SMART HOME USING TINKERCAD

A Project Report submitted in partial fulfillment of the requirements

for the award of degree of

BACHELOR OF TECHNOLOGY

in

ELECTRONICS & COMMUNICATION ENGINEERING

by

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

This is to Certify that the work which is being presented in the Project entitled **"SMART HOME USING TINKERCAD"** by M.SHIVANI(19G31A0441), K.DEEPTHI(19G31A0438) ,K.RENUKA(19G31A0429) ,N.TEJAMMMA(19G31A0445), K.MOUNIKA(19G31A0437) in partial fulfillment of the requirements for the award of the Degree of **B.Tech** submitted in the Department of Electronics & Communication Engineering at **St. JOHNS COLLEGE OF ENGINEERING & TECHNOLOGY, Yerrakota,** is an authentic record of their own work carried out during **2022-23**.

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ABSTRACT

This project describe about the smart home using sensors by the software Tinkercad.In the IoT home automation ecosystem can control devices like light,dooretc.A domestic automation system can monitor and manage home attributes adore lighting and appliances.Now a days most home automation systems consists of a smart phone and microcontroller.The experiment has been demonstrated with the environment which is programming commands to control the home appliance devices through Wi-Fi and the Internet.The users can control the on/off switch in the connected devices by both methods of command.Due to the rapid development in the field of the automation industry, all aspects.The modern home automation system gives security and blissful life at residence.This smart home implemented using the Tinkercadsoftware.The people can develop the system for their home with the effective cost of implementation.

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INTRODUCTION

Chapter –1
INTRODUCTION

1.1 Overview:

Smart home usingTinkercad is a easy to use tool for creating designs that are ready to be 3D printed into supercool physical objects.A home automation system will be monitor and/or control home attributes such as ligthing,climate,entertainment systems,appliances.It may also include home security such as access control and alarm systems.The method of regulating house appliances automatically utilizing various control system approaches is known as IOT home automation .Various control mechanisms may be used to regulate electrical and electronic equipment in the house,such as windows, refrigerators, fans,lights, firealarms,kitchen, timers, and so on.

1.2 Objective:

The main objective of the this project describe about the smart home using sensors. In the IoT home automation ecosystem can control devices like light, door etc. A domestic automation system can monitor and manage home attributes adore lighting and appliances. This is very helpful to control home devices. Now a days most home automation system systems consists of a smart phone and microcontroller. Due to the rapid development in the field of the automation industry, all aspects. The modem home automation system gives securiy and bissful life at residence. This smart home is to implemented using the Tinkercad software.

1.3 Motivation:

The main motive of this system is to control the home appliances and electronic devices with the help of a supervisory system. The supervisory system is designed in such a way that everyone can access it. Smart homes allow you to have greater control of your energy use, all while automating things like adjusting temperature, turning on and off lights, opening and closing window treatments, and adjusting irrigation based on the weather. The motivation for radiating smart home systems comes from more reason,but maximum great are benefit, security, energy management , connectivity and luxury. Smart home systems are one of the modern areas of test that have not been completely integrated into our society

1.4 Documentation outline ;

A smart home refers to a convenient home setup where appliances and devices can be automatically controlled remotely from anywhere with an internet connection using a mobile or other networked device. Devices in a smart home are interconnected through the internet, allowing the user to control functions such as security access to the home, temperature, lighting, and a home theater remotely.

A smart home's devices are connected with each other and can be accessed through one central point—a smartphone, tablet, laptop, or game console. Door locks, televisions, thermostats, home monitors, cameras, lights, and even appliances such as the refrigerator can be controlled through one home automation system. The system is installed on a mobile or other networked device, and the user can create time schedules for certain changes to take effect.

The main motive of this system is to control the home appliances and electronic devices withthe help of a supervisory system. The supervisory system is designed in such a way that everyone can access it.

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CHAPTER-2

LITERATURE REVIEW

Chapter – 02

LITERATURE REVIEW

2.1 Component Selection

Based on our requirements and extensive research done on the different modules and microcontrollers available at our disposal, a calculated approach was taken to select the optimal components that are required to satisfy our objectives.

Microcontroller - Arduino Uno - R3 TheArduino Uno R3 is a microcontroller board based on a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs). Programs can be loaded onto it from the easy-to-use Arduino computer program. The Arduino has an extensive support community, which makes it a very easy way to get started working with embedded electronics. The R3 is the third, and latest, revision of the Arduino Uno**.**

Figure 2.1: Picture of Arduino UNO R3 controller

The Arduino Uno is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button. Based on our requirements of input voltage, number of input ports , availability of the microcontroller and the online support available for our module, we have decided to go with the Arduino Uno R3 controller.

2.2 Comparision of different microcontrollers

	 Arduino Uno R3	 Arduino Leonardo	 A-Star 32U4 Prime LV	 A-Star 32U4 Prime SV
Microcontroller:	ATmega328P	ATmega32U4	ATmega32U4	
Clock:	16 MHz resonator	16 MHz crystal	16 MHz crystal	
User I/O lines:	20	23	26	
PWM outputs:	6	7	7	
Analog inputs:	6	12	12	
Ground access points:	4	4	43	
User LEDs:	3	3	3	
User pushbuttons:	—	—	3	
Reset button:	✓	✓	✓	
Power switch:			✓	
Buzzer option:			✓	
microSD option:			✓	
LCD option:			✓	
Arduino-compatible bootloader:	✓	✓	✓	
USB connector:	B	Micro-B	Micro-B	
USB/regulator power selection:	partial	partial	TPS2113A	
High-performance reverse-voltage protection:			✓	
Recommended input voltage:	7 V to 12 V	7 V to 12 V	2 V to 16 V	5 V to 36 V
Regulator type (5 V):	linear	linear	switching step-up/step-down	switching step-down

Fig 2.2:Different microcontrollers

2.3 Methodology

Internet of Things comprises of a collection of sensors and actuators which gathers the from the environment.The data gathered can be futher processed to generate information.Thissystem allows the users to remotely control the appliance in their absentia at the home.IoT based home automation system was implemented .The main components of the system are Arduinouno R3,internet.Many sensors and equipment are used to monitor or supervise the home appliances.

- Low cost Wi-Fi based automation system
- Home automation using set of sensors
- Ethernet based system

2.4 Wireless Home Automation system using IoT

This system uses mobiles or computers to control basic home control and function automatically through internet from anywhere around the worldglobally,an automated home is sometimes called a smart home.It is meant to save the electric power and human energy.The proposed system is a distributed home automation system,consists of server i.e.,WiFi module ,sensors.Server controls and monitors the various sensors,and can be easily configured to handle more hardware interface module. . The Arduino board, with built in Wi-Fi module acts as web server. Automation System can be accessed from the web browser of any local PC using server IP, or remotely from any PC or mobile handheld device connected to the internet with appropriate web browser through server real IP (internet IP). Wi-Fi technology is selected to be the network infrastructure that connects server and the sensors. Wi-Fi is chosen to improve system security (by using secure Wi-Fi connection), and to increase system mobility and scalability.

CHAPTER-3

SMART HOME

3.1 Introduction to smart home

Smart home automation is the practice of using internet enabled devices to remotely and automatically control appliances, in and around your home. You could use your phone to control most of these appliances. Smart homes are gaining popularity day-by-day with some numerous benefits. Industries and researchers are working hard to build sustainable and low-cost automatic systems to monitor and control different machines like lights, fans and motors. Smartphones can be used to control devices in a smart home. Systems based on the Bluetooth protocol are faster than most of the other technologies. Bluetooth is very effective for serial data communication where data can be transmitted at speeds of up to 3 mbps at a distance of I0 - 100 m. Automation systems not only alleviate the wastage of electricity in a house but also reduce human effort in switching on and off home appliances. Home automation is an important application of wireless technologies like Bluetooth. Homes require sophisticated control of different gadgets such as electronic appliances. Home appliance can be integrated to smartphones via Bluetooth. Bluetooth works at a frequency range of 2.4 GHz over a distance of 100 m with a speed of 1 Mbps.This is an efficient solution for controlling the process of home automation. A microcontroller can be used as a device controller for home devices. The significance of using the Bluetooth protocol for communication in a smart home stem from the fact that. Bluetooth is found in nearly every smartphone today. Hence having a smart home.where the microcontroller is Bluetooth enabled, makes it possible to easily control most devices with the aid of your smartphone which can save a lot of cost. Secondly most homes are not more than 200 m2 in floor area and Bluetooth protocol can cover a perimeter of a couple 100 meters hence this is the appropriate technology for this application.The Internet of Things (IoT) is used to describe a network of physical objects which are connected to each other with the help of embedded sensors, transceivers and software code to communicate and share data with each other.

Fig 3.1:Smart Home

3.2 System proposal

The overall system works in this way First,we use a Wi-Fi network to control the entire system without any need of external wiring system.Different kinds of sensors are needed to obtain physical condition,temperature sensor detects the temperature value,.This information is gained by using micro-controller.To judge the intensity of light LDRs are used.With this property of LDR it allows automation switching on/off the light control by determining the day light intensity.Passive Infrared Sensor(PIR) is added to motion detector to detect any movement in the house when the security system is turned on.A relay switch is used to send control signals from the microcontroller to the electronic device used to achieve the switching on and off.

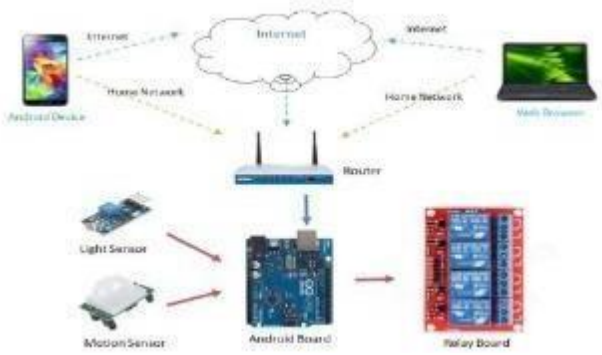

Fig 3.2: Basic design of proposal system

Home automation is the concept of controlling and automating the use of home appliances and other electrical equipment, such as light bulbs, temperature gauges or door locks. The topic of home automation is nothing new. In fact, computer based systems were developed already in the 1960s [1]; however, there has not been any wide scale breakthrough until recently. According to Berg Insight, a market research firm based in Sweden, there were approximately 2.9 million smart homes [2], i.e. homes with automation technology controlled by a computer, in the U.S. 2012. Furthermore, the installed base is expected to reach 31.4 million by 2017 [2], potentially increasing economical and technical interests. The concept Internet Of Things (IoT) can be closely tied together with home automation. IoT devices, such as smart thermometers, can be controlled by, for example, a smartphone and thus possibly providing worldwide range through the Internet. These devices together with the rising popularity of the smartphone [3] account for one of the reasons to the increase in home automation. Home automation with IoT devices provides great convenience and means of optimizing energy consumption by, for example, enabling automatic energy saving or presenting power consumption data to a user in real time. However, it could become expensive if conventional devices were to be replaced by their IoT equivalents. Therefore, when converting to a smart house, a major issue is making all non-IoT devices compatible with a home-automation system [4]. Gill et al. [5] identify the intrusiveness of installations as one of the areas that have hindered consumer adoption of home automation technologies. Consequently, converting non-IoT devices should be done in a manner such that a user would easily be able to install a system, without the need to make hardware changes in the house. IoT devices also have their drawbacks, mainly in the way they communicate with each other. According to Gill et al. [5] the interoperability between home automation technologies, such

as the vast use of different communication protocols, is one of the major factors impeding consumer adoption of home-automation system. Therefore, in an ideal home-automation system, the communication protocols used should preferably be those supported by common consumer devices, in order to provide maximum compatibility. This section further explains the purpose of creating a concept for automating existing home appliances and electrical devices.

