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# IoT-Enabled Water Level Monitoring for Smart Farming

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***Abstract: The rate of population growth in the world is alarming. It is quite difficult to meet the needs of such a large population. Good nutrition is the most fundamental requirement for each human being. The old and conventional farming techniques, however, are proving insufficient for supplying food in large amounts due to the growing population. Fortunately, by utilizing cutting-edge agricultural techniques and smart electronics technology, we can raise efficiency and productivity to higher levels. Additionally, this will guarantee us access to food. An IOT-based smart agriculture monitoring system project using Arduino is presented to improve the effectiveness and productivity of agricultural crops. One of the most crucial aspects of our society is agriculture. Every day, farmers generate food. Water is a key aspect of successful agriculture. Technology has played a crucial role in developing agriculture. The world's largest water user is the agriculture industry. Since water is used so extensively in agriculture, which makes up the majority of the Indian economy, it is disappearing day by day. One answer to this issue is irrigation, as plants are fed with water by drip irrigation. Water is well conserved by irrigation. The agricultural land must be consistently watered while being continuously monitored. In many parts of the world, manual irrigation is still used to deliver water for agriculture.***
***Keywords: ESP8266 (Wi-Fi module), Smart Agriculture, Automation of Irrigation System, Sensors, Internet of Things (IOT), Crop Monitoring***

## I. INTRODUCTION

The primary ideal of this design is to enhance the Smart Plant Irrigation System which is grounded on IoT, in this study we apply the automatic smart factory irrigation system grounded on the changes of temperature, moisture, water position on terrain grounded on this data the factory irrigation will going to be. The literacy medium of the model reveals the fine connections of the environmental variables used in the determination of the irrigation habit and precipitously enhances its literacy procedure as the irrigation data accumulates in the model. We estimated the success of our irrigation model with four different supervised machine learning algorithms and acclimated the grade Boosting Retrogression Trees( GBRT) system in our IoT result. We established a test bed for the detector edge, mobile customer, and the decision service on the pall to dissect the overall system performance. Then we fit one soil humidity inquiry in every certain distance so delicacy of data will increase fleetly if delicacy of data increases also plant irrigation will done in good manner without damaging the factory and beach.

## II. PROPOSED SYSTEM

Wi-Fi gadgets have made their mark in the medical sector with their diverse capabilities. Leveraging existing technologies, agricultural land specifics can be monitored periodically. By utilizing three different sensors for data collection, the need for injecting them into the agricultural land is eliminated, allowing for remote monitoring and data collection of a specific area.

## III. SYSTEM ANALYSIS

### *A. Existing System*

A new technology concept known as "smart farming" collects information from various agricultural fields, ranging in size from tiny to vast, and their surroundings utilizing sophisticated electronic sensors. Experts and local farmers examine the data obtained to provide short- and long-term predictions about weather patterns, soil fertility, the quality of the crops currently being grown, the amount of water that will be needed in the coming week to month, and other factors. By automating some farming processes, such as smart irrigation and water management, we can advance the concept of smart farming. Predictive algorithms can be used on SoC or microcontrollers to determine how much water will be needed right now for a certain agricultural sector. Consider the scenario where there was rain yesterday and less water is needed today. Similar to how high humidity will result in less evaporation of water at higher ground level, resulting in less water being needed than usual and reduced water use.

### *B. Proposed System*

The IOT Smart farm monitoring project is one of the key Arduino based projects. A IOT modem is also included. The sensors' data is transmitted to an Arduino controller. A remote IOT platform can be used to remotely monitor the crop status. This information is processed by Arduino before being sent to the IOT platform. The GSM modem is connected to the Arduino, which uses IOT protocols to transmit sensor values to a distant IOT platform. The Arduino board sends sensor values to the IOT module, which then receives them and sends them to the user by SMS every up normal situation. Thus, we are able to hydrate the crops. When the water level is increased pump motor will get activated and excess water is moved out.

