Savy Plant based on IOT

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***Abstract*: This paper represents an automatic watering system to deliver water to the gardens constructed on moisture content situations with the use of an android application and ESP segments.**

Statistical Analysis: Moisture Sensor continuously feeds values microcontroller. The sensor value is the displayed on the android app. Based on that, user can manually switch on the motor to water the plants. The moisture sensor continuously sends soil moisture reading at set time intervals. The status displayed on the mobile app is refreshed every 5 seconds. The values are displayed as lo, medium, and high.

Findings: Because of system's energy dominion, low cost and relatively more volumes of underground water saving, this structure is desirable for house gardening commitments. This irrigation system has been employed with high effectiveness and top rapidity. By using this arrangement, user can appreciate the soil situations and control the system too automatically.

***Keywords*: ATmega 328, Instinctive Irrigation, ESP Module, Internet of Things, Node MCU, Soil Moisture Sensor.**

I. INTRODUCTION

As agriculture has a chief impression on economy of the country, lots of Investigation been conceded in automating the irrigation structure by engaging mobile computing and wireless sensor. As of now "Machine to machine (M2M)" communication is an evolving expertise which permits devices, substances etc. to interconnect each other and refer data to Server or Cloud from side to side the Core System. So, consequently we have established an Intellectual IOT based structure for Automated Irrigation where sensor data relating to soil moisture and temperature apprehended and rendering to that motor and fan can be motorized on or off grounded on the involvements from user.

II. LITERATURE SURVEY

In the current structure of agriculture, the crops are being supervised with the support of ATMEGA boards and GSM machinery where in Arduino boards acts as a microcontroller but not as a server. So, in order to overcome all these structures we have used ATmega 328 microcontroller with the Node MCU, which is latest version turns as both a microcontroller as well as server. Main feature of this organization is that it is inexpensive for installation and multiple compensations. Here, one can admittance as well as manager the agriculture scheme in laptop, cell phone or a computer.

III. EXISTING SYSTEMS

Almost all existing solution to auto irrigation are meant for large scale implementation and farming. The systems available for these purpose are drip irrigation, sprinkler heads, centre pivot, lateral/linear move, etc.

Disadvantages of existing systems

- Need of being physically present to start water supply.
- Wastage of water.
- No way of knowing if water content in soil is under or over.

PROBLEM STATEMENT

The planned paper aims to supply water whenever the soil is dry or as anticipated deprived of user being materially present and avoiding water expenditure. We also monitor the moisture level and it will also be conceivable to control the process remotely from anywhere, anytime by mobile.

IV. PROPOSED SYSTEM

The aim of this smart agricultural model is to sidestep water consumption in the irrigation progression. It is low price and effective structure. It includes Node MCU, ATMEGA 328, soil moisture sensors, relays.

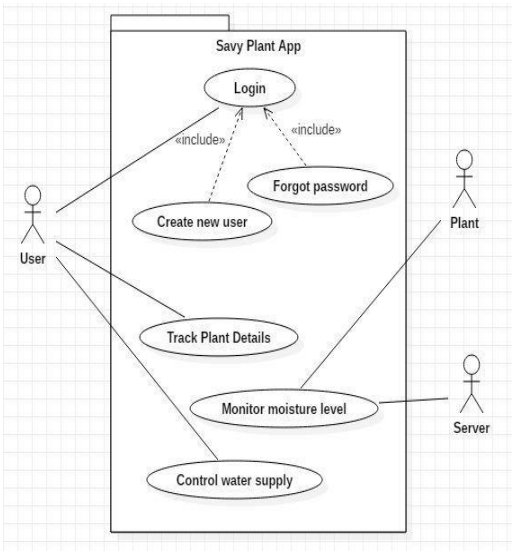

Fig:1 Use Case Diagram of system

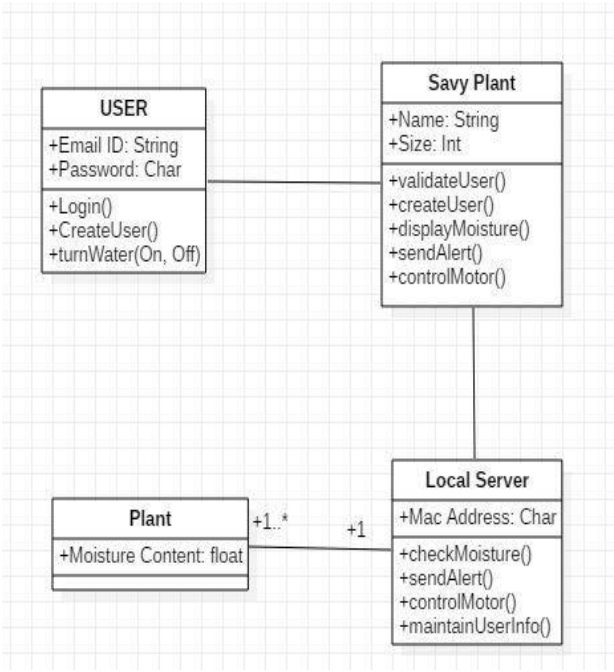

Fig:2 Class Diagram of system

NodeMCU: NodeMCU is an open source IoT platform that comprises firmware which runs on the ESP8266 Wi-Fi SoC from Expressive Systems, and hardware which is based on the ESP-12 module.

