SYNOPSIS

ON

"SMART Agriculture System"

Submitted in

Partial Fulfillment of requirements for the Award of Degree

of

Bachelor of Technology

In

Computer Science and Engineering

By

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1. Introduction

The agriculture sector plays a crucial role in ensuring food security and sustaining global economies. However, traditional farming methods often face challenges related to inefficiency, resource wastage, and inadequate monitoring, leading to reduced yields and economic losses. To address these issues, there is a need for advanced technological solutions that enable precision farming and real-time monitoring of agricultural parameters.

The existing agricultural monitoring systems lack the capability to provide comprehensive, real-time data on crucial factors such as soil moisture levels, temperature, humidity, crop health, and environmental conditions. To contribute to the advancement of precision agriculture practices, this project presents a reliable IoT based SMART Agriculture Monitoring System. This will not only enable farmers and agriculture industries to optimize resource usage but also enhance crop productivity, and promote sustainable farming practices in an increasingly challenging agricultural landscape.

2. Project Objective

- This project aims at developing a Real-Time IoT based SMART Agriculture System that would cater the needs of agriculture industries, farmers, and food processing and distribution companies.
- The system prototype can measure various parameters such as temperature, humidity, soil moisture, atmospheric pressure, sunlight intensity, and precipitation levels. The system can be modified as per the customer requirements to incorporate many more features and sensors.
- The proposed system is fully automated and reliable. It does not require any manual labor or attention and is easy to install. This device is highly economical and can easily be afforded by the customers. All the electronic components and sensors to be used in this project are easily available on various e-commerce websites and local electronic stores.
- The estimated time duration for the completion of this project is expected to be about 12 months including all the four phases i.e. Planning, Design, Development and Launch.

3. Feasibility Study:

Feasibility study is a preliminary exploration of a proposed project to determine its merits and viability. A feasibility study aims to provide an independent assessment that examines all aspects of a proposed project, including technical, operational, economic, legal, and schedule considerations.

A. Technical Feasibility

With the advent of High Speed Internet, more and more humans around the globe are interconnected. Internet of Things (IoT) takes this a step further, and connects not only humans but electronic devices which can speak amongst themselves. IoT has a wide-ranging impact on human life and work. It allows machines to take over tedious tasks and make life more productive and comfortable. This project presents a reliable IoT based SMART Agriculture Monitoring System equipped with environmental sensors that measure various parameters at any particular place and report them in real time on IoT Cloud.

B. Operational Feasibility

The existing agricultural monitoring systems lack the capability to provide comprehensive, real-time data on crucial factors such as soil moisture levels, temperature, humidity, crop health, and environmental conditions. This system will integrate various sensors and devices to collect data from agricultural fields and transmit it wirelessly via the IoT Cloud.

The SMART Agriculture System has an application for agriculture industries and farmers where they can ensure higher productivity of crops and lower the risk of weather hazards. This project seeks to contribute to the advancement of precision agriculture practices, enabling farmers to optimize resource usage, enhance crop productivity, and promote sustainable farming practices in an increasingly challenging agricultural landscape.

The system proves helpful for remote areas like rain forest or places where drastic changes in the weather conditions are observed. The SMART Agriculture System is fully automated and reliable. It does not require any manual labor or attention and is easy to install.