## IV. DEVELOPMENT ENVIRONMENT

### *A. Hardware Requirements*

| | |
|---|---|
| Processor | Intel Core i3 |
| Speed | 2.3 GHz |
| RAM | 4 GB |
| Hard Disk | 500 GB |
| Arduino UNO | R3 ATmega328P |
| Water Level Sensor | Robodo SEN18 |
| Soil Moisture Sensor | REES32 |
| LCD | I2C LCD |
| Pump Motor | DC 12-24v |
| Servo Motor | SG 90 |
| IOT Module | ESP32 |
| Jumper Wires | M-F Wires |
| Battery | HW 12w |

### *B. Software Requirements*

| | |
|---|---|
| Arduino IDE | |
| Embedded C | |

## V. MODULE DESCRIPTION

### *A. Arduino*

Arduino is Microcontroller. An Arduino board consists of an Atmel8-, 16- or 32-bit AVR microcontroller (ATmega8,ATmega168,Atmega368, ATmega1280, ATmega2560), but other makers' microcontrollers have been used.The code which ever we do in the system, all those code are stored in the Arduino UNO chip. If we need to change the code we need to update the code in the Arduino UNO by feeding them again using connecting cable. Arduino Control all the devices and Sensors which are used in this prototype.

### *B. IOT Module*

IOT Module is used to send the Status of the Motor and the location of the Device as a SMS to our Mobile phone with the help of internet.This Module is most important device to send the Status of those motors and share those Locations.With help of this we can know exact status of the device

### *C. Pump Motor*

The working of Pump Motor is when the water level is low, the Pump Motor will activate and the water will fill the surrounding land.If the water level are high, it will be de-activate. It can increase the yield of crops.

### *D. Servo Motor*

The working of Pump Motor is when the water level is high, the Servo Motor will activate and the motor will rotate which we can assume that the water is draining from the land. If the water level are low, it will be de-activate. It removes the unwanted water from the land.

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*E. Water Level Sensor*

Water level sensor is used to sense the moisture level present in the sensor that we have placed. And, It updates the water level values to LCD board as well, so that we can know whether the water is high or low in the surrounding land.

*F. Soil Moisture Sensor*

Soil Moisture Sensor is used to sense the moisture level present in the soil where we have placed. And, It updates the soil mositure level values to LCD board as well, so that we can know whether the water is high or low in the surrounding land.

*G. LCD*

LCD is used to display the water level which has been sensed by the water level sensor from where we have placed the sensor. LCD is used to display the water level which has been sensed by the soil moisture level sensor from where we have placed the sensor. It is used to display the Values sensed by those sensors. So that we can come to know whether water is high or low.

*H. Relay*

Relay is use to control the volt which is supplied to Device. It sends the required volts needed for Pump Motor and Servo Motor. Relay is used to send the sufficient voltage which has required for both motors. This is used to safe the Motor from high voltage.

