INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

Automated Irrigation System using IOT

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ABSTRACT: India is a country of villages where agriculture plays an important role in the development of the country. In our country, agriculture depends on the monsoons which have insufficient sources of water. So the irrigation based watering is used in agricultural fields, depending upon the soil type, water is provided to the plant. If the farmland has a water pump, a manual intervention by farmers is required to turn the pump on/off whenever needed regardless of the season or weather conditions. This may lead to the wastage of water.

India's population is reached beyond 1.2 billion and the population rate is increasing day by day. Then after 25-30 years, there will be a serious problem with food, so the development in agriculture is necessary. Today, the farmers are suffering from the lack of rain and scarcity of water. The main objective of this paper is to provide an automatic irrigation system thereby saving time, money, and power for the farmer. The traditional irrigation techniques require manual intervention. With the automated technology of irrigation, human intervention can be minimized. Whenever there is a change in humidity of the surrounding, these sensors sense the change in humidity that give an interrupt signal to the Arduino board. . Irrigation may be defined as the science of the artificial application of water to the land or soil that means depending on the soil type, plants are to be provided with water.

For continuously increasing demand and decrease in the supply of food necessities, it's important for rapid improvement in the production of food technology. Agriculture is the only source to provide the required production. This is an important factor in human societies for growing and dynamic demand in food production. Agriculture plays an important role in the economy and development in countries like India. Due to the lack of water and scarcity of land water result in the decreasing volume of water on earth, the farmers use irrigation.

I. INTRODUCTION

Water Management is a paramount with water scarcity. This also effects the large amount of land with less water. With the raising population there is a need for increased agricultural production. The possible consequences of global warming lead to the consideration of creating water adaptation measures to ensure the availability of water for food production and consumption. Thus studies aimed at saving water usage in the irrigation process have increased over the years. Due to the recent advances in IoT technologies that can be applied in the development of these systems, present a survey aimed at summarizing the current state of the art regarding smart irrigation systems determine the parameters that are monitored in irrigation systems regarding water quantity and quality, soil characteristics and weather conditions. That provide an overview of the most utilized nodes and wireless technologies. So discussed the challenges and the best practices for the implementation of sensor-based irrigation systems. The lack of fresh water is a rising concern, particularly in the Mediterranean countries or southern Asian countries such as India. Among the countries in Europe, the Mediterranean countries are the most vulnerable to drought. A connection has been established between climate policies and water management. Water management can be affected by different variables such as the water demand from the different sectors or the consequences of some degrees of warming on hydrological resources. The agricultural sector is one of the most important economic resources in these countries adding to the importance of managing well the available water resources to ensure the continuing of this economical sector.

II. PROPOSED SYSTEM

This Fig 1 is an overall block diagram of Arduino based automatic irrigation system which consist of two sensors that are soil moisture sensor and rain detector sensor which are connected to controller and sensed values from these sensors used to start the motor automatically. Arduino is a open-source electronics platform based on use of both hardware and software. This board is used to read input from sensors and can do several output performances. Soil moisture sensor which is been used to measure the water content of soil. The output range of the soil moisture sensor is 0 to 1023. The rain water sensor is one of switching device which will detect the rain and make an alert.
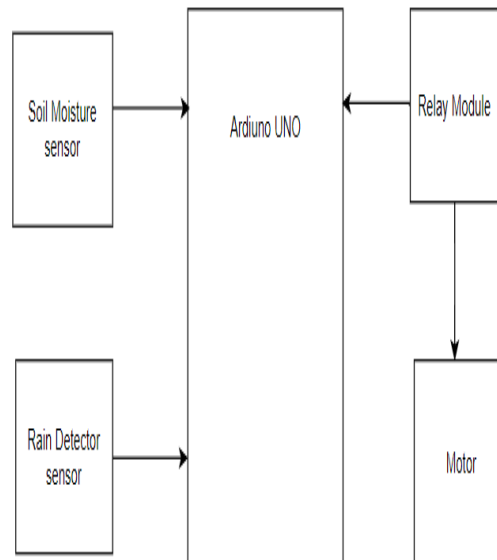
Fig-1 Block diagram of automatic irrigation system

In existing irrigation, there is only a scheduled irrigation system that will work regardless of the weather conditions and moisture level. Even if the plants are well welted enough the scheduled irrigation system water the plants in the timed schedule which may cause wastage of water. And also if the plants are over watered it could lead to danger for the plants. This is the main disadvantage of this system. This system may cause serious wastage of water which will be a bad situation in areas where there is water scarcity. Then also in the current system while irrigating the crops it may starts raining, then the irrigation system doesn't know about the weather conditions and it will also continue till the scheduled time which may lead to wastage of water. Also if while water a plant too much it may cause the plant to root disease which may destroy the plant totally. So watering the plant only when the plant needs water may save the wastage of water and also that will increase the growth of plants and also save the time for the farmers to look after the plants. With the correct amount of water irrigation, farmers may get a good yield from their farms and also can save a lot of water and time.

