

# Implementation of Cubify (An IoT Based Smart Controller)

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**Abstract**— Cubify is a Home automation controller which is a revolutionary way to control home devices. The innovation of this controller will not only help to control home in a smart way but also in a interactive way. The main objective of this device is the simplicity to control the home devices so that any person interacting with our device to control other multiple devices should not take a long time and can control in a very convenient way. We are Introducing our product in the market to remove the barrier between the smart device and the user interface. Our device can easily be controlled by a old person or a small child by a geek or a simple layman. Cubify can be customized and designed according to the convince of the user since it would be used in different places there would be no restriction over, the design of cubify is fully flexible. The innovation of this remote controller is related with the innovation of Arduino[1] UNO Wemos D1R1 board. It uses WIFI to control lights, temperature and your tv and you can also synchronize it with your smartphone. But the major innovation is the way you interact with CUBIFY with your gesture using the Infrared Sensors. The cube has 6 faces and each one control a particular function. The function you want to use is detected by the Infrared sensors when we move the hand over the face. For example you can open the lights of the room in which you are just by moving the hand over the face of the cube where the picture of light is shown. If you want to switch off the light you just need to move the hand again over the face. This device need a receiver that interpret the data and manage the functions of your smart home. The main output of the cube is an Infrared sensors and Wifi that could be used in many ways: for example you can connect the cube with a smartphone app (or make your own), or we can build a station with another Arduino[1] that collect the WIFI data and directly controls the appliances of your home.

**Key words:** Home Automation, Smart Home, Home Controlling

## I. INTRODUCTION

Cubify is a Home automation controller which is a revolutionary way to control home devices. The innovation of this controller will not only help to control home in a smart way but also in a interactive way. The main objective of this device is the simplicity to control the home devices so that any person interacting with our device to control other multiple devices should not take a long time and can control in a very convenient way. We are Introducing our product in the market to remove the barrier between the smart device and the user interface. Our device can easily be controlled by a old person or a small child by a geek or a simple layman. Cubify can be customized and designed according to the convince of the user since it would be used in different places there would be no restriction over, the design of cubify is fully flexible. The innovation of this remote controller is related with the innovation of Arduino[1] UNO Wemos D1R1 board. It uses WIFI to control lights, temperature and your tv and you can also synchronize it with your smartphone. But the major innovation is the way you interact with CUBIFY with

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## II. TECHNOLOGY USED

### A. Hardware Requirement:

- A 32/64 bit Computer.
- Router or Mobile with Hotspot function

#### 1) List of Electronic Items:

Name	Quantity
Arduino[1] Uno Wemos D1 R1	2
IR Modules	6
LEDs	4
USB Controlled Fan	1
Resistors (330 ohm)	5
Relay Module	1
Jumper Wires	40
Soldering Machine	1
Soldering Wire	10meters
USB Cables	3
Battery	1

### B. Software Requirement:

- Arduino[1] IDE

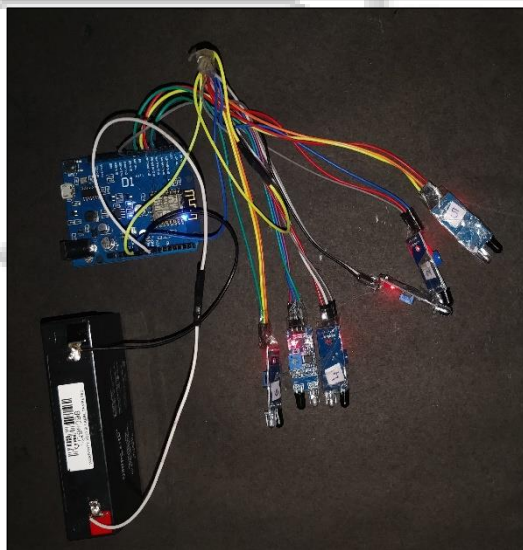
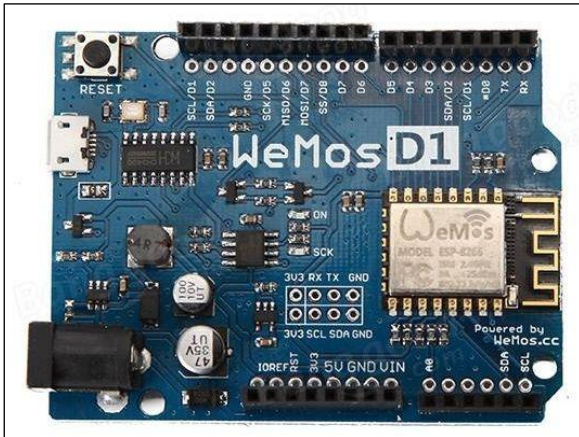
## III. IMPLEMENTATION

