Design Thinking Based Automatic Zebra Crossing For Pedestrians Using IoT

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Abstract. In this paper, we're to discuss the Automatic Zebra Crossing for Pedestrians Using IOT. In our daily routine, we must travel to our destination location via roadways. The pedestrian crossing is a crucial component of the transportation framework because it functions to safeguard pedestrians lives and maintain traffic flow. In metropolitan areas, the heavy traffic in the pedestrians to direct the pedestrian to proceed across the road delicate. Accidents thereby do while we're crossing the road. This is because of geste of the drivers skipping the signals that's Traffic rules. Rate of accidents per day is increased gradationally. Mainly people will face difficulties while crossing the road in heavy traffic. Our project aims to provides a better result for this problem by introducing a prototype called Automatic Zebra Crossing for Pedestrians Using IOT. It'll give an escalator way to move on from one side to another side of road and in the meanwhile which facilitiates monitoring and maintenance of traffic by indicating signal by providinga barrier between the road. It'll reduce death rate and so on it'll overcome difficulties in it by the same way. It'll be beneficial for both Pedestrians, Blind People and for physically Challenged People could perhaps proceed across the road comfortably.

Keywords: Road, Pedestrians, Signal, Accident, Traffic, IoT.

1 Introduction

Based on information from the World Health Organization(WHO) Around 1.3 million people pass away each year. traffic deaths result in mortality. according to the Ministry of Road Transport and Highways (MORTH). For road safety, the situation is even more concerning. Because India is among the world's largest networks for road safety, this becomes even more significant. According to the Traffic incidents in India 2020 report, there were 3,66,138 unfortunate road accidents in 2020 that resulted in 1,31,713 fatalities and 3,48,279 injuries. As of right now, the death rate has of now. This survey was conducted two years ago. Traffic signal structures everywhere around the world are becoming increasingly innovatively situated in the 21st century, and the advancement of such innovation has reached the mark of computerization.

However, the interaction of computerization is, in a sense, restricted to some emerging nations or the entire developed world. Despite being innovation-based, many developing nations actually rely on the physical and strategic administrations of traffic management authorities. In these big cities, it's too hard to move a roadway from one end to the other. Some people will not obey the traffic regulations. While pedestrians are crossing the road, drivers can stop at that moment. Accidents can happen.With the help of a person to move a roadway is more risky, especially for blind people. Therefore, in order to resolve these issues, we have developed a prototype.By providing a means of start moving a route in safety in accordance with the idea of, this will preserve the traffic signal and provide pedestrians with a better route. This creates a barrier gate that prevents vehicles from entering the roadway until pedestrians cross it. As a result, fewer traffic officers are required to stand in front of the road to monitor and control traffic. It offered a better means of ensuring our safety and comfort. As a crucial component of transportation structure, pedestrian crossings effectively protect walker lives and property. The typical traffic signals are monitored by our project model, and it signals pedestrians that they can move. Blind people may have an easier time by crossing the road more effectively.

2 Project Analysis

2.1 Problem Statement

The high intensity of road network makes pedestrian crossings unsafe in urban areas. The high traffic also makes it difficult for pedestrians to cross the street in metropolitan areas. As a result, an accident occurs as we cross the road. This is on account of drivers actions of not obeying traffic signals. The daily accident rate gradually rises. Most people will have trouble crossing the road when there is a lot of traffic. Regardless of whether the vehicle is able to stop at the precise moment, people will encounter difficulties crossing the road. To traverse a roadway, blind people need someone to help them. There may or may not be traffic police present at the location. Because there are no traffic signals at this location, it is difficult for a person to move across the roadways more quickly and safely. Additionally, drivers may choose to ignore traffic signals. It generates public traffic. The Signal must be monitored by traffic police. Our project's primary goal is to make people feel better by saving their lives and ensuring their safety. It provides a signal for traffic surveillance, allowing pedestrians to pass aroadway in greater safety and benefit. It prevents vehicles from passing through the gate until pedestrians cross their road.