3.3 Purpose:

The purpose of this project is to develop a concept anda prototype of a smart power control system that allows for scalable home automation and can be used to operate existing home appliances and electrical equipment. The concept aims to increase the convenience of controlling home appliances for a broad audience, by being simple to install, maintain, and use.

3.4 Wi-Fi

IEEE 802.11, more commonly know as Wi-Fi, is a widely used wireless network protocol designed for short range high speed communication between devices ranging up to a few hundred meters [20, p. 12], depending on the protocol version and external factors. The latest standard, 802.11ac, offers a data transfer rate of up to 1300 Mb/s [21, p. 3]. Due to the high speed communication, the current power consumption of Wi-Fi devices can be regarded as relatively high. Recently, however, low power Wi-Fi modules have become available that offer significantly lower power consumption. According to the datasheet of one such device, the RN-131G, the active power consumptioncurrent usage is between 40 mA (receiving) and 210 mA(transmitting) [22, p. 2]. Wi-Fi is a single-hop infrastructure-based technology utilizing a star topology with an access point (AP), as base station. However there is an amendment to the 802.11 standard called 802.11s which enables an infrastructure-based multi-hop mesh networking functionality [23]. An 802.11s network consists of several mesh access points (MAP), that communicate and relay messages amongst themselves. Every MAP also grants clients access to the mesh network, consequently only allowing the clients to communicate with a MAP, and not with other clients.

As a smart home automation system Under the Home Automation we can control all electrical appliances from long distance through an mobile phone. In this project we are controlling Lights and Fans through an Internet .Even though if Wi-Fi is not available we can go to 3G or 4G services to operate the system. This will helps us to operate our home appliances through a long distance. This will helps the handicapped and aged people to control their home appliances easily.

3.5 Advanced smart home composition.

Home Automation System is built using various sensors, motors, modules so that it can store access real time data and work accordingly. Main function of sensors is to constantly sense sound, temperature, light and other sensing elements which will send all the real time data to the controlling devices. The control devices will accept data, execute the function and will give the expected output. Home Automation System is proposed to reduce the labour work. This system will help us to save time and energy. Nowadays smartphones are used by majority of the people and keeping that in mind this system is created where the majority of the tasks can be performed by Smartphones.Remote Access - This feature enables the user to remotely access and control all the IoT based devices at home. As long as the devices are connected to the Wi-Fi Module [2], the user can access it from anywhere. An open source UI toolkit, Flutter is used to control the devices remotely. Devices need to be connected to the network always. The main objective of this research is to develop an economical and secured smart home automation system along with healthcare benefits to counteract the effects of pandemic. The user can have secured access to his devices at minimal cost and optimal design.

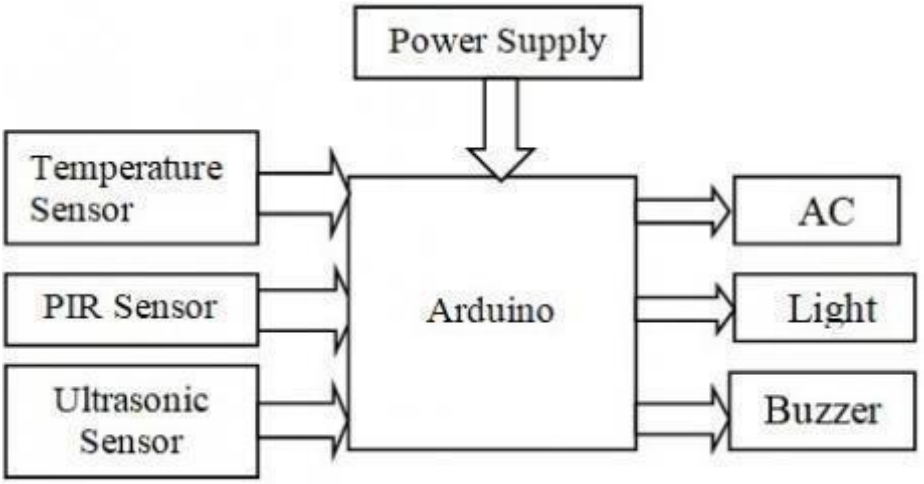

Fig 3.5:Basic Block Diagram

Smart home technology refers to home automation or domotics that provides homeowners security, comfort, energy efficiency and convenience by allowing one to control smart devices by a smart home app on a smartphone or any other network device. Tinkercad is a free online electronic lab simulation programme that is known for its simplicity and ease of use.Tinkercad is a free online 3D modelling programme which is known for its ease of use. It is also a popular platform for 3D printing. It was founded as a company in 2010. Then, Autodesk acquired Tinkercad in May 2013 and merged the electronic lab from Autodesk into Tinkercad in May 2017" .

3.6 Implementing the code in Tinkercad

Fig 3.6:Tinkeracd software

To implement the code in Tinkeracad software is as shown in the below fig.The code is in the form of Blocks in the below figure.The code is in c++ language in the Text form as shown below and simulate the code to get output based on the given values for the sensors.

