

PEDESTRAIN VEHICLE CROSSING DETECTOR USING ARDUINO

MINI PROJECT REPORT

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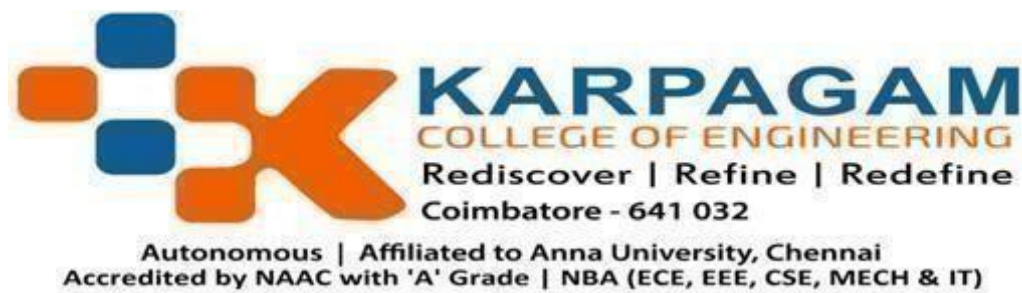
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**AUTOMATIC IRRIGATION SYSTEM
USING ARDUINO**

BONAFIDE RECORD OF WORK DONE BY

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Faculty guide

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ABSTRACT

Traffic control systems all over the world are becoming more and more technology oriented and the development of such technology has reached the point of automation. That being said, the automation process is only limited to the already developed countries or to some developing countries in many underdeveloped and developing countries, the custom and laws of crossing the roads are not very strict, in which case an automated road crossing system is much needed. Besides, the amount of risk being taken every other day around us, only makes the case for an Pedestrian crossing with presence detector and warning. This paper presents a cost effective and easy solution to this problem using a simple system based on Arduino UNO. The system is entirely autonomous and can effectively measure the parameters expected of an Pedestrian crossing with presence detector. Measurements of the parameters required in the system has been done by ultrasonic sensors, and the experiments done on the system show that it has a chance of being outsmarted 1 out of 200 times, which is an efficiency rate close to 99.5%.

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CHAPTER 1

1.INTRODUCTION

With the growth of urban vehicle ownership and the development of urban road facilities, pedestrian crashes are on the rise, and the issue of pedestrian safety has become increasingly serious. Among the traffic participants, pedestrians are most vulnerable to injury. According to the annual report on road traffic accident statistics released by the Traffic Administration Bureau of the Ministry of Public Security in China in 2017, the number of pedestrian injuries in traffic accidents was 35,058, accounting for 16.72% of all transportation modes. The fatalities were 17,286, accounting for 27.11% of all transportation modes.

OBJECTIVE AND GOAL OF THE PROJECT

The present descriptive specification concerns an Invention Patent relating to a pedestrian crossing provided with a presence detection system, which permits both the detecting of pedestrians and of vehicles approaching the crossing, with both systems being able to be combined or presented separately; so, with regard to the detection of pedestrians, the proposed invention permits on the one hand the detection of the presence of a pedestrian located on the crossing or in a position immediately next to it, and on the other hand, once the pedestrian has been detected, the emitting of a signal, preferably of a luminous and/or acoustic nature, which alerts both the vehicles and the pedestrians themselves, warning the former of the presence of a pedestrian on the crossing and warning the latter so that the pedestrian (with an acoustic signal in case he or she is blind) can be sure that the crossing has alerted the vehicle, as well as confirming for the pedestrian that this is an appropriate place to cross; as far as the detection of vehicles is concerned the concept is the same, and the invention that is advocated would, on the one hand, permit detection of the vehicle as it approaches the pedestrian crossing and, on the other hand, alert the pedestrian to the proximity of the vehicle so that he or she can take the greatest care when crossing. In turn, said crossing is configured either as an independent constructive element which represents an enormous simplification and improvement in the location of pedestrian crossings, or as a modification to a fixed pedestrian crossing which is provided with all or part of the characteristic elements of the invention.

1.1 OBJECTIVES

- The main objective of this work is to control the traffic jam.
- As well saving human's life is major purpose.
- To save the life and reduce the accident.

1.2 PROBLEM STATEMENT

Knowing when and how much accident happen in daily life. The invention that is proposed offers us in all senses a clear advantage over the traditional pedestrian crossings, which are located on our public roads with cement or derived substances, though it also permits the adaptation of these..