Fig:3 NodeMCU

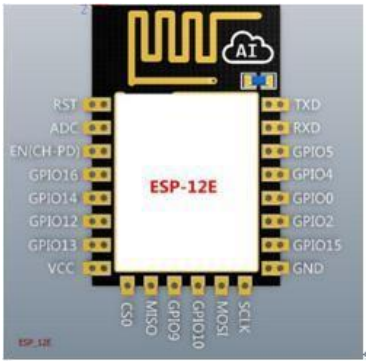

Fig: 4 Esp 12 wifi module

ESP8266 is high assimilation wireless SOCs, planned for space and power controlled mobile platform originators. It also delivers unsurpassed capability to embed Wi-Fi capabilities within other organisms, or to function as an unconnected application, with cost efficient, and minimal space prerequisite.

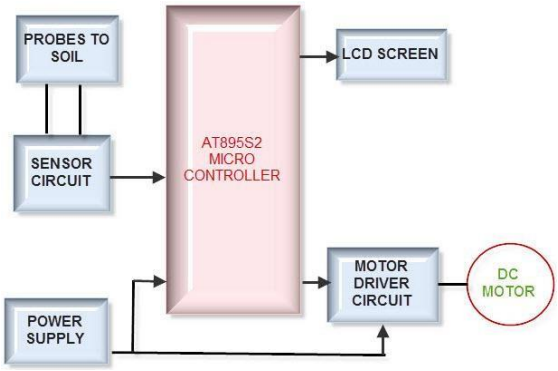

Fig: 5 Block Diagram of Iot Based Savy Plant

We are going to design the automatic irrigation system for garden plants which will take decision of motor ON\OFF based on the moisture content. But decision of turning the motor ON/OFF will be taken by the user based on the moisture status inside the soil.

We are going to use ATMEGA 328 microcontroller as the main processing unit of this project. This microcontroller has a built-in ADC. We are consuming soil moisture sensor in development to observe the moisture in soil. Reading sensed by the sensor will be given to the microcontroller and then it will analyze the amount of moisture based on the predefined threshold.

Those readings will be given to the online PHP scripts and moisture content will be sent to the owner and then owner can turn the motor on or off accordingly. Then that status will be fetched by the hardware device and it will turn on/off motor. The communication between the hardware and the user will be done over the internet. ESP 12 is the wifi module coordinating connections between the user and device.

Atmega 328 microcontroller: The high-performance Microchip 8-bit AVR RISC-based microcontroller syndicates 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose operational registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable regulator timer with inner oscillator, and five software selectable power convertible modes. The device functions between the range 1.8 and 5.5 volts.

By effecting powerful directions in a single clock cycle, the scheme accomplishes throughputs imminent 1 MIPS per MHz, harmonizing power feasting and dispensation speed.

Fig:6 ATmega 328

Moisture sensor: The soil moisture sensor contains two examinations which are used to measure the volumetric content of water. The two examinations allow the existing to pass through the soil and then it gets the conflict value to amount the moisture value.

When there is more water, the soil will bearing more energy which means there will be less struggle. Hence the humidity level will be advanced. Dry soil bearings electricity poorly, So when there will be less water, then the soil will bearing less energy which means that there will be more resistance. Therefore, the moisture level will be lesser.

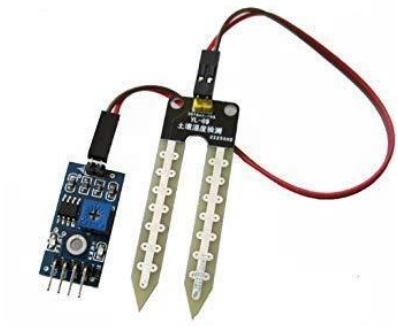

Fig:7 Soil Moisture sensor

Advantages of proposed system

- Cost Efficient
- Mobile app actively displays moisture content of the soil, better helping the user to decide when to give water to plants.
- User can turn on water supply from mobile phone, thereby eliminating need of physically being present to give water.
- System is highly portable.
- App can be used from anywhere in the world, therefore providing excellent range to user

V. EXPERIMENTAL RESULTS

This system helps us to monitor the moisture content in soil. The sensor sends the data to the mobile app at regular intervals. The Status of the Moisture of the soil is displayed on the application as low, medium and high, based on that, the user can start water supply from anywhere in the world. For water supply, we have used a single motor which is connected via microcontroller and wifi module.

