ISSN: 0976-3031

Available Online at http://www.recentscientific.com

International Journal of Recent Scientific Research
Vol. 7, Issue, 10, pp. 13607-13610, October, 2016

International Journal of Recent Scientific Research

Research Article

AUTO WORLD-AUTOMATIC TRANSPORTATION SYSTEM

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ARTICLE INFO

Article History:

Received 20th June, 2016
Received in revised form 29th August, 2016
Accepted 30th September, 2016
Published online 28th October, 2016

ABSTRACT

Auto world is an automatic transportation system that involves developing technology for autonomous cars, mainly electric cars. This can be very useful in commercial, educational and industrial areas. The idea of the system is based on Google car. The main aim of the proposed system is based on Google car. The main aim of the proposed system is the easy transportation of the employees in an industrial zone. This would help the employees to reach the destination without confusion and thus save time. For the demonstration purpose, the project uses a predetermined track of convenient dimensions and a prototype for the driverless car.

INTRODUCTION

The idea of this project is based on Google car which is a self-driving car developed by Google X as part of its project to develop technology for electric cars. Driverless vehicle technology has the potential to be a real game changer on the roads. Driverless cars and other automated vehicles offer major potential benefits and could profoundly change our lives for better. They will make driving easier, allow people to be more productive and offer greater mobility to a wider range of people than ever before. They will also help improve road safety, reduce emissions and ease congestions. As a result, they can provide significant economic, environmental and social benefits. Automated technology represents a significant area of interest and investment in the global automobile industry. Manufacturers have recognized the potential benefits the technology offers and are carrying out extensive research on private testing tracks.

The main objective of this project is to propose a transportation system that offers safe transportation of people to the desired location. Deaths from traffic accidents are over 1.2 million worldwide every year. With the introduction of driverless cars these accidents can be reduced dramatically. Everyone can get around easily and safely, regardless of their ability to drive. Aged or visually impaired loved ones need not give up their freedom to travel. The self-driving car is designed to navigate safely through the desired track. The advent of driverless and automated vehicle technologies offers enormous opportunities. As a result, driverless vehicles can provide significant economic, environmental and social benefits.

Experimental Setup

The heart of the project consists a predesigned track, motor section and the control section. This project uses a predetermined track for the purpose of demonstration. The control section covers the following details; it consists of IR transmitter receiver pairs on the either side of the track to check the density of traffic around those specific junctions. It also consists of **RFID cards** [1] placed beneath the track which helps the car to take decisions about the direction of travel. A motor section is a mobile unit of the project. It is a car which includes a keypad for entering the destination. Upon entering the destination, the car chooses a path depending on the traffic intensity to reach the destination.

The hardware requirement was to have a platform to run the car. There are three major sections from the project design standpoint: track, a motor section, control section.

Track Design

The track which represents a particular commercial zone is constructed using plywood. Two separate layers of wood were used. The upper layer consists of RFID cards placed beneath them at each turning. This helps the car to decide on the directions to be followed during the journey. The track also has slots to accommodate the IR transmitter receiver pairs on the either side of the track. Space is provided between the two plywood sections to accommodate the circuit for control section.

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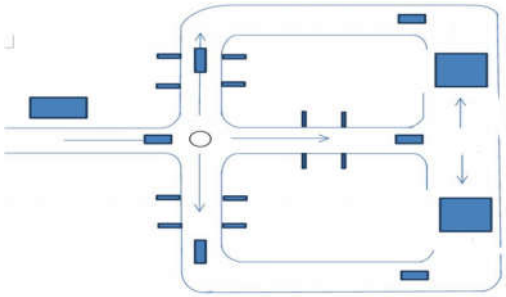

Figure 1 Track

Figure 1 shows the track design. Large rectangular boxes represent starting and destination points. For demonstration purpose, starting point is assigned as2. The destination building is marked as 1 and 3. The keypad is provided along with the car which is a part of the motor section. Six pairs of transmitter-receiver pairs are placed on the tracks along three different paths. Six RFID cards are also placed beneath the first layer of the track.

Control Section

The control section includes IR transmitter-receiver pairs, RFID cards, PIC16F877A, Max232 and Zigbee module.

IR Transmitter Receiver

The **Infrared (IR) transmitter and receivers** [2] are used in many different devices, though they are most commonly found in consumer electronics. The way this technology works is that one component flashes an infrared light in a particular pattern, which another component can pick up and translate into an instruction. These transmitters and receivers are found in remote controls and all different types of devices, such as televisions and DVD players.

The basic concept of IR (Infrared) obstacle detection is to transmit the IR signal in a direction and a signal is received at the IR receiver when the IR radiation bounces back from a surface of the object.

Here in the project, the object is an obstacle that is another vehicle used to indicate the traffic. The IR LED transmits the IR signal onto the object and the signal is reflected back from the surface of the object. The reflected signal is received by an IR receiver. The IR receiver is a photodiode/phototransistor which decodes the signal.

