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IOT Based Smart Farming Using Machine Learning

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***Abstract* - Agriculture is one of the most important factors for economic growth for any country. Agriculture plays a very crucial role in increasing the economy of many developing countries. India, being one of the major countries in the world for producing vast amounts of different crops, still uses traditional techniques in the field of agriculture. Farmers not only face problems in coping with the changing climatic conditions but also need to meet up the rising demands of higher food production with good quality. As a matter of fact, Farmers need to be aware of the changing climatic conditions in order for them to yield quality crops. IoT based Smart Agriculture would not only help farmers monitor their crops in real time but also would help in recommendations regarding crops and fertilizers. This paper focuses on proposing an IoT based Smart Agriculture system, which would help farmers, get recommendations based on various factors like humidity, temperature, and moisture.**

Keywords: IoT, Smart Farming, Crop Prediction, Fertilizer Prediction.

I. INTRODUCTION

The development and usage of Smart Agriculture systems based on IoT is changing the field of agriculture sector by not only improving the crop production but also making it cost effective. The agriculture sector has gone through a constructional transformation in recent years, demonstrated by hikes in prices and guided by population growth and urbanization. There is no hesitation that the government needs to invest in the agriculture sector in order for it to bloom. The world seems to be making advancements in the field of technology and it is necessary to make reasonable advancements in the field of agriculture as well. According to the World Bank, the food consumption would increase by 50% by 2050 if the global population continues to rise at its current pace.

As a matter of fact, the effects of drastic changes in climatic conditions have seen crops yield falling by more than a quarter. There needs to be a focus on the implementation of smart technologies in the field of agriculture to yield quality and bulk production of crops. The combination of IoT and Machine Learning can certainly help in lowering the cost and also help in increasing the scale of production through the collection of time series data from sensors. There are certain factors, which play a vital role in the production of crops. Nearly 51% of the crop yield is dependent on the influence of these factors. These factors include precipitation, temperature, humidity, and moisture.

II. LITERATURE SURVEY

If climatic condition is hot, dry, sunny, windy then there is need of high amount of water for crops and if these factors are like cold, humid, cloudy, little wind then we need less water for the crops. Earlier study model conceptualized a system that consist of six parts that are monitoring, management, planning, Information Distribution, decision support and control action. And above study model does data analysis for better decision support [1].

In [2], a GSM based smart farming system was proposed for doing automation of several farming tasks. Automation is proposed by smart irrigator that moves on mechanical bridge slider arrangement. The smart irrigator receives signal from smart farm sensing system through GSM module. Then sensed data is transfer towards central database from which all crop details are analysed and transferred to irrigator system to perform automatic actions.

IoT based smart Agriculture [3] gives information about irrigation having facilities like smart control and making intelligent decision depending upon real time data from fields. All these operations will be controlled through any smart device placed remotely and the interfacing sensors are used to perform operations along with Wi-Fi, actuators and other hardware devices. The whole system was developed using infield sensors which collects data from farm and using GPS data is sent to the base station where necessary actions are determined to control irrigation according to database available with the system. Researcher's measure soil related parameters such as humidity and moisture important for the growth of any crop.

Auto mode and Manual mode are the two modes of operation of the system. System takes its own decisions and

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controls the installed devices and user can control the operations of system using android app or commands in auto and manual mode respectively. Internet of Things is proven to be a cost effective and reliable technology to implement smart systems [5].In smart village system advance rural connectivity is enabled through web service and measuring different environmental factors real time.

System proposed in [6] suggests use of IoT in almost all phases like growing, harvesting, packaging, transportation. Real time data provided by sensors, RFID tags in all the above phases of cultivation of crop will help farmers and all the stake holders to have complete view of the product right from the production to sales.

Automated farming system proposed in [7] turns on the motor on/off depending on the moisture values from the moisture sensor and turn the lights in the green house on or off based on the light sensors. Actuators are used to control the motor. Automated system definitely helps farmer in increasing the yield of crops.

Paper [8] produces an agricultural model in IoT environment which is human centric. It incorporates IoT and cloud computing ubiquitously to remove the inefficiency and lack of management, which are the root of problems in agriculture.

III. MOTIVATION

Agriculture is one of the most important factors for economic growth for any country. Agriculture plays a very crucial role in increasing the economy of many developing countries. India, being one of the major countries in the world for producing vast amounts of different crops, still uses traditional techniques in the field of agriculture. Farmers not only face problems in coping with the changing climatic conditions but also need to meet up the rising demands of higher food production with good quality. As a matter of fact, Farmers need to be aware of the changing climatic conditions in order for them to yield quality crops. IoT and Machine Learning based Smart Agriculture would not only help farmers monitor their crops in real time but also would help in recommendations regarding crops and fertilizers.

IV. PROBLEM STATEMENT

Farming is a major input sector for economic development of any country. Livelihood of majority of population of the country like India depends on agriculture. In this project, it is proposed to develop a Smart Farming System that uses advantages of cutting edge technologies such as IoT.

V. METHODOLOGY

In the proposed system, the main concept implemented is the Internet of Things (IOT). There will be a low-level hardware device that will measure different variables of the surroundings like temperature, humidity, soil moisture, water level, and MQ2 sensor.

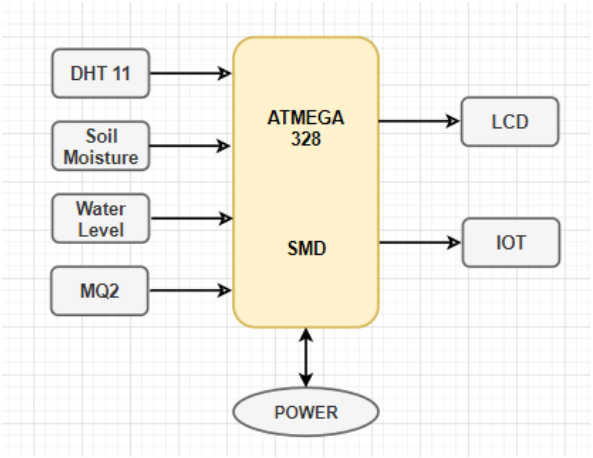

Figure 1: Block Diagram

The measured values will then be transferred to microcontroller for further processing. Atmega328p SMD will check the threshold value of sensor and send data to IOT accordingly.

VI. CONCLUSION

IoT based smart farming system can prove to be very helpful for farmers since over also shows that less irrigation is not good for farming. Threshold values for climatic conditions like humidity, temperature, moisture can be fixed based on the environmental conditions of that particular region. This system generates irrigation schedule based on the sensed real time data from field and data from the weather repository. This system can recommend farmer whether or not, is there a need for irrigation.

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