2.2 Existing System

There is no automated route for crossing the road in our traffic system. People manually cross the road until the signal changes, at which point they verify that no vehicles are moving on their crossing roads. Throughout the entire day, traffic workers must stand so that people can safely cross and move under their vision. To make the day more secure, automation cannot be implemented. Until the pedestrians begin to move across a road, there is no barrier or gate to stop vehicles. They used a PIR sensor to vibrate the moment in the existing demonstration model and used intricate assembly and coding languages to transfer that technology there. Asa result, it is difficult to put into practice. Both the barrier gate and the moving path lack automation. There, pedestrians are confused as a result. Insufficient resources are not sufficient to get clear

information regarding the traffic and system. It makes use of complicated sensors and components that can be transported over here in this existing model.

2.3 Proposed System

We developed a prototype known as Automatic Zebra Crossing for Pedestrians Using IOT to solve all of these problems. This system will make it easier for pedestrians, blind people, and physically disabled people,individuals to safely traverse the street by sending a signal that LED lights will be shown over there with a timer to walk across a roadways. Using the idea of an escalator and providing a barrier gate for vehicles to stop over until pedestrians cross the road. The barrier gate will then be activated, requiring pedestrians to wait until the subsequent timer and signal arrive. As a result, it will be simple to transport up and monitor the traffic signal. Our project was implemented with an Arduino UNO, a DC motor, a buzzer, a 7- segment display gate servo motor, and a light emitting diode.

4 List of Modules

4.1 Arduino UNO

The open-source platform for creating and customizing electronics projects is Arduino. The tiny LCD screen in the Arduino displays the pressure measured by the sensor. In order to serve as the Arduino's output , the detector for electric field magnetic lines measures the strength regarding the magnetic field present in it and gives the output.

4.2 RGB Diffused Common Cathode

The longest of these 5 mm units four pins is the cathode per colour separately, as with the same cathode. This one LED can be used for three different status indicators, or those triple output frequency significantly affect of them to get mixed colors. The LEDs here are dispersed, so that they will appear dimmer but offer a wider field of view.

4.3 Jump Wires

A jump wire is a wired circuit or group of wires in a cable that have connectors perhaps pinning each end. It is typically used to connect the motherboard components or other prototype circuit internally or with other equipment or parts without using solder.

4.4 7-Segment Display

The seven LED's that make up as well the 7-segment panel known as the "seven segment display," are aligned in a rectangular prism. Among seven, apiece LED's is referred to as a segment because, when illuminated it contributes to the display of a decimal or hexadecimal number.

4.5 Servo Motor

Electronic components and rotary or line actuators make up servo motors, or "servos," which precisely rotate and push machine components. Servos are mostly used for longitudinal as well as circular orientation, acceleration, and specific velocity.

5 Prototype Screenshot

We all encounter traffic accidents on a daily basis. We developed a prototype zebra crossing that is automatic that uses Arduino UNO and feeding code to prevent accidents. It uses a servo motor to lift the barrier, a geared DC motor to operate the escalator, gear to control the rotational speed, a seven-segment display to show the result, and manual escalator operation. We intend to automate the function in the future.
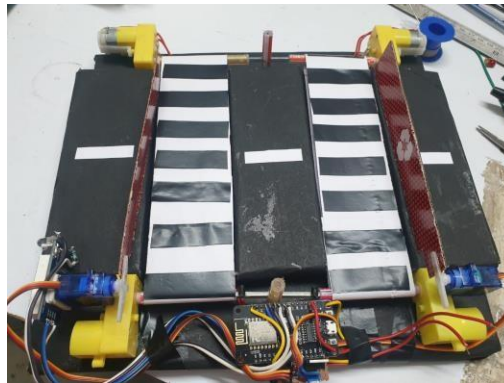
Fig. 5.1. Prototype of Automated Zebra Crossing
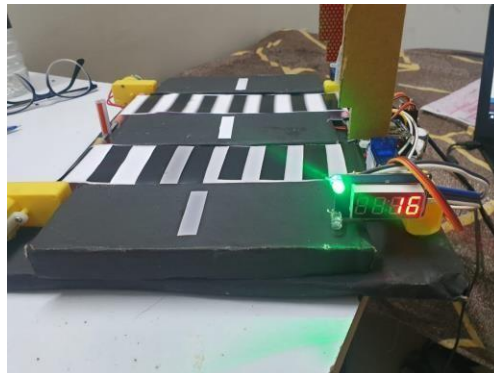
Fig.5.2. During Working of Automated Zebra Crossing