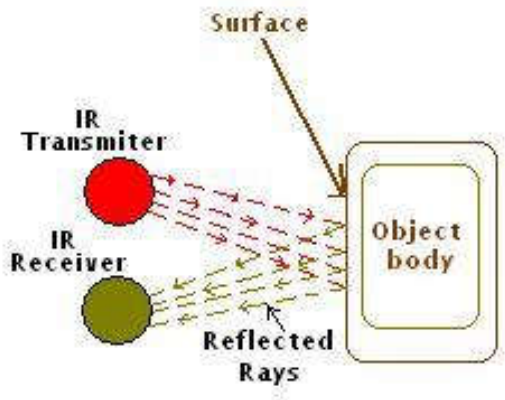

Figure 2 IR Transmitter Receiver pair

A thick enclosure is necessary for both IR transmitter and receiver, because the IR radiation may bounce back from the surrounding which may not help when you want to detect an obstacle in one direction. Sometimes, if we don't have a thick enclosure then the signal may directly reach the receiver even in the absence of an obstacle. The enclosure can be made of plastic or even metal material which is painted black in color. Here we have provided a black tape coating around the IR LED to minimize this effect.

Motor Section

The heart of the motor section is the vehicle which is used to reach the destination. The vehicle accommodates the necessary circuitry required for the motor section. The important components used in this section are rectifier circuitry, PIC16F877A, MAX232, DB9 connector, Zigbee module, dc geared motor, L293D motor driver IC and the keypad which is used to enter the destination.

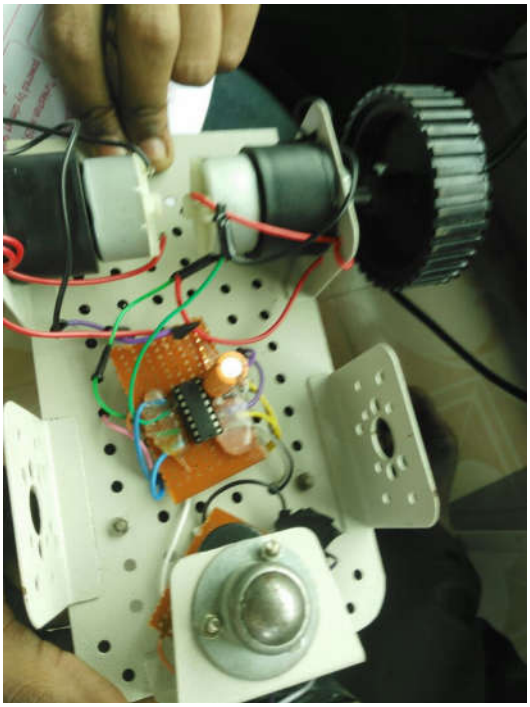

Figure 3 Flowchart (control section)

The power required for the circuit comes from a 12V dc adapter. The rectifier [3] circuitry accommodates a bridge rectifier IC, capacitors for smoothening ripples in the dc output of the rectifier IC and a 7805 regulator.

The main component of circuitry is the PIC16F877A. The PIC takes all the necessary decisions depending on the conditions. MAX232 is used to convert RS232 to TTL logic level.DB9 connector is used in which only 3 pins are used; w transmit, receive and ground pins. The vehicle moves with the help of dc geared motors which are driven by the **motor driver** [4] IC L239D.Zigbee module is used for communication with the control section.

Working

The destination is entered through the keypad. Once the destination is chosen the vehicle approaches the first junction. On reaching the junction, the vehicle stops and read the particular value of RF tag placed beneath the first junction.

Then the vehicle request for information from the control section. The control section chooses an appropriate path based on traffic intensity and then send this information to the vehicle.

Once the path is identified, the vehicle starts to move in that direction. It changes the direction of travel at the turnings by reading the RFID tag value. This procedure is followed at all the turnings. On reaching the destination, the vehicle will stop by identifying the tag value placed in the destination.

The RFID uses an electromagnetic field to automatically identify and track tags attached to the car. The tag contains electronically stored information. The passive tag collect energy from car's interrogating radio waves. The active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object.

RFID Technology

The RFID is an initialization of Radio Frequency Identification Tag. The RFID technology has two components-the readers and the tag. The reader has two parts-transceiver and an antenna. The transceiver generates a weak radio signal that may have a range from few feet to few yards. The signal is necessary to activate the tag and is transmitted through the antenna. The signal itself is a form of energy that can be used to power the tag.

The transponder is the part of the **RFID tag** [5] that converts the radio frequency into usable power, as well as sends and receives messages. When the transponder is hit by the radio wave, the wave goes up and down the length of the transceiver. When a conductor passes through the magnetic field it can conduct that field down its length. Like those flashlights, where we shake them and a magnet goes back and forth through a copper coil, creating electromagnetic force.

Now that the RFID has some power to work with, it activates the transponder. The transponder immediately upon being wakened up spews out all information it has stored on it. The whole process can take as little as a few millisecond.