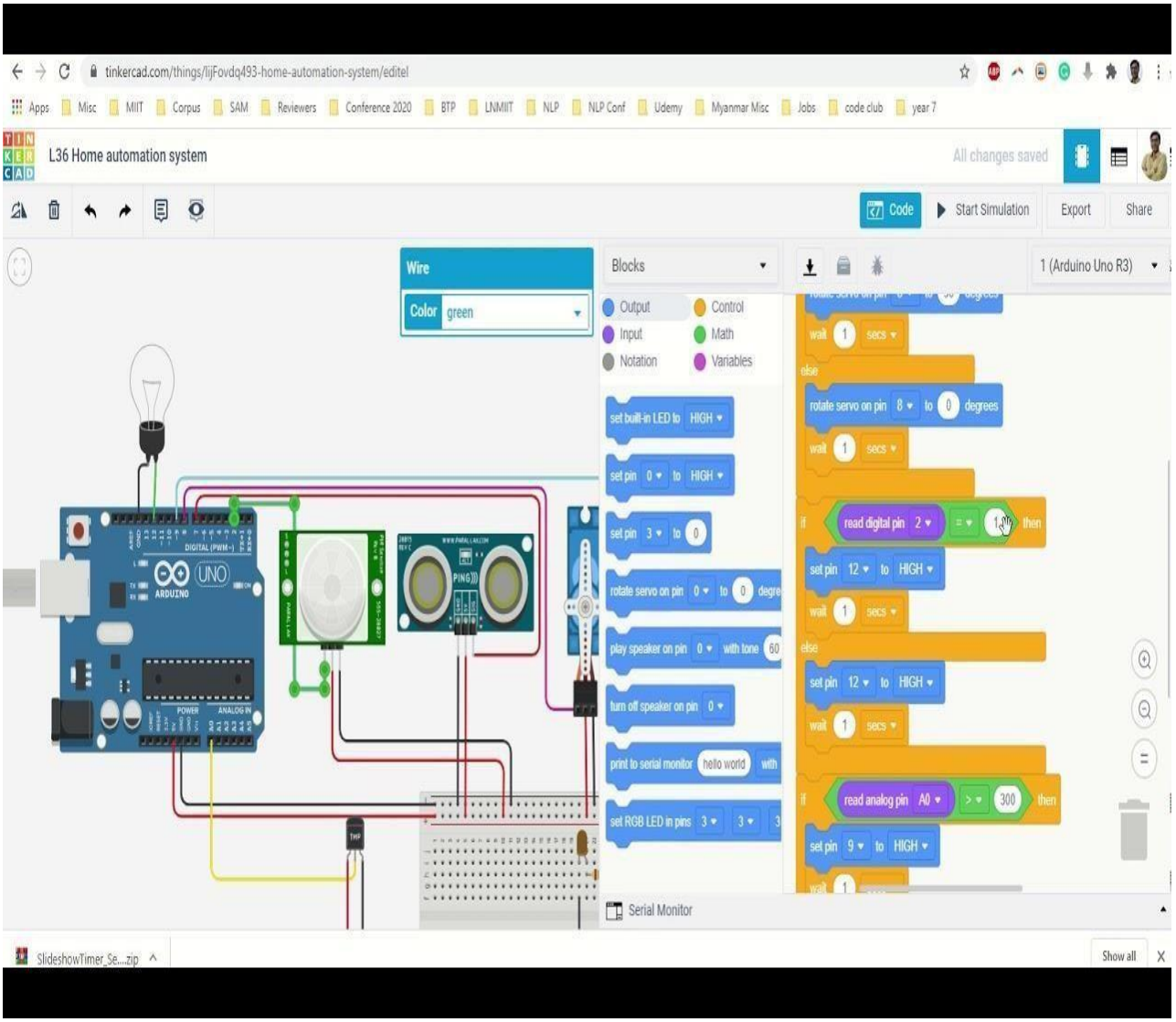

Fig 3.7:Circuit diagram with block code

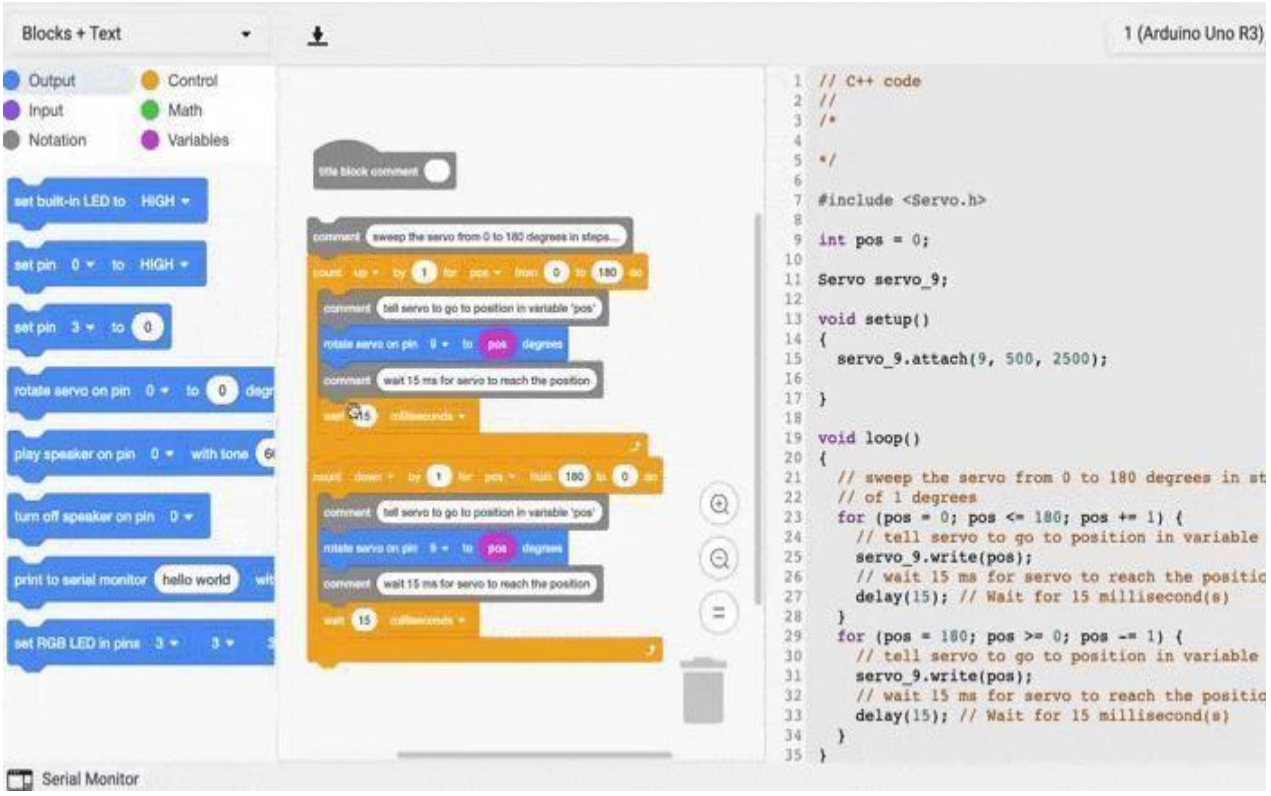

Fig 3.8:Blocks converted into c++ code

CHAPTER-4

SYSTEM IMPLEMENTATION

Chapter-04

SYSTEM IMPLIMENTATION

4.1 Block diagram

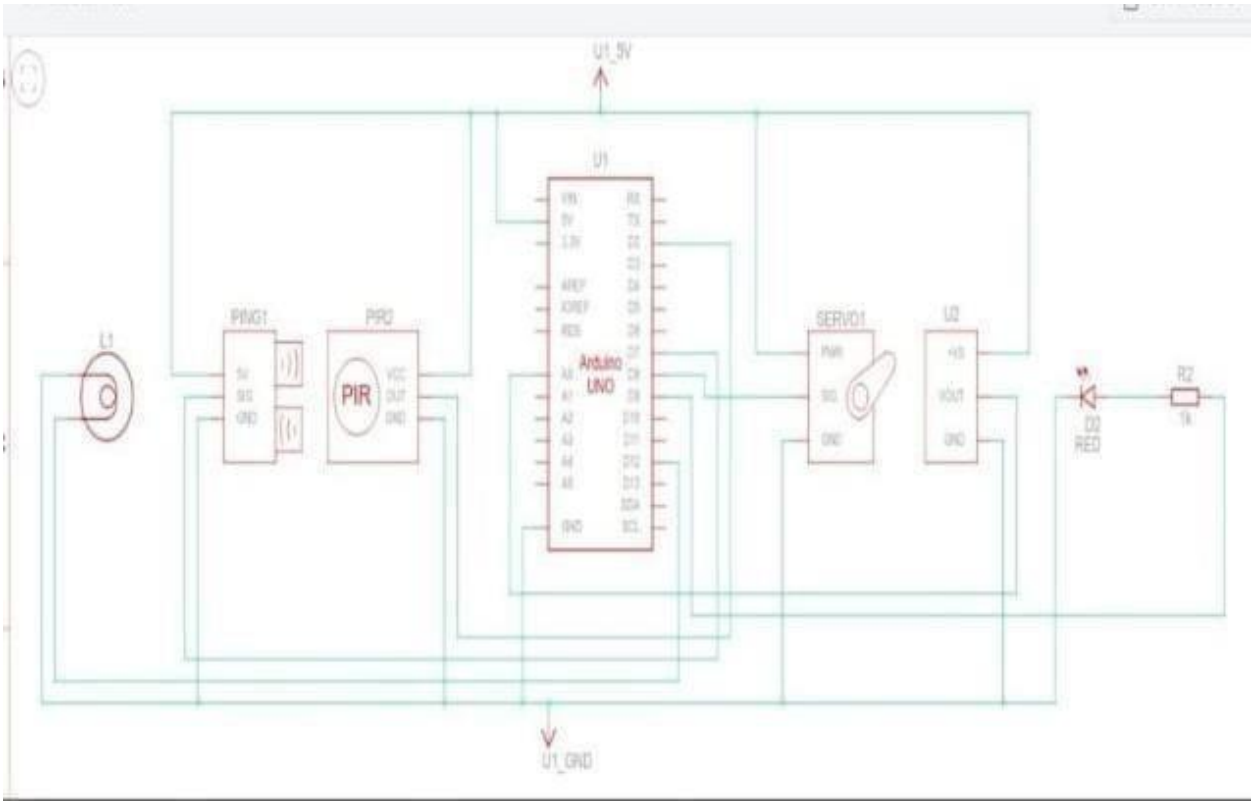

Fig 4.1:Block diagram

Smart home can be integrated into an existing home appliances to reduce the need for human intervention, increase security and energy efficiency. However, it is still an open problem due to difficulties such as network distance, signal interference, not user friendly, increased cost and power consumption.

4.2 Implementation of Home Automation in Tinkercad:

we are now discussing the implementation of the algorithms and how these algorithms are used in implementing this problem statement. First, we will implement normal Home Automation system using Tinkercad.First connect the circuit as shown in the below figure:

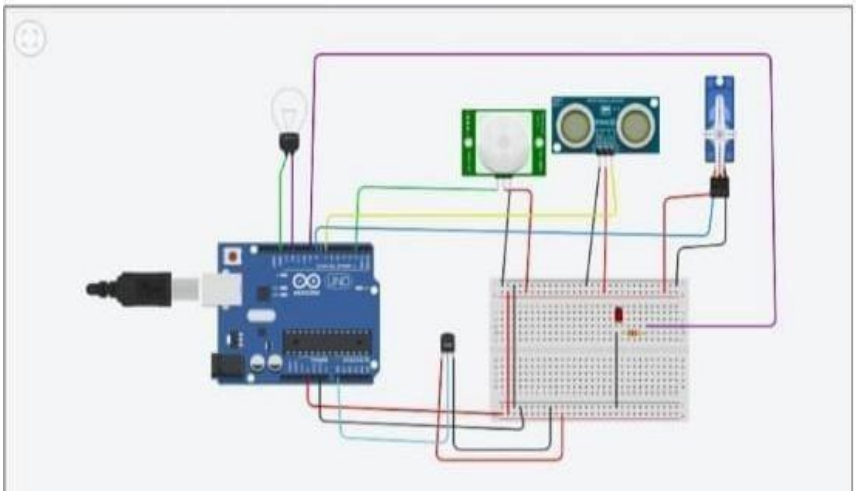

Fig 4.2:Circuit diagram of smart home

From above picture we seen that

- The Arduino uno 5v pin and gnd pin is given to the breadboard supply and ground.
- The Ultrasonic sensor's power and Gnd pin given to breadboard and the Signal pin is connected to Arduino digital pin 7.And DC servo motor input is connected to the Arduino digital pin 8.
- Ultrasonic sensor is used to detect the distance of the objects or persons by using this principle we made an automatic door system.
- Here we use the DC servo motor in place of door.
- If the person far from the door means more than 100cm the door will close or else if person is less than 100cm near to the door so the door will as the servo motor turn 90 degrees
- The PIR sensor's power and Gnd pin given to breadboard and the Signal pin is connected to Arduino digital pin 2.The bulb is given to gnd and digital pin 12.
- PIR sensor is used to detect the movement of objects we use this sensor for home security.Suppose any person movement is detected the bulb will glow for sometime. If there is no movement the bulb will glow off.
- The Temperature sensor's power and Gnd pin given to breadboard and the Signal pin is connected to Arduino Analog pin Ao.
- By varying the temperature intensity in slide bar as shown in the above figure.If the temperature is low the LED will turn off else the LED will glow.

4.3 Arduino UNO:

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. 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-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms

- The components of Arduino UNO board are shown below:

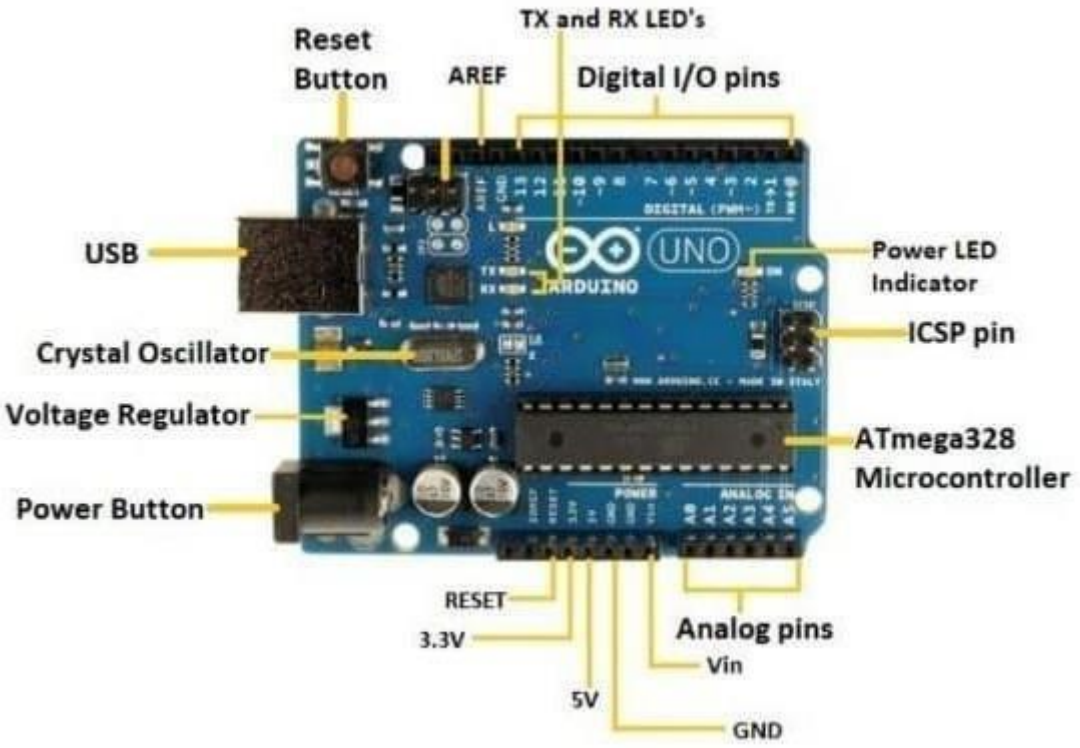

Fig 4.3 Arduino Uno

Let's discuss each component in detail.

