

Efficient Model for Automated Home Management System Using Internet Of Things

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Abstract: We introduce a home automation system (HAS) that uses wireless communication to allow the user to remotely control various lights, fans and devices in their home and to save the data in the cloud. This system is inexpensive and expandable, and allows a wide variety of devices to be controlled.

Keywords: IoT, NodeMCU, Relay, IFTTT, Blynk , Google Assistant

I.INTRODUCTION

Home is the place where you want or want to be after a busy day. People come home exhausted after a long day at work. Some are too tired to find it difficult to move when they land on their sofa, couch, or bed. So every little device / technology that helps you turn the lights on or off or play your favourite music etc. With the help of their smartphones, they would make your home more comfortable. It would also be better if everything like heating the bath water and setting the room temperature were already done before they get to your home by simply giving a command of the voice. When they got home, they found the room temperature, the bath water set to their right preferences, and they could instantly relax and feel more comfortable and more homely. Human assistants, like housekeepers, have been a way for millionaires to keep their homes in the past. Even now, if technology is useful enough, only the people in society are blessed with these new smart home devices as the cost of these devices is somewhat high. Home Kit. So the need to find a smart and inexpensive assistant for ordinary families grows. Our project proposes such a cost-effective system. Use Google Assistant, IFTTT App, The Blynk app and the NodeMCU microcontroller as main components as well as a relay board that consists of 2 relays together with the ULN 2803 IC. Natural language speech is used to send commands to the Google Assistant. All components are connected to the Internet via Wi-Fi system under the IoT.

II.TECHNOLOGY USED

INTERNET OF THINGS [IoT] IoT refers to an Internet of Things. As shown in Figure 1, IoT is the network of intelligent objects connected to the Internet. Each of the objects is uniquely addressable, accessible and programmable. (including everything from cell phones, vehicles, household appliances, and other wearables built into sensors and actuators) to the Internet so that these objects can exchange data with each other on a network.



III.PROPOSED SYSTEM

To solve the above functionality and flexibility problems, we have developed and implemented a new, flexible, cost-effective, self-contained monitoring and control system for private households that incorporates Google's mobile application and support as an interoperable application layer used. Hardware interface modules. The architecture



