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AUTOMAtic IRRIGATION SYSTEM

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Abstract - *In Bangladesh, an automated irrigation system utilizing solar power is very important. Depending on agriculture, the gadget is specialized in rice fields in economically dependent nations such as Bangladesh. The central concept in this gadget is the awareness of water level in agricultural fields since these fields lose tons of their products due to flooding. The sensor sends the person a message from the field about the amount of water inside the area; whether it rises or decreases, then the operator controls the pump to regulate or turn the phone off. The benefit of this system is that getting hold of electricity depends on the sun's energy. The drawbacks of this device are that it is based on one kind of sensor, the water stage sensor, regardless of whether the plant needs water. There may not be a potential for energy supply if there is no solar power to operate it.*

Key Words: Automation, Irrigation System.

1. INTRODUCTION

We have done automation of farm irrigation and soil moisture control by Ar- Duino using soil moisture sensor, humidity sensor, gas sensor, and Wi-Fi modular. This automatic irrigation system senses the soil's moisture content. It automatically activates the pump when the power is on, and Wi-Fi modular records our server data when the motor is on or off, and the moisture level. Proper and intelligent usage of the irrigation system is significant because the main reason is the lack of land-reserved water due to lack of rain, the accidental use of water, resulting in large amounts of wastewater. We may busy with our job and other work, but we may notice all the things using our phones or pc through the server (modular wifi system). This is why we use this automatic system for watering plants and monitoring soil moisture, and this system is advantageous under all climatic conditions. Bangladesh is a country that is focused on agriculture. Our majority of peoples rely entirely on agricultural harvesting. Agriculture is a source of work for the majority of Bangladeshi people. It has a significant impact on the country's economy Irrigation becomes difficult in dry areas or the absence of rainfall. For proper watering of a plant, it needs to be automated and handled remotely by the farmer. The pump will start watering when the soil needs water. The purpose of the implementation is to reduce water usage, and it is possible to use automatic irrigation to save time and a low power monitor system. This project's implementation aimed to show that automatic plant irrigation can minimize water usage and save time.

2. RELATED WORK

Sensor Based Automatic Irrigation Management System: The purpose of this project is to build a system that helps the water regulation process by measuring the ratio of humidity. The grounded sensors around the land area will notify the water requirement and will also be provided. Simultaneously, a mechanized approach for filling the water tanker when it is empty was arranged.

Automatic plant watering system: This machine was considered to feel the soil's dryness and, in the end, switch on the electric pump to start water supply and turn off the pump once there is ample water. The Materials used are: Transistor 548, Resistor 1k, Variable resistor 47kilo ohm, Diode1N4007, Relay 5v, LED, DC converter, Circuit board, Probes, AC water pump, water reservoir. There is no real implementation in this study, it's only on the circuit and information on how the system should work, and I don't think there's a need to use an LED system that can operate fully automated without using LED.

Identifying Soil Humidity Content by Automatic Irrigation Methods: An extraordinary program on "Identifying Soil Humidity Content in Automatic Irrigation Methods" is being proposed to improve an automatic irrigation strategy that regulates motorized pumping by turning it on or off machine due to soil moisture detection. It's been shown that the use of automated irrigation techniques enables employee operational errors to be minimized and adequately automated irrigation to be applied to the field of agriculture. This project is expressed by a board called Arduino, which assembles input signs of variable moisture conditions through a unique method of sensing moisture. The project shows that the amount of water used in crops can be monitored and corrected by using a moisture sensor, preserving the precious soil, and retaining the quantity of water required for crop irrigation.

3. METHODOLOGY

The machine method involves robotically and controlled implementation of proto-type computer functions via the mobile application. The drawing of the timeline and reading-related works will be step one for the prototype format. Having looked at the advantages and downsides of previous studies in the subject of an automatic irrigation system, we can start implementing the executable layout and automation method. The project timeline was set to the project's flowchart.

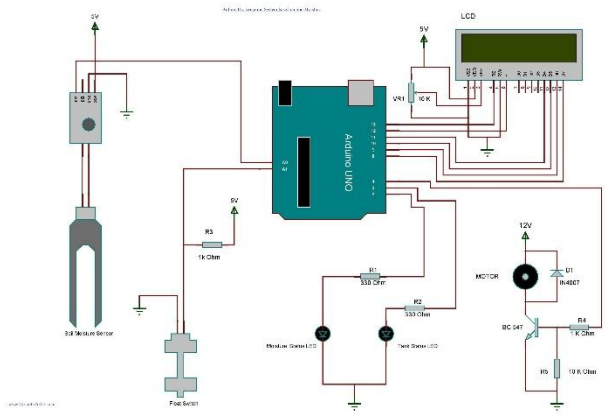

Fig -1: Name of the figure

Circuit Diagram: Here In this figure: For analog input, seven soil moisture sensors are connected to the Ar- Arduino A0 pin, so that we can get temperature content in the soil. Vcc pin is connected via 5V Arduino pin; the GND pin is the ground for connecting all the components. D7 is known as a digital pin and is therefore related to low-power amplification with transistors. Motor driver module VCC pin connected to Arduino board through D13 pin, Based on the temperature monitor, the current is passed to the motor pump, and the D7 pin is used for ground. As an output, we can write the values. D7 connected through 1k resistors, and the same connection goes via low amplifying current transistors. There are three pins in transistors, which we call Emitter, Base, and Collector.