Coding and algoritham

Control section

The control section begins action on receiving a command from the motor section. Once the command is received to the PIC A via zigbee from the motor section, the IR transmitter-receiver part will come into play. The PIC A instructs the IR section on both the paths to check the traffic intensity. This part of the circuit checks for the traffic intensity at all the path. Obstacle detection principle is used for analyzing the traffic intensity. Now the route is selected. Once the path with less traffic is identified this route status is sent to PIC B (on the motor section) sends this information (yes/no) to the motor section via zigbee module. The process stops after sending information to PIC B. This process will take place in the same manner when the control section receives a command from the motor section.

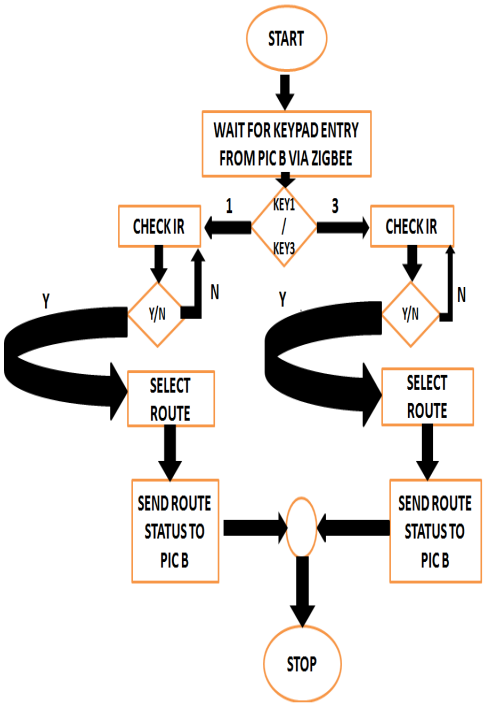

Figure 4 Flowchart (control section)

Motor Section

The destination is entered through the keypad. Hence it waits for the keypad entry initially. This keypad value is sent to PIC A. Once the destination is chosen the vehicle approaches towards the first junction. Once the vehicle stops, it chooses the appropriate path by checking the traffic on both paths. This happens when the PIC A instructs the control section to check for the traffic intensity on both paths. The control section PIC B decides on the appropriate path. Hence motor section waits for route status from PIC B.

Once the path is identified, the vehicle starts to move in the left/right direction or it stops accordingly. The motors are rotated in specific directions depending on the direction of the path chosen. It changes the direction of travel at the turnings by reading the RF tag value at the turnings. This procedure is followed at all turnings. On reaching the destination, the vehicle will stop by identifying the tag value placed in the destination. The user can again enter destination from the same point also. In all cases, the same procedure is repeated

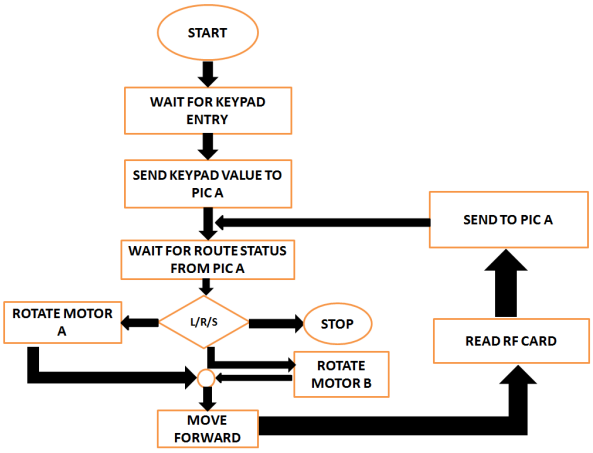

Figure 5 Flowchart (motor section)

Testing and Results

The IR LED was adjusted many times to achieve optimum obstacle detection. The placing of IR LED in tiny slots was a difficult task. Another challenge was to adjust the delay of motor rotation.

The delay was adjusted several times for the vehicle to move in real time track. LED lights were used in motor section and control section to interpret the sequence of implementation of instructions

CONCLUSION

The proposed system is an easy and safe transportation model. It can be employed in commercial areas. In order to demonstrate our system, we developed an automatic vehicle. The layout of the track which consists of various paths and buildings resembling a commercial zone should be known in advance.

The auto world is intended to improve the quality of transportation in such a way by decreasing the number of accidents and traffic congestion. It ensures perfect timing transportation. Since the acceleration and speed of all cars in the system are same, there will be no overtaking.

Reference

1. Weis, Stephen A. (2007), RFID (Radio Frequency Identification): Principles and Applications, MIT CSAIL.
2. Liew S. C. "Electromagnetic Waves". Centre for Remote Imaging, Sensing and Processing.
3. Williams, B.W. (1992). "Chapter 11". Power electronics; devices, drivers and applications (2nd ed.). Basingstoke: Macmillan.
4. Campbell, Sylvester J. (1987). Solid-State AC Motor Controls .New York: Marcel Dekker, Inc.
5. Daniel M. Dobkin the RF in RFID: Passive UHF RFID in Practice, Newnes, chapter 8.

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How to cite this article:

Sarin Abraham, Noel Johney, Vrathi J.B, Vivek H and Krishna M.K.2016, Auto World-Automatic Transportation System. *Int J Recent Sci Res.* 7(10), pp. 13607-13610.