SMART GARDENING USING BLYNK

A MINI-PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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LIST OF ABBREVIATION

ABBREVIATION	ACCRONYM
SRS	Software Requirement Specification
CLIENT/SERVER	The entity who will be using the interview feedback system.
SERVER	A system that runs in Linux

ABSTRACT

The plant monitoring system described in this project can be controlled remotely via the Blynk app. The main features include a PIR sensor for movement detection, an optional soil moisture sensor for possible irrigation control, and a DHT11 temperature sensor for monitoring the plant's surroundings. The LCD shield displays the sensor data locally, and they are wirelessly relayed to the Blynk app so that temperature, soil moisture, and movement detection events may be monitored remotely. Users may access real-time data and gain insights into their plant's environment with the Blynk app, and the PIR sensor can provide useful information about potential disturbances close to the plant. Plant enthusiasts now have a handy way to remotely check on the health of their plants and make educated decisions thanks to this portable gadget. Regarding possible treatments based on movement sensing, irrigation, and maintenance. Subsequent versions can include a light sensor for more thorough environmental monitoring or investigate other sensors for particular plant requirements.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The project “SMART GARDEN USING BLYNK” is used to automate all processes and monitoring of plant growth and irrigation, Monitoring the health of your plants means paying close attention to a variety of environmental elements. It can be challenging to keep an eye on these things, particularly from a distance. In order to give you immediate information into your plant's environment and enable you to make educated decisions regarding its maintenance, this project introduces a comprehensive plant monitoring system that makes use of the Blynk IoT platform.

Plant lovers of all skill levels will enjoy the system's easily accessible sensors and user-friendly UI, which can be accessed via the Blynk smartphone. This portable system is designed to monitor important environmental elements that have a direct impact on the health of plants. It tracks ambient temperature using a DHT11 temperature sensor, which is essential for plant growth and development.

Furthermore, data on the amount of moisture can be obtained by integrating an optional soil moisture sensor, which could eventually be used to automate irrigation systems and help with well-informed irrigation decisions. Lastly, a PIR sensor picks up movement close to the plant, which is useful for spotting possible dangers or environmental disruptions.

Through a smooth integration with the Blynk platform, this project enables remote viewing of sensor data from your tablet or smartphone. For the purpose of displaying sensor readings, analyzing historical data trends, and possibly even taking control of some system functions (such as setting off alarms depending on sensor values), the Blynk app offers an intuitive user interface. With the ability to monitor your plants' health remotely, you can make sure they get the attention they require to thrive from any location.

1.2 SCOPE OF THE WORK

The purpose of this project is to create a portable plant monitoring system that will enable customers to utilize the Blynk app to wirelessly tend their garden plants. For the purpose of making educated watering decisions, the system will make use of an Arduino Uno to gather data from sensors such as a DHT11 temperature sensor and an optional soil moisture sensor. Furthermore, a PIR sensor will identify any movement close to the plant, possibly warning users of impending problems. Sensor readings will be wirelessly transferred to the Blynk smartphone application and shown locally on an LCD shield, if one is provided. With features like the ability to trigger alerts based on sensor readings, the intuitive Blynk app will provide a platform for examining both historical and real-time sensor data.

With the potential for further research into recording data, sophisticated functions, and potentially machine learning integration for even more in-depth plant health examination, this project establishes the groundwork for an extensive plant monitoring system. Deliverables will include user manuals, a configured Blynk app, and an Arduino coded working system. The system's capacity to gather and present sensor data both locally and remotely using the Blynk app will be used to determine its success, with the possibility of adding more features and functionalities in the future.

1.3 PROBLEM STATEMENT

It's common to need to continuously check on environmental variables like temperature and moisture in order to maintain healthy plants. But using traditional approaches can be cumbersome. Frequent manual checks of these elements take time, and without the right tools, remote monitoring from a distance might be challenging. Plus, a visual check by itself may not reveal underlying problems that compromise the health of the plant. These restrictions may result in improper plant care, overwatering, underwatering, and undetected environmental hazards. In order to address these issues, our project is creating a portable plant monitoring system. Sensors will be used by this system to continuously collect temperature and moisture level data in real time. This data will be wirelessly transmitted to an intuitive mobile app, allowing effortless remote monitoring from any location. The technology gives consumers the ability to make knowledgeable judgments regarding their plants' care, fostering a more efficient and effective approach to keeping them healthy.