4. DEVELOPMENT

Arduino board is an open-source platform that is used to create electronics projects. Arduino is the board of a programmable circuit that we can write based on the projects. Arduino program can upload to the Arduino physical board with IDE (Integrated Development Environment) software that runs on your device. Arduino language is simply a collection of C / C++ functions that you can call from your code. Moisture sensors for soil measure the moisture content of water in the soil. Since direct hydrometric measurement of free-soil wetness requires removal, drying, and sample coefficient, soil moistness sensors indirectly live the meter's water content by victimizing certain soil properties, such as electrical phenomenon, nonconductor constant interaction or neutron interaction, as substitutes for wetness content. It will detect the temperature and humidity from the environment and show this information in the Arduino display. Through this, we will able to know what the condition of the air and soil is. This is how proper timing for providing water and fertilizer will be measured. It will work as programed in the Arduino. An AC motor is an electric motor operated in alternating current (AC) by Associate. The AC motor usually consists of two essential parts, an outdoor stationary stator coil with coils fitted with AC to supply a rotating flux and an indoor rotor attached to the output shaft to generate a second rotating flux. The rotor flux could also be made through permanent magnets, striking reluctance, or electrical DC or AC win-dings.

5. DISCUSSION

Effective application of irrigation scheduling has identified six themes for determining particular constraints and providing suggestions for improving irrigation control.

Limitations of irrigation scheduling methods and techniques: Different methods and Tools were conducted to evaluate when crops require water and how much water they need to use for irrigation. Those include the specific techniques of soil and plant monitoring, as well as the more traditional models of soil water balance and simulation schedule. The use of the different scheduling tools depends on the data type input requirements: weather, soil, and crop, as well as data collection frequency. Evapotranspiration projections and conditions for crop water play a significant role in many of the models and specific parameters for water stress. Identifying limitations and requirements for use by farmers and managers is important in selecting the appropriate scheduling methods.

Inter-relationships between on-farm irrigation systems and irrigation scheduling methods: A crucial problem in irrigation scheduling is whether and how much water will be added to the crop. This is dictated by the process of irrigation on the field. The adequacy and adaptability of the various irrigation scheduling approaches and techniques concerning the irrigation system (surface irrigation, sprinkler, and micro-irrigation) are also not adequately considered. The performance of irrigation as calculated in terms of appropriateness and efficiency of operation, the irrigation scheduling method has to be included in the selection and Service, as well as the design criteria for the irrigation system.

Under insufficient water supplies, unpredictable rainfall and saline conditions, limits and applicability of irrigation schedules: Under conditions with restricted water availability, irrigation schedules are highly vulnerable, where water shortages require precise scheduling with water applications to mitigate yield reductions—likewise, water scheduling sufficient.

Knowledge of the water yield functions and salt tolerance levels under saline conditions. Deficit irrigation requires adequate and reliable measures of water stress, while accurate information on yield-salinity relationships is necessary to manage saline waters.

When planning irrigation schedules, the variability of the rainfall is also difficult to manage appropriately. It is essential to consider the choices, special requirements, and limitations

of irrigation schedule under variable frequency and amount of rainfall.

6. CONCLUTION

Thus the "Automated soil moisture-based irrigation system using Arduino" has been successfully designed and tested. It was developed through the integrated features of all the components used for the hardware. Each element has been thought out and carefully put in this Presence, thereby leading to the unit's best running. The Arduino Automatic Plant Watering System has been successfully designed and tested. The system was automatically tested to work. The humidity sensors measure the level of moisture (water content) of the different plants. The moisture sensor sends the signal to the Arduino board, which triggers the Water Pump to turn on and supply the water to the respective plant using the Rotating Platform / Sprinkler if the moisture level is below the desired and limited level. When the desired moisture level is reached, the system halts on its own, and the water pump is turned OFF. Thus, the functionality of the entire system has been tested thoroughly, and it is said to function successfully. The system has many benefits and can run with less human resources. The device only provides water when the soil moisture is below the reference value. Water conservation occurs due to the direct transfer of water to the roots and also helps to maintain the soil moisture ratio at the constant to some extent root zone. The system is, therefore, efficient and compatible with the changing environment.

Future work: For the future, the first phase of the project will result in moving this project to a broad scale. Instead of wire link, also control system via Zig Bee. Besides, to create more flexible mobile apps that have more data controlled. We can also develop this system by using renewable energy, which is solar power instead of solar-powered batteries, to help reduce future costs.

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