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PLANT MONITORING SYSTEM

A MINOR PROJECT- I REPORT

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M.KUMARASAMY COLLEGE OF ENGINEERING ,KARUR

BONAFIDE CERTIFICATE

Certified that this **18ECP103-Minor Project I** report "PLANT MONITORING SYSTEM**"** is the bonafide work of"**JOTHI.R(927622BEC086), MADHUBALA.V(927622BEC105),MONIKA.S(927622BEC122),NANDHINI.S.R(927622 BEC129)**who carried out the project work under my supervision in the academic year 2023 - 2024

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This report has been submitted for the **18ECP103L – Minor Project-I** final review held at M. Kumarasamy College of Engineering, Karur on **Final Review on 23.12.2023**

PROJECT COORDINATOR

INSTITUTION VISION AND MISSION

Vision

To emerge as a leader among the top institutions in the field of technical education.

Mission

M1: Produce smart technocrats with empirical knowledge who can surmount the global challenges.

M2: Create a diverse, fully -engaged, learner -centric campus environment to provide quality education to the students.

M3: Maintain mutually beneficial partnerships with our alumni, industry and professional associations

DEPARTMENT VISION, MISSION, PEO, PO AND PSO

Vision

To empower the Electronics and Communication Engineering students with emerging technologies, professionalism, innovative research and social responsibility.

Mission

M1: Attain the academic excellence through innovative teaching learning process, research areas & laboratories and Consultancy projects.

M2: Inculcate the students in problem solving and lifelong learning ability.

M3: Provide entrepreneurial skills and leadership qualities.

M4: Render the technical knowledge and skills of faculty members.

Program Educational Objectives

PEO1: **Core Competence:** Graduates will have a successful career in academia or industry associated with Electronics and Communication Engineering

PEO2: **Professionalism:** Graduates will provide feasible solutions for the challenging problems through comprehensive research and innovation in the allied areas of Electronics and Communication Engineering.

PEO3: **Lifelong Learning:** Graduates will contribute to the social needs through lifelong learning, practicing professional ethics and leadership quality

Program Outcomes

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PSO1: Applying knowledge in various areas, like Electronics, Communications, Signal processing, VLSI, Embedded systems etc., in the design and implementation of Engineering application.

PSO2: Able to solve complex problems in Electronics and Communication Engineering with analytical and managerial skills either independently or in team using latest hardware and software tools to fulfil the industrial expectations.

Abstract	Matching with POs,PSOs
MONITORING SYSTEM	PO1, PO2, PO3, PO4, PO5, PO6,PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2

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ABSTRACT

In the Iot based smart plant monitoring system we can monitor and control using Iot . It is very difficult to control scattered without a remote environment monitoring system. In recent years, there appeared a canopy remote monitoring system based on Ethernet.In this project we use different modules such as IOT, arduino as controller, Temperature sensor. If soil is dry automatically water pump will get ON. And the sensor values are given to ADC to get processed by arduino controller. The temperature sensor LM35 senses the temperature and converts it into an electrical signal, which is applied to the micro controller through ADC. If temperature increases more than set threshold value. Automatically Motor will be ON. In this project we are using Temperature Sensor and Dc Motor. In an industry during certain hazards is will be very difficult to monitor the parameter through wires and analog devices such as transducers. To overcome this problem we use wireless device to monitor the parameters so that we can take certain steps even in worst case. Few years back the use of wireless device was very less, but due the rapid development is technology now-a-days we use maximum of our data transfer through wireless like Wi-Fi, Bluetooth, WI-Max,etc.

Plants play a vital role in maintaining the ecological cycle, and thus, to maintain the plant's proper growth and health, adequate monitoring is required.

• Hence, the aim of the project is to create a smart plant monitoring system using automation and internet of things (IOT) technology.