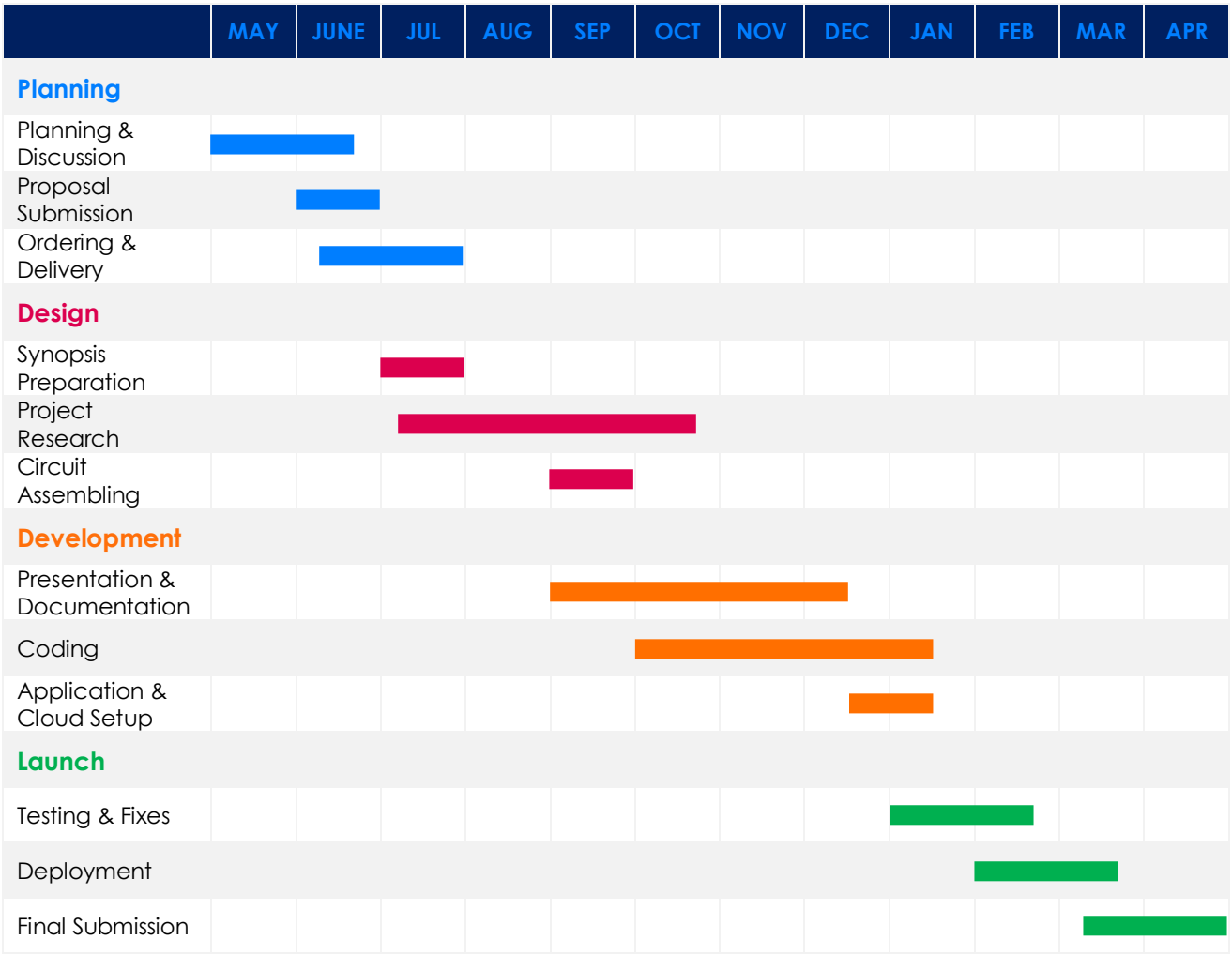
C. Economical Feasibility

The system is highly economical as compared to the other competitors and can easily be afforded by our customers and clients. All the electronic components and sensors to be used in this project are easily available on various e-commerce websites and local electronic stores at a fair price.