1.3 MOTIVATION

The pedestrian crossing with presence detector and warning, which the present invention proposes, is constituted on the basis of an independent constructive element making up the actual pedestrian crossing, or on the basis of adapting a fixed pedestrian crossing as the constructive element, is designed as an independent constructive element, easy to assemble and dismantle, in which the other elements are incorporated, being created in any material though preferably those which can withstand the action of the environment and the rigour of the traffic

1.4 CHALLENGES

It allows Local Councils not to have their streets completely unused because there is a pedestrian crossing in them. If a Local Council with present-days crossings is interested in having a sports event pass along that road (cycle race or any kind of vehicle race, etc.), then it either has to seek alternative routes, or make costly modifications, or simply not hold the race. With this product it is very easy to solve this problem for a street or avenue and, once the event has finished, the crossings are again installed so that they can carry on performing

2.REQUIRED COMPONENTS

To implement this project we are using an ultra sonic sensor,buzzer, jumper wires and Arduino board as our main components. Details of various components is given below.

2.1ARDUINO BOARD

Arduino is an easy-to-use open platform to create electronics projects. Arduino boards play a vital role in creating different projects. It makes electronics accessible to non- engineers, hobbyists, etc.

The various components present on the Arduino boards are **Microcontroller, Digital**

Input/output pins, USB Interface and Connector, Analog Pins, Reset Button, Power button, LED's, Crystal Oscillator, and Voltage Regulator. Some components may differ depending on the type of board.

The most standard and popular board used over time is **Arduino UNO**. The ATmega328 Microcontroller present on the UNO board makes it rather powerful than other boards. There are various types of Arduino boards used for different purposes and projects. The Arduino Boards are organized using the Arduino (IDE), which can run on various platforms. Here, IDE stands for Integrated Development Environment. The Arduino is simple for beginners and makes it more flexible for advanced users. It can be easily executed on Linux, Mac, and Windows and it is budget-friendly, which is available as minimum price scientific components. Even the architects and designers have attractive and interactive prototypes and make the user easy to install and make their product more standard and better. Arduino is a fundamental tool to explore new things that have the ability to understand and obey the user's concept through a simple set of instructions.

ARDUINO UNO

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-CircuitSerialProgramming) header.

It is the most used and of standard form from the list of all available Arduino Boards. It is also recommended for beginners as it is easy to use.

For internal functioning & processing Microcontroller, 8051 comes with integrated built-in RAM. is prime memory and is employed for storing temporary data. It is an unpredictable memory i.e. its data can get lost when the power supply to the Microcontroller is switched OFF. This microcontroller is very simple to use, affordable, less computing power, simple architecture & instruction set

