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Automated Guided Vehicle (Agv)

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ABSTRACT: Automated guided vehicles (AGVs) are used for the internal and external transport of materials. Traditionally, AGVs were mostly used at manufacturing systems. Currently, AGVs are also used for repeating transportation tasks in other areas, such as warehouses, container terminals and external transportation systems. In this paper, literature related to design and control issues of AGV systems at manufacturing, distribution, transhipment and transportation systems. Some of these models have already proved to be successful in large AGV systems. The transition of conventional vehicles into an autonomous vehicle by adopting and implementing different upcoming technologies is discussed.

KEYWORDS:
Automobiles,Training,Autonomousautomobiles,Task analysisLearning (artificial intelligence)

I. INTRODUCTION

Automated Guided Vehicle(Self driver car) is avehiclethat is capable of sensing its environment and moving safely with little or nohuman input. Self-driving cars combine a variety of sensors to perceive their
Surroundings, such asradar, lidar, sonar, GPS, odometryandinertial measurement units. Advanced controlsy stemsinterpretsensory informationto identify appropriate navigation paths, as well as obstacles and relevantsignage.

A human passenger is not required to take control of the vehicle at any time, nor is a human passenger required to be present in the vehicle at all. An autonomous car can go anywhere a traditional cargoes and do everything that an experienced human driver [1]. Autonomous car in 2011, as an autonomous vehicle, it is capable of sensing its environment and navigating without human input. Robotic cars exist mainly as prototypes and demonstration systems. It sense their surrounding with such a technique as radar, GPS and computer vision Advanced control system[2] interpret sensory information to identify appropriate navigation paths .as well as obstacles and relevant signage[3]. Some Autonomous vehicles update their maps based on sensory input, allowing the vehicles to keep track of their position even when conditions change or when they enter uncharted environments.

Currently on highways drivers usually keep between 40 to 50 m (130 to 160 ft) distance away from the car in front of their pathway. These increases in highway capacity sometime are one of the main significant reason for impact in traffic congestion, particularly in the urban areas and more affected in highway congestion in some places. For the authorities to manage the traffic flow usually leads to increase the traffic congestion, with the extra data and predicting the driving behaviour of people, we can combine these two details for reducing the traffic congestion the road with less need for traffic police on the roads and even for the road signage. Manually driven vehicles on online surveys are reported to be used only 4–5% time, while being parked and unused for the remaining 95–96% of the time. Autonomous vehicles, on the other hand, be continuously used even after it has travelled from some source to some destination for a given person. This could lead to reduce the need for parking space.

II. PROBLEM STATEMENT

Non-autonomous vehicles have been around several years, and based on online survey we have found that ratio of accident happening due to human error is quite high and reason being Human beings are not well-suited to travel at high speed[4]. As speed increases, our time and distance perception degrade. Fuel wastagecaused by human error is quite high.

III. PROPOSED SYSTEM

The current proposed system uses pattern matching technique, cameras are used to detect a special pattern that will be printed on the roads. The camera will capture this pattern and process it using a raspberry pi and instruct the car to move on specified direction. The camera will also capture surrounding Images[5], to determine different obstacles next to it, if the obstacles get too close or about to make contact with the vehicle then the

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vehicle will stop until the obstacle near it moves. Special patterns will be deployed beside the road to detect what kind of road is present ahead.

IV. OBJECTIVES

Self-driving car help reduce the pollution emitted byvehicles. Autonomous capabilities such as consistent driving speeds and keeping a measured distance between vehicles can reduce unnecessary breaking and re-acceleration. It can reduce travel time. It can improve in fuel economy. It can increase in lane capacity. It can reduce travel time.

V. LITERTURE

Many technical advances that enable self-driving cars are of course due to software and algorithmic innovation. There have been incredible advances in machine learning that improve the ability to perceive the world, new tracking and planning algorithms allow for safer and smoother driving, and the software infrastructure to simulate and analyse large amounts of data in data centres have all been key contributors towards making self-driving cars. The rapid development of self-driving capabilities, Google's self-driving car project began in 2009 and transitioned to its own business entity – Waymo – within Google's parent company (Alphabet) in 2016. Waymo's self-driving cars contain a broad set of technologies that enable our cars to sense the vehicle surroundings, perceive and understand what is happening in the vehicle vicinity, and determine the safe and efficient actions that the vehicle should take. From a hardware perspective, it can divide Waymo's self-driving technology into three key areas: sensing, compute, and embedded control[6]. Sensors capture information about the vehicle surroundings, position, and environment. The sensors send their information to a high-performance computer. The computer fuses, processes, and interprets the sensor data, ultimately generating trajectories that the vehicle must follow. The computer passes these trajectories to embedded control systems, which in turn communicate with the vehicle actuators to manipulate steering, braking, and throttle. Self-Driving Car requires several concepts that needed to be known in order to have it getting implemented they are Computer Vision, Sensor Fusion, Deep Learning, Path Planning, Actuator. Computer vision allows us to understand how computers can be made for gaining information from digital images or videos. From engineering perspective, it is used to automate tasks that the human visualize how system can do it. Sensor fusion combine variety of sensory data or data derived from various sources so that the resulting information has less uncertainty in them rather than how it would be when these sources were used individually.

