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GSM BASED SOLAR POWERED AUTOMATIC IRRIGATION SYSTEM

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Abstract - *Agriculture is the source of living of majority Indians and it also has a countless influence economy of the country. The objective of our project is to reduce this manual involvement by the farmer by using an automated irrigation system which purpose is to enhance water used for agriculture crops. The inspiration for this project came from the countries where economy is based on agriculture and the climatic conditions prime to storage of rains and scarcity of water. The farmers working in the farm lands are only depends on the rain and the bore wells for irrigation of the land. Even if the farm land has water pump, manual involvement by farmers is required to turn the pump on /off when needed. The project is intended to cultivate on automatic irrigation system which controls the pump motor ON/OFF on sensing the moisture content of the soil. In the field of agriculture, use of appropriate technique of irrigation is essential. The advantages of this technique is to reduce human interventions and still certify proper irrigation. A software application was developed by predetermining the threshold values of soil moisture, temperature and water level that was programmed into an arm controller. This paper presents the controlling and monitoring the level of water and detecting the soil moisture content.*

***Key Words*: Solar panel, GSM module, Microcontroller, Moisture sensor.**

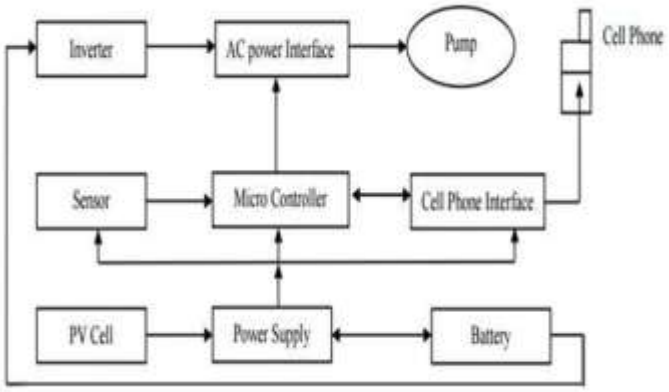
1. INTRODUCTION

Sun based vitality is that the most proliferating supply of vitality inside the world. Sunlight based power isn't exclusively related degrees were an answer for now's vitality emergency however conjointly an ecological inviting kind of vitality. Electrical marvel era is a temperature approach for misuse sun oriented power. Sun based high controlled water system framework might be a suitable distinctive for ranchers inside the blessing condition of vitality emergency. Programmed water system framework utilizes elective vitality that drives water pump to pump water from bore well to a tank and subsequently the outlet valve of tank is naturally directed misuse controller. A wet finder is utilized to deal with the stream of water from the tank to the water system field that advantages the work of water. Since our nation position second in agribusiness and it gets sunlight consistently, its educated use sun oriented vitality for water system capacities. The option vitality is totally amazing for use with water system frameworks for greenery enclosures, loft nurseries and so forth. Enhancing water system strength will contribute significantly to lessening generation cost of harvests, making the request give reaction extra productive. Through right water system advancement, normal vegetables yields might be kept up or expanded.

1.1 Literature Review

In this paper, soil moisture sensor and opening unit handle the sensor info and transmit data to a web submission. One algorithm was developed for measure threshold values of temperature sensor and soil moisture sensor that was planned into a microcontroller to control water amount. For power photovoltaic panel was used. Another facto like cellular-Internet interface used that that allowed for data assessment and irrigation planning to be programmed through a web page. The automatic system was tested for 30 days and save 90% compared with modern irrigation system. Because of its energy autonomy and low price, the system has the possible to be valuable in water limited geologically isolated zone. In this paper, soil moisture content has been sensed using acoustic based technique was developed. The main propose of this technique is growth for measure soil moisture in real time method, The technique based on association between two quantities i.e. speed of sound and the degree of permeation with water in soils. This experiment found that the speed of sound reductions with moisture content following, contingent on the kind of soil this paper design a model of automatic irrigation arrangement which is based on microcontroller and solar power was used only for source of power supply. Several sensors are placed in paddy field. Sensors sense water level unceasingly and give the data to farmer through cellular phone. Farmer controls the motor without going in paddy field. If the water level reaches at danger level, routinely motor will be off without conformation of farmer.

1.2 Block Diagram



GSM based programmed water system framework compromises of four push to on switches, three for product determination and one to ON engine forcedly. One of three changes is utilized to choose water system sort for a specific product developed in the field. Once the water system mode is chosen, LCD shows the dampness contained of the dirt and in addition shows the condition of engine ON/OFF. It additionally comprises of GSM module LCD and engine to pump water in the field. At the point when a mode for specific yield is chosen, the dampness sensor measures the resistivity of the dirt. Dampness sensor is a transducer which changes over the estimation of dampness contained in soil into electric frame. The yield of dampness sensor is simple in nature. The inbuilt ADC in ATmega328 changes over simple information into 10-bit advanced information. In this way got information is additionally handled by the processor and shown in LCD. Each yield is characterized with the lower and higher characterized esteem which is required for legitimate development. In the event that the esteem detected by the dampness sensor is beneath the lower characterized esteem, engine naturally ON and pump the water in the field. In the events that higher characterized esteem is met, engine is OFF again consequently. The condition of engine is additionally shown in LCD. In that proprietor of the field need to know the state of field, remaining at the home can call the number. In the event that call is gotten at GSM module, the processor send SMS with detail state of field to the ace SIM.