In figure 5.2, figure 5.3 When the LED turns on i.e,green light displayed over there with a timer, the barrier gate will get opened,the vehicles starts to move.After the timer ,the barrier gate will get closed. So,the pedestrians starts to move across roadways by the concept of escalator.

Fig.5.3. Barrier Gate

6 Specifications

6.1 Hardware Specifications

Table.1.Specifications used

S.NO	SYSTEM REQUIREMENTS	PERFORMANCE
1	RAM	4 GB
2	ROM	4-8 MB
3	Processor	Intel Core

Our work is done in these System requirements in computer.

6.2 Software Specifications
6.2.1 Python

Python is a high-level, interpreted programming language that is object-oriented and has dynamic semantics. It is very appealing for in order to develop applications because it has advanced internal data architecture, dynamic typing and binding. It could also be utilised as bridging or programming to connect components that already exist. Python's terminology prioritizes readability, which affects the profitability of program maintenance Code repetition and software modularity are encouraged by Python's provision for segments and packages. The enormous standard library, the Python interpreter, and every one of the popular services all seem to be are free to distribute in source or binary form.Because of its high-level, built-in data structures, dynamic typing, and dynamic binding, which tie together existing components. Additionally serves for software development, mathematics, system scripting, and server-side web development. Due to Python's emphasis on readability and simple syntax, Program operation premium are reduced. Additionally, modular programs and code reuse are made easier by Python's intervention with functionalities and packages.

6.2.2 Visual Studio Code

Visual Studio Code is programming environment.desktopbased, lightweight, and powerful source code editor for Windows, mac OS, and Linux. It supports JavaScript, Type Script, and Node.js already built in, and it has a large network of additional advancements for other languages and runtimes (like C++, C#, Java, Python, PHP, and Go). Microsoft's Visual Studio Code, also known as VS Code, is a free open- source text editor. There are versions of VS Code for Mac, Linux, and Windows. Despite the editor's light weight, VS Code has become only one of the most favored development environment tools in recent times thanks to its powerful features. Instead of a project system, it lets users open one or more directories and save them to workspaces so they can be used again later. As a result, it can function as a code editor for any language. Several programming languages are supported, and each language has its own set of features. Through the settings, unwanted files and folders can be excluded from the project tree. The command palette is a convenient way to access many features of Visual Studio Code that are not accessible through menus or the user interface.

7 Conclusion and Future Works

7.1 Conclusion

The main idea is to build a prototype as part of the project. that will be helpful for the Pedestrians,blind people and physically challenged to move across the roadways.The prototype discussed here prevents pedestrian accidents in areas with a lot of traffic. Cops will have no trouble locating the defaulters if this clever setup is implemented. When it comes to setting up on a large scale, this is more compatible and economical. The advantage is saves time and life,also less need for traffic police to sign over there. Through the installation of automatic barrier at pedestrian crossings raise automatically when a pedestrian crossover and lie down when there is heavy traffic.

7.2 Future Works

The future work is to implement by detecting human face without human verification, we will implement a monitor to demonstrate that the scanning portion of human verification fails. Additionally, a screen timer with a voice announcement was shown on the board. To detect a zebra crossing during the day or at night, a camera with image processing capabilities can be utilized to monitor the reckless vehicle in the street.

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