### A. Transmitter

The Transmitter part is the Cube which consist of wooden faces from outside. Wood is used because it makes the Cube tough so that the delicate parts which are installed inside the cube doesn't get damaged. Inside the Cube there are electronic devices which are Arduino[1] Board, IR modules, Battery. The IR module is a sensor that detects gesture and sends the signal to the Arduino[1] board, Arduino[1] board after reading the signal from IR module send the data to receiver which in turn makes the appliance Turn ON/OFF which was connected to that IR module. The six IR modules are installed inside the cube in such a way that each module is facing each face of the cube. There is a small hole on each face of the cube from which the LED portion of the IR module can come outside so that it can read user gesture. Each face of the cube has an image on it that shows which face controls which electronic appliance. The battery and Arduino[1] are

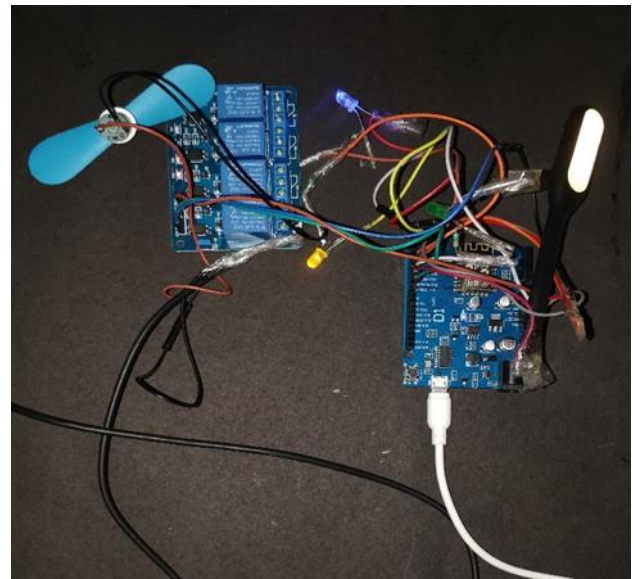
fitted inside the cube on a wooden slab so that they can't move when the cube is moved in order to switch ON/OFF the appliances. The IR modules can be programmed to increase their sensitivity range. The IR module has 3 pins 1st is VCC, 2nd is ground and 3rd is for sending and receiving data. The 6 VCC pins of 6 IR modules are connected together and are connected to the Arduino[1]'s VCC pin, in the same manner the ground pin is also connected. The data pin of 6 modules are connected to 6 different pins of the Arduino[1] so that Arduino[1] can understand which IR module is activated. The Arduino[1]'s VCC and ground pins are connected to the battery for power supply.

Arduino[1] Wemos d1 r1



### B. Receiver

The Receiver is the part to which all the electronic appliances (loads) are connected. The Receiver part is connected to the main supply board of the house. So the receiver part does not require any battery. The VCC and ground of the loads are connected to the Arduino[1] Board in the same way as the IR modules are connected to the Arduino[1] of transmitter part. The receiver is not much complicated as compared to transmitter part. Here the Arduino[1] Board gets the signal from transmitter and then based on the code it Turns ON/OFF the load.