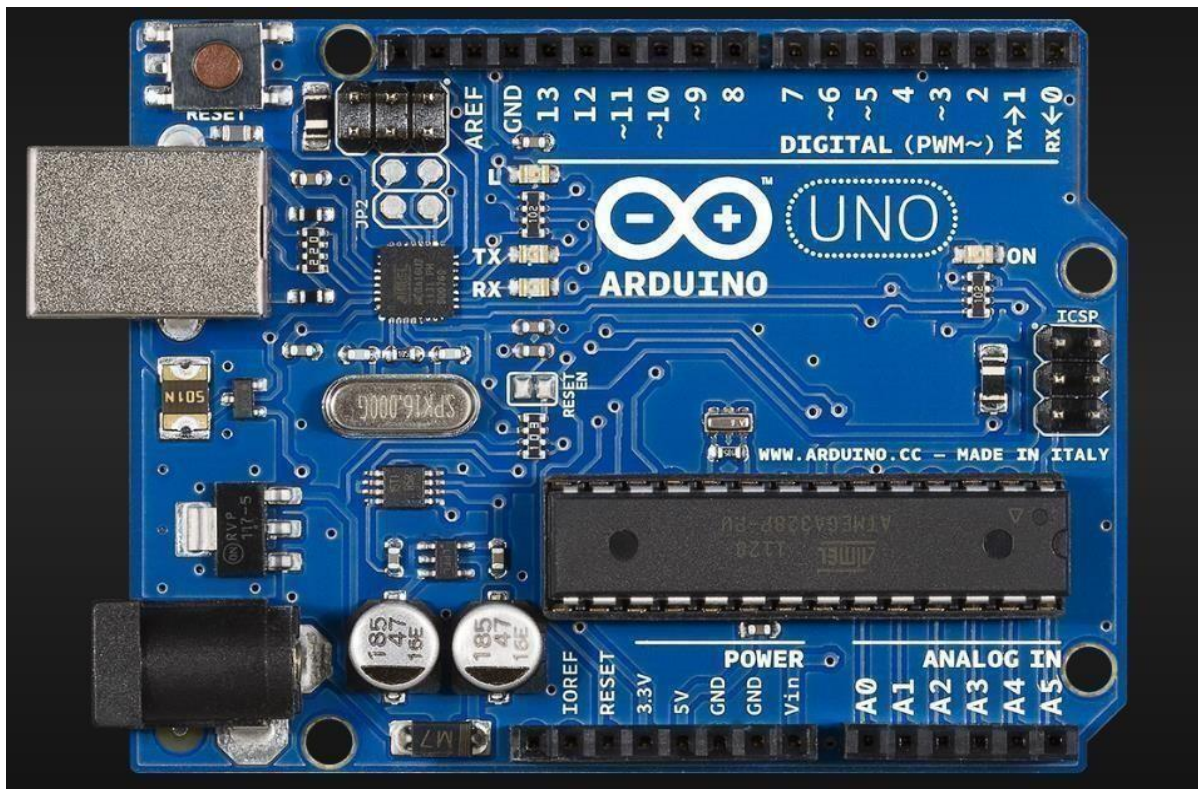


Fig 1 Arduino UNO

2.2 ARCHITECTURE OF ARDUINO BOARD

The Arduino uno architecture is shown below. Let's have a closer look at the features of the Arduino uno design. It consists of 14-digital i/o pins. Wherein 6 pins are used as pulse width modulation o/p's and 6 analog i/p's, a USB connection, a power jack, a 16MHz crystal oscillator, a reset button, and an ICSP header. Arduino board can be powered either from the personal computer through a USB or external source like a battery or an adaptor. This board can operate with an external supply of 7-12V by giving voltage reference through the IOREf pin or through the pin Vin.