1.4 AIM AND OBJECTIVES OF THE PROJECT

The aim of this project is to create a handy, user-friendly plant monitoring system that will enable users to efficiently take care of their plants from a distance. In order to do this, the project's main objective is to collect temperature and moisture level data from the plant's surroundings in real-time utilizing sensors. This sensor data will then be transmitted wirelessly between the Arduino Uno and the Blynk app by the system, enabling customers to remotely monitor the health of their plants via an easy-to-use mobile interface on the Blynk app. Furthermore, for easy access, the system will locally show sensor readings on an LCD shield. By achieving these goals, this project hopes to provide an all-encompassing plant monitoring system that goes above and beyond conventional techniques and enables users to make knowledgeable decisions on their plants'

CHAPTER 2

LITERATURE SURVEY

In [1] paper explains about the difficulty in Expanding crops. The need for more food as a result of growing populations has increased demand for this work. For it to grow their crops properly, farmers in traditional farming must visit the agricultural area on a regular basis to assess the many environmental characteristics, such as temperature, humidity, light intensity, and soil moisture. As a result, an automated system that can track and manage the plant's aspects is required for effective growth.

[2 This paper works for agricultural expansion at minimal use of water by providing a self-watering system to the consumer. An effective water management system should be created as people frequently squander a lot of time watering their plants. The suggested system works by estimating the plant's proper growth utilizing the information that the sensors transmit. This system's main benefits are that it uses less water and creates an atmosphere that is ideal for plant development.

[3] The development of the Internet of Things marked one of the revolutions in the field of technological innovation throughout the 21st century. The Internet of Things, or IoT for short, is an infrastructure that handles data and applications by fusing sensors, electrical devices, and the internet. IoT development in greenhouse takes advantage of a Raspberry Pi microcomputer or an Arduino microcontroller. These gadgets are in use because they are cheap and easy to find on the market.

[4] Intelligent sensors have drawn a lot of attention in agriculture recently. It is used in agriculture to effectively set up different tasks and missions while maximizing the best use of limited assets and avoiding human intervention. Currently, makers are highly interested in growing plants with modern methods of agriculture. By substituting the dirt in the development chamber with a tiny spray of a solution of nutrients, the method allows the plant to develop under total control.

[5] We are now capable of doing things that we were never able to achieve before due to the rapid advancement of technology, but first we must develop the necessary platforms. The home automation method for an intelligent plant watering system is presented by the suggested system. Using IoT, a smartphone allows the user to access their present gardening status from anywhere in the globe. Node ESP8266 is used by the system as the microcontroller interface component.

[6] Greenhouses are included climate-controlled buildings with walls and a roof that have been designed for plant growth during the off-season. Since most greenhouse systems rely on human techniques to monitor and adjust humidity and temperature, workers that must visit a greenhouse daily may find it uncomfortable. Therefore, the convergence of embedded technology and IoT has been helpful with offering answers to several real-world issues all through

CHAPTER 3

SYSTEM SPECIFICATIONS

3.1 HARDWARE SPECIFICATIONS

Processor	:	12th Generation Intel® Core™ i7 processor
Memory Size	:	256 GB (Minimum)
HDD	:	40 GB (Minimum)
BOARD	:	Arduino Uno
SENSOR	:	DHT11 Temperature Soil Moisture PIR Sensor
Bread Board	:	1
Jumper Wire	:	Required amount
LCD	:	16*2 Board

3.2 SOFTWARE SPECIFICATIONS

Operating System	:	WINDOWS 10 AND PLUS
Open-source Platform	:	Arduino IDE
Library	:	DHT library sensor Soil moisture sensor PIR library WiFi library
Blynk App	:	User -friendly mobile application

CHAPTER 4

MODULES DESCRIPTION

Arduino Uno

This is microcontroller setup for the car parking system which acts as the CPU of the whole system. This takes inputs from the Sensors and triggers the actuators.