D. Legal Feasibility

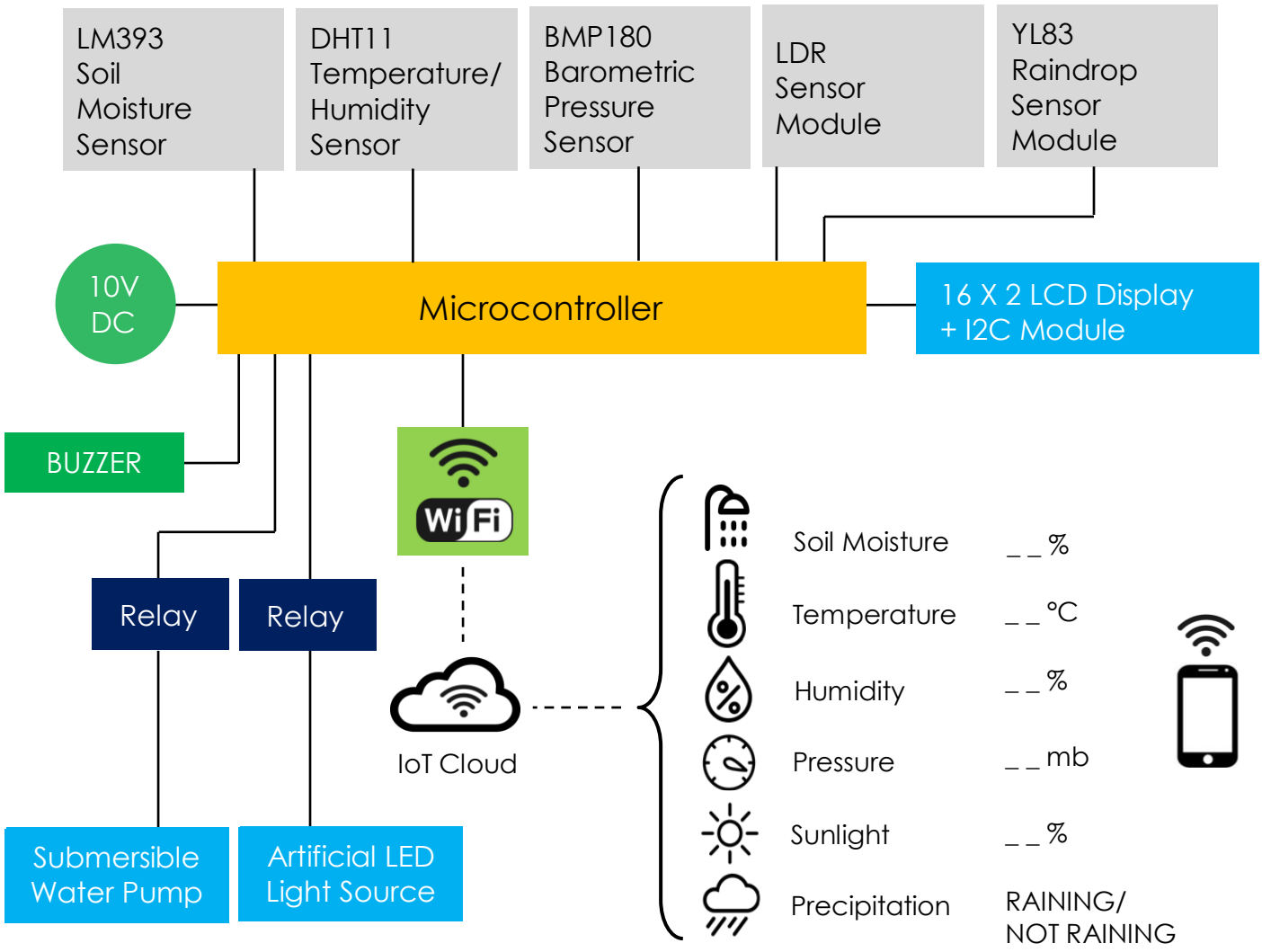
All the hardware and software used during the development of this project are certified and legal to use under the national and international standards. All the sensors, electronics, Wi-Fi Module, and the microcontroller are under compliance with the government rules and regulations and are legal to operate as per the national and international standards.

E. Schedule Feasibility



4. Methodology/ Planning of work

The implemented system consists of a Microcontroller Board (ArduinoUNO + ESP8266WiFi Module / NodeMCU ESP8266), a low-cost open source IoT platform, equipped with ESP8266 Wi-Fi Module, a self contained SOC with integrated TCP/IP protocol. The Microcotroller acts as the heart of this device. All the other sensors and electronic equipments are connected to it via jumper wires. The circuitry is arranged over 830 point breadboard. The system uses sensors to monitor various environmental parameters such as temperature, humidity, soil moisture, atmospheric pressure, sunlight intensity, and precipitation levels. The values read by the sensors are processed by the microcontroller and then sent to the Blynk IoT Cloud Platform. The Cloud can be easily accessed with the help of a Smartphone / Laptop via Blynk IoT Mobile App or Blynk's Website respectively. The readings are also displayed on an onboard 16 x 2 LCD Display which is interfaced with the Microcontroller for quick viewing.



Architecture Diagram

5. Tools/Technology Used:

5.1 Hardware Requirements

- ArduiniUNO + ESP8266 WiFi Module / NodeMCU ESP8266
- 830 Point Breadboard
- LDR Sensor Module
- BMP180 Pressure Sensor
- YL-83 Raindrop Sensor Module
- LM393 Soil Moisture Sensor Module
- Active Buzzer Module
- 3-6V DC Mini Submersible Water Pump
- DHT11 Temperature / Humidity Sensor
- 16 x 2 LCD Display
- I2C Module
- Jumper Wires
- 12V DC Battery
- 12V Mini LED Strip
- 5V 1-Channel Relay
- Flexible PVC Tubing

5.2 Software Requirements

- Arduino IDE
- Blynk IoT Mobile App
- Web Browser (Chrome / Edge / Firefox / Safari)

6. References:

1. https://www.airtel.in/blog/business/iot-use-cases-in-real-time-weather-monitoring-system/
2. https://knepublishing.com/index.php/Kne-Social/article/view/4128/8495
3. https://www.javatpoint.com/iot-in-agriculture
4. https://ijarsct.co.in/Paper3892.pdf
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