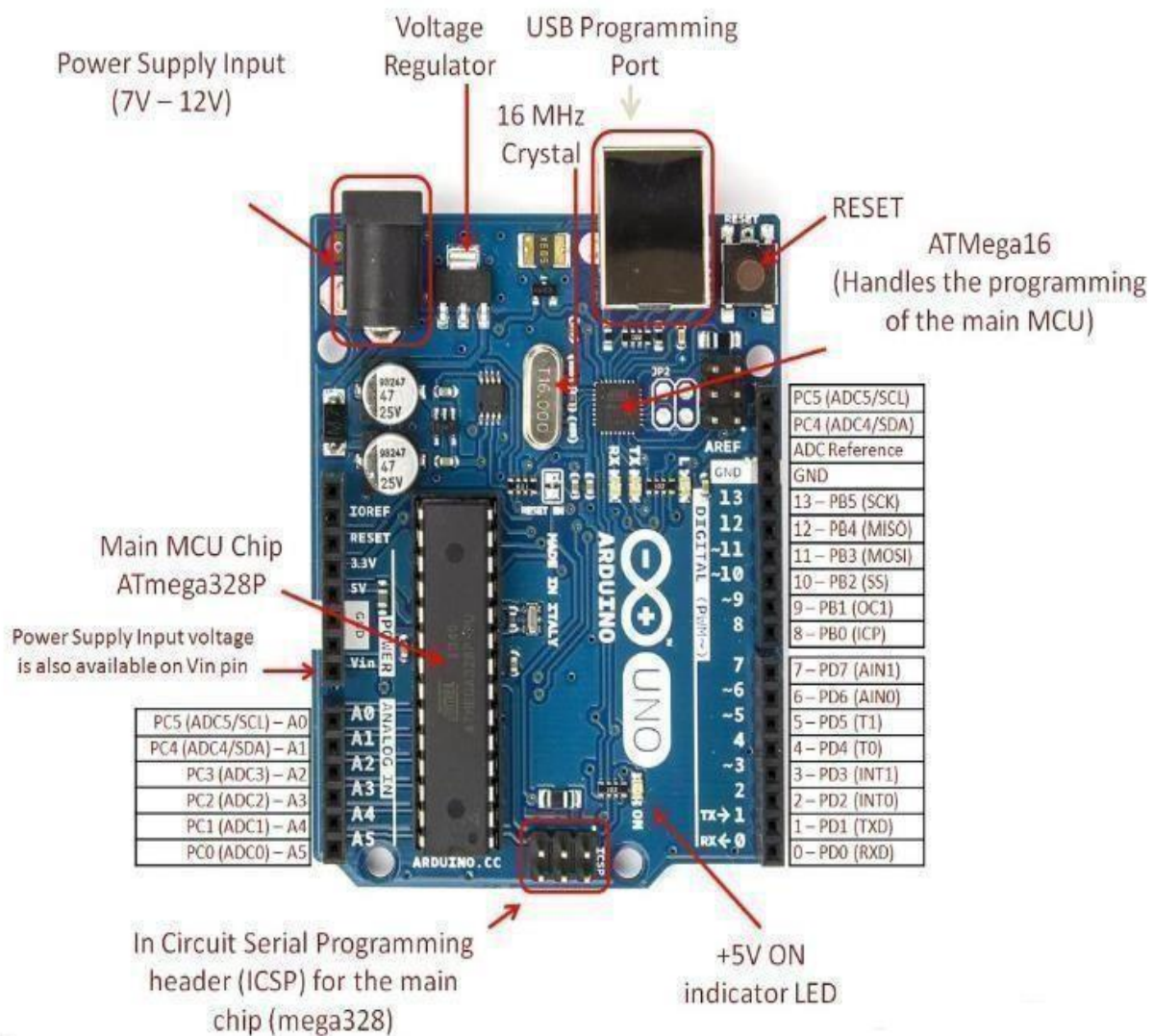


Fig 2 Architecture of Arduino board

COMPONENTS OF ARDUNIO BOARD

- **ATmega328 Microcontroller**- It is a single chip Microcontroller of the ATmel family. The processor code inside it is of 8-bit. It combines **Memory , Analog to Digital Converter, SPI serial ports, I/O lines, registers, timer, external and internal interrupts, and oscillator.**
- **ICSP pin** - The In-Circuit Serial Programming pin allows the user to program using the firmware of the Arduino board.
- **Power LED Indicator**- The ON status of LED shows the power is activated. When the power is OFF, the LED will not light up.
- **Digital I/O pins**- The digital pins have the value HIGH or LOW. The pins numbered from D0 to D13 are digital pins.
- **TX and RX LED's**- The successful flow of data is represented by the lighting of these LED's.
- **AREF**- The Analog Reference (AREF) pin is used to feed a reference voltage to the Arduino UNO board from the external power supply.
- **Reset button**- It is used to add a Reset button to the connection.
- **USB**- It allows the board to connect to the computer. It is essential for the programming of the Arduino UNO board.
- **Crystal Oscillator**- The Crystal oscillator has a frequency of 16MHz, which makes the Arduino UNO a powerful board.
- **Voltage Regulator**- The voltage regulator converts the input voltage to 5V.
- **GND**- Ground pins. The ground pin acts as a pin with zero voltage.
- **Vin**- It is the input voltage.
- **Analog Pins**- The pins numbered from A0 to A5 are analog pins. The function of Analog pins is to read the analog sensor used in the connection. It can also act as **GPIO (General Purpose Input Output) pins.**

Technical Specifications of Arduino UNO

The technical specifications of the Arduino UNO are listed below:

- There are 20 Input/Output pins present on the Arduino UNO board. These 20 pins include 6 PWM pins, 6 analog pins, and 8 digital I/O pins.
- The PWM pins are Pulse Width Modulation capable pins.
- The crystal oscillator present in Arduino UNO comes with a frequency of 16MHz.
- It also has a Arduino integrated WiFi module. Such Arduino UNO board is based on the Integrated WiFi ESP8266 Module and ATmega328P microcontroller.
- The input voltage of the UNO board varies from 7V to 20V.
- Arduino UNO automatically draws power from the external power supply. It can also draw power from the USB.

Arduino UNO starting progress

Arduino UNO can be program using the Arduino IDE. The Arduino IDE is the Integral Development program, which is common to all the boards.

Use Arduino Web Editor, which allows to upload sketches and write the code from our web browser (Google Chrome recommended) to any Arduino Board. This is an online platform.

The USB connection is essential to connect the computer with the board. After the connection, the PWR pins will light in green. It is a green power LED.

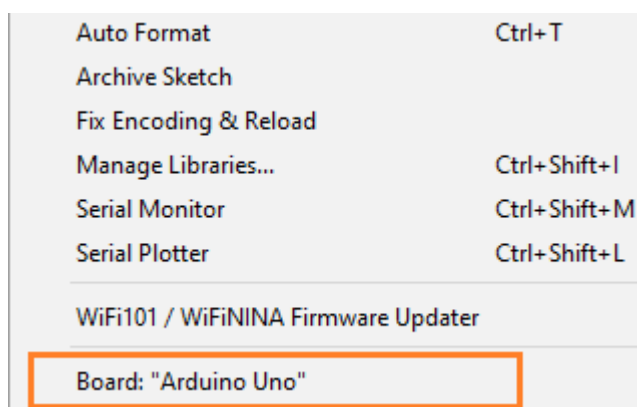
The steps to get started with Arduino UNO are listed below:

Install the **drivers** of the board.

As soon we connect the board to the computer, Windows from XP to 10 will automatically install the board drivers.

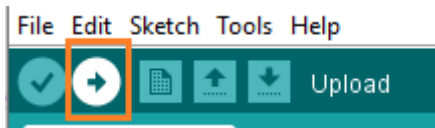
But, if you have expanded or downloaded the zip package, follow the below steps:

1. Click on **Start -> Control Panel -> System and Security**.
 2. Click on **System -> Device Manager -> Ports (COM & LPT) -> Arduino UNO (COMxx)**. If the COM & LPT is absent, look **Other Devices -> Unknown Device**.
 3. Right-click to **Arduino UNO (COMxx) -> Update Driver Software -> Browse my computer for driver software**.
 4. Select the file "**inf**" to navigate else, select "**ArduinoUNO.inf**".
 5. Installation Finished.
- Open the code or sketch written in the Arduino software.