LCD Module

This module is used to notify about the availability of slots in the parking.

I2C Module

This is used as a communication medium between the LCD module and Controller just utilizing 4 pins from the controller whereas to connect LCD directly it needs more pins

CHAPTER 5

SYSTEM DESIGN

5.1 FLOW CHAT

A flowchart is a type of diagram that represents an algorithm, workflow or process. The plant monitoring system starts by initializing and connecting to WiFi and Blynk. It then enters a continuous loop where it acquires sensor data (temperature, soil moisture, optional movement detection). If enabled, the LCD displays readings for local reference. Simultaneously, the system transmits data to the Blynk app for remote monitoring. Future enhancements could include Blynk app-based alerts, data logging for analysis, machine learning integration, and even control features based on sensor readings.

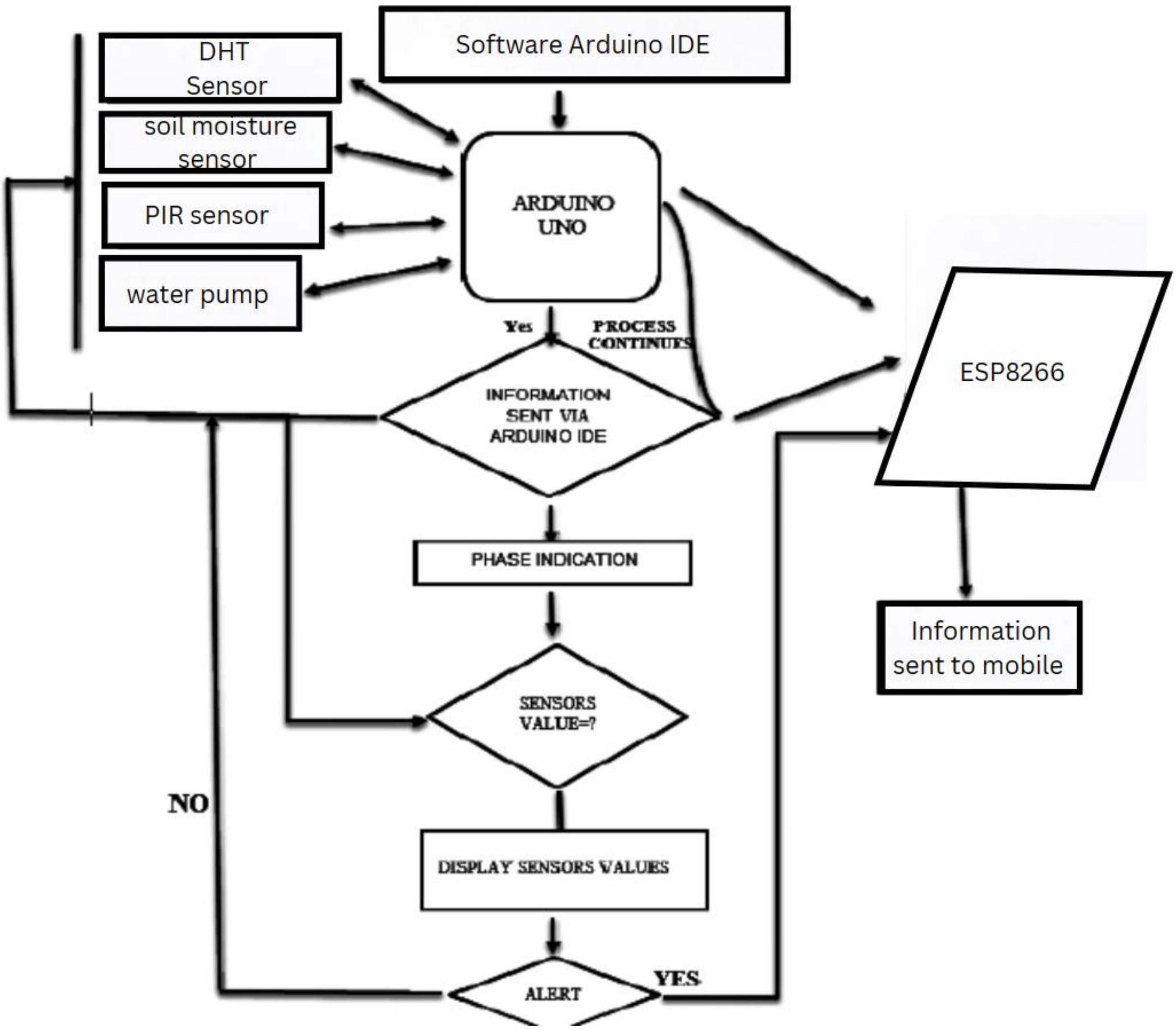

Figure 4.1 Architecture diagram

5.2 ARCHITECTURE DIAGRAM

An activity in Unified Modelling Language (UML) is a major task that must take place in order to fulfil an operation contract. Activities can be represented inactivity diagrams. An activity can represent: The invocation of an operation. A step in a business process.