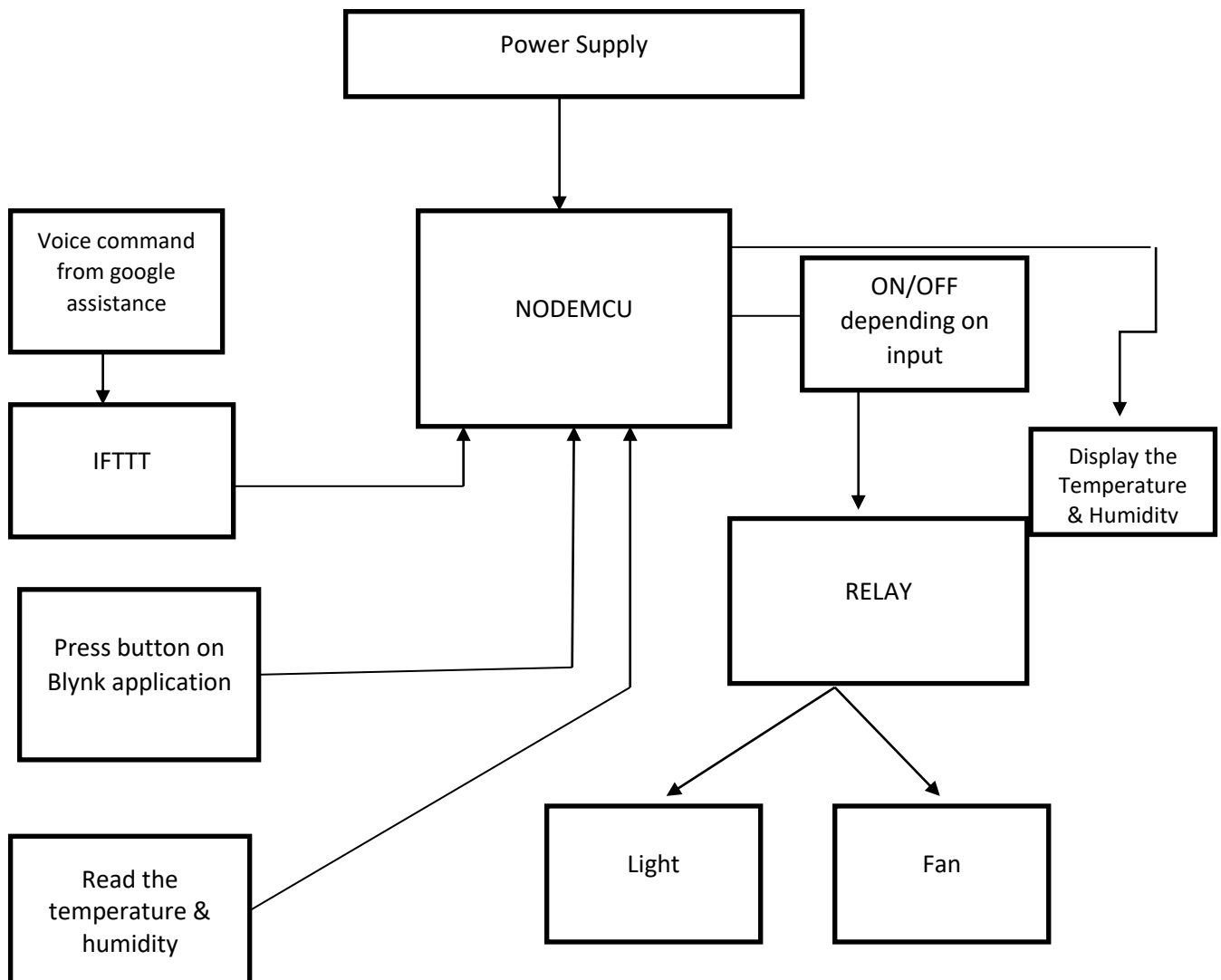
presented in this thesis can be adapted in various ways to different application scenarios with minimal design and recoding. Every time a new device is added to the microcontroller, code and interfaces can be used. The aim of the proposed work is therefore not to integrate expensive components such as high-end PCs. With this system, authorized owners can control and monitor connected devices at home. The mobile application provides a graphical user interface (GUI) for accessing and controlling the devices. With the help of Google, our system is more reliable for the controller. The proposed home automation system is a more advanced home automation system that uses servers, cloud, and sensors. The server is used to provide the details of the environment and the application is used to control various devices and store the values in the cloud. In this system, Blynk is used as a cloud to store various sensor values. The Google Assistant is used to provide information for IFTTT. IFTTT acts as an intermediary between them.

IV.OBJECTIVE

Improvement of the standard of living .This enables the end user to seamlessly interact with household appliances. Various applications for home automation make the lifestyle more comfortable and easier, e.g. .

- Reduction of energy consumption.
- Do your work efficiently and promptly.
- It is useful for security reasons.

