-Driving Cars, Predictability, and Law." Available at SSRN 2747491, 2016. [12]N. Goodall, "Ethical decision making during automated vehicle crashes," Transportation Research Record: Journal of the Transportation Research Board, vol. 2424, pp. 58 – 65, Dec. 2014.
[13]. N Thomopoulos, M Givoni. "The autonomous car—a blessing or a curse for the future of low carbon mobility? An exploration of likely vs. desirable outcomes." European Journal of Futures Research 3.1: 1-14, 2015.
[14]. Guizzo, E. "Autonomous vehicle driving from Italy to China." IEEE Spectrum, September, 2010.
[15]. Guizzo, Erico. "How google's self-driving car works." IEEE Spectrum Online, October 18 (2011).
[16]. Carbonell, Jaime G., Ryszard S. Michalski, and Tom M. Mitchell. "An overview of machine learning." Machine learning. Springer Berlin Heidelberg, 1983. 3-23.