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Smart Irrigation System Using Moisture Level Sensor

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Abstract: ***Farming is the cultivation of plants and livestock. Plant monitoring is one of the most important tasks in farming. The goal of this paper is to use IoT in the NodeMCU system platform for plant monitoring and smart gardening. The primary goal of this paper is to reduce direct interaction and provide comfort to the farmer by improving the system's overall performance. Humidity, sunlight, and soil moisture are important factors to consider when monitoring plant productivity. Plant growth and health information must be provided to the user on a continuous basis by monitoring and recording these parameters. The NodeMCU interfaces with all of the sensors used in this project. Farmers can use IoT to directly monitor and control plant information via their smart phones. By sensing and controlling the parameters of the plants without their physical presence, this smart plant monitoring system will provide the user with convenience and comfort. The smart plant monitoring application can be installed on any Android-enabled device. The software used is the Arduino IDE and the IoT platform. The Arduino IDE is used to compile and upload the programme to the NodeMCU, and the IoT platform is used to display temperature, humidity, atmospheric pressure, and soil moisture from a distance. This will assist the farmer in understanding the relationship between plant growth and mentioned plant parameter.***
Keywords: Temperature sensor, Node MCU.

I. INTRODUCTION

This project aims to create a smart houseplant watering and monitoring system that analyses and records environmental factors to help plants thrive. Sensors collect and evaluate data regarding changing weather and soil moisture levels before sending timely warnings to the user's Android phone. The current approach is based on observation with the naked eye, which is a time-consuming process. To detect plant disease at an early stage, automatic detection of plant disease can be used. The project aims to make the managing of plants easy for the customer using IOT and machine learning, reducing manpower and saving time.

The Indoor Plant Monitoring System is an IOT application that can be accessed from Android devices and provides user manuals to guide customers. Automation is the key to empowering several sectors of Pakistan's economy, and IoT is a technique of using computers, mobile phones, or digital devices in monitoring and controlling the simple parameters of day-to-day life. Data exchange is the key factor for IoT, and people are using automation for simple things. The Internet of Things (IoT) is the future of current technology and will be 20 billion-plus digital devices interconnected over the internet in 2020. It is an integration of digital devices, people, and processes for meaningful communication and operation of any real-life system.

IoT based system development is harder due to a lack of flexible and proper integration of digital devices. Cloud things architecture that integrates cloud computing and the Internet of Things is a solution to the challenges of IoT based systems.

II. OBJECTIVE

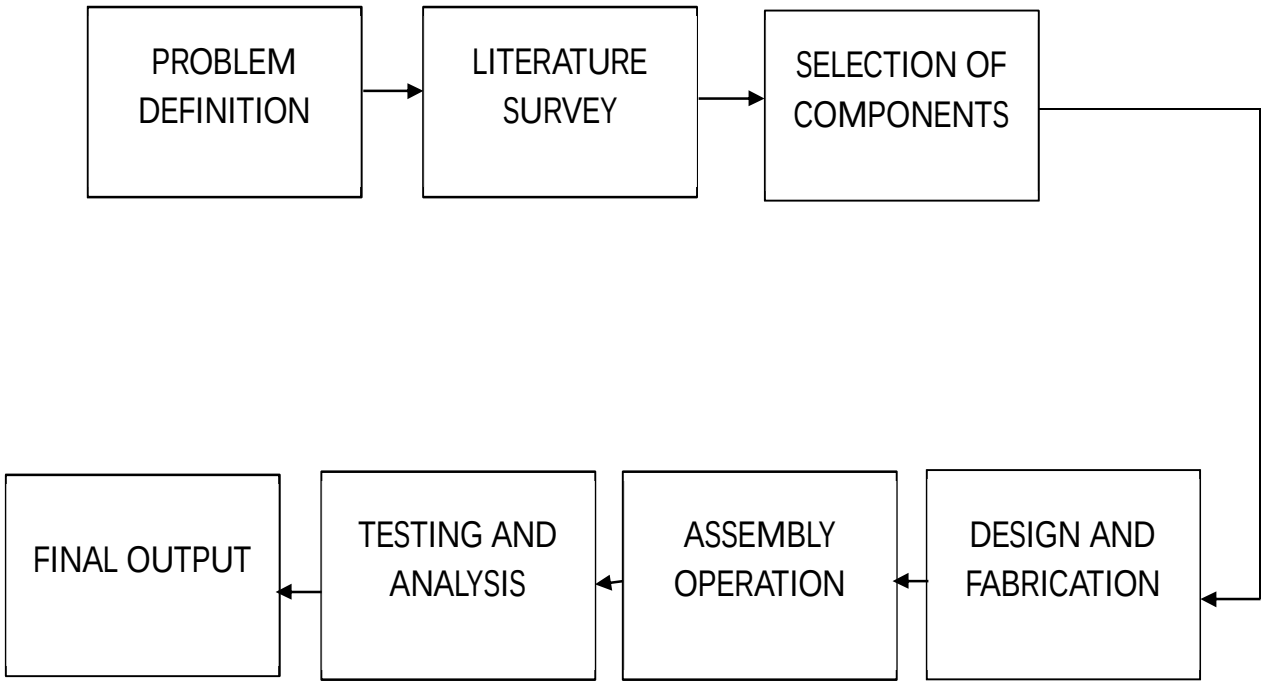
The main objective of this project is to detect the moisture content, temperature and humidity in the soil. It may support to control water usage and wastage of water. This is also suitable to check the soil conditions as well, which may help to start a better growth of a plant