The motivation for this project came from the countries where the economy is based on agriculture and the climatic conditions led to a lack of rain and scarcity of water. If the farm land has a water pump, a manual invention by farmers is required to turn the pump on\off whenever needed. But using this system that can be reduced.

The automatic irrigation system is very important in the field of agriculture. It is used to maintain the level of water or moisture in the soil where crops are planted. The moisture sensor is interfaced with an 8051microcontroller. The sensor sends the status of the soil to the microcontroller and if the soil is dry the micro controller will automatically switch ON the water pump system.

Automatic irrigation systems are very important in the field of agriculture. It is used to maintain the level of water or moisture in the soil where crops are planted. The moisture sensor is interfaced with the Arduino board. The sensor sends the status of the soil to the Arduino board which evaluates the data from the sensor and if the soil is dry the Arduino board will send an analog signal to the motor which will automatically switch ON the water pump system. While water is being supplied in the field, the climatic condition(Rain) is monitored simultaneously by the rain detector sensor which is interfaced with Arduino broad. The raindrop sensor sends the status to the Arduino board if it is raining. The Arduino board will evaluate the status of the raindrop sensor and automatically switch OFF the water pump system by sending a signal to the motor. This may save the wastage of water and save time for the farmers so the soil moisture based irrigation system was implemented. Users can easily have predefined the levels of moisture and it is easy to set up these sensors.
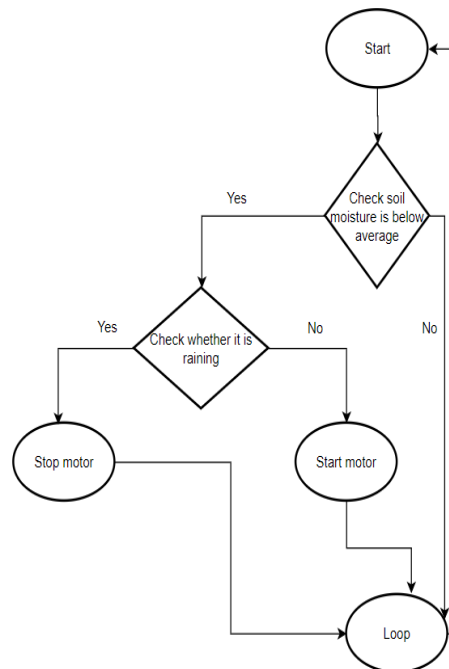
III. FLOWCHART

Fig 2 Flowchart of automatic irrigation system

From the Fig 2 you can clearly understand the flow of our project initially the Arduino instruct the soil moisture to check the reading if it is below the average , it goes to next step checks for the rain detection if the rain detector sends positive value it is not raining so it will start motor. The motor will run till the soil moisture increase above the average soil moisture . Once the moisture is above the moisture level, then motor get off automatically. If the rain detector sends negative value while the motor is in running state it will turn off it automatically. The Arduino checks the moisture for every two seconds.

IV. OBJECTIVE OF THE PROJECT

The main objective of this project is to provide an automatic irrigation system thereby saving water , money and power of the farmer. In the traditional way of farming irrigation techniques require manual intervention. With the automated System of irrigation the human intervention can be reduced.

V. ADVANTAGES OF SMART IRRIGATION SYSTEM

Traditional irrigation strategies are not suitable for dealing with the shortage of irrigation water, this sector must benefit from modern technological advances. Hence the new smart agricultural irrigation system has following advantages.

• Increase the productivity: Productivity on farmland is going too increased.

• Reduce water consumption.

• No manpower required.

• Reduce soil erosion and nutrient leaching.

• Cost effective method.

• High quality crop production.

• System not damage by weathers and birds.

• Efficient use of water.

VI. FUTURE WORK

In the Future, this system can be made as an intelligent system, where in the system predicts user actions, rainfall pattern, time to harvest, animal intruder in the field and communicating the information through advanced technology like IoMT can be implemented so that agricultural system can be made independent of human operation and in turn quality and huge quantity yield can be obtained.

VII. CONCLUSION

The application of agriculture networking technology is need of the modern agricultural development, but also an important symbol of the future level of agricultural development; it will be the future direction of agricultural development. After building the agricultural water irrigation system hardware then analyzing and researching the network hierarchy features, functionality and the corresponding software architecture of precision agriculture water irrigation systems, actually applying the internet of things to the highly effective and safe agricultural production has a significant impact on ensuring the efficient use of water resources as well as ensuring the efficiency and stability of the agricultural production. With more advancement in the field of IoT expected in the coming years, these systems can be more efficient, much faster and less costlier which will help all kind of agriculturalist.

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