• This technique plays a very important role in the society for every humans and specially for the physically challenged people. In this project we are also discussing the wide ranging fluid level control and managing techniques with central controller based system

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LIST OF ABBREVIATIONS

ACRONYM		ABBREVIATION
IOT	-	**Internet Of Things**
RFID	-	**Radio Frequency Identification**
NTC	-	**Negative Temperature Co-efficient**
MCU	-	**Micro Controller Unit**
LUA	-	**Programming Language**
WIFI	-	**Wireless Fedelity**
GPIO	-	**General Purpose Input And Output**
SMS	-	**Short Message Service**
GSM	-	**Global System For Mobile Communication**
PHP	-	**Hypertext Preprocessor**

INTRODUCTION

We live in a world where everything can be controlled and operated automatically, but there are still a few important sectors in our country where automation has not been adopted or not been put to a full-fledged use, perhaps because of several reasons one such reason is cost. One such field is that of agriculture. Agriculture has been one of the primary occupations of man since early civilizations and even today manual interventions in farming are inevitable. Plant monitoring form an important part of the agriculture and horticulture sectors in our country as they can be used to grow plants under controlled climatic conditions for optimum produce. Automating a plant monitoring and controlling of the climatic parameters which directly or indirectly govern the plant growth and hence their produce. Automation is process control of industrial machinery and processes, thereby replacing human operators. In this paper the presented plant monitoring system technology to provide feedback to the user through smart phone. The automated system will reduce the need of manpower, hence reducing the error. for a largescale area, it is quite impossible for a farmer to monitor the efficiency of the system by implementing this technology, the farmers can easily monitor the system using their smart phone. Also due to busy life these days we are not able to keep proper care of plants such as watering plant, to check whether plant is getting sufficient sunlight etc. To easy this we are making an IOT based automation system in which user can monitor plant parameters such as temperature, humidity, moisture and can also water them.

OBJECTIVES :

Its main objective is to monitor a plant by providing the suitable environment with the help of sensors such as moisture sensor to check the moisture of the soil and temperature sensor to check the temperature around the plant and then the light sensor to check the availability of the light which plays the major role ...

PROBLEM STATEMENT:

To develop a Smart Plant Watering System which has the following features: To start the pump motor (irrigation) automatically using relays when sensed by Soil Moisture Sensor. To alert user about the Temperature in the surrounding of plant. To alert user about the Humidity in the surrounding of plant. To alert user when the level of water in the container goes below a threshold value. To develop an Android App that monitors all this data. To send a SMS in case of alert.

LITERATURE SURVEY

We have studied many previous works done in this field by different researchers. Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the manpower efforts. A Review paper IoT Based Plant Monitoring System[2] shows, In India about 35% of land was under reliably irrigated. And the 2/3rd part of land is depending on monsoon for the water. Irrigation reduces dependency on monsoon, improves food security and improves productivity of agriculture and it offers more opportunities for jobs in rural areas.

Farmers are facing problems related to watering system that how much water has to supply and at what time? Sometimes overwatering causes the damage to crops and as well as waste of water. Hence for avoid such damage we need to maintain approximate water level in soil. A Review paper Internet of Things and Node MCU[3] explains that prototype is the first, step in building an Internet of Things(IoT) product.

An IoT prototype consists of user interface, hardware devices including sensors, actuators and processors, backend software and connectivity. IoT microcontroller unit (MCU) or development board is used for prototyping. IoT microcontroller unit (MCU) or development board contain low-power processors which support various programming environments and may collect data from the sensor by using the firmware and transfer raw or processed data to an local or cloud-based server. NodeMCU is an open source and LUA programming language based firmware developed for ESP8266 wifi chip.

EXISTING SYSTEM :

The system is developed for irrigation is on two ways:

I) System Software

II) System hardware

Software is web page designed be using PHP and hardware consists of embedded system which monitors soil content. In this system open source Arduino boards along with moisture sensors, it is applicable to create devices that can monitor the soil moisture content and accordingly irrigating the fields as when needed.

