VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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MINI PROJECT REPORT

ON

"TOUCHLESS DOOR BELL"

For the Academic Year 2021-2022

Submitted by

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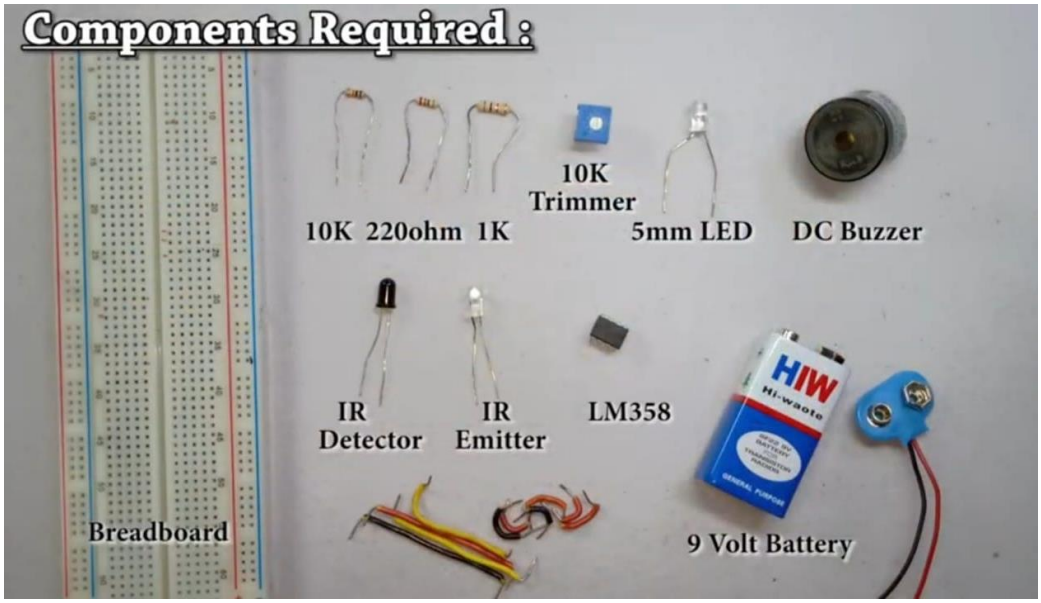
INTRODUCTION

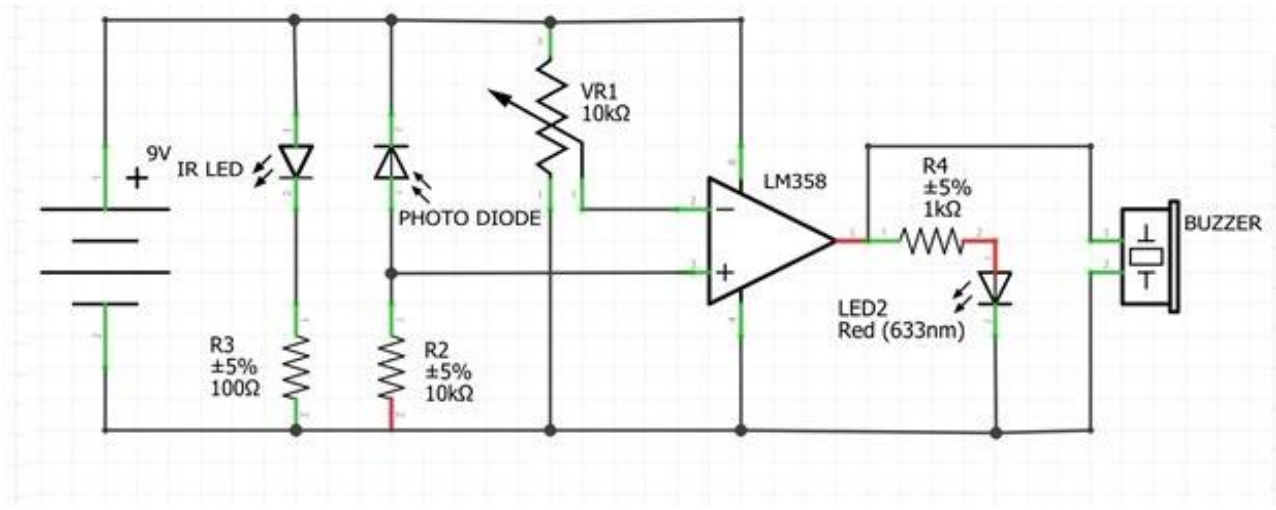
The project is designed for non-contact door-bell system using LM-358 sensor. Amidst of the pandemic time, health concerns are a part of major discussion and hence this project is developed based on these concerns. This project proposes a system of Touchless-door bell system which brings the attention of the Owner of the Visitor. This is achieved with help of a LM-358 Comparator. The IR-Emitter emits infrared energy and when an obstacle is brought in front of it, the emitted ray gets reflected back and is caught by the IR-Photodiode (Receiver). When IR radiation is incident on the IR photo diode, current is generated (which is directly proportional to the closeness of the obstacle to the sensor). This current is passed on to the LM358 IC. If the obstacle is close enough to the sensor, the current generated is large enough to generate the BUZZ-sound. Switch is used to temporarily turn of the device when not in use to save the battery.

