

## Machine Learning Based Smart Irrigation System

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**Abstract.** A smart irrigation system is a combination for hardware and software applications with various technologies. It has a data analysis method with a variety of techniques and models to read data directly. Information technology plays an important role. An application for machine learning helps to maintain a proper irrigation system. For example, measuring hand-held interventions, increasing water use and providing water and fertility in the field improves crop production. It helps farmers to adapt to the right system according to their needs. Machine learning prediction algorithm is added for predicting the temperature and humidity in the environment.

**Keywords:** Machine learning , Arduino uno, Sensors , IOT.

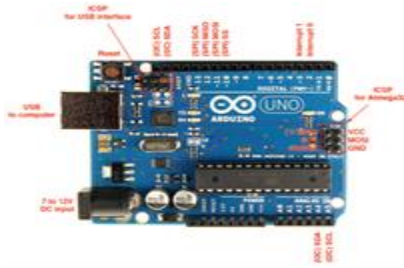
### 1. Introduction:

#### 1.1 Overview:

Agriculture is a large number of GDP (Gross Domestic Product) not only for developing countries but also for many developed countries. Therefore, upgrading and improving existing agricultural technologies is appropriate. It will not only contribute to the sustainable development of human, plant and animal life but also address global challenges such as climate change and the drought-like epidemic. Technology needs to be available at a lower cost to make its impact on billions of people around the world. Therefore, it will help to protect conditions such as hunger and malnutrition

#### 1.2 Arduino

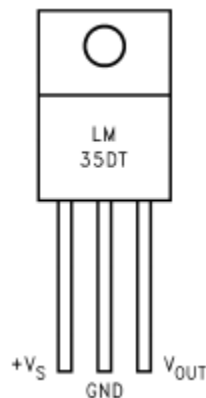
The micro control is small and costs less. It is an open source microcontroller board. The important part is that the little controller contains a processor and memory, and some input / output pins that you can control. (GPIO - Standard Input Anchors). Uno means "one" in Italian and marks the release of Arduino Software (IDE). Arduino Board , and a reference model for the Arduino platform; For a comprehensive list of current, past or expired boards see the Arduino



**Fig - 1: Arduino**

### 1.3 Temperature Sensor:

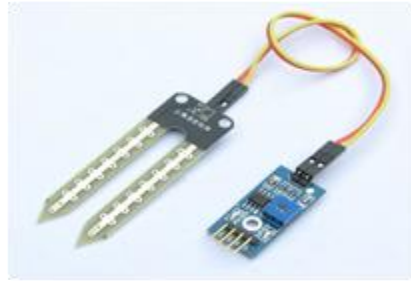
A device that is used to measure the natural temperature. Here the LM35 temperature sensor is used for implementing this project. LM35 is an integrated region, the effect of which varies according to the temperature around us. It is used to measure temperatures between  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$ . It measures the temperature of a particular environment



**Fig - 2: Temperature sensor**

### 1.4 Soil Moisture Sensor:

Soil sensors are often used to check volumetric water volume in the soil. The relationship between the measured material and the soil moisture should be tagged and should vary according to natural factors such as soil temperature or electrical object. The microwave radiation shown is filled with wet soil and is used for distant sensations in geophysics and agriculture. Soil sensors often visit sensors that balance excessive water content. Some groundwater is known as water; these square sensors are sometimes referred to as groundwater sensors and accept tensioners and mineral blocks



**Fig – 3 :Soil Moisture Sensor**

#### 1.4 Humidity Sensor:

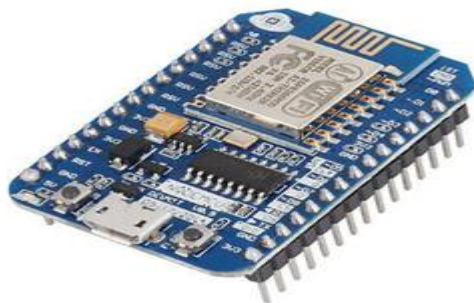
Moisture is the availability of water content in the air. The amount of steam in the air will affect human comfort in the same way as several industrial processes. The presence of the vapor effect has a variety of physical, chemical, and biological processes. Industrial moisture level is important because it should have an impact on business prices and the health and safety of employees. Here we have a tendency to use an opposing type of moisture detectorGeneral guidelines for the preparation of your text



**Fig – 4 :Humidity Sensor**

#### 1.5Node Mcu

The node MCU firmware open-source board design is available. The firmware uses light-weight language, high-level, multi-paradigm. ESP8266 Core Arduino IDE used for software development.



**Fig – 5:Node MCU**

## 2. Literature Review:

Comprehensive book reviews have been done and a few working technologies and algorithms that support book reviews and testing are suggested within the paper when there is a Smart Farm Monitoring System.