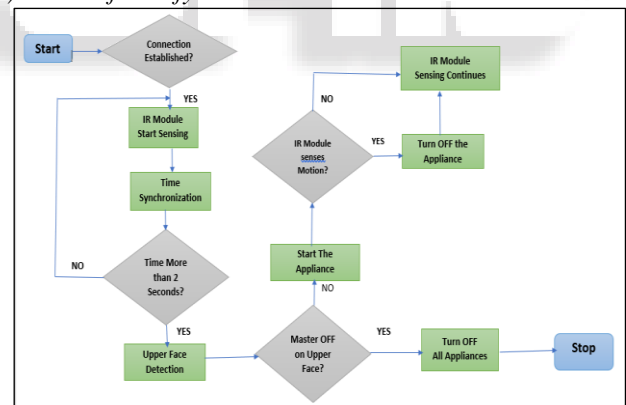
### C. Connection

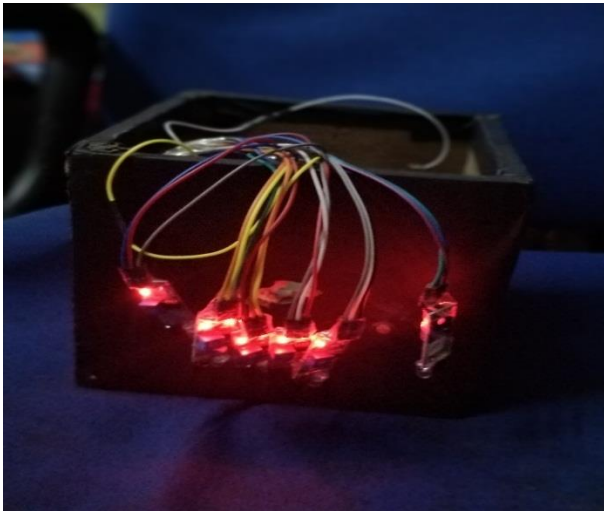
The Arduino[1] Board in transmitter and receiver are Arduino[1] Wemos d1 r1, which has inbuilt wifi function.

Both the Arduino[1] require a constant hotspot for the proper working of the Cube. Both the Arduino[1] are programmed to connect directly to the wifi hotspot, whose ssid and password are written inside the code.

So if the password of the home wifi is changed than the same password should also be burned again on both the Arduino[1]. If both the Arduino[1] are connected then only the cube can work. The Battery in the transmitter gets discharged in a month so it must be charged again.

#### 1) Flow of Cubify:





#### 2) Testing:

- 1) Installation of IDE: This test case involves the testing of proper installation of the software.
- 2) Running Basic Codes: The basic Programs present on the IDE were executed to check working of it.
- 3) Individual Inspection of Hardware Components: All the hardware components are checked individually before designing the circuit.
- 4) Initializing Arduino[1] Wemos: Check if Arduino[1] is being detected by IDE.
- 5) Signals being sent: check if the connection being made by the transmitter Arduino[1] and receiver Arduino[1] with router.
- 6) Measuring IR Sensor Connection: The IR sensor are checked and the value of each sensor and LED resistance value is noted.
- 7) Working of Loads: The working of Fan, LED are checked for proper tilt reading.
- 8) Proper Execution of IF ELSE loop: The value generated by IR sensors are matched with the values of if else loop.
- 9) Total Integration: The integration of various component is checked.

#### IV. CONCLUSION

Cubify is a new and an innovative way of Home Automation based on IOT. It can be easily operated by elder people and young children as well. The Cube is connected wirelessly to the electronic appliance using wifi so the range of Cubify is totally dependent on wifi strength of your mobile/router. It does not require smart appliances to connect to the Cube. The old appliances which do not have Bluetooth or wifi can also be connected to Cubify by just installing the receiver module of the Cubify to the main board of the house. This provides Cubify an Upper edge as compared to other home automation devices developed by google, amazon, etc. Connection the appliances like lights in series, the Cubify can also be used in Offices and Colleges also.

#### V. FUTURE SCOPE

- Providing buttons on the Cube so that TV, AC, Speaker, etc. can be connected
- Providing Notification by a Beep Sound
- Can be Operated with Internet

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