3.1 CLOUD COMPUTING

Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software.

Rather than keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database. As long as an electronic device has access to the web, it has access to the data and the software programs to run it.

Cloud computing is a popular option for people and businesses for several reasons including cost savings, increased productivity, speed and efficiency, performance, and security.

3.2 KEY TAKE AWAYS OF CLOUD COMPUTING

- Cloud computing is the delivery of different services through the Internet, including data storage, servers, databases, networking, and software.
- Cloud-based storage makes it possible to save files to a remote database and retrieve them on demand.

- Services can be both public and private—public services are provided online for a fee while private services are hosted on a network to specific clients.

3.3 Types of Cloud Services

Regardless of the kind of service, cloud computing services provide users with a series of functions including:

- Email
- Storage, backup, and data retrieval
- Creating and testing apps
- Analysation of data
- Audio and video streaming
- Delivering software on demand

Cloud computing is still a new service but is being used by a number of different organizations from big corporations to small businesses, non-profits to government agencies, and even individual consumers.

3.4 TYPES OF CLOUD COMPUTING

1. **Software-as-a-service (SAAS)** involves the licensure of a software application to customers. Licenses are typically provided through a pay-as-you-go model or on-demand. This type of system can be found in Microsoft Office's 365.
2. **Infrastructure-as-a-service (IAAS)** involves a method for delivering everything from operating systems to servers and storage through IP-based connectivity as part of an on-**demand service. Clients can avoid the need to purchase software or servers, and instead** procure these resources in an outsourced on-demand service. Popular examples of the IAAS system include IBM Cloud and Microsoft Azure.
3. **Platform-as-a-service (PAAS)** is considered the most complex of the three layers of cloud-based computing. PAAS shares some similarities with SAAS, the primary difference being that instead of delivering software

online, it is a platform for creating software that is delivered via the Internet. This model includes platforms like Salesforce.com

3.5 THINGSPEAK IOT CLOUD

Thing Speak is an IOT analytics platform service that allows you to aggregate, visualize, and analyse live data streams in the cloud. You can send data to Thing Speak from your devices, create instant visualization of live data, and send alerts.

- Collect
- Send sensor data privately to the cloud.

- Analyse
- Analyse and visualize your data with MATLAB
- Act
- Trigger a reaction.

3.6 THINGSPEAK FEATURES

Collect data in private channels.

- **Share data with public channels.**
- **REST ful and MQTT APIs.**
- **MATLAB® analytics and visualizations.**
- **Event scheduling.**
- **Alerts**
- **App integrations.**

WORKS WITH

- **MATLAB® & Simulink®.**
- **Arduino®.**
- **Particle devices.**
- **ESP8266 and ESP32 Modules.**
- **Raspberry Pi™.**
- **LoRaWAN®.**
- **Things Network.**
- **Senet.**
- **Libelium.**
- **Beckhoff.**

THINGSPEAK CLOUD

Thing Speak is **an IOT analytics platform service that allows you to aggregate, visualize, and analyse live data streams in the cloud**. You can send data to Thing Speak from your devices, create instant visualization of live data, and send alerts.

3.7 THINGSPEAK USED FOR

Fig 3.9 Thing speak Used For

ThingSpeak provides instant visualizations of data posted by your devices to Thing Speak. With the ability to execute MATLAB® code in Thing Speak you can perform online analysis and processing of the data as it comes in. Thing Speak is often used for proto typing and proof of concept IOT systems that require analytics.

3.8 THINGSPEAK IS A DATABASE

At the heart of Thing Speak is a time-series database. Thing Speak providesusers with free time-series data storage in channels. Each channel can include up to eight data field

CIRCUIT DIAGRAM AND CONNECTIONS

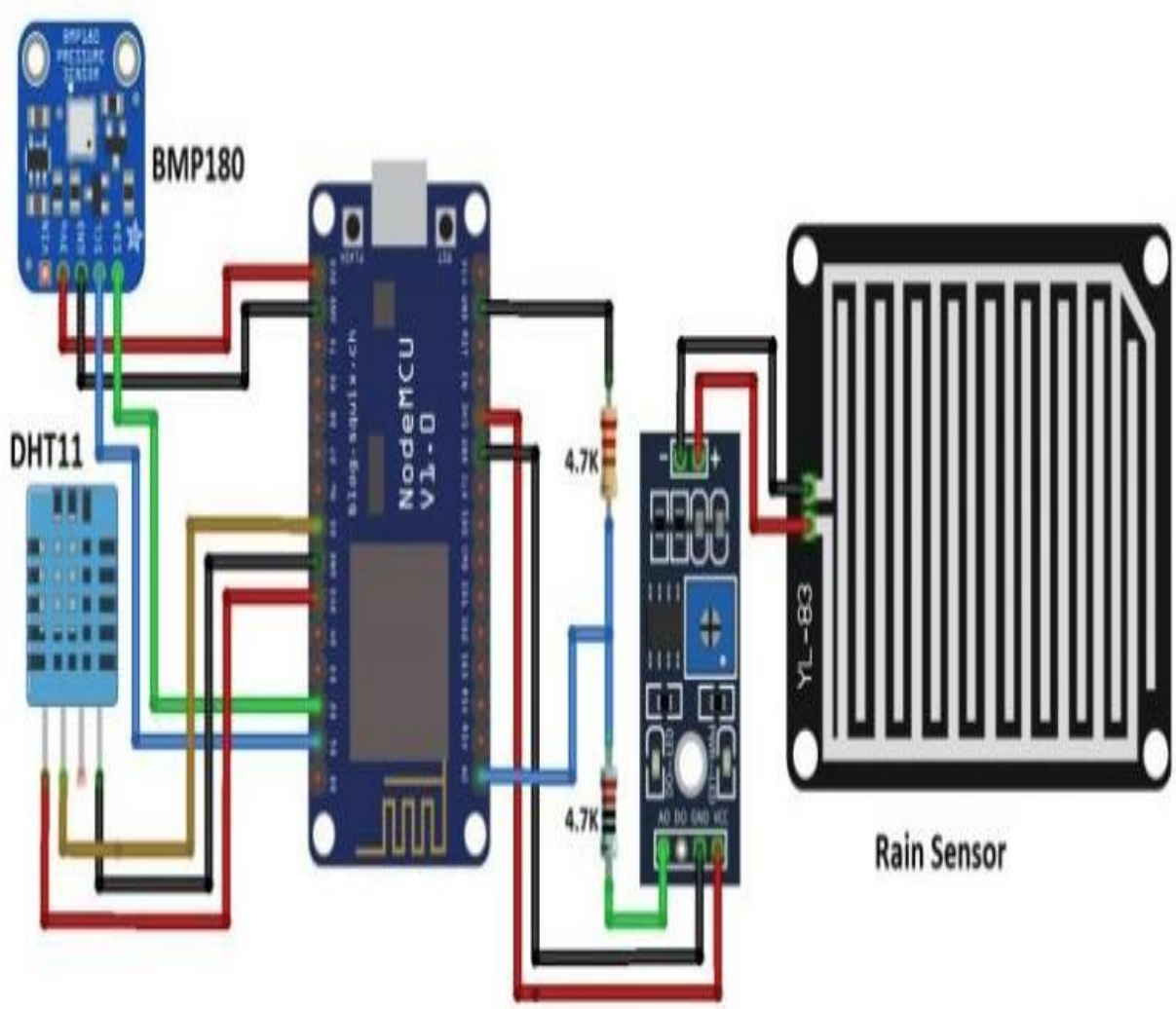

Fig 3.10 Circuit Diagram