V.SYSTEM ARCHITECTURE



**VI.SYSTEM REQUIREMENT****Hardware Requirement**

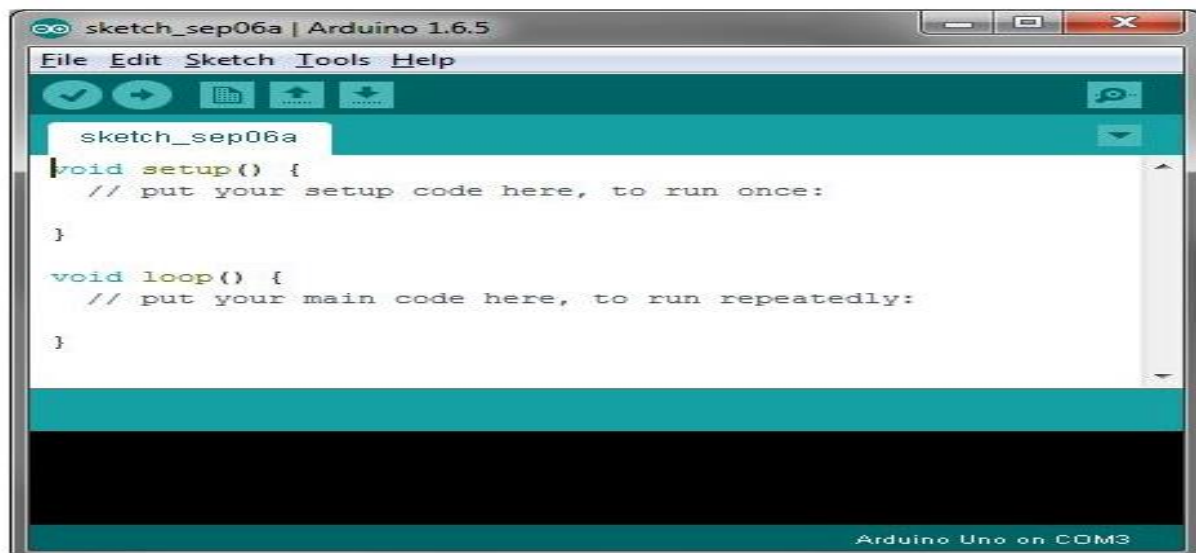
- NodeMCU
- DHT11
- 2 Relay
- Bulb holder with Bulb
- Fan
- Adaptor Cable
- Power Supply

Software Requirement

- Arduino IDE
- C++
- Blynk
- Google Assistance
- IFTTT

VII.SOFTWARE SPECIFICATION

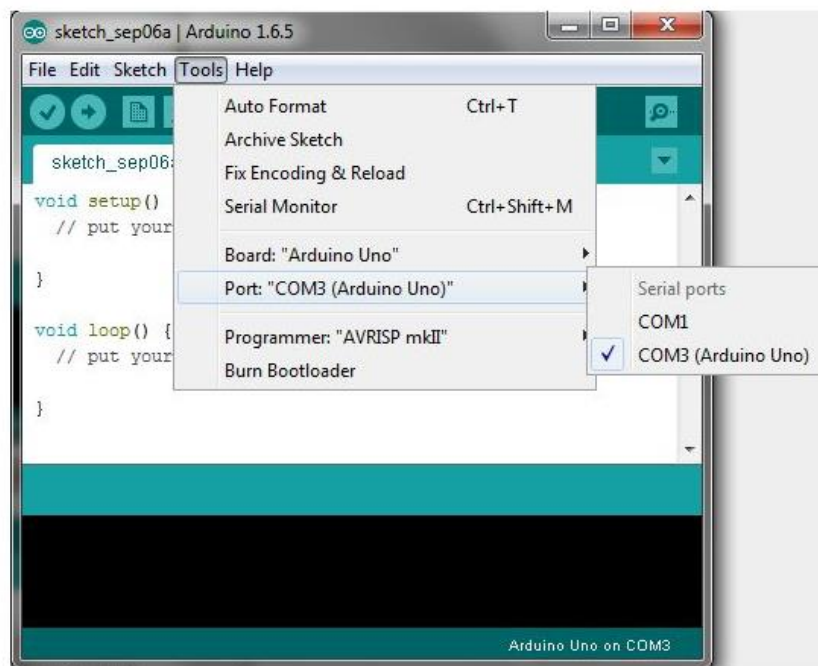
ARDUINO IDE is primarily an open source computer hardware and software company. The Arduino community refers to the project and user community that designs and uses microcontroller-based development boards. These development boards are known as Arduino modules, which are open source prototyping platforms. The simplified microcontroller card is available in various development card packages. The most common approach to programming is to use the Arduino IDE which uses the C programming language. This gives you access to a huge Arduino library that is constantly growing thanks to the open source community. The Arduino IDE is not: AVRStudio (Yes, we know. I loved EE 346 but unfortunately no assembly language is used.) Download the Arduino Integrated Design Environment (IDE) here (latest version: 1.5): <https://www.arduino.cc/en/Main/Software> This is the Arduino IDE once opened. An empty sketch opens in which you can start programming immediately. First we need to configure the card and port settings so that we can load the code. Connect your Arduino card to the PC using a USB cable.