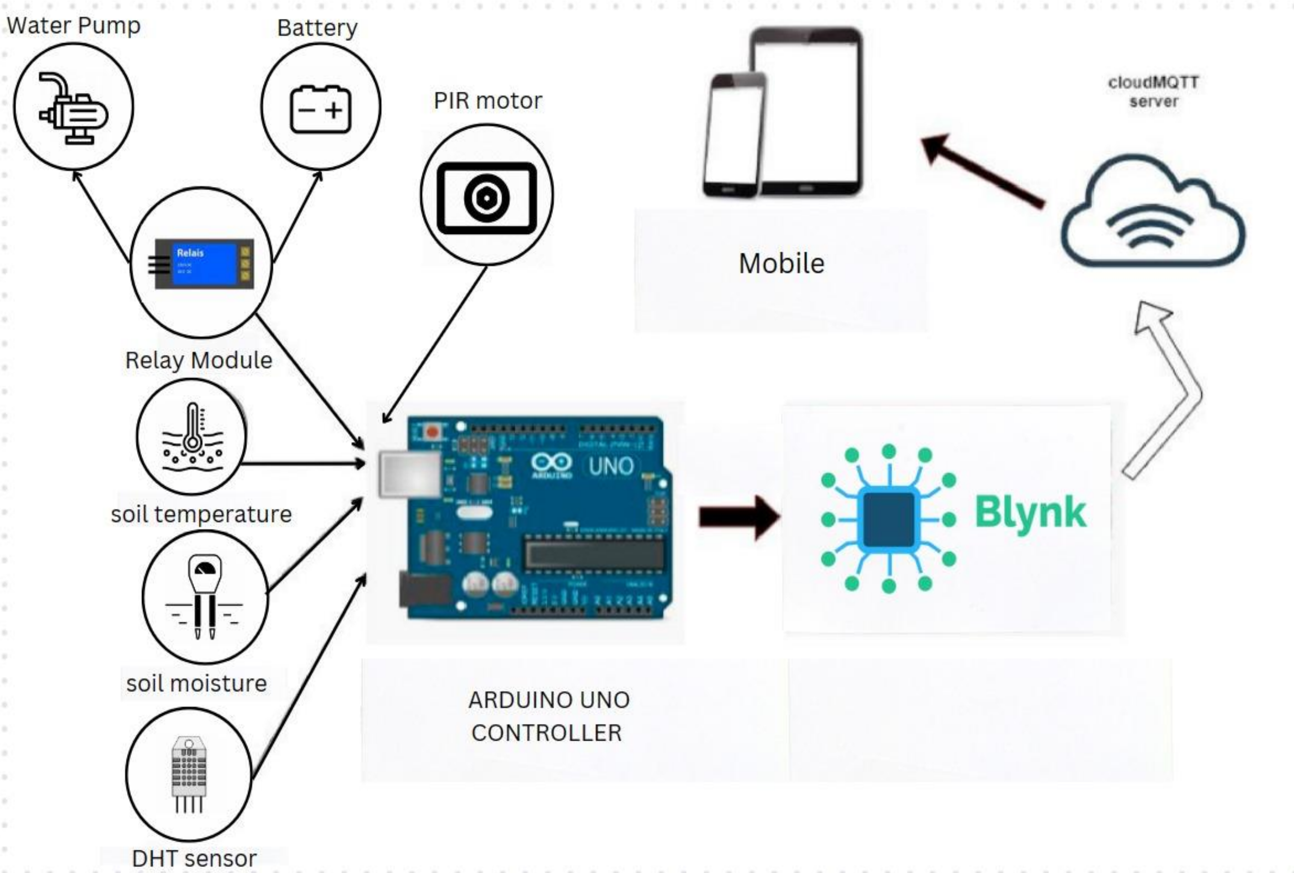

Figure 4.2 Block diagram

CHAPTER 6

CODING

1. ARDUINO IDE- C++

```
#include <LiquidCrystal_I2C.h>
#include <ESP8266WiFi.h>
#include <BlynkSimpleLib.h
#include <DHT.h>
#include <SoilMoistureSensor.h>
#include <PIRsensor.h>
#define LCD_I2C_ADDRESS 0x27
#define LCD_COLUMNS 16
#define LCD_ROWS 2
LiquidCrystal_I2C lcd(LCD_I2C_ADDRESS, LCD_COLUMNS, LCD_ROWS);
const char* ssid = "your_wifi_ssid";
const char* password = "your_wifi_password";
const char* authToken = "your_blynk_auth_token";
const int temperatureVirtualPin = V0;
const int soilMoistureVirtualPin = V1;
const int movementVirtualPin = V2;
const int wateringVirtualPin = V3;
const int dhtPin = D4;
const int soilMoisturePin = A0;
const int pirPin = D2;
DHT dht(dhtPin, DHT11);
SoilMoistureSensor soilMoistureSensor(soilMoisturePin);

PIRsensor pirSensor(pirPin);

WiFiClient espClient; // Create a WiFi client object

void setup() {
  Serial.begin(115200);
  lcd.init();
  lcd.backlight();
  Serial.print("Connecting to WiFi: ");
  Serial.println(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
```

```
  Serial.println("Connected!");

  // Blynk setup
  Blynk.begin(authToken, espClient);
}
```

2. LOOP

```
void loop() {
  // Read sensor data
  float temperature = dht.readTemperature();
  int soilMoisture = soilMoistureSensor.readValue(); // Replace with appropriate read method
    for your sensor
  bool movementDetected = pirSensor.isMotionDetected(); // Replace with appropriate
    method for your sensor (optional)


  if (isnan(temperature)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Temp: ");
  lcd.print(temperature);


  lcd.print("°C");
  lcd.setCursor(0, 1);
  lcd.print("Soil: ");
  lcd.print(soilMoisture);
  lcd.print("%");


  Blynk.virtualWrite(temperatureVirtualPin, temperature);
  Blynk.virtualWrite(soilMoistureVirtualPin, soilMoisture);
  if (movementDetected) {
    Blynk.virtualWrite(movementVirtualPin, 1);
  } else {
        Blynk.virtualWrite(movementVirtualPin, 0);
```