This system introduced a GSM-SMS remote measurement and control system for farms based on PC-based database system connected with base station, which is developed by using a microcontroller, GSM module, actuators and sensors.
It informs users about many conditions like status of electricity, dry running motor, increased /decreased temperature, water content in soil via SMS on GSM network or by Bluetooth. In practical the central station receives and sends messages through GSM module Values of temperature, air humidity and moisture which are set by central station are measure in every base station information is exchanged between far end and designed system via SMS on GSM network.

This system sets the irrigation time depending on reading from sensors and type of crop and it can automatically irrigate the field when needed, by using GSM-GPRS SIM900A parameter from sensor regularly updated on a webpage. This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. This system was used to cover lower range of land and not economically affordable.

PROPOSED SYSTEM

METHODOLOGY:

This Project is designed to monitor, water, and provide security for the plants inthe garden. For this project, we are selecting the Spinach plant as our testing garden plant.

Also, this is an IoT based project. It provides you to monitor and control the system.

This system consists of different sensors to get data from the plants. They are soil moisture sensor, temperature and humidity sensor. These sensors are used to take the data from the plants by monitoring it and make some decisions according to the inputs. This system has four main operations.

HARDWARE REQUIED :

1. Sensors (Moisture, DHT11)
2. NodeMCU
3. Relay
4. Motor

SOFTWARE REQUIED:

1. PhpMyAdmin
2. Android studio
3. Visual studio code
4. Postman tool

LANGUAGE USED :

1. JAVA
2. PHP
3. C

4,HTML

5.JAVA scrip

BLOCK DIAGRAM :