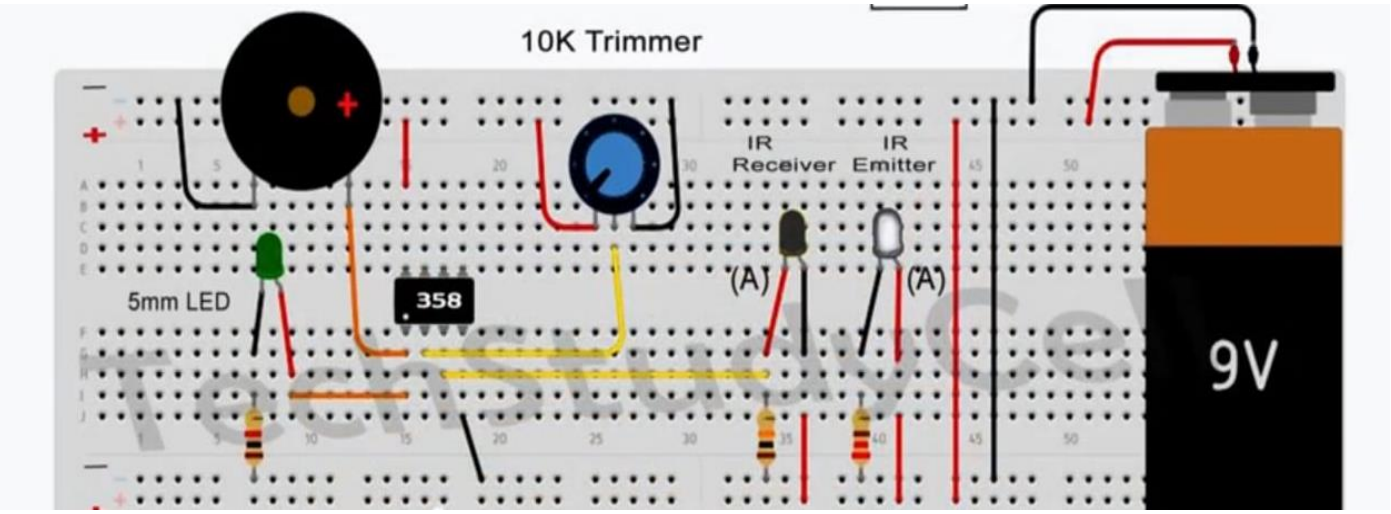
COMPONENTS REQUIRED

- LM358 Op-Amp IC
- 220-ohm 0.25watt Resistor
- 10k 0.25watt Resistor
- 1k 0.25-watt Resistor
- 10k Variable Resistor
- IR Transmitter Receiver Pair(IR Emitter Receiver)
- Breadboard
- Battery Holders
- DC Buzzer
- Connecting wire
- 9V battery



CIRCUIT DIAGRAM





LIST THE TASKS INVOLVED

The main objective of the project is to produce a buzz sound when an object is brought near the sensor at a specific distance.

The sensitivity or Range of detection can be controlled by adjusting the potentiometer.

WORKING OF THE PROJECT

- Our objective is to turn on LED or any other electronic device whenever any obstacle comes nearer than a specific distance using Infrared proximity Sensor circuit on a Breadboard while simultaneously learning how it works, also the detecting range can be configured by adjusting the potentiometer

- Initially the sensor element which is in fact an IR Photodiode is placed on the breadboard, energy from infrared radiation is absorbed by PN junction of the infrared photodiode and is converted to electrical energy, which is very less in magnitude, which we can consider this as a tiny cell whose output current is directly proportional to the amount of infrared radiation falling on it.

- The best way of flowing current into triggering the LED is to translate current flowing from the sensor to voltage and then control LED basing on the magnitude of this voltage. Connecting –ve terminal of the infrared photodiode to positive rail like we connect batteries in series negative to positive and its positive terminal to the negative rail via 10K resistor.