**Arduino IDE Default Window**



Board Setup You need to tell the Arduino IDE which card you are loading onto. Select the Tools drop-down menu and go to Plate. By default, this list includes currently available Arduino boards developed by Arduino. Uno compatible clone (e.g. Funduino, SainSmart, IEIK etc), choose Arduino Uno. If you are using a different card / clone, select that card.

IDE: COM Port Settings If you downloaded the Arduino IDE before connecting your Arduino card, the USB drivers should have been installed automatically when you connected the card. Connected cards and label them with the COM port they are using. Select the Tools drop-down menu, then select Port. All open COM ports should be listed here. When an Arduino card is recognized, you will also get its name. Select the Arduino card that you connected to the PC. If the setup was successful you should see the card type and COM number of the card you want to program in the lower right corner of the Arduino IDE. Note: The Arduino Uno occupies the next available COM port. It won't always be COM3.



Arduino IDE: COM Port Setup

At this point, our board should be set up for programming, and you can begin writing and uploading code.

BLYNK was developed for the Internet of Things. It can remotely control hardware, display sensor data, store data, visualize and do many other cool things. The platform consists of three main components: Blynk App - allows you to create amazing interfaces for your projects using various widgets provided by us. Blynk Server - Responsible for all communication between the smartphone and the hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open source, can easily handle thousands of devices, and can even start on a Raspberry Pi. The Blynk libraries enable communication with the server for all common hardware platforms and process all incoming and outgoing commands.

IFTTT If This Then That, also known as IFTTT, is a free web-based service for creating strings of simple conditional statements called applets. An applet is triggered by changes that occur in other web services such as Gmail, Facebook, Telegram, Instagram or Pinterest. For example, an applet can send an email message when the user tweets with a hashtag, or copy a photo on Facebook to a user archive when someone tags a user on a photo. In addition to the web-based application, the service runs on iOS and Android. In February 2015, IFTTT changed the name of its original application to IF and released a new suite of applications called Do, which allows users to create shortcut applications and actions. Users created around 20 million recipes every day. Since then, the entire functionality of the Do-Suite has been integrated into a newly designed IFTTT application.

GOOGLE ASSISTANT The Google Assistant is a virtual assistant with artificial intelligence developed by Google, which is mainly available on mobile and smart home devices. Unlike the company's previous virtual assistant, Google Now, the Google Assistant is capable of two-way conversations. The assistant was first introduced in May 2016 as part of Google's Allo-Messaging app and its voice-activated speaker, Google Home. After a period of exclusivity on the Pixel and Pixel XL smartphones, the introduction was carried over to other Android devices in February 2017.



including third party smartphones and Android Wear (now Wear OS), and was Released as a standalone application on the iOS operating system in May 2017. Along with the announcement of a software development kit in April 2017, the assistant has been and will be expanded to support a wide variety of devices, including third-party smart cars and devices. External developers can also improve the functionality of the wizard. Users primarily interact with the Google Assistant using natural language, although keyboard input is also supported. Like Google Now, the wizard can search the Internet, schedule events and alarms, customize hardware settings on the user's device, and view information from the user's Google account. Google also announced that the assistant can identify objects and collect visual information about the device's camera, as well as assist in purchasing products and sending money, and identifying songs.