• ATmega328 Microcontroller- It is a single chip Microcontroller of the ATmel family. The processor code inside it is of 8-bit. It combines Memory (SRAM, EEPROM, and Flash), 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.

4.4 working process

SENSORS:

Sensor is a device or a module which is used to detect events or changes in its environment and send the information to Sensors are used everywhere such as touch-sensitive elevator buttons and automated doors, smoke detectors, etc. Sensors advances in micro

with easy-to-use microcontroller platforms.. A sensor's sensitivity indicates how much the sensor's output changes when the input quantity being measured changes like PIR sensor,Temperature sensor,Ultrasonic sensor.

4.5 PIR sensor:

Passive infrared (PIR) sensors use a pair of pyroelectric sensors to detect heat energy in the surrounding environment. These two sensors sit beside each other, and when the signal differential between the two sensors changes (if a person enters the room, for example), the sensor will engage.

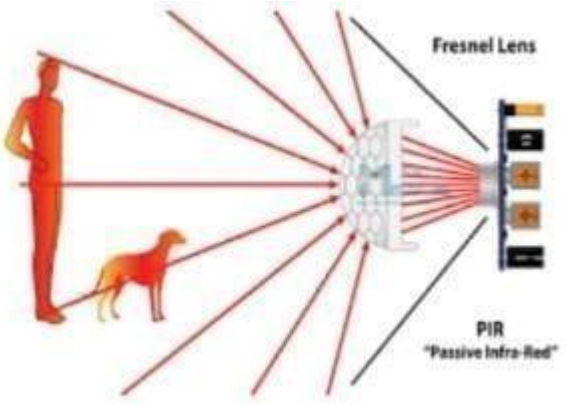

Fig 4.5 PIR sensor

4.6 Ultrasonic sensor:

Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo.

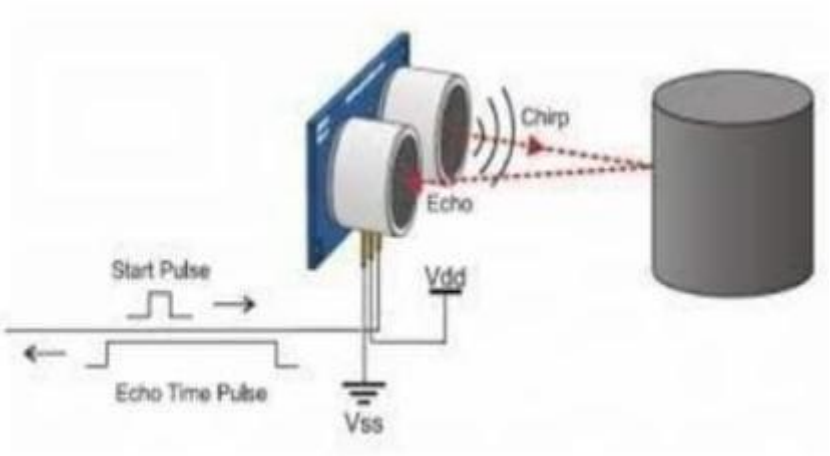

Fig 4.6:Ultrasonic sensor

4.7 DC SERVO MOTOR:

Servo motor works on PWM (Pulse width modulation) principle, means its angle of rotationis controlled by the duration of applied pulse to its Control PIN. Basically servo motor is made up of DC motor which is controlled by a variable resistor (potentiometer) and some gears.

• Here we used servo motor as door which motor rotates 90 degrees is assumed to be as door.

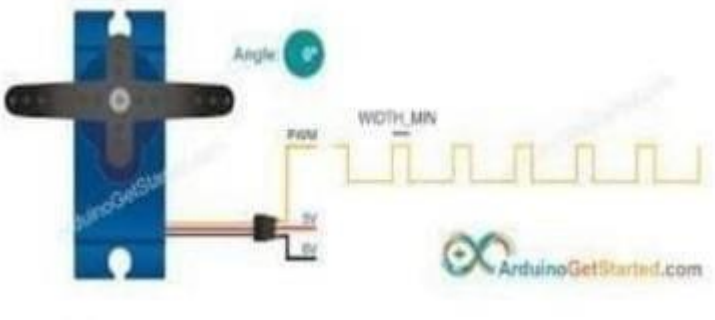

Fig 4.7:DC servo motor

4.8 Temperature sensor :

The basic principle of working of the temperature sensors is the voltage across the diode terminals. If the voltage increases, the temperature also rises, followed by a voltage dropbetween the transistor terminals of base and emitter in a diode.

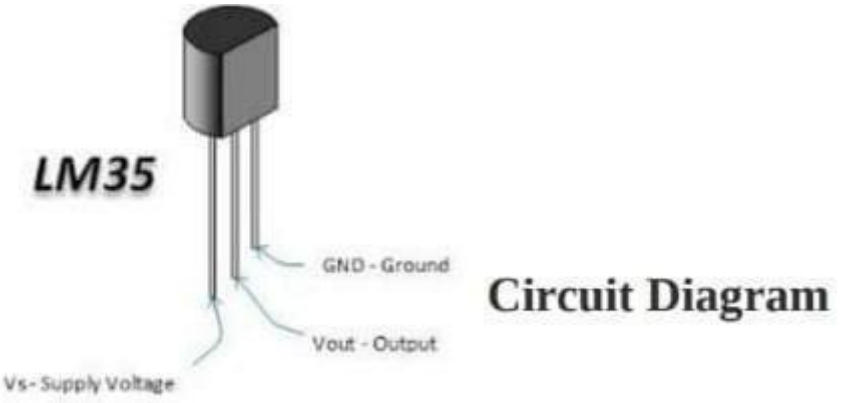

Fig 4.8 :Temperature sensor

4.9 Description of Basic Home Automation:

Here first we connect Arduino uno Vcc and Gnd pins on the bread board later in the implementation of home automation here we use 3 sensors they are ultrasonic sensor, PIR 55 sensor, Temperature sensor. The function of ultrasonic sensor is used for obstacle detection in our project, PIR sensor is used to sense the motion of any object at a distance of 10m, temperature sensor is used to detect the temperature of the environment. Here current status of the project will be displayed on LCD now we connect the circuit as shown above after connections we write the code accordingly. The above circuit is said to be home automation for below reasons: 1. The servo motor which is connected in the circuit is similar to our main door in home when an obstacle is detected near to ultrasonic sensor the door opens and later when obstacle is far automatically the door closes. 2. When the moving object is entered into home as we have PIR sensor it detects the motion then LED's blink accordingly.

Fig 4.9:Home Control system

CHAPTER-5

TINKERCAD SOFTWARE

Chapter-5

TINKERCAD SOFTWARE

5.1 Introduction toTinkercad software

Tinkercad is an online collection of software tools from Autodesk that enable complete beginners to create 3D models. This CAD software is based on constructive solid geometry (CSG), which allows users to create complex models by combining simpler objects together. As a result, this 3D modeling software is user-friendly and currently enjoyed by many, particularly teachers, kids, hobbyists, and designers. Best of all, it's free and only requires an internet connection. The software allows users to create models that are compatible with 3D printing, a great option for beginners to the technology.

Tinkercad is a good alternative to other 3D modeling software such as sketchUP or Fusion360 if you do not need the more advanced features of these solutions. Autodesk, producers of Fusion 360, acquired Tinkercad in 2013, two years after the latter was launched by former Google engineer Kai Backman and cofounder Mikko Mononen. The software's main advantage over the other two software is that it is free, while still offering more modeling freedom than what first meets the eye! It is currently available in 16 languages.

Even though Tinkercad is perfect for beginners, it does not mean that those who are more experienced with 3D modeling will not also enjoy this software. Given that it is based on CSG to create solid models, you can always make your model more complex by adding more shapes. In more concrete terms, all you have to do is select one of the available shapes and add or remove material as you wish. For example, you could start with a cylinder before adding triangles, circles, cones, etc. The shape can then be moved and rotated, allowing users to see it from all angles. the software allows you to add electronic circuits to 3D models in order to create objects with light and movement. The end result can even be simulated on the software to check how the components will respond in real life. Another feature of Tinkercad is its ability to transform a 3D design into buildable brick models, similar to creating Lego designs. Finally, Tinkercad is suitable for young learners, as it adheres to the ISTE (International Society for Technology in Education) standards.

Tinkercad can be used for a range of applications, including 3D printing. The 3D models can be saved in three different formats, STL, OBJ, and SVG. Once you have an STL file of your model, you can go on to using slicing software. Slicing software converts the 3D model into a series of thin layers and produces a G-code file containing instructions tailored to a specific type of printer. In other words, it is you can also order your dividing the object into a stack of flat layers and describing these layers as linear movements of the 3D printer extruder. If you don't have a 3D printer, model via the online service offered by Tinkercad. You should also know that it can be exported in SVG format for laser cutting.

Tinkercad's 50 million+ users often compliment the intuitiveness of this CAD software. Transformation, duplication, and shape modification are easy to grasp. Additionally, Autodesk has made many resources available to its community. For example, you will find inspiration, and tips & tricks to get started on their blog, as well as videos and course to get you started with 3D modeling! The software works on any computer with an internet connection, you just have to create your account. It also offers a backup of 3D models on the cloud. As mentioned before, the software is very suitable for education. Tinkercad offers the option to upgrade to Fusion 360: the website shows teachers how to help learners transition from the basic Tinkercad software to more advanced Fusion 360 CADCAM solution.

Fig 5.1:Tinkercad

In this project we use the Tinkercad online platform.We use this platform for the IOT projects simulation in the software before getting done with the hardware project.Since it became available in 2011 it became a popular platform for creating electronic circuits,3D models and

also to construct solid geometry.This web app that equips the next generation of designers and engineers with the foundational skills for innovation.In this project we use the ULTRASONIC Sensor,PIR Sensor,Temperature sensor,LED,Breadboard, Arduino which are available in the Tinkercad website.

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5.2 Installation of Tinkercad

There are very few steps in downloading and Installation of Tinker CAD for IoT Applications in your system

Those steps are:

The first step to

- Download this software is open the web browser, and search for “tinkercad.com”, the official page of Tinkercad opens for the user to download and install Tinkercad software.