VI. SYSTEM DESIGN

The purpose of the design phase is to plan a solution of the problem specified by the requirement document. The design and quality of the system plays very much important in the later phases which include testing and maintenance. The output of this phase is the design document. The pie camera that streams video live and send it to the raspberry pie as shown in fig 1. Then the raspberry pie that processes the data and sends the data to be processed in remote system placed someplace. The data that is processed then transmitted to the Arduino that further sends the information for the modelled car[7] so it can operate based on the condition.

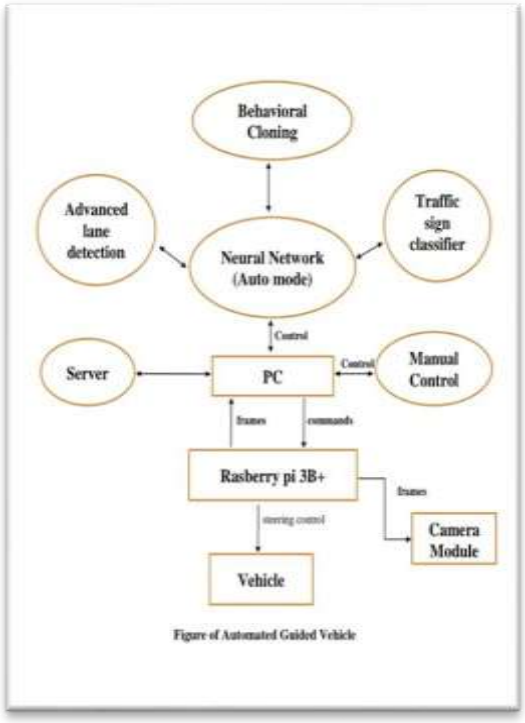

Fig 1: Block diagram of AGV

The car once placed on the road starts moving unless and until it detects an obstacle in front or it reaches end of pattern. The car captures the pattern present on road and follows that particular pattern. If it has to take a particular path from source to destination and further the current path isn't available for some reason then it can let user choose a new path to travel. If it comes in contact with a scenario where current path has two pathways ahead then it lets the user decide on which path to take.

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VII. IMPLEMENTATION

Prototype model shows some work on both the application that have been discussed in this paper. The following set of figures shows the prototype Mobile Robot (Vehicle) used in the construction of the model. The main focus was on Following Vehicle, which detects and avoids obstacles, coordinate with environment, get route and follow the route.

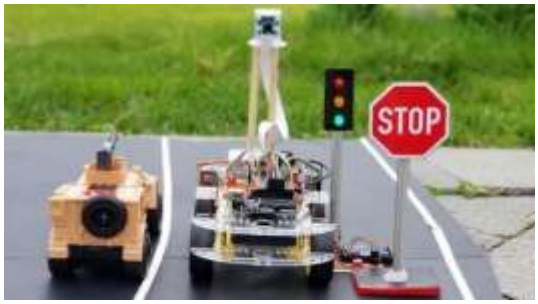

Fig 2: Prototype of AGV

Other application includes, checking vehicles around and automatically moves slowly behind the traffic until it gets out of traffic jam situation[8]. It was initially implemented sensors on the modelled car so that it was able to detect the surrounding obstacles and other vehicles in the surrounding

Fig3:Working model of AGV

Required components are needed for the Arduino and then there areconnected output of the Arduino to the motor driver, which would be used to output specify power to modelled car to control its speed. Once the sensors were implemented in the model, the camera which was going capture the video footage, to detect the pattern was connected to the Raspberry pie. The processing of the image was done remotely on the external system. Hence using the radio waves,The data sent from the raspberry pie to the system, process the data and then send the required output back to the raspberry pi [9]. The system will process on determining what obstacles are detected and what it should when it detects an obstacle in the environment. The obstacle could be another vehicle or pedestrians crossing the road. The remote system can also determine what speed the modelled car should travel, what direction it should travel following the specific pattern(pathway) provided for the modelled car on the road.

VIII. APPLICATIONS

Driverless cars stand to solve all sorts of problems, like traffic delays and traffic collisions caused by driver error. The GPS-based navigation system would plot the route, allowing the autonomous driving system to get the vehicle to the destination. Autonomous vehicles will bring to market all sorts of new and exciting applications for a variety of industries, like shipping, transportation, and emergency transportation. Taxi-cab application would have to rely on the user/hirer to enter the destination into the system, and that might be beyond the ability of a nontechnical individual to handle. An incorrect address entered would likely greatly complicate the task of completing the trip accurately. The military has run a competition for autonomous vehicles to navigate across the desert (not in regular traffic) to a pre-set destination.

IX. CONCLUSIONS

Automation is the outcome of a series of processes, which loop from the acquisition of environmental data, to data processing, and the usage of processed data to control the vehicle. Motion control can occur according to a user predetermined or vehicle generated path by sending a command to the vehicle actuator[10]. This loop ensures the vehicle moves in the desired direction. Motion changes environmental data, which is acquired by the sensors to restart the series of processes. In this way an automated vehicle will be able to perform tasks of increasing complexity. Vehicle automation, from this viewpoint, is indeed a window into the evolution of self and technology.

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