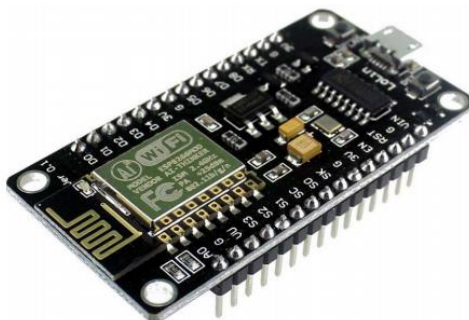
VIII.HARDWARE SPECIFICATION

NodeMCU

The ESP8266 is the name of a microcontroller developed by EspressifSystems. The ESP8266 itself is an independent Wi-Fi network solution that is offered as a bridge between the existing microcontroller and Wi-Fi and can also run independent applications. USB connector and a variety of pin outs. With a micro USB cable you can easily connect the NodeMCU Dev kit like Arduino to your laptop and flash it .It is also instantly compatible with the breadboard.

Specification:

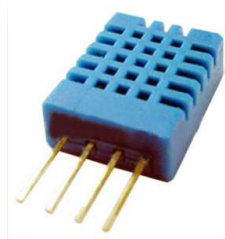
- Voltage: 3.3V.
- Wi-Fi Direct (P2P), soft AP.
- Current consumption: 10uA ~ 170mA.
- Attachable flash memory: max 16 MB. (512 K normal).
- Integrated TCP / IP protocol stack.
- Processor: Tensilica L106 32-bit
- Processor speed: 80 ~ 160 MHz.
- RAM: 32 KB + 80 KB.
- GPIOs: 17 (multiplexed with other functions).
- Analog to digital: 1 input with a resolution of 1024 steps.
- + 19.5 dBm output power in 802.11b mode 802.11 support: b / g / n
- .Maximum number of simultaneous TCP connections: 5.



TWO CHANNEL RELAY The relay module is an electrically operated switch that allows you to turn a circuit on or off with a much higher voltage and / or current than would be possible with a microcontroller. There is no connection between the low-voltage circuit operated by the microcontroller and the high-performance circuit. The relay protects each circuit from one another. Each channel of the module has three connections labelled NC, COM and NO. Depending on the trigger mode of the input signal, the bypass cap can be switched to the high-level effective mode, which "closes" the normally open switch (NO) at the high-level input and in the low-level effective mode. It works the same way but with a low input level. Built-in photoelectric EL817 coupler with strong photoelectric isolation suppression capability Built-in 5V, 10A / 250VAC, 10A / 30VDC relays The long life of the relay can absorb 100000 times in a row. The module can be direct and I / O interconnect MCU with the exit shield Indicator.



DHT 11 SENSOR The temperature and humidity sensor has a complex of temperature and humidity sensors with a calibrated digital signal output. The use of the unique digital signal acquisition technology as well as the temperature and humidity sensor technology ensures high reliability and excellent long-term stability. This sensor contains a resistive sensor humidity measuring component and an NTC temperature measuring component and is connected to an 8-bit high-performance microcontroller, which offers excellent quality and quick response. Interference suppression capability and cost efficiency Each DHT11 element is rigorously calibrated in the laboratory, which is extremely accurate when calibrating humidity. The calibration coefficients are stored in OTP memory as programs that are used by the sensor's internal signal detection process. makes system integration quick and easy. Its small size, low power consumption and signal transmission up to 20 meters make it the best choice for various Applications, including the most demanding. The component is a single row 4-pin housing. It is convenient to connect, and special packages can be provided at the request of users.