III. LITERATURE REVIEW

1) “Enhancement of plant monitoring using IoT” by A.Pravin, T.Prem Jacob and P.Asha.
2) “An IoT based plant health monitoring system implementing using Image Processing” by Monirul Islam Pavel, Syed Mohammed Kamruzzaman.
3) " Monitoring of hydroponics system using IoT technology " by Nivesh Patil, Shubham Patil, Animesh Uttekar, A.R.Suryawanshi.
4) “Interfacing NODEMCU ESP8266 with ARDUINO IDE” by Ganesh Khomane.

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IV. EXISTING SYSTEM



V. HARDWARE SPECIFICATIONS

1) Nodemcu ESP8266
2) Soil Moisture Sensor
3) Relay module
4) Solenoid Water valve
5) Jumpers
6) 12v Battery

A. NODEMCU ESP8266

NodeMCU ESP8266 an open-source Lua based firmware and development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Express if Systems, and hardware which is based on the ESP-12 module.



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VI. SOFTWARE SPECIFICATIONS

Operating System: Windows 10
Tools: ARDUINO IDE
BLYNK 2.0

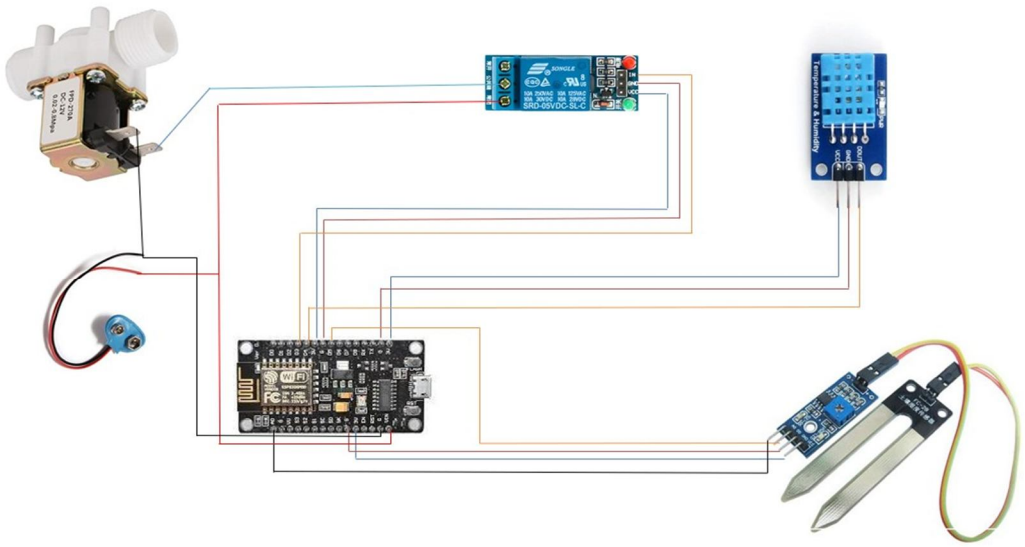
A. ARDUINO IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.