- Select the port. Click on the **Tools -> Port**. The port likely will be **COM3** or higher. For example, **COM6**, etc. The **COM1** and **COM2** ports will not appear, because these two ports are reserved for the hardware serial ports.
- Now, **upload** and **run** the written code or sketch.

To upload and run, click on the button present on the top panel of the Arduino display, as shown below:



Within the few seconds after the compile and run of code or sketch, the RX and TX light present on the Arduino board will flash.

The 'Done Uploading' message will appear after the code is successfully uploaded. The message will be visible in the status bar.

PROCEDURE FOR PROGRAMMING ARDUINO

The main advantage of the Arduino technology is, you can directly load the programs into the device without the need of a hardware programmer to burn the program. This is done because of the presence of the 0.5KB of boot loader, that allows the program to be dumped into the circuit. The Arduino tool window contains a toolbar with various buttons like new, open, verify, upload and serial monitor. And additionally it comprises of a text editor (employed to write the code), a message space (displays the feedback) like showing the errors, the text console, that displays the o/p & a series of menus just like the file, tool menu & edit.

ARDUINO PROGRAM

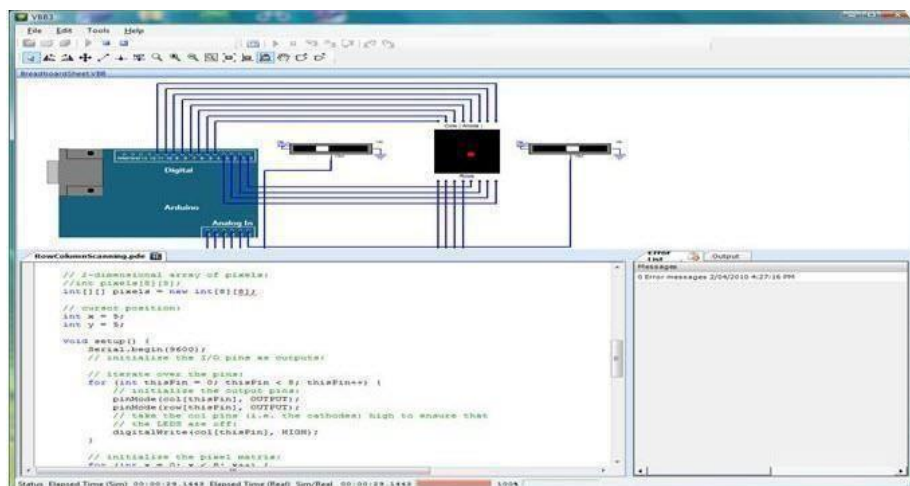


Fig.3 Arduino Program

Programming into the Arduino board is called as sketches. Each sketch contains of three parts such as Variables Declaration, Initialization and Control code. Where, Initialization is written in the setup function and Control code is written in the loop function.

If the sketch is saved and any operation like opening a sketch, verifying and saving can be done using the tool menu.

If the sketch must be stored in the sketchbook directory.

Select the suitable board from the serial port numbers and tools menu.

Select the tools menu and click on the upload button, then the boot loader uploads the code on the microcontroller.

ADVANTAGES OF ARDUINO TECHNOLOGY

- It is cheap
- It comes with an open supply hardware feature that permits users to develop their own kit
- The software of the Arduino is well-suited with all kinds of in operation systems like Linux, Windows, and Macintosh, etc.
- It also comes with open supply software system feature that permits tough software system developers to use the Arduino code to merge with the prevailing programming language libraries and may be extended and changed.
- For beg
- inners, it is very simple to use.

2.3ULTRA SONIC SENSOR



Fig 3 Ultra sonic sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

PRINCIPLE OF OPERATION

The basic principle of operation employs the frequency shift (Doppler Effect) of an ultrasonic signal when it is reflected by suspended particles or gas bubbles (discontinuities) in motion. This metering technique utilizes the physical phenomenon of a sound wave that changes frequency when it is reflected by moving discontinuities in a flowing liquid. Ultrasonic sound is transmitted into a pipe with flowing liquids, and the discontinuities reflect the ultrasonic wave with a slightly different frequency that is directly proportional to the rate of flow of the liquid (Figure 1). Current technology requires that the liquid contain at least 100 parts per million (PPM) of 100 micron or larger suspended particles or bubbles.

JUMPER WIRES

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with bread boards and other prototyping tools in order to make it easy to change a circuit as needed.