LEB BULB with Holder



TABLE FAN





IX.CODING DONE FOR IMPLEMENTATION

```

#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include "DHT.h"
#define DHTPIN 0
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "Mtb3-0pxSDxyRQwrYtz56F9OldoXYNSJ";
// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "SmartHome";
char pass[] = "123456789";
BlynkTimer timer;
int light = 5;
int fan = 4;
void setup()
{
  // Debug console
  Serial.begin(9600);
  dht.begin();
  Blynk.begin(auth, ssid, pass);
  timer.setInterval(3000,temp);
  pinMode(light,OUTPUT);
  pinMode(fan,OUTPUT);
  digitalWrite(light,HIGH);
  digitalWrite(fan,HIGH);}
void loop()
{
  Blynk.run();
  timer.run();
}
void temp()
{
  float h = dht.readHumidity();
  // Read temperature as Celsius (the default)
  float t = dht.readTemperature();
  if (isnan(h) || isnan(t))
  {
    Serial.println(F("Failed to read from DHT sensor!"));
    return;
  }
  Blynk.virtualWrite(V0,t);
  Blynk.virtualWrite(V1,h);
}
BLYNK_WRITE(V2)
{
  int li = param.asInt();
  if(li==1)
  {
    digitalWrite(light,LOW);
  }
  else
  {
    digitalWrite(light,HIGH);
  }
}

```



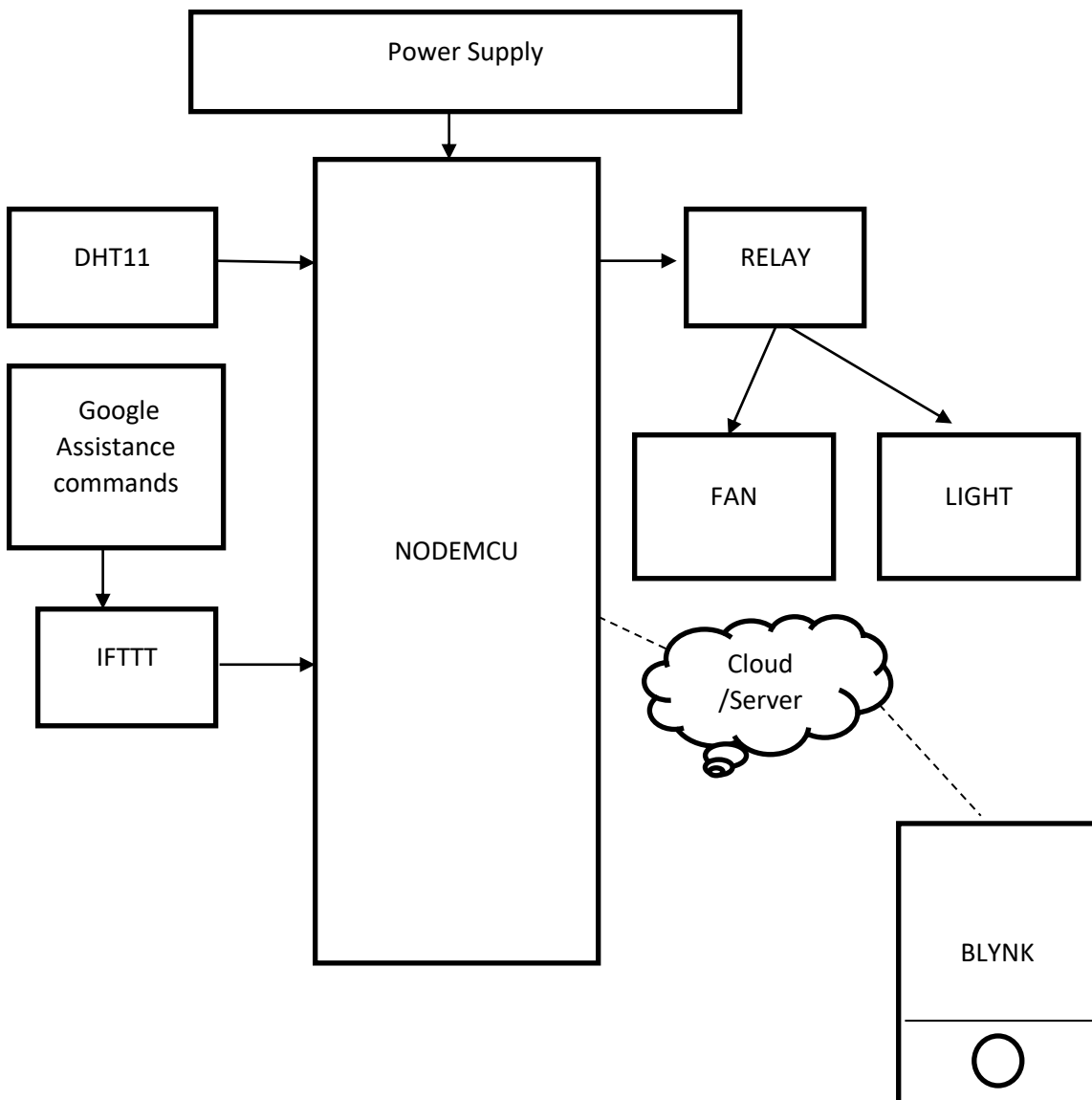
```

}
}
BLYNK_WRITE(V3)
{
  int fan1 = param.asInt();
  if (fan1==1)
  {
    digitalWrite(fan,LOW);
  }
  else
  {
    digitalWrite(fan,HIGH);
  }
}
}