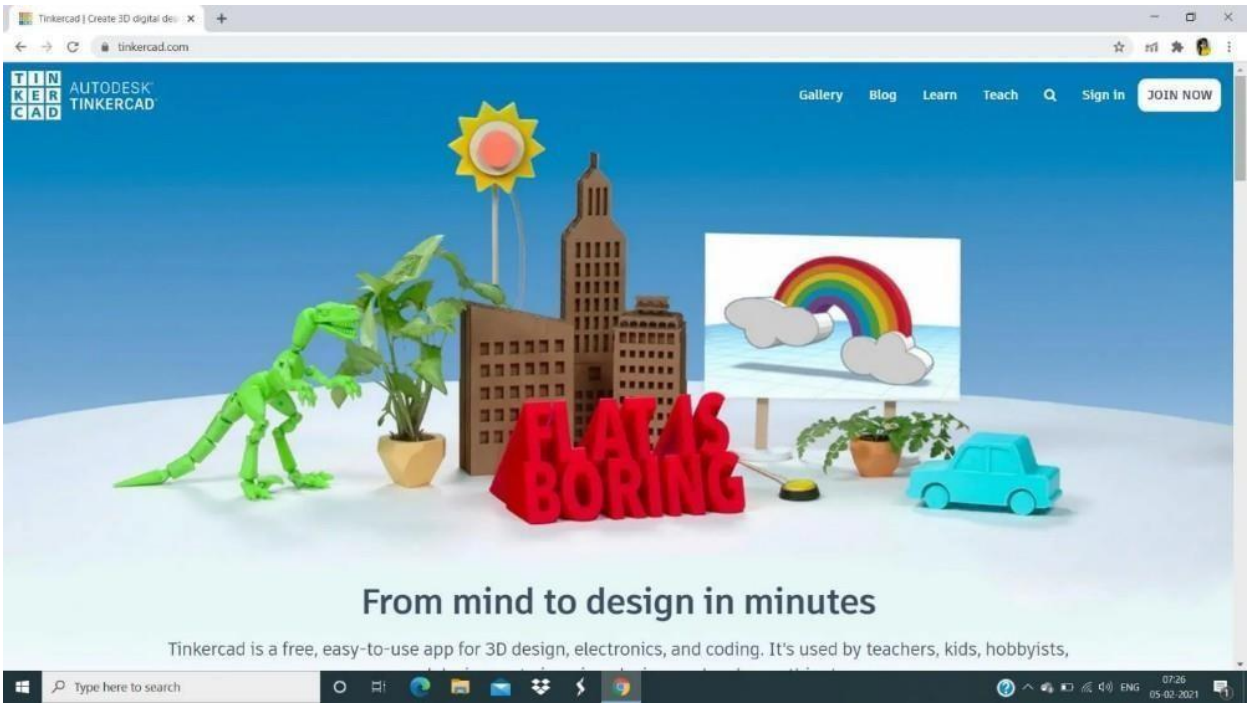

Fig 5.2:Installing Tinkeracd software

- If you wanted to download this software, you need to have an account in the Tinkercad software.
- If you already have an account. You can click “Sign in” in the right corner of the official page. If you don’t have the account in this software, you can create it by clicking “Join Now” at the right corner of the same official page.

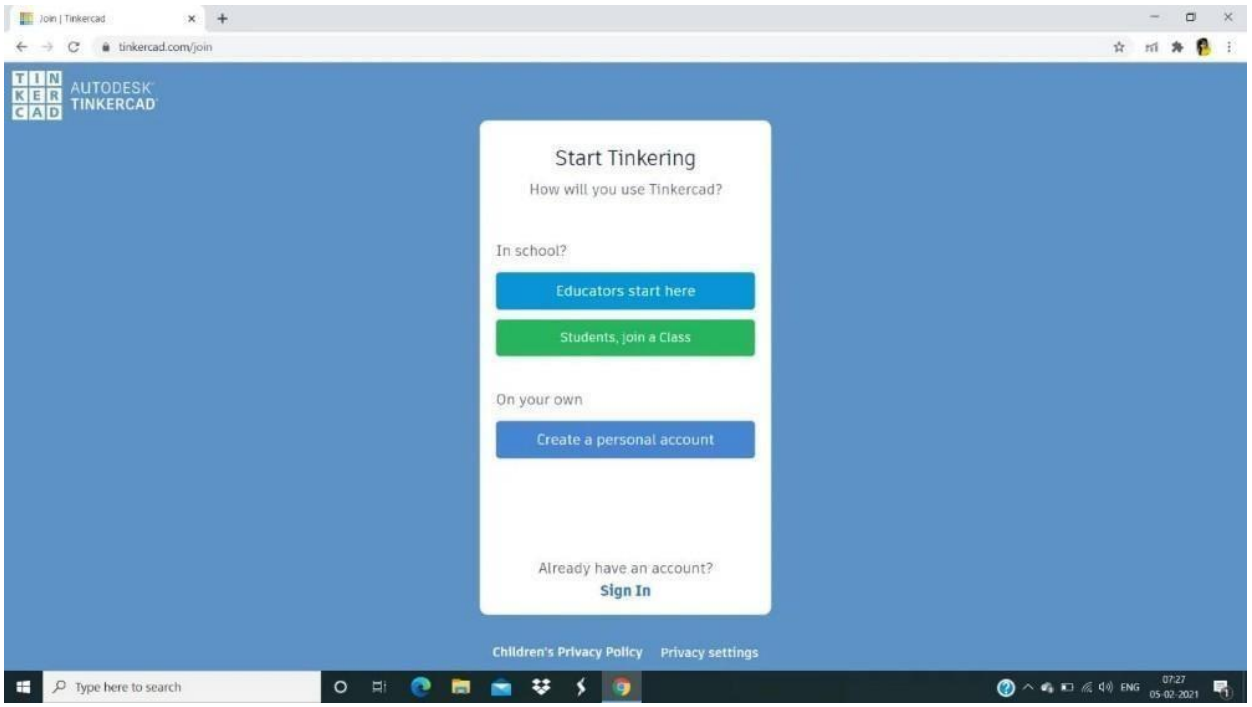

Fig 5.3:How to login into Tinkercad

- After clicking the "Join Now" in the first page, you will be taken to the account opening page. For creating account, it will ask you whether you are opening the account for school student or Educators or you wanted to open the account for personal reasons.
- Just click the reason for which you wanted to open this software account.

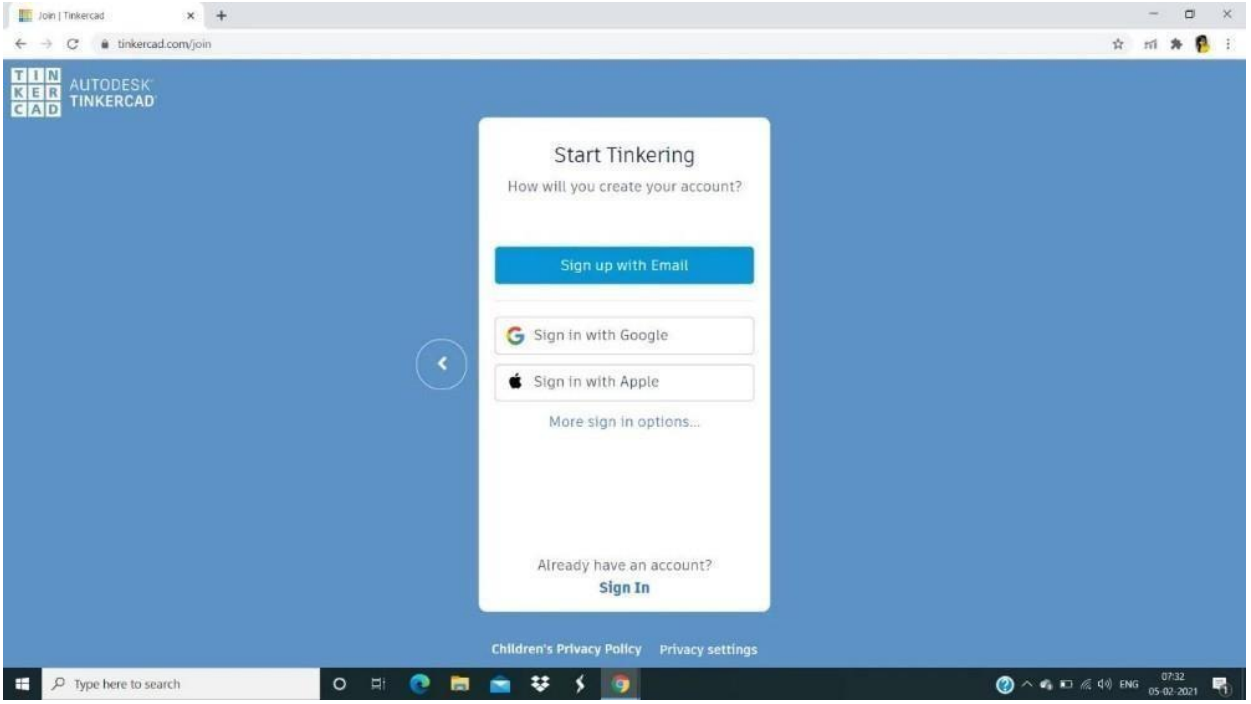

Fig 5.4: How to sign into Tinkercad

- On the next page, you will be asked whether you wanted to open this software account by logging into your Google, if your using Windows, or you can sign into the Apple account, if you are having the Apple software in your system.
- The next way is to logging separately into the software by logging through giving your Email ID. If that is to be done then click “Sign up with Email”.