Though jumper wires come in a variety of colors, the colors don't actually mean anything. This means that a red jumper wire is technically the same as a black one. But the colors can be used to your advantage in order to differentiate between types of connections, such as ground or power.



Fig.4 Jumper wires

3.BLOCK DIAGRAM

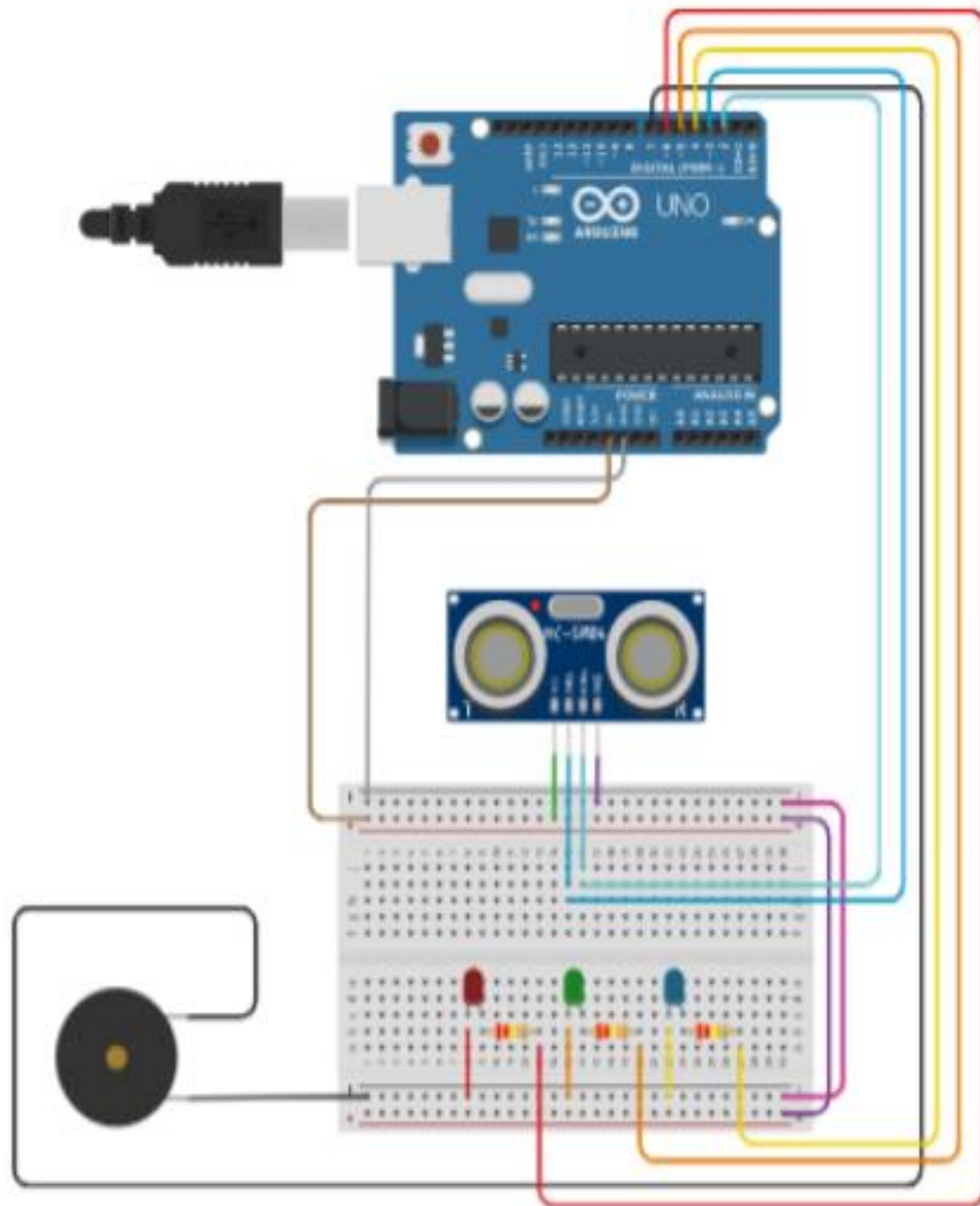


Fig.5 Block Diagram

4.ASSEMBLY LANGUAGE PROGRAM

```
int const trigPin = 10;
int const echoPin = 9;
int const buzzPin = 2;
void setup()
{
  pinMode(trigPin, OUTPUT); // trig pin will have pulses output
  pinMode(echoPin, INPUT); // echo pin should be input to get pulse width
  pinMode(buzzPin, OUTPUT); // buzz pin is output to control buzzing
}
void loop()
{

  int duration, distance;

  digitalWrite(trigPin, HIGH);
  delay(1);
  digitalWrite(trigPin, LOW);

  duration = pulseIn(echoPin, HIGH);

  distance = (duration/2) / 29.1;

  if (distance <= 50 && distance >= 0) {

    digitalWrite(buzzPin, HIGH);
  } else {
```

```
digitalWrite(buzzPin, LOW);  
}
```

```
delay(60);  
}
```

