```
   for (pos = 02; pos <= 95; pos += 1) {
   s1.write(pos);
   delay(20);
   }
   for (pos =95; pos >= 02; pos -= 1) {
   s2.write(pos);
   delay(20);
   }
   delay(10000);
   for (pos = 95; pos >= 02; pos -= 1) {
     s1.write(pos);
     delay(20);
     }
     for (pos = 02; pos <= 95; pos += 1) {
     s2.write(pos);
     delay(20);
     }
     statuss = 1;
     //digitalWrite(Relay_Motor,HIGH);
  }

  else
{
   Serial.println(" Access Denied ");
   Serial.println(" TRY AGAIN!!! ");
    delay(3000);
  }
```

7.2 Water level Control

Figure 7.2: Water-level Control

The following snippet code implies the automation of the water tank using water level depth detection sensor. When the water level reaches a minimum level of forty percent, the motor gets switched on. When the water level reaches sixty percent, the motor is turned off. CAYENNE_OUT() function enables the user to view the water level of the sump through the widget in the dashboard.

```
void loop()
{
  liquid_level = analogRead(tank);
  liquid_percentage = ((liquid_level-bottom_level)/top_level)*100;
  Serial.println(liquid_level);
  Serial.println(liquid_percentage);
  delay(1000);
  Cayenne.loop();
  Motor();
}

void Motor(){
```

```
  delay(1000);
  if (liquid_percentage < 40.00){
    digitalWrite(WaterMotor, HIGH);
  }
  if(liquid_percentage >= 60.00){
    digitalWrite(WaterMotor, LOW);
  }
}

CAYENNE_OUT(V10)
{
   Cayenne.virtualWrite(V10, liquid_percentage);
}
```

7.3 Indoor Control

Figure 7.3: Indoor Control

The following snippet code is for the indoor appliances such as lights, fan and geyser. Here, DHT11 sensor is used to measure the temperature and humidity. The working of these appliances is controlled by smart sensing as well as Web API via dashboard.

```
void loop() {
  Cayenne.loop();

  delay(2000);
  float t = dht.readTemperature();

  if( t < minTemp1) {
     digitalWrite(geyser, HIGH);
  }
  if( t >= minTemp2){
    digitalWrite(geyser, LOW);
  }

  Serial.print("Temperature: ");
  Serial.print(t);
  Serial.println(" *C ");

  Cayenne.virtualWrite(VTemp, t);
}

CAYENNE_OUT_DEFAULT()
{
  Cayenne.virtualWrite(0, millis());
}

CAYENNE_IN(5)
{
  int currentValue1 = getValue.asInt();
  if (currentValue1 == 1)
  {
    digitalWrite(Kitchen, HIGH);
    Serial.print("Kitchen On");
   }
   else if(currentValue1 == 0)
```

```
  {
   digitalWrite(Kitchen, LOW);
   Serial.print("Kitchen Off");
  }
}

CAYENNE_IN(6)
{
 int currentValue3 = getValue.asInt();
 if (currentValue3 == 1)
 {
  digitalWrite(HallLight, HIGH);
  Serial.print("HallLight Off");
 }
 else if(currentValue3 == 0)
 {
  digitalWrite(HallLight, LOW);
  Serial.print("HallLight On");
 }
}
CAYENNE_IN(7)
{
 int currentValue2 = getValue.asInt();
 if (currentValue2 == 1)
 {
  digitalWrite(HallFan, HIGH);
  Serial.print("HallFan On");
 }
 else if(currentValue2 == 0)
 {
  digitalWrite(HallFan, LOW);
  Serial.print("HallFan Off");
 }
```

CHAPTER 8

APPLICATIONS

The smart home revolution is likely to be more of an evolution, with the incorporation of one or two home systems at a time, gradually automating our households through smart mobile devices. The following are some of the applications of the proposed system.

Security System

While efficiency and conservation are certainly IoT benefits, its potential to have improved control over home security is a primary focus. Various connected home security systems, such as iSmartAlarm, offer a variety of features including door and window sensors, motion detectors. All of which are connected to a mobile device and accessible via the cloud, thus enabling to access real-time information on the security status of your home. Naturally, there is a great deal of scrutiny regarding the level of trust in controlling your home's security system via a mobile device.

Smart Irrigation or Gardening

A lush and healthy lawn is a source of pride for most homeowners, but the weather doesn't always cooperate and provide the adequate elements for a flourishing landscape. The average home spends approximately 30% of their daily water usage on lawn and garden maintenance. Nearly half of that amount is wasted due to inefficiency. To overcome this problem, moisture sensor can be used to check for appropriate soil conditions and temperature sensor can be used to checkout for the temperature and then supply water.

Other Applications

Due to scalability and expandable features, the implementation of the proposed system can also be applied to various other places like offices and schools and make them smart. Moreover, an automation system also proves to be a boon to the people who are handicapped or old aged. So, apart from manually operating the area, they have an option to control the appliances with much ease.

CHAPTER 9

HIGHLIGHTS

Home automation can offer benefits on many fields that a home requires. It can offer security, energy efficiency, automation, remote control, remote access to information of home, is environmental friendly and generally anything that can be achieved by the current technology. This is because the garden will get automatically watered, the geyser will always have hot water from the solar energy, and the lights will be opened only when someone is in the room and so on. This means the owner will have to take less actions which equals to more free time. Furthermore, the home has fewer bills, the owners of the home are more relaxed and become less tired by trivial actions and finally, all this can mean in the end fewer bills. As a result, the home automation is needed to make our lives easier, better, healthier, relaxed and finally, happier. The proposed system has the following properties:

- Adapted to New Technologies: Using Wireless communications instead of wired ones.
- Reliability: A trustable system due to security features provided by the web.
- Expandable: You can add and remove modules if it has to adapt to your needs.
- Low Cost: Chosen Wireless Devices are cheap and for the main system we only need an old computer.
- Security features provided by the web.
- When a sensor fails, it doesn't affect other components because of the individual connection with relays.
- Easy to install and maintain.
- Faults can be easily identified.
- Information is backed up in the cloud via log files.
- Many houses can be controlled using different client ids in the Web API.
- Since the domain is on Internet of Things, when there is no internet, the proposed system becomes a demerit.

CHAPTER 10

CONCLUSION

"Home Automation" industry is growing rapidly. Home Automation is a way to have things around your home happen automatically. The automated system has many features to provide a good environment in terms of cost, control, convenience, security and scalability features. The proposed system ensures other features such as activity history backup, remote and easy troubleshooting, robustness, easy installation and maintenance and easy detection of faults in components. WiFi and Bluetooth modules are implemented to share internet and connect devices. Since the system is entirely dependent on internet, so a good network is required for functioning smoothly. The modules used here can be applicable in various platforms such as offices and halls, to create an inviting environment. The water level and garden irrigation module can also be applicable in the field of agriculture.

Stepping into the twenty first century, we have seen how traditional houses are being developed gradually with the use of technologies. This idea is the contribution to the modernizing of houses. Due to the development of technology, our houses tend to become smarter and this is the main objective of our project by using the concept of Internet of Things. This system will also be handy for the elderly or the handicapped people and make their life easy and comforting.

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