CHAPTER 7

SCREEN SHOTS

CONNECTION

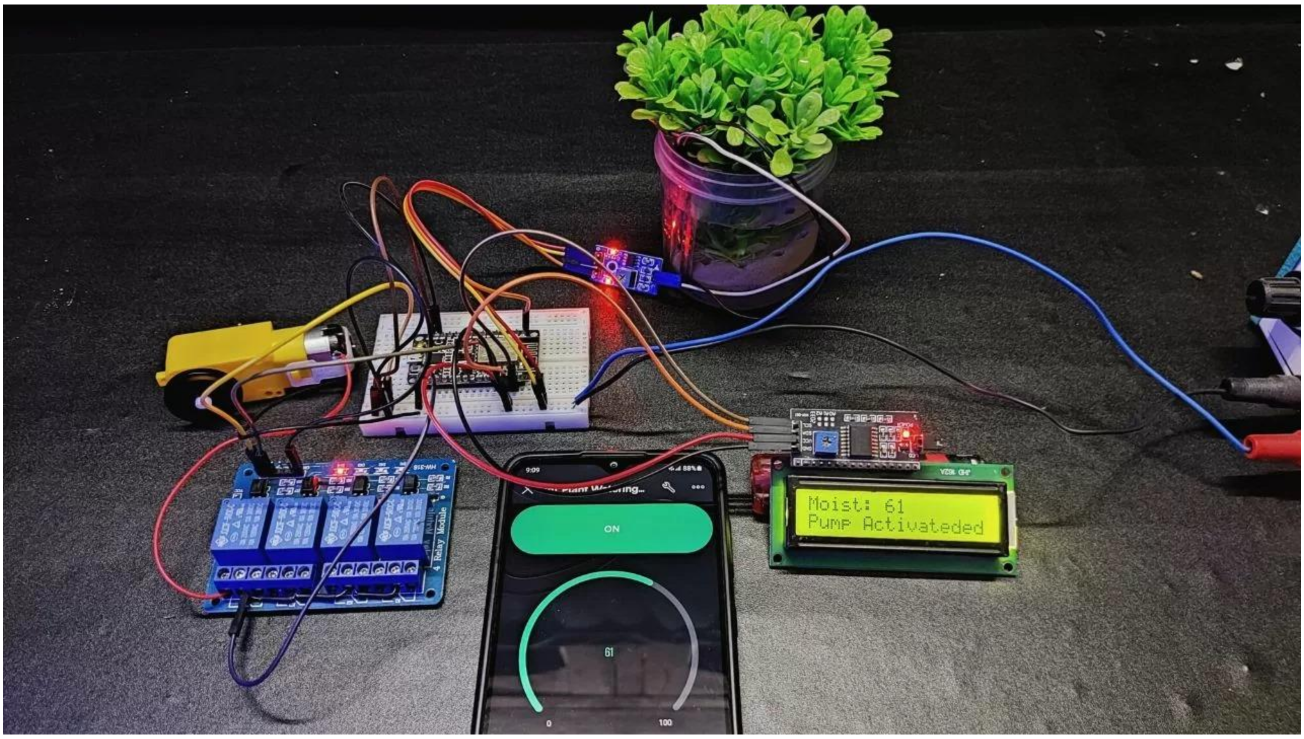

Figure 7.1 Connection Setup

This plant monitoring system brings the world of your plants to your fingertips. Upon startup, it connects to your WiFi network and the Blynk app, allowing remote monitoring. The core functionality revolves around a continuous loop. The system tirelessly gathers data on temperature using a DHT sensor, and soil moisture levels with a dedicated sensor. Optionally, it can even detect movement near the plant with a PIR sensor. This valuable information is then displayed locally on an LCD screen (if included) for quick reference. Simultaneously, the system transmits this data to the Blynk app, giving you a real-time view of your plant's environment from anywhere. This opens doors for future possibilities, like setting alerts for watering based on soil moisture readings, or even leveraging machine learning for deeper insights into your plant's health.

CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

This project successfully outlined the development of a user-friendly and portable plant monitoring system. The system leverages an Arduino Uno, various sensors, and the Blynk app to empower users with remote plant monitoring through real-time data acquisition and visualization. This core functionality includes monitoring temperature with a DHT11 sensor, optional soil moisture monitoring for informed watering, optional PIR sensor for movement detection, local data display on an LCD shield (if included), and remote data monitoring via the Blynk app. This system offers a significant improvement over traditional methods by providing convenient and valuable insights into the plant's environment.

However, the possibilities for advancement are vast. Future iterations could explore data logging for trend analysis and refined plant care strategies, incorporate alerts based on sensor readings, integrate machine learning for in-depth plant health insights, and even introduce automation features like controlled irrigation. The Blynk app interface could also be expanded with historical data graphs, plant care guides based on sensor readings, or the ability to control external devices. By exploring these future enhancements, this plant monitoring system has the potential to evolve into a comprehensive and intelligent tool, empowering users to become even more effective plant stewards.

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