## VI. SYSTEM DESIGN

*A. Block Diagram*

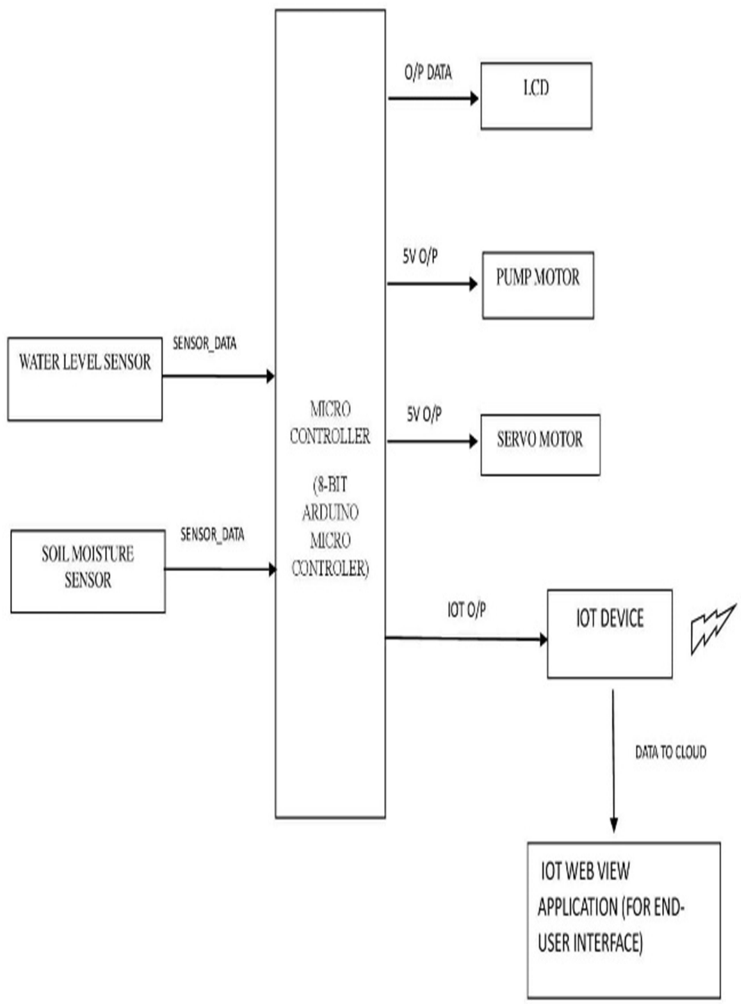


Fig.1 Architecture Diagram

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### *B. Work Flow Diagram*

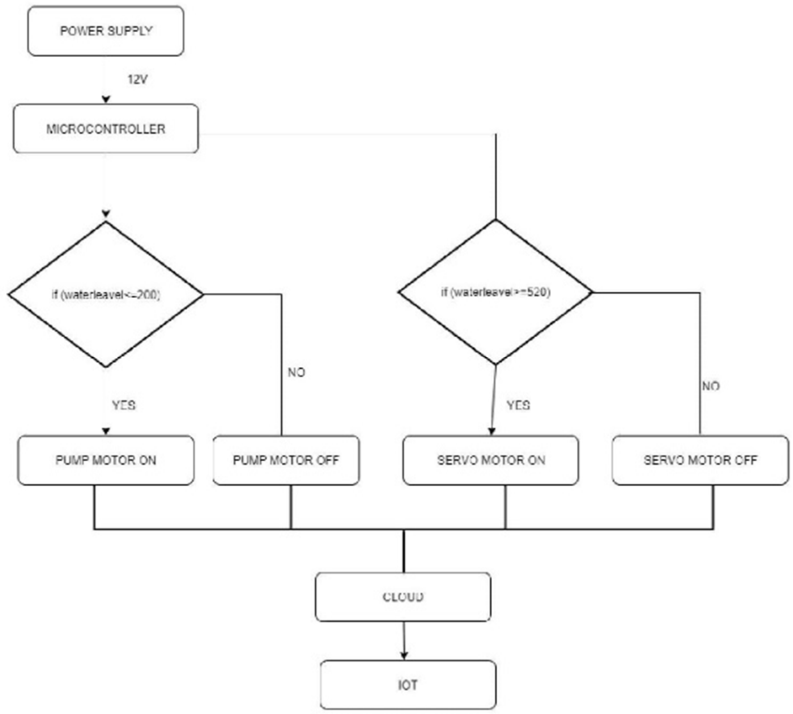


Fig.2 Working Process

### *C. Use Case Diagram*

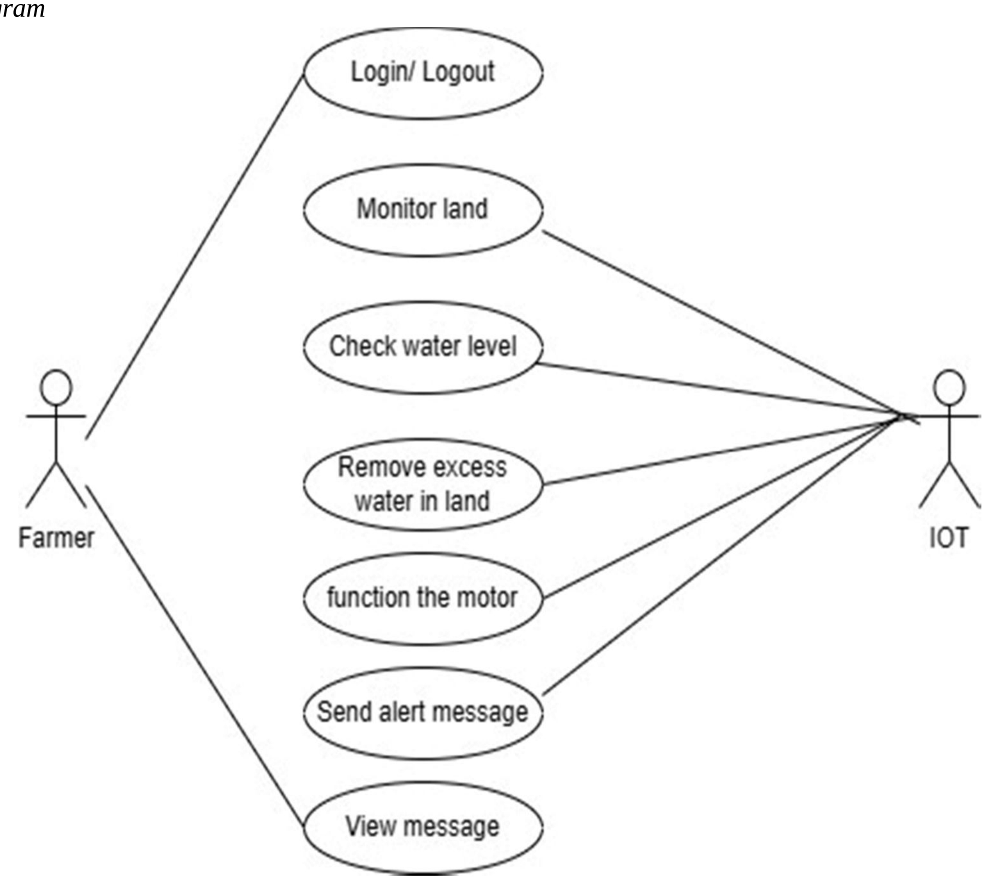


Fig.3 Usecase Diagram

### *D. Sequence Diagram*

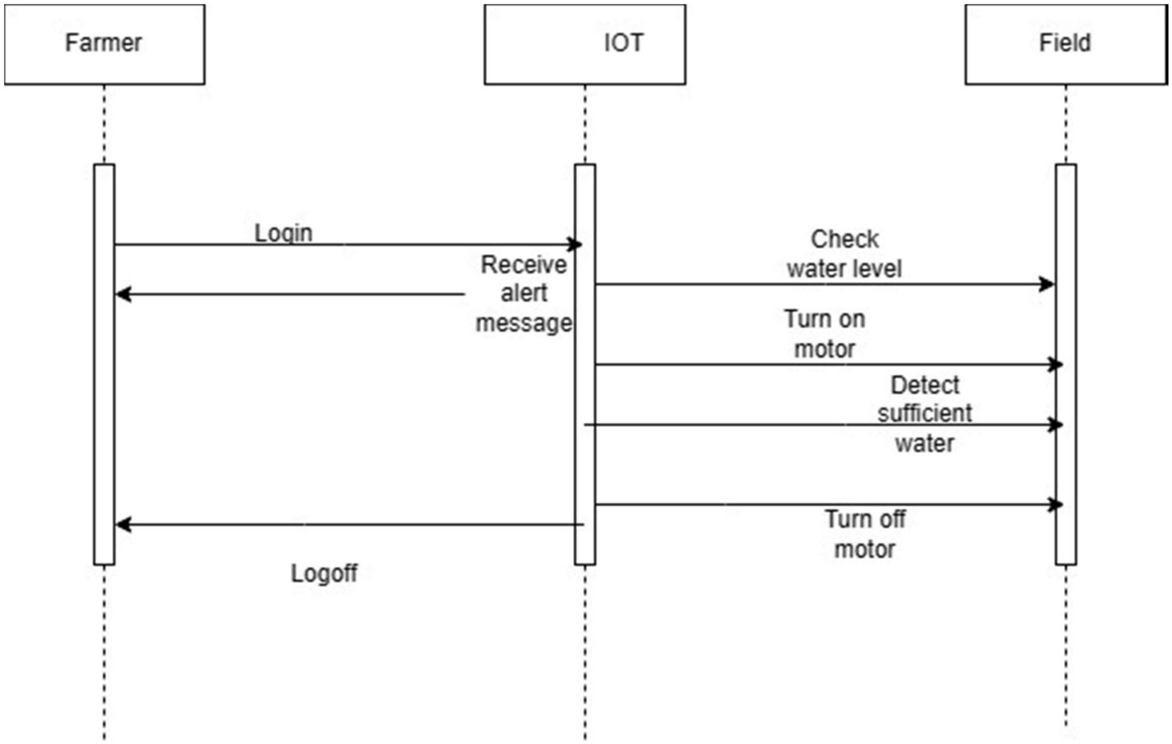


Fig.4 Sequence Diagram

## VII. CONCLUSION

From our results and literature check of other papers, we saw that the tackle and accoutrements we used to develop our porotype allowed us to make an effective and accurate, as well as cheap product for growers. Which was provident and fluently installable for growers as well. therefore, we can conclude that this porotype will surely help growers in small cropland to effectively cover their crops with the stoner-friendly app and other alert means.

## VIII. FUTURE ENHANCEMENT

We can implement an expensive motors for draining purpose instead of servo motors. We can control the Pump motors and Servo motors through mobile

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