B. BLYNK 2.0

Blynk 2.0 is a comprehensive software suite that enables the prototyping, deployment, and remote management of connected electronic devices at any scale. Whether it's personal IoT projects or commercial connected products in the millions, Blynk empowers users to connect their hardware to the cloud and create iOS, Android, and web applications, analyse real-time and historical data from devices, remotely control them from anywhere, receive important notifications, and much more

VII. CIRCUIT DIAGRAM

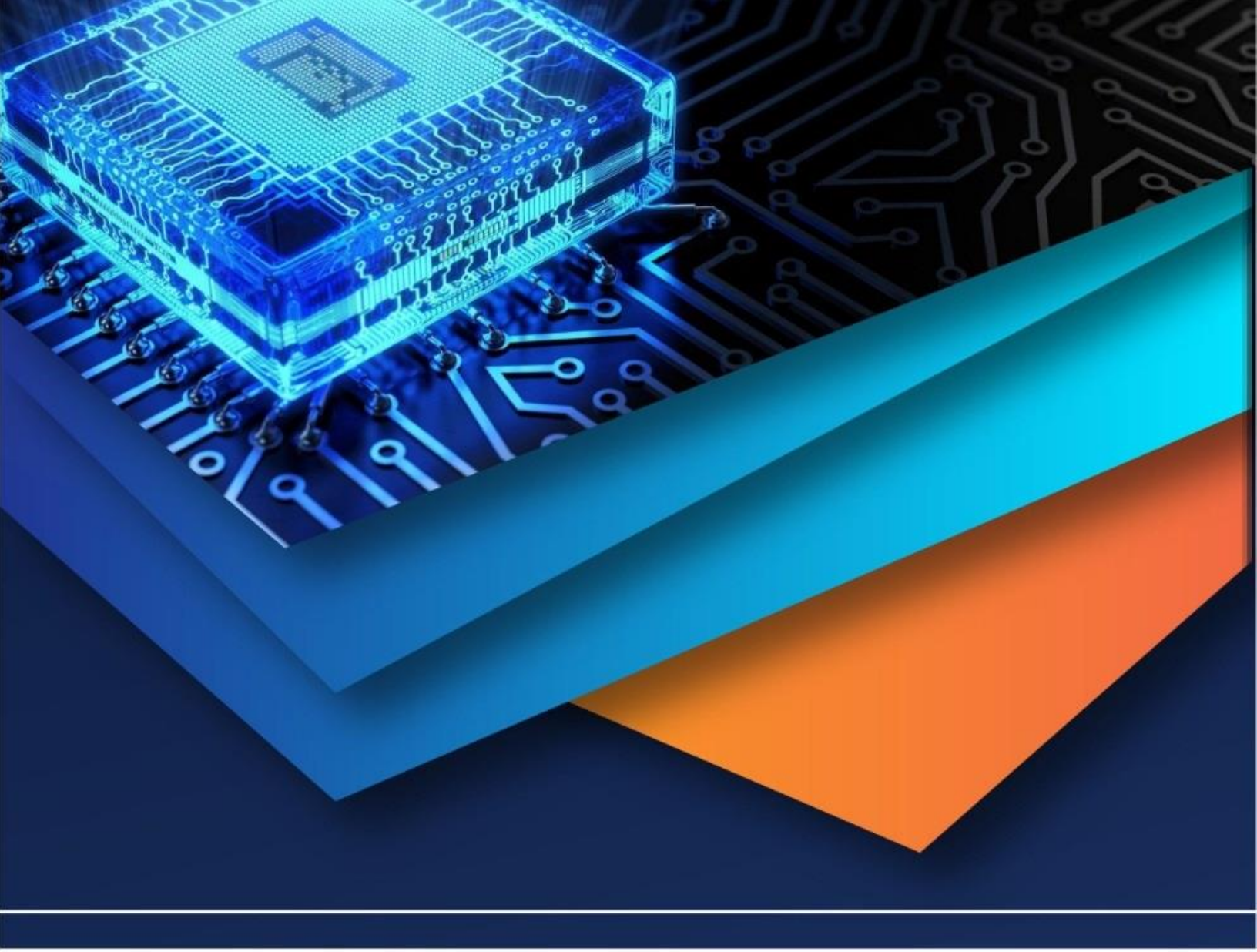


VIII. CONCLUSION

This project presented a smart irrigation system which could be deployed in gardens or fields. The Smart irrigation System operates perfectly and sends all the sensor values to Thing Speak. This data is then sent to app. The app and the system work perfectly as they were expected to be. Automation has been implemented and organized properly in this system. The efficient automation on monitoring and control of the plants requires new and revolutionary solutions. Wireless sensor networks can respond to requirement by offering an accurate and easily configurable monitoring system. In this work we are using the moisture sensor and light sensor with which, we could efficiently monitor the basic resources of the plant. This is prototype of the monitoring and control system for plants. Unlike other automated systems which relies on automated data, our model is more "Intelligent" to utilize the resources according to the changes in weather conditions. Our model has the capability to integrate with any mobile platform, Since the broker service is running on a cloud-based service it is scalable.

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