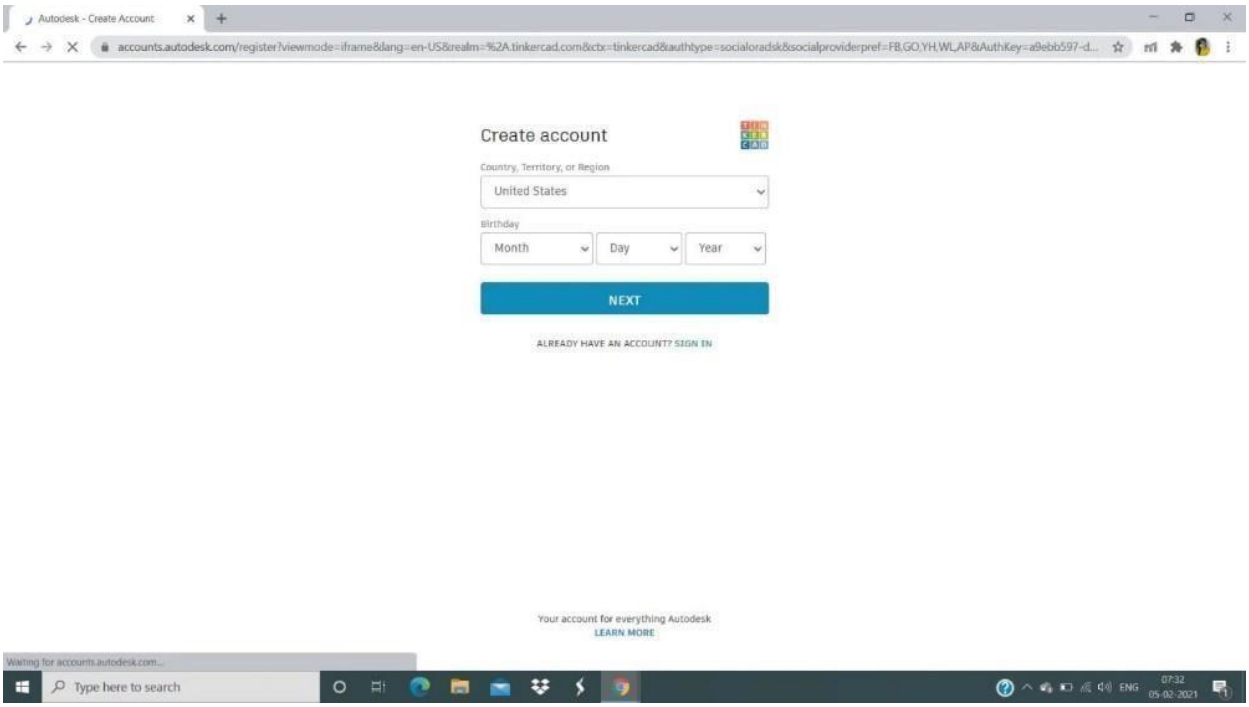

Fig 5.5: How to create account in Tinkeracd

- Installation of Tinker CAD for IoT Applications Aided Design (CAD) refers to computer systems being used to help the design system creating account page, you need to choose the country and your date of birth. In that case, you can keep the country as default or you can change it accordingly to your country,'
- In the case of date of birth, you need choose your date of birth correctly, of your date of birth is below 10 or 12yrs, your parents or guardian is supposed to give the email id which will asked in the next page, if your age is below some level. If your parent or Guardian accepts the mail sent by this software, you are allowed to continue in this process of installation.
- If the information is given properly then you can click "Next".

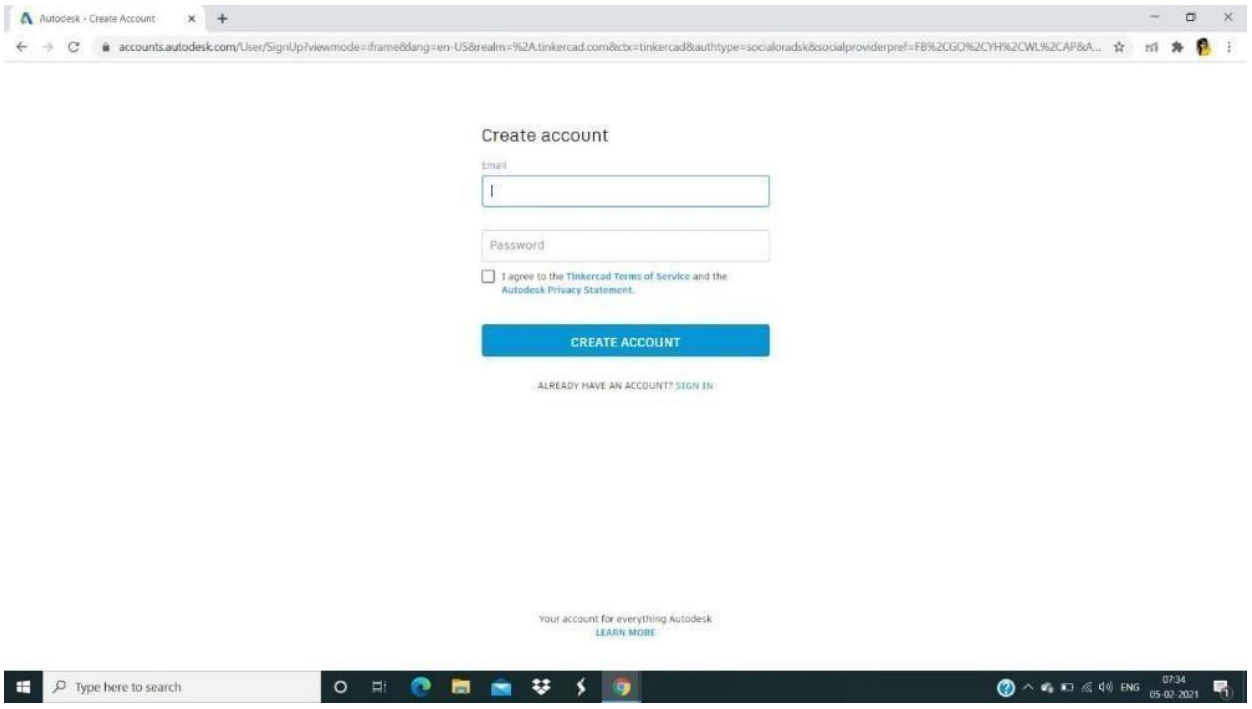

Fig 5.6:Creating account

- In the next page, you need fill up the email id of yours and create password for the creating theTinkercad account. Enter the email id and password and tick the box given below for agreeing the terms and conditions regarding this software. In the next page, you need fill up the email id of yours and create password for the creating the
- After entering all the details properly, you need to click the “Create Account”.

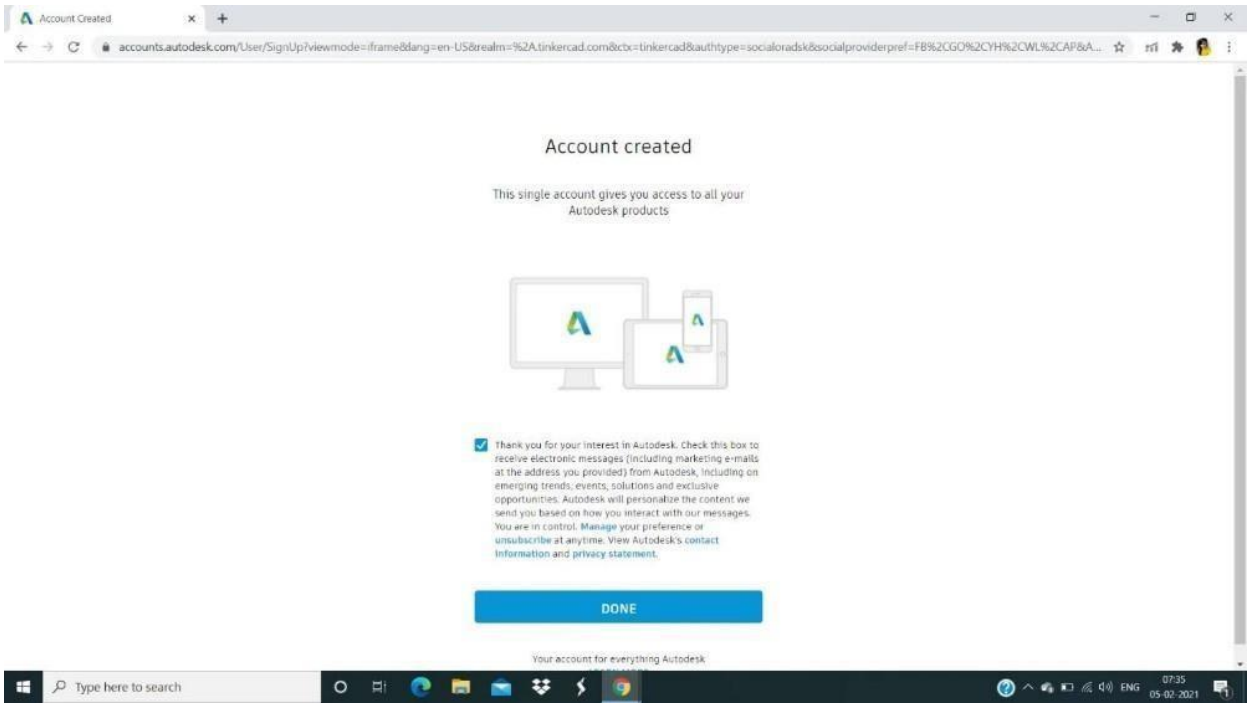

Fig 5.7:Account Created

- In the next page you will receive a page that tells the account has been created. You can read all the information regarding the Autodesk, where your account has been created regarding working on the Tinkercad software. After reading the information you can “Done”.

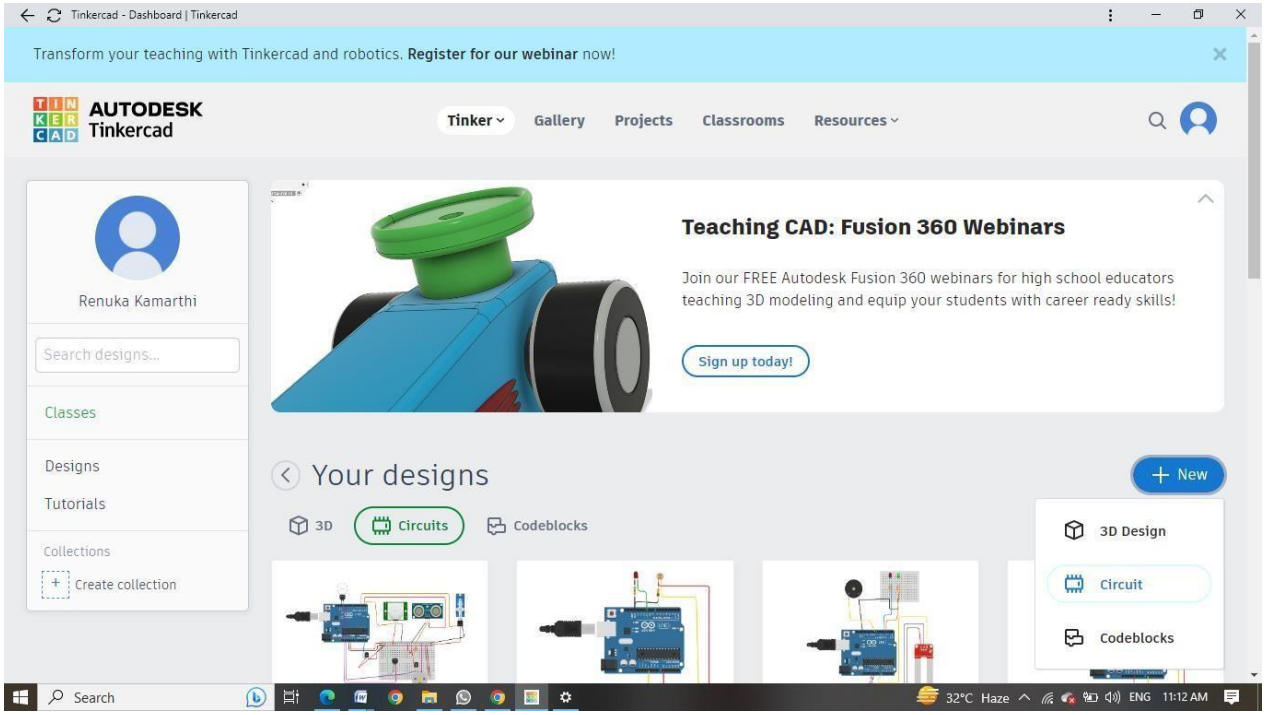

Fig 5.8:Start Tinkering in Circuits

- This is the official page of Tinkercad for creating designs, circuits, code blocks etc.
- You can click to “Create new design”, to create your own idea regarding designs.