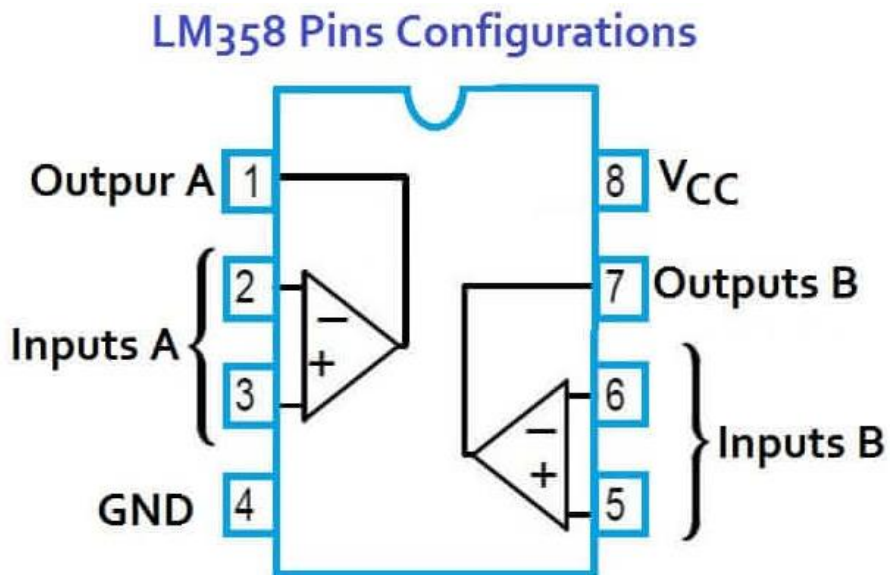
- Every object in the surroundings emit infrared radiation and is not consistent we need an external infrared source so we use Infrared-LED which provides some infrared light which reflects and hits the photodiode whenever any object is in front of them. We need to connect positive terminal of the infrared LED to the positive rail and its negative terminal to the negative rail via a 270-ohm resistor.

- Now we have a setup where the voltage at this point is inversely proportional to the distance of obstacle from the sensor ,so as the obstacle comes nearer to the sensor the amount of infrared light that reflects and falls on the infrared photodiode increases which causes more current to flow through the resistor and more the current more is the voltage at this point, as we can reduce it from the ohms law V equal to IR where R is constant and I which is current increases when an object approaches the Proximity sensor. The voltage at this point increases when any obstacle comes nearer. When we need to turn on LED whenever the obstacle comes below this level and let's assume the voltage at this point is 2.2 V, the condition we have now is whenever the voltage at this point is more than 2.2 volts which can be named as reference voltage, the output needs to be turned on.

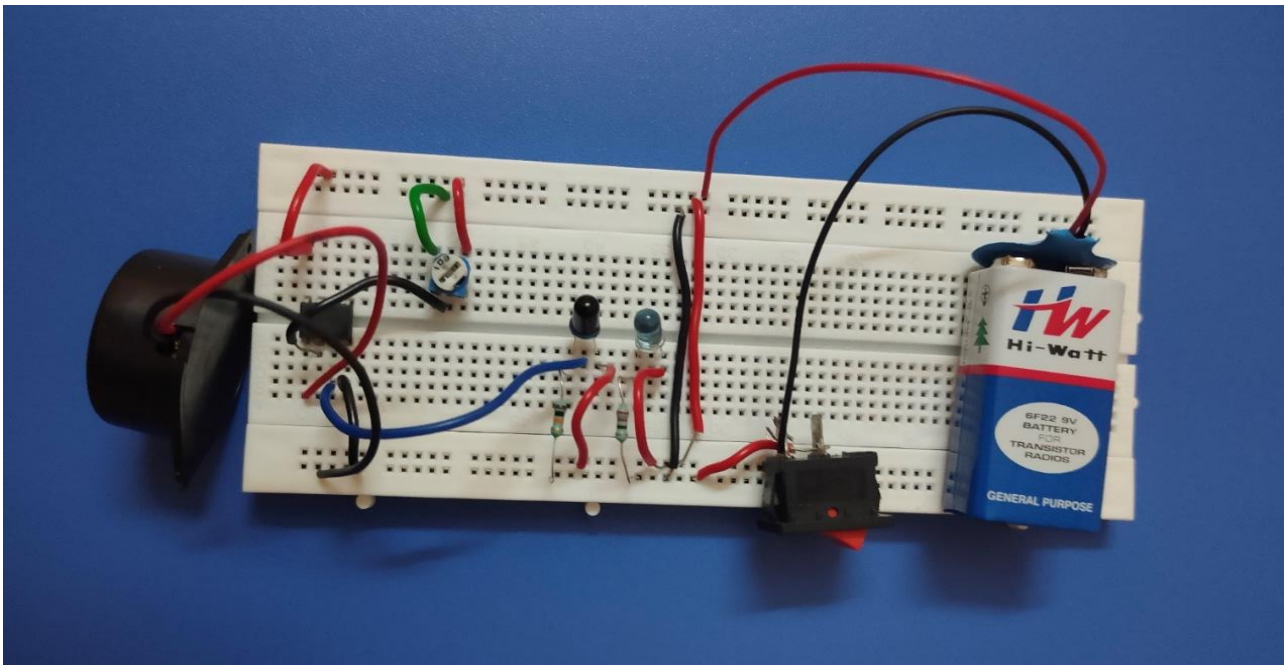
- For this comparison We use comparator the LM 358 IC this operational amplifier has two comparators and each comparator has two inputs, one is named inverting input and the other non-inverting. In simple terms if the voltage at non inverting input is more than the voltage at the inverting input, the output turns on.