2. Methodology

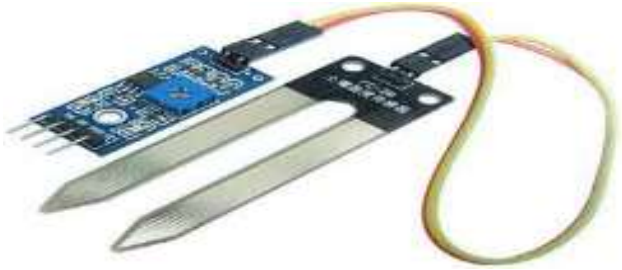
A. Solar panel-

A. The system is designed with the solar panels of the semiconductor material. the main function of the solar panel is convert the solar energy into dc electrical energy which is generally 12v. The no. of cells and size of cell depends upon rating of load.

B. GSM module-

Modem remains for modulator- demodulator. It is a specialised gadget that can regulate a simple transporter motion with computerized information and transmit, while it likewise demodulates the approaching adjusted flag to remove the simple data. There can be wired and in addition remote modems. We are utilizing the latter one where in the modem catches the regulated bearer motion with a reception apparatus associated with it. A GSM modem is a remote modem that works with GSM remote system. Like GSM mobile phone, A GSM modem requires a SIM card from a remote transporter so as to work. Once a GSM modem is put and controlled it is prepared to work as collector and transmitter GSM modem underpins an arrangement of AT orders. Our venture concentrates all perusing, composing, sending, accepting,erasing SMS messages by means of AT summons. The GSM we utilized is SIM 900 and its deal with 9600bps.

C. Moisture Sensor(SEN92355P)



This moisture sensor can be utilized to distinguish the dampness of the soil or judge if their water around the sensor, let the plants in your garden connect for human offer assistance. They can be anything but difficult to utilize, simply embed it into the dirt afterward read it. With the assistance of this sensor, it will be feasible to make plant remind you hello I am parched now, please give me some water. The dampness sensor which can be utilized to recognize the dampness of the dirt. At the point when the dirt dampness shortfalls, the sensor yield esteem will diminish. You can know whether a plant needs water and not

by watching the outcomes that the sensor yields. Soil dampness sensor in view of soil resistivity estimation. It is atransducer which measures dampness contain in the dirt and change over it into electrical shape. Along this lines watched esteem is in simple frame and further all the more handling it is changed over into advanced shape. This dampness sensor is effectively accessible in the near by market and simple to utilize. In this sensor there are three pins one for ground, next for supply and next for flag.

D. Microcontroller ATmega328

The ATmega328 is a low power, high performance CMOS 8bit microcomputer with 4kbytes of flash programmable ad erasable read only memory(PROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard MCS-51 instruction set and pin out. The on-chip allows the program memory to the reprogrammed on system or by conventional non volatile memory programmer. By combining a versatile 8-bitCPU with flash on monolithic chip, the Atmel AT89C51 is powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.
The mega328 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The idle mode stops the CPU while allowing the RAM, timer/counter, serial ports and interrupt system to continue functioning the power down mode saves the RAM contains but freezes the oscillator disabling all other chip functions until the next hardware reset.

E. LCD

LCD (Liquid crystal display) is an electronic show module generally utilized as a part of different gadgets and circuit. LCDs are prudent, effectively programmable, have a no restriction of showing extraordinary and even custom characters etcetera. This LCD has two resistors to be specific command and data. The charge enroll stores the summon guidelines given to the LCD. A summon is guideline given to LCD to do a predefined undertaking like instating it, clearing its screen, setting the cursor position, controlling showcase and so on. The information enroll stores the information to be shown on the LCD. The information is the ASCII estimation of the character to be shown on the LCD.

ADVANTAGES

1. Save the time.
2. Save the water.
3. It is more efficient.
4. It is cost effective.
5. Used for the agriculture area.
6. Reduce the farmer's problems.

3. CONCLUSION

The use of automatic irrigation method would allow us to save the excess water which may be wasted during manual methods. Further it improvises the process of irrigation and makes it a reliable one. The provision of water to the fields is done in a more effective way using this technique. Moreover, electricity issue can also be resolved by using solar energy. Thus, this method has an upper hand over all other methods of irrigation because of its consistency and usability. This improvisation in food reduction technology greatly enhances the opportunities to increase the economic growth in India. With the use of minimum resources, the proposed system can save a lot of water and electricity hence economically favourable.

FUTURE SCOPE

The project can be made more versatile through using more sensors. The addition of more sensors can increase the accuracy of moisture content measurement. This project operates on solar power(DC power),it can be made to

operate at AC power as well through two-way power supply system. Such that, motor operates on AC and in case of load shedding motors take their input supply from solar circuit.

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