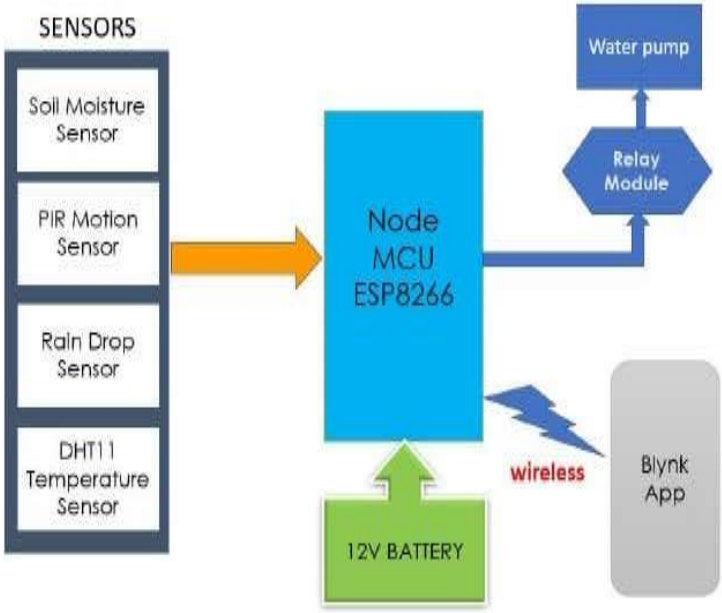

FIG 1

BLOCK DIAGRAM

CIRCUIT DIAGRAM

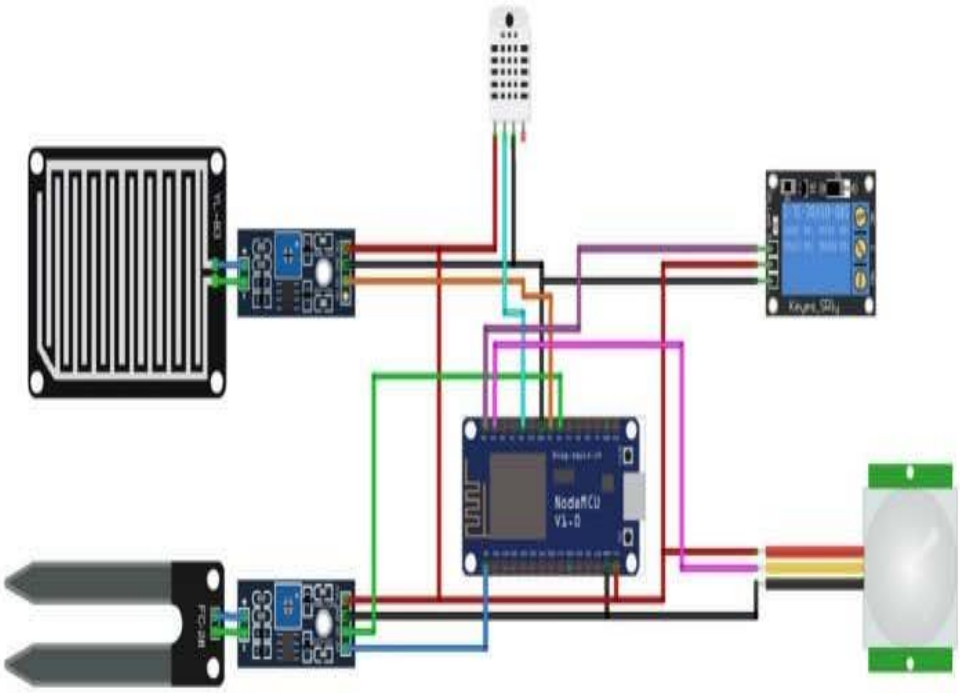

FIG 2

CIRCUIT DIAGRAM

WORKING DESCRIPTION :

SENSOR

Moisture sensor :

Soil moisture sensor is used to detect the moisture of the soil. This sensor is made up of two pieces: the electronic board at the right, and the probe with two pads, that detects the moisture content of soil. How does it work? The voltage of the sensor outputs changes accordingly to the moisture level in the soil. When the soil is: Wet: The output voltage decrease Dry: The output voltage increase

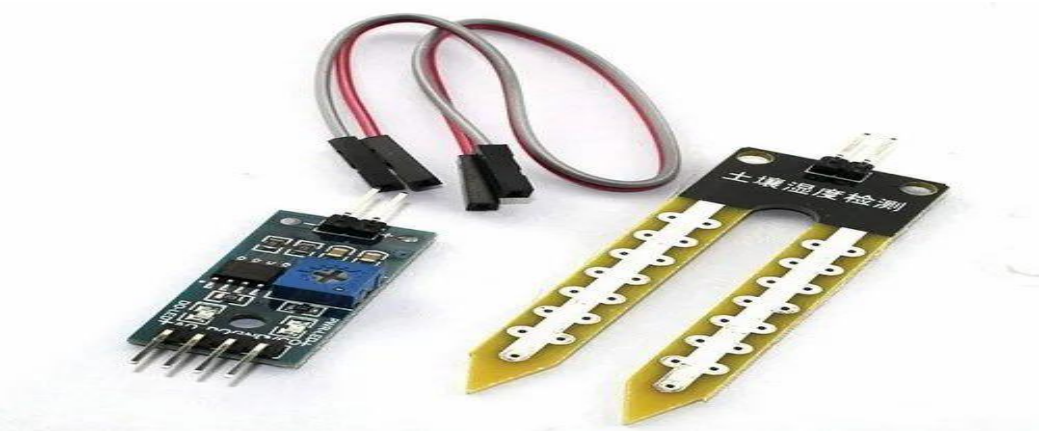

FIG 3

MOISTURE SENSOR

2 DHT 11 (Temperature and Humidity):

DHT11 consist of both humidity and temperature sensor. For measuring humidity there are two electrodes with moisture holding substrate between them. So when the humidity changes, the resistance between these electrodes changes and conductivity of the substrate changes. This change in resistance are measured and processed by the IC which makes it ready to be read by a microcontroller.

On the other side for measuring temperature DHT11 sensor use a NTC temperature sensor or a thermistor. A thermistor changes its resistance with change of the temperature because it is variable resistor. These sensors are made by sintering of semi-conductive materials (ceramic

and polymers), which provide large changes in the resistance with just small changes in temperature.