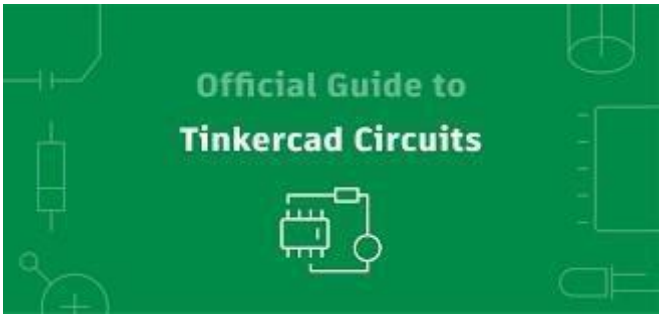

Fig 5.9:Tinkercad logo

- This is the space where you can create your own designs and develop your knowledge skill.

CHAPTER-6

RESULTS

Chapter-6

RESULTS

6.1 ULTRASONIC SENSOR:

An ultrasonic sensor is an instrument that measures the distance to an object usingultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receiveultrasonic pulses that relay back information about an object's proximity.
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.

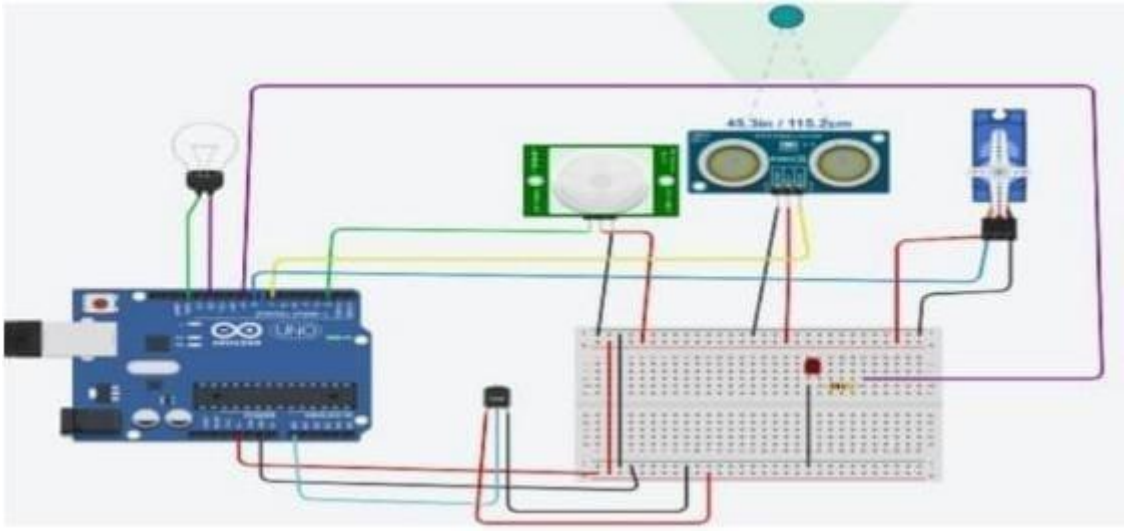

Fig 6.1:Circuit Diagram Using Ultrasonic Sensor before stimulation

- If the person far from the door means more than 100cm the door will close.

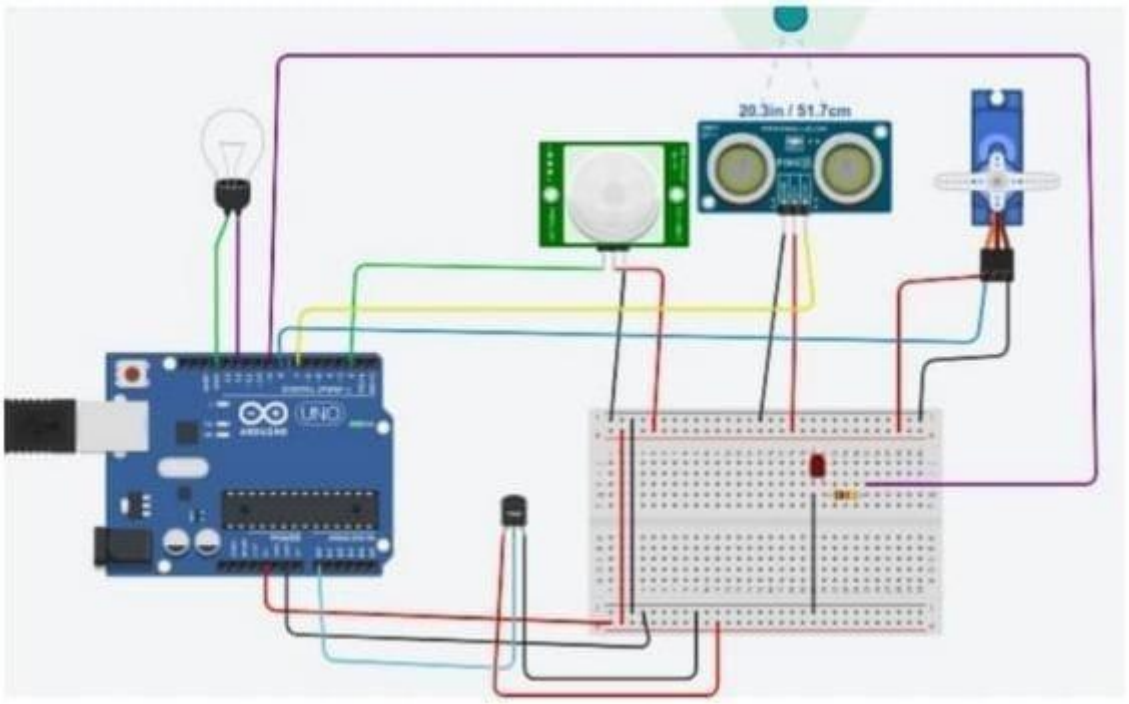

Fig 6.2:Circuit diagram using Ultrasonic sensor after stimulation

- Here the person is less than 100cm near to the door so the door will as the servo motor turn 90 degrees.

6.2. TEMPERATURE SENSOR:

A temperature sensor is a device used to measure temperature. This can be air temperature, liquid temperature or the temperature of solid matter. There are different types of temperature sensors available and they each use different technologies and principles to take the temperature measurement.

- By varying the temperature intensity in slide bar as shown in the above figure. * If the temperature is high then LED will glow.

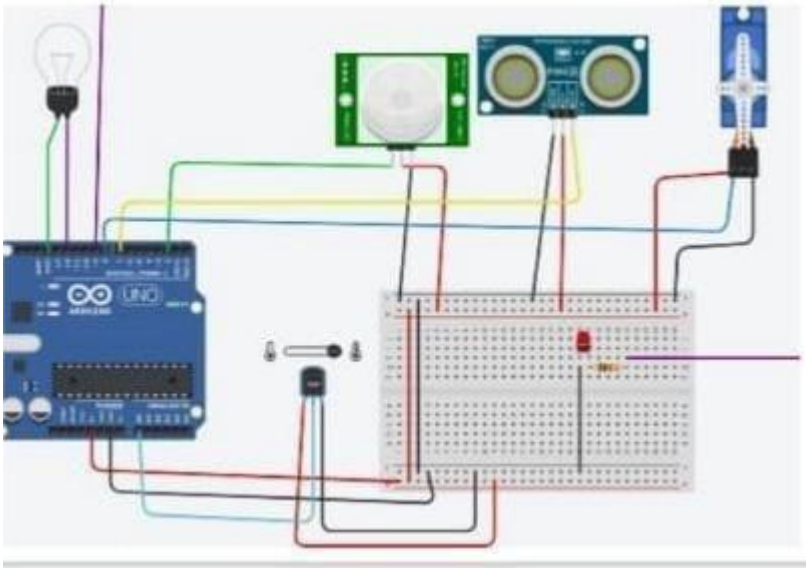

Fig 6.3:Circuit diagram using Temperature sensor after stimulation

- The temperature is low the LED will turn off.

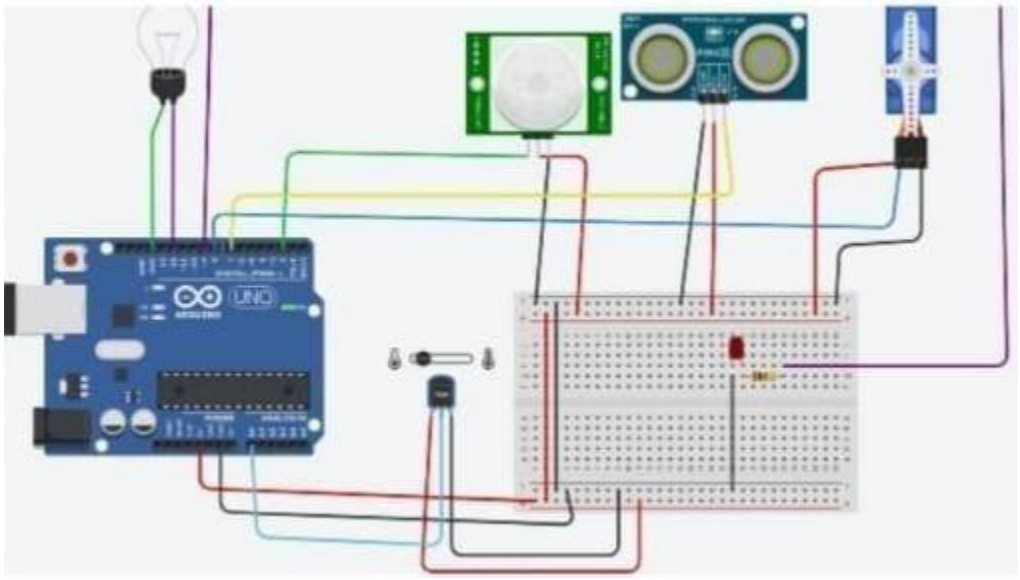

Fig 6.4: Circuit diagram using Temperature sensor before stimulation

6. 3.PIR SENSOR:

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.