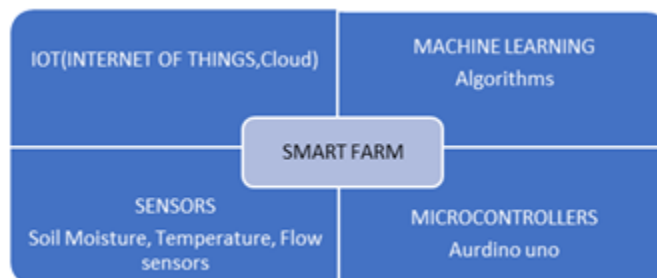
WSN technology is used to monitor the quality of the water and is monitored by solar set up members. Viewing water quality in several areas of the camp and in real-time, using distributed sensor nodes and a base station a different system configuration was made. Ruan Yue, Tang Ying has proposed a paper called water quality monitoring system based on a network of solar power and solar energy which addresses this issue [1]

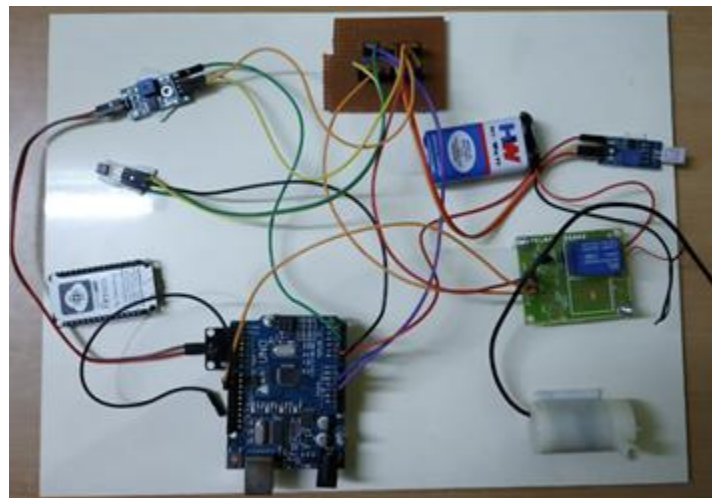
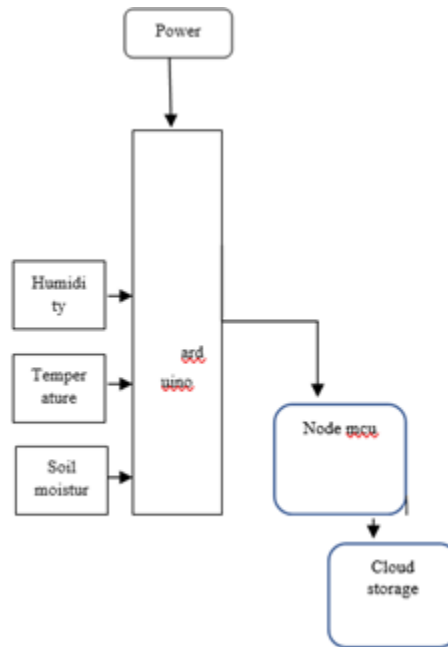
The employee is trying to address this issue through a multidisciplinary approach. ZesongFei, Chengwen Xing published the paper on the Survey of Multi-Objective Optimization in Wireless Sensor Networks-Metrics, Algorithms and Open Problems which addresses this issue [2]

The leaf spot of phaeosphaeria was the real diseases which will reduce the production of corn in the tropical and subtropical areas of Africa. Elhadi Adam et al addressed this issue by publishing the paper. The maize crop is taken into consideration and the first stage of infection is identified. The detection of the First Stage of Phaeosphaeria Leaf Spot Infestations in Maize Crop which uses hyperspectral Data and Random Forest Algorithm is implemented by the authors. [3]

## 3. Proposed System

The proposed system provides the best solution for farm and irrigation requirements depending on the various open source information available online and in the machine learning algorithm. The solution available for smaller controllers is Arduino Uno, the choice of a small controller depends on their calculation capabilities, cost and ease of availability. With the use of a variety of sensors, variable parameters will be regularly monitored and irrigated appropriately and to determine the type of plant to be produced .Local water level will also be determined. Temperature details will be uploaded to the cloud and accessed through a machine learning algorithm and run.





#### 4. Conclusion

Machine learning in a sensible irrigation system is a useful and effective way to reduce water resources for agricultural crops. This method is worn to cultivate in areas where there is a shortage of water thus improving comfort. within the existing system but during this irrigation system the machine can be read by contributing to the weather that can lead to the weather prediction. The system is familiar and economical.

#### 5. References

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