```

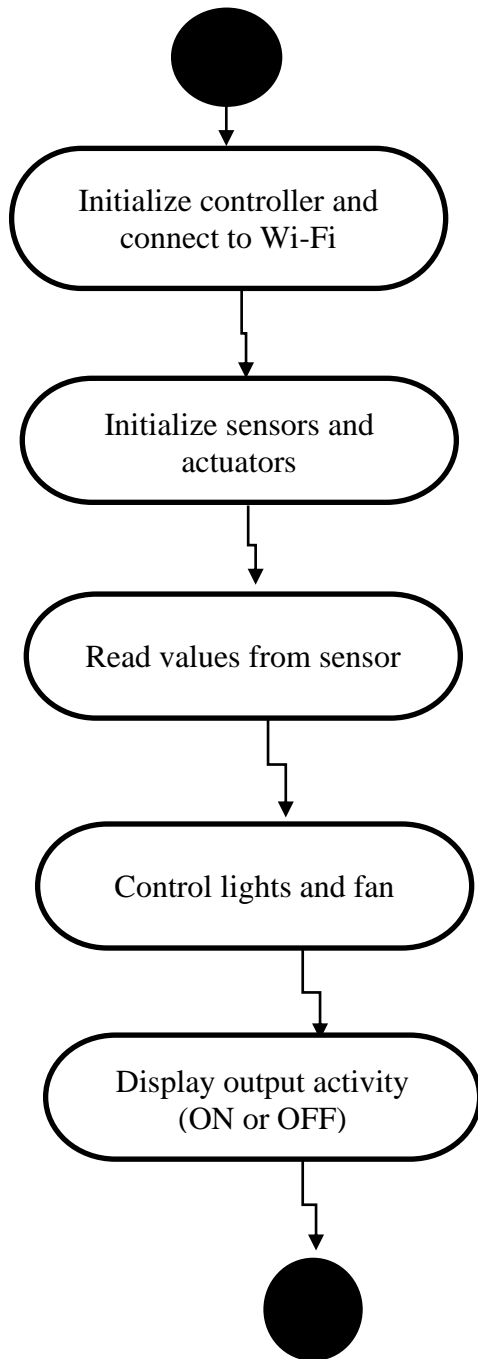
X.METHODOLOGY

BLOCK DIAGRAM



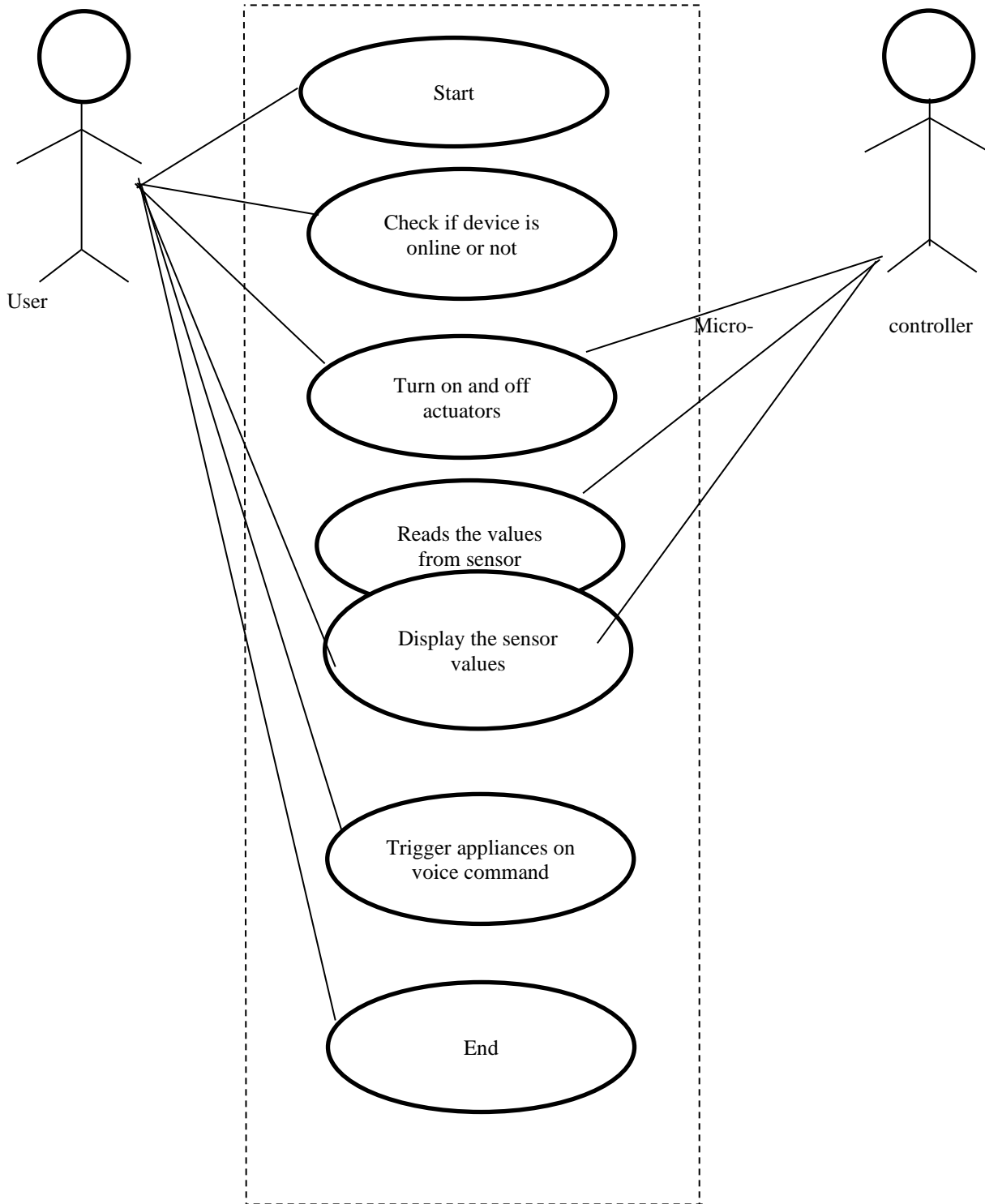


DESIGN





ACTIVITY DIAGRAM





XI.CONCLUSION

It has been proven in practice that automated devices using the Internet of Things work by managing simple devices, and devices have been successfully controlled by voice commands. This system monitors sensor data such as temperature and humidity, but also switches the lights on or off if the user so wishes. Save sensor data in the cloud. It helps the user to analyse and control the conditions of various parameters at home anytime and anywhere.

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