- PIR sensor is used to detect the movement of objects we use this sensor for home security.
- Suppose any person movement is detected the bulb will glow for sometime

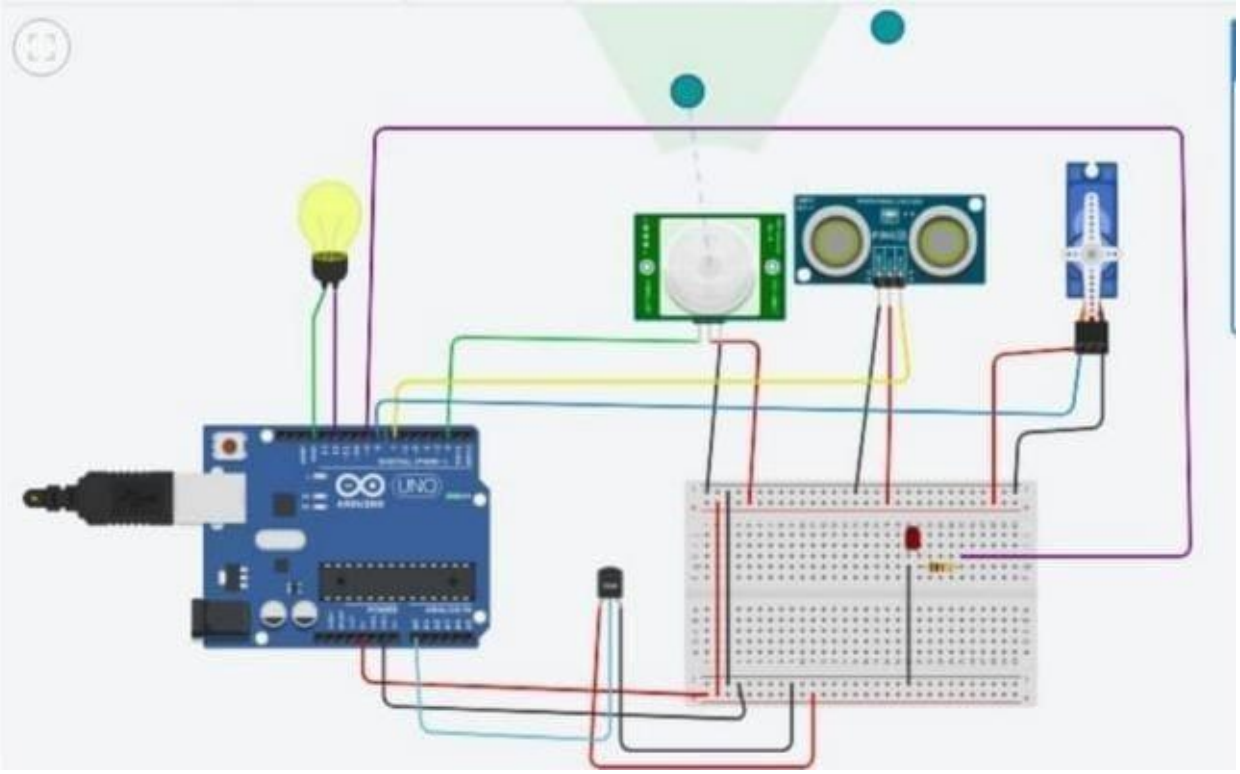

Fig 6.5:Circuit diagram using PIR sensor to glow Bulb

CHAPTER-7

ADVANTAGES

Chapter-7

ADVANTAGES

ADVATAGES:

1. **Comfort**: Use home automation to make your home a more comfortable, livable space. Preprogram your thermostat with your preferred settings so that your home is always at a comfortable temperature, set up smart speakers to play music when you get home from work, or adjust your lights to soften or brighten based on the time of day.

2. **Convenience**: Program devices to turn on automatically at certain times, or access their settings remotely from anywhere with an Internet connection. When you don't have to remember to lock the door behind you or switch off the lights, you can turn your attention to more important things.

3. **Increased safety**: Smart fire detectors, carbon monoxide monitors, pressure sensors, and other home automation security features can help protect your home from disaster.

4. **Energy efficiency**: Home automation allows you to be more mindful of your power usage. For example, you can save on energy bills by reducing the length of time that lights stay on, or by lowering temperatures when you leave a room.

5. **Managing all of your home devices from one place :** The convenience factor here is enormous. Being able to keep all of the technology in your home connected through one interface is a massive step forward for technology and home management. Theoretically, all you'll have to do is learn how to use one app on your smartphone and tablet, and you'll be able to tap into countless functions and devices throughout your home. This cuts way back on the learning curve for new users, makes it easier to access the functionality you truly want for your home.

2. Flexibility for new devices and appliances: Smart home systems tend to be wonderfully flexible when it comes to the accommodation of new devices and appliances and other technology. No matter how state-of-the-art your appliances seem today, there will be newer, more impressive models developed as time goes on. Beyond that, you'llprobably add to your suite of devices as you replace the older ones or discover new technology to accompany your

indoor and outdoor spaces. Being able to integrate these newcomers seamlessly will make your job as a homeowner much easier, and allow you to keep upgrading to the latest lifestyle technology.

3. Maximizing home security: When you incorporate security and surveillance features in your smart home network, your home security can skyrocket. There are tons of options here -- only a few dozen of which are currently being explored. For example, home automation systems can connect motion detectors, surveillance cameras, automated door locks, and other tangible security measures throughout your home so you can activate them from one mobile device before heading to bed. You can also choose to receive security alerts on your various devices depending on the time of day an alert goes off, and monitor activities in real-time whether you're in the house or halfway around the globe.

4. Remote control of home functions: Don't underestimate the power of being able to control your home's functions from a distance. On an exceptionally hot day, you can order your house to become cooler in just enough time before you get home from work. If you're in a hurry to get dinner started but you're still at the store, you can have your oven start to preheat while you're still on your way home. You can even check to see if you left the lights on, who is at your front door, or make sure you turned off all your media while you're away.

5. Increased energy efficiency: Depending on how you use your smart-home technology, it's possible to make your space more energy-efficient. For example, you can have more precise control over the heating and cooling of your home with a programmable smart thermostat that learns your schedule and temperature preferences, and then suggests the best energy efficient settings throughout the day. Lights and motorized shades can be programed to switch to an evening mode as the sun sets, or lights can turn on and off automatically when you enter or leave the room, so you never have to worry about wasting energy.

6. Improved appliance functionality: Smart homes can also help you run your appliances Dbetter. A smart TV will help you find better apps and channels to locate your favorite programming. A smart oven will assist you with cooking your chicken to perfection -- without ever worrying about overcooking or undercooking it. An intelligently designed home theater and audio system can make managing your movie and music collection effortless when entertaining guests. Ultimately, connecting your appliances and other systems with

automation technology will improve your appliance effectiveness and overall make your home life much more easier and enjoyable.

7. Home management insights. There's also something to be said for your ability to tap into insights on how your home operates. You can monitor how often you watch TV (and what you watch), what kind of meals you cook in your oven, the type of foods you keep in your refrigerator, and your energy consumption habits over time. From these insights, you may be able to analyze your daily habits and behaviors, and make adjustments to live the lifestyle you desire.

CHAPTER-8

APPLICATIONS

Chapter-8

APPLICATIONS

Lighting :

Today, home lighting can automatically adjust to personal needs. For instance, if users start watching a movie, the lights can be programmed to automatically dim not to distract them from the plot. When you enter your home, the lighting can be turned on automatically without the necessity to press a button.

When you leave your home, the system can turn the lights off automatically to save energy, and you don't have to worry about it. All the home lighting can be connected to your smartphone, laptop, and other connected devices. Consequently, you can configure your app so that your light turns on when your alarm rings in the morning.

Safety Sensors :

safety sensors are smart devices that can identify when there is something wrong at your home. They can notify users of potential threats immediately and even take necessary action to prevent them. All they need is a smartphone connected to the Internet and sensors installed at their home.

There are temperature, humidity, and gas controllers that can regularly check the air in your home and send you alerts on the Internet if the indicators are outside the optimum range. Safety sensors help protect your home from natural disasters, fires, water and gas leakages. Proximity and video sensors can identify if a burglar makes an attempt to enter your home, and automatically turn on the alarm and call the police.

Temperature Control :

With temperature control automation, you can adjust the home temperature to the level that suits you best. Smart thermostats control the temperature based on configurations set by users in accordance with their preferences. These controllers can check your current activity and change the temperature accordingly.

Doors :

The doors of our future will not need keys. To unlock your house, the smart door can use facial recognition. Any people that are not recognized as residents at the premises will need to be let in by a resident. The doors can further be programmed to open when you approach your home and close when you leave.

Street light :

LDR sensor is used for detecting the presence of surrounding light so that during the day timewhen sun is bright ,thestreet light is switched automatically.during the night time when there is no light, the LDR sends signal to microcontroller to turn on the street light.

CHAPTER-9

CONCLUSION AND FUTURESCOPE

Chapter-9
CONCLUSION AND FUTURESCOPE

9.1 CONCLUSION

The project has proposed the idea of smart homes that can support a lot of home automation systems. A smart home contains a connection between wireless communication,sensors,monitoring and tracking.Smart homes are a huge system that includes multiple technologies and applications that can be used to provide security and control of the home easily.Also this project showed the idea of making a navigator in the home to measuring the temperature in all rooms and to detect any motion in the home by using ultrasonic sensors.These designs were for access control to the home, temperature validation ,and control board system to connect all the security and control circuits together.Usage of IoT applications to develop smart home systems has been a popular field of research in recent years, and the extent of its application could go on increasing. It is necessary to incorporate as many features as possible to develop a system that can automate and control all the appliances in the house but it is also essential to design efficient systems to reduce usage of electricity, hence adding features such as controlling the intensity of lighting can reduce the amount of power consumption by such appliances. In this project, a prototype to control some of these home appliances was developed, these features were tested and demonstrated successfully.

9.2 FutureScope

Home Automation is creating new automation technologies for houses that will make Them Smart using internet-based technologies. These homes/houses that use home automation technologies are smart Homes. This field of home automation is fastly emerging in technology making homes safer and better places to live. The home automation systems involves making homes even smarter. Homes can be interfaced with sensors including motion sensors, light sensors and temperature sensors and provide automated toggling of devices based on conditions. Home automation technology is constantly evolving, and more features are being added to make homes more efficient, secure, and comfortable. Potential applications include automated security systems, smart lighting, climate control, appliance control, voice assistants, and more. Smart homes will continue to become more connected, making life easier for homeowners.

1.**Increased efficiency, control, and customization**: The devices will work automatically and you don't need to waste your energy it will act upon user's preferences.

2.Integration of Smart home devices: In near future , homes will be equipped with such IoT Devices which will make your daily lives work faster smoother and more accurate.Also, more recently, Google launched two more Google Home speakers, Home Max and Home Mini.

3.**Smart spaces outside homes**: Smart parking through sensors will help to recognize whether the parking is available or not.Camera monitoring can be done and with the help of artificial intelligence and computer vision, both parking facilities and security can beprovided. Streetlights can also be automated through sensors and build for effective use for the people nearby.

CHAPTER-10

REFERENCES

Chapter-10

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