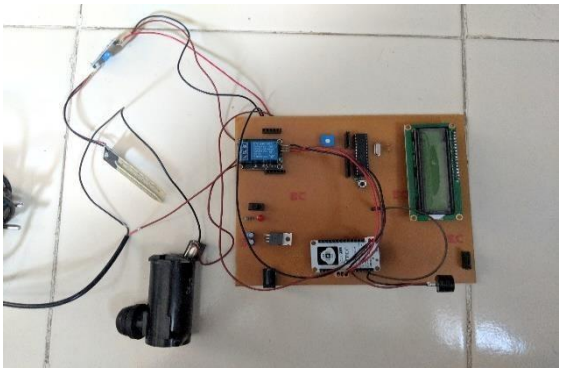

Fig: 7 Hardware Setup

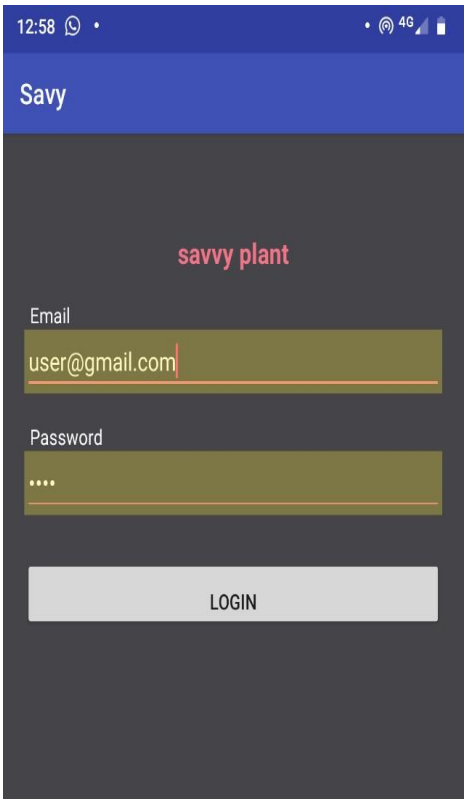

Fig: 8.1 Savy Plant App

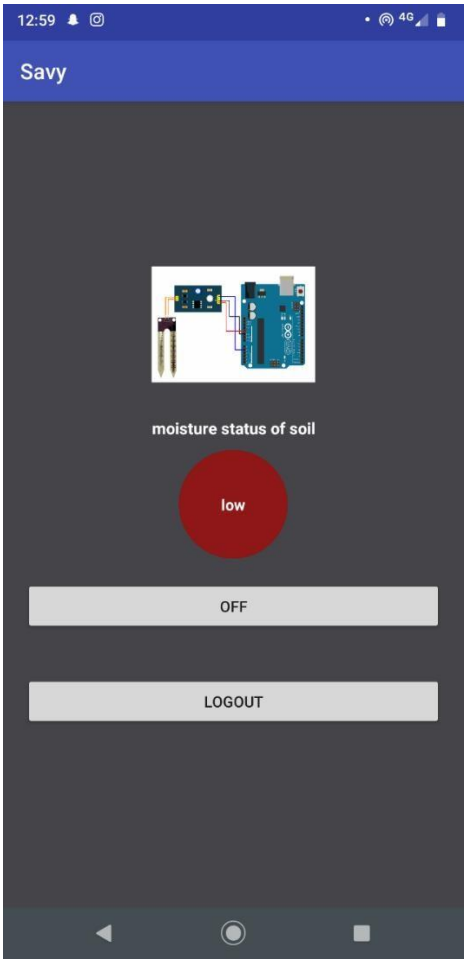

Fig: 8.2 Savy Plant App

As shown in fig. no 8.2 the moisture content is displayed using values sent by the moisture sensor. There is a button which is used to turn the motor on or off. This button also displays the status of the motor i.e on/off. User can logout after his/her work is done.

CONCLUSION

During the implementation of this project, number of results have been studied based on the practical results obtained from the implemented systems.

The Designed system is comparatively cost efficient to other approaches.

The intent of designing Iot based Savy Plant is a successfully accomplished and meets the desired objectives. The software and hardware components work efficiently to produce desired results. Use of this system helps user to better understand the status of the plants. The system does not require the user to be physically present to water the plants. Also the mobile App allows the user to use the system from anywhere in the world. The system is used to monitor the soil's moisture content and switch on/off the motor.

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