The term "NTC" means "Negative Temperature Coefficient", which means that the resistance decreases with increase of the temperature.

FIG 4

TEMPERATURE AND HUMIDITY SENSOR

CONTROL :

Node MCU :

Node MCU is an open source IOT platform. While writing GPIO code on NodeMCU, you can't address them with actual GPIO Pin Numbers. There are different I/O Index numbers assigned to each GPIO Pin which is used for GPIO Pin addressing. ESP8266EX offers a complete and selfcontained WIFI networking solution; it can be used to host the application or float WIFI networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications.

FIG 5

NODE MCU

RELAY :

The relay is used to switch ON/OFF the water pump. It's connected between the "NO" (normally open) terminal and the circuit ground. Relays are electrically operated switches that open and close the circuits by receiving electrical signals from outside sources. They receive an electrical signal and send the signal to other equipment by turning the switch on and off.

The relay module is used to control the water pump and it ensures that the plant receives sufficient amount of water for their growth. The system continuously monitors the moisture level of the soil using the soil moisture sensor as stated above.

FIG 6

RELAY

WATER PUMP :

The relay and water pump both operate at 12 V, which is provided by the batter

FIG 7

WATER PUMP

ARDUINO UNO BOARD:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the micro controller on the board. To do so you use the Arduino programming language , and the Arduino Software (IDE), based on Processing.

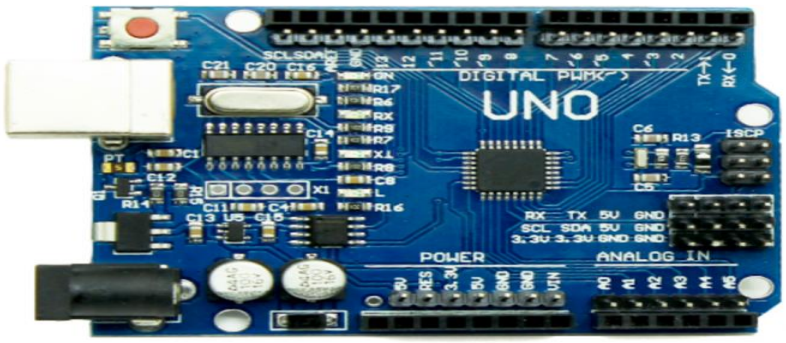

FIG 8

Arduino UNO Board

CONCLUSION

The proposed system is made to ensure good health of a plant in a smart way. Now adays ,maintaining the health of a plant is one of the major concerns of our society, so with the help of our project a lot of help can be provided. This system can be upgraded by developing it in a large scale and deploying it into forests to avoid disasters like forest fires. This project can help plants in home gardens to large forest.

A system to monitor temperature, humidity, moisture levels in the soil was designed and the project provides an opportunity to study the existing systems, along with their features and drawbacks. Agriculture is one of the most water consuming activities. The proposed system can be used to switch the motor (on/off) depending on favorable condition of plants i.e., sensor values, thereby automating the process of irrigation.

It is one of the most time efficient activities in farming, which helps to prevent over irrigation or under irrigation of soil thereby avoiding crop damage. The farm owner can monitor the process online through Front End Structure. By this work, the wastage of water and the consumption of power by motor can be reduced so that they are conserved for the future use. Through this project it can be concluded that there can be considerable development in farming with the use
IOT and automation.

FUTURE SCOPE

1. To Add Security to Device and Owner's A**cc**ount.

2. Detect amount of Sunlight available for plant.

3. To Implement AI and Check whether plant is in good condition or not.

4. Making Product compact so that can be fitted anywhere.

5. Can use solar cell to charge battery so need of Plug.

6.The project has a wide variety to upgrade which can be applied to improve it performance and efficiency.

7. The product can be upgraded by adding a wifi-module to the product and to create a application for the circuit.

8.The project can be also improved by adding sensors(humidity sensor)
to monitor and report and maintain the Health of the Plants.

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