5.CIRCUIT IMPLEMENTATION

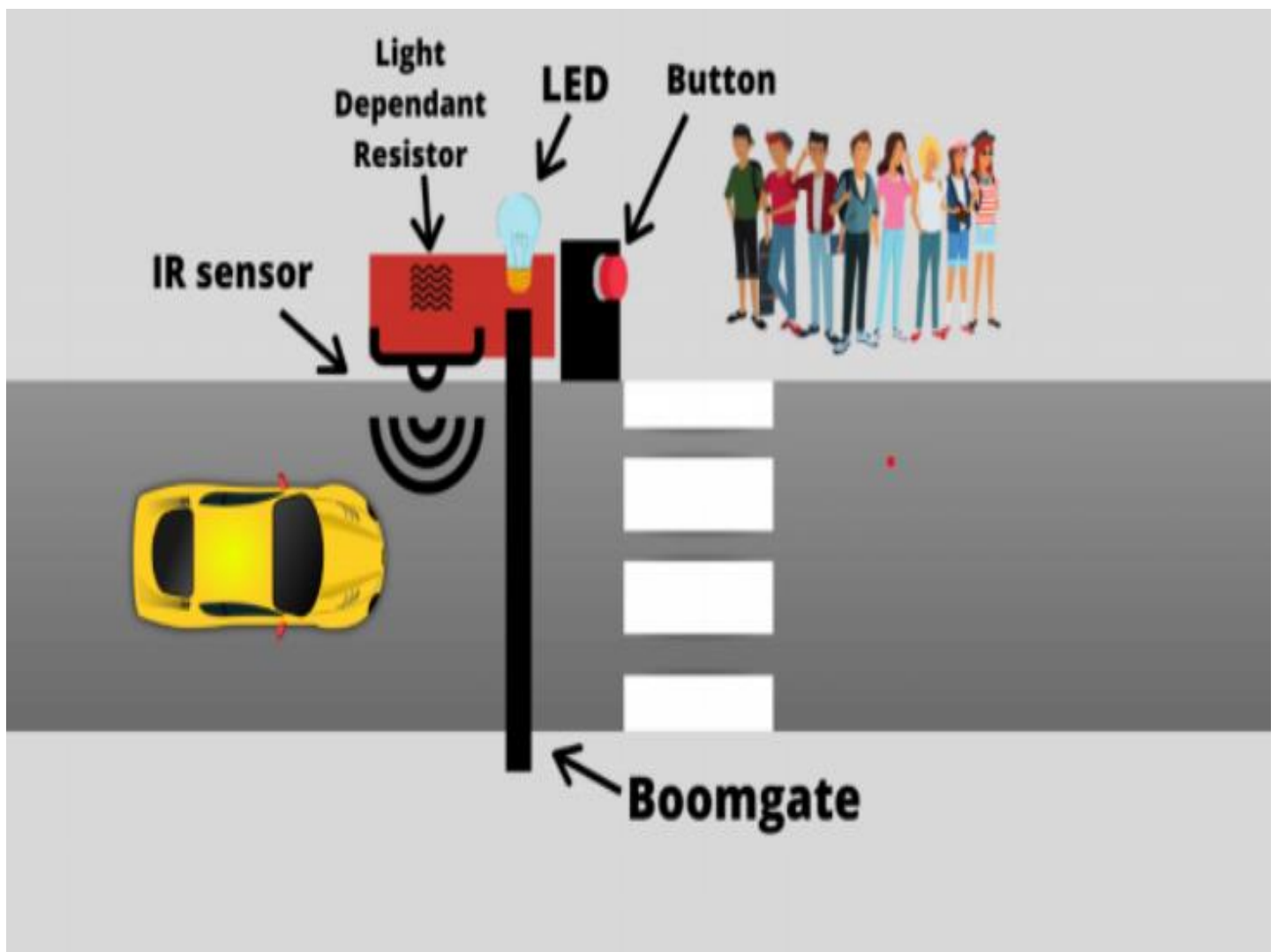


Fig.6 Circuit implementation

6.CONCLUSION

This proposed system is used to detect the sudden pedestrian cross on the road. On the national highways the vehicles are moving very fast. At that time if any objects tries to cross the road unwanted things are happens automatically. To avoid this condition this proposed system is embedded with the vehicle. In front of the vehicle the camera is installed. The camera captures the images when the object tries to cross the road. The microcontroller is used to process the captured images using various image processing concepts and detect the objects type and the location of the object. When the objects are detected the speed of the vehicle will be controlled automatically. The display system shows the image types with their entire details. The alarm sound is used to alert the driver when the objects are detected on the road.