- We use the comparator to turn on the output whenever the voltage at the infrared photodiode is more than the reference Voltage. To provide a reference voltage that is adjustable, the best way is to use a potentiometer, so we place it on the breadboard and connect one of its extreme terminals to the positive rail and the other extreme terminal to the negative Rail, now the voltage at the center terminal can be adjusted by turning the knob so this is connected to the inverting input which is PIN 2 of LM-358 and connect the non-inverting input of LM-358 which is pin 3 to the positive terminal of the Infrared photo-diode we have a setup where whenever any obstacle gets so close that the voltage at infrared photodiode is more than the reference voltage which also means that the inverting input is more than the non-inverting input , the output turns on. so finally place and LED with its positive terminal connected to the output of LM 358 which is PIN 1 and its negative terminal connected to ground via a 270-ohm resistor, also connect the 6V DC buzzer same as that of the LED. Finally connect the positive and negative terminals of the battery to the respective rails.

PIN DIAGRAM OF LM-358



RESULTS



END USER APPLICATIONS

This device can be used as contactless door bell

This can also be used as a parking sensor in cars with a few modifications

This can also be used in automatic door opening sensor

CONCLUSION

By doing this project we have come across different kinds hardware components that are available and their applications in different fields.

We have learnt how to implement them in various platforms and in projects to get theend product.

We would like to thank Dr. Rekha P M for giving us this opportunity and for guidingand assisting us for making this project a successful one.

REFERENCES

1. https://www.youtube.com/watch?v=qEMtCKfZOHw
2. https://www.youtube.com/watch?v=YwedPAIoR4g

QUESTIONAIRE

1. What is a sensor?
Ans-A sensor is a device that detects and responds to some type of input from the physical environment. The specific input could be light, heat, motion, moisture, pressure, or any one of a great number of other environmental phenomena.

2.What is a proximity sensor? And how does is work?

Ans-A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact.

A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor

targets demand different sensors. For example, a capacitive proximity sensor or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target.

3.What is the advantage of using proximity sensor?

Ans-Proximity sensors can have a high reliability and long functional life because of the absence of mechanical parts and lack of physical contact between the sensor and the sensed object.

4.What is an IC? What are the advantages of using an IC?

Ans-An integrated circuit or monolithic integrated circuit (also referred to as an IC, a chip, or a microchip) is a set of electronic circuits on one small flat piece (or "chip") of semiconductor material, usually silicon. Large numbers of tiny MOSFETs (metal–oxide–semiconductor field-effect transistors) integrate into a small chip. This results in circuits that are orders of magnitude smaller, faster, and less expensive than those constructed of discrete electronic components. The IC's mass production capability, reliability, and building-block approach to integrated circuit design has ensured the rapid adoption of standardized ICs in place of designs using discrete transistors. ICs are now used in virtually all electronic equipment and have revolutionized the world of electronics. Computers, mobile phones, and other digital home appliances are now inextricable parts of the structure of modern societies, made possible by the small size and low cost of ICs such as modern computer processors and microcontrollers.

5.What is an OP-amp and where is it used?

Ans –An operational amplifier (often op amp or op-amp) is a DC-coupled high-gain electronic voltage amplifier with a differential input and, usually, a single-ended output.[1] In this configuration, an op amp produces an output potential (relative to circuit ground) that is typically 100,000 times larger than the potential difference between its input terminals.

The LM358 is a low-power dual operational amplifier(OP-amp) integrated circuit.