7.RESULT

The VD-SGM is a new human-like model, connecting pedestrian decision-making to vehiclebehavior. This model is simple and can more accurately reflect pedestrian street-crossing decisions.The human-like model proposed in this article can be valuable in ensuring self-driving vehicles' safepass through zebra crossings and intersections Int. Although the computable and interpretable model established in this paper can better reflect pedestrian street-crossing decisions, the model still has some shortcomings, for example, the data during off-peak hours is relatively small and the impact of different weather on pedestrian street-crossing decisions has not been considered.

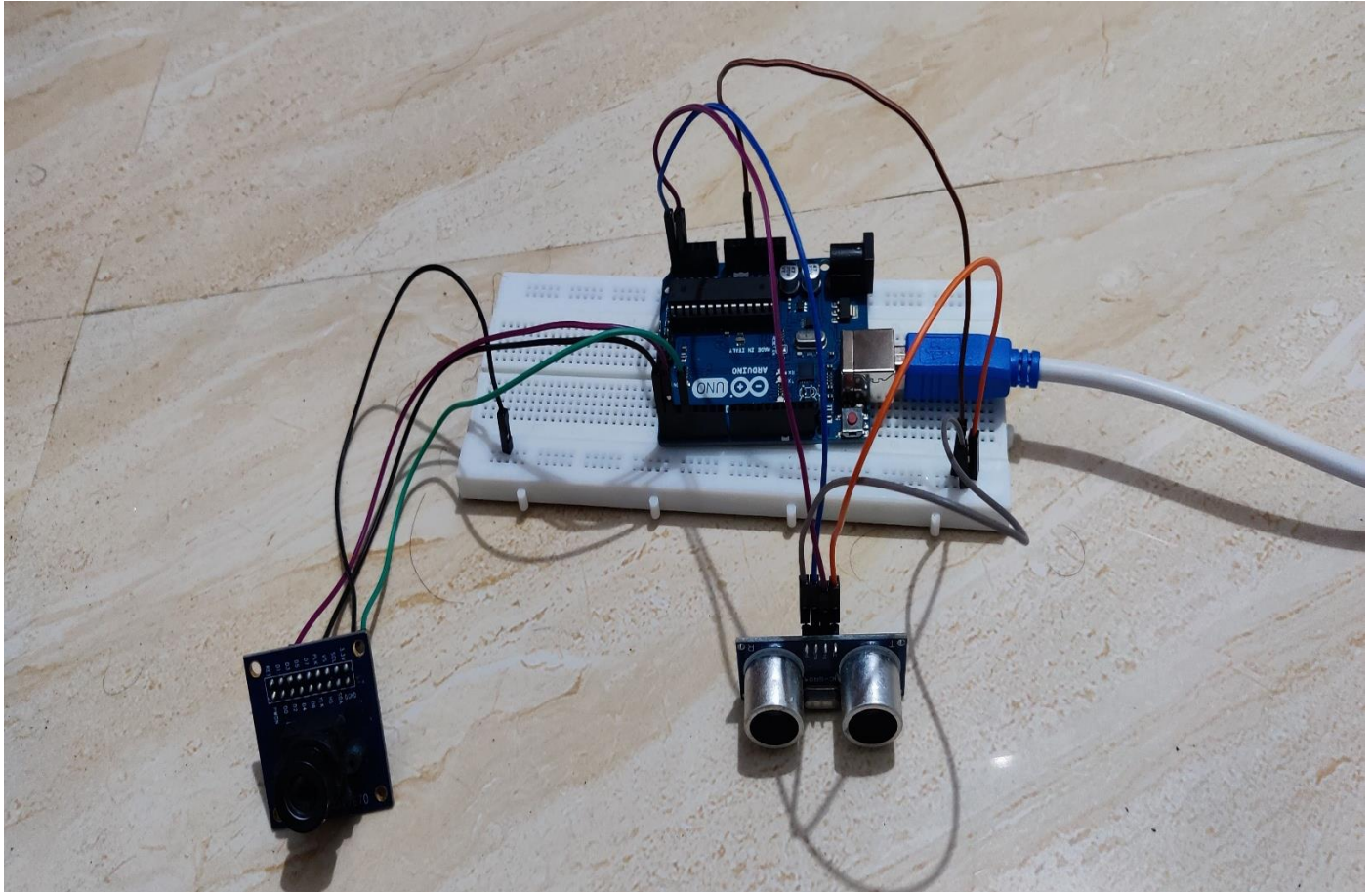


Fig.7 PEDESTRAIN VEHICLE CROSSING DETECTOR USING ARDUINO

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