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IOT Based Automated Irrigation Water Robot with Solar Power

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ABSTRACT: Irrigation systems require large piping setups along with many sprinklers in order to achieve proper irrigation. This system has many problems associated with it. It requires expensive piping as well as sprinkler costs along with high powered motors in order to drive water through such long pipes. There is always a chance of leakages that may cause oversupply of water to a particular area and under supply in another leading to plantation loss. Also this will incur heavy repairing costs. Our proposed system uses a robot with a single sprinkler that moves through the field with a water tank that moves throughout the field spraying water all over it. It is like a moving water tank that automatically moves all over the field spraying water through it. This robot can be equipped with geo fencing sensors so it will cover complete fields without needing any manual intervention Irrigation of the agricultural sector is a major problem facing most farmers now a days. The problems associated with irrigation are over-irrigation, underirrigation and manual labour Irrigation of the agricultural sector is a major problem facing most farmers now days.

KEYWORDS: Arduino Uno R3 Microcontroller, LCD, Solar panel, water sprinkler, Battery

I.INTRODUCTION

The limitation of water resources and global population growth has led states and governments worldwide to increase agricultural products per area unit and optimize soil and water resources productivity with using new irrigation methods. Developing irrigation methods and their equipment manufacturing technologies, especially those of pressure irrigation system resulted in inventing new approaches to increase irrigation efficiency. Generally, current irrigations systems are classified into pressure and gravitational systems; the pressure category includes sprinkler and drip irrigation systems and Gravitational system usually involves furrow irrigation. Thus, choosing each system could maximize water productivity and minimize costs of keeping farms.

Because of the limitation in fresh water resources and fertile lands and the costs of institutions (workforce, energy resources, chemical fertilizers, etc.) which are going to be high, it seems to be necessary employing appropriate methods.Therefore, in order to improve utilization and productivity, it would be possible to optimize economic efficiency through resource management and utilization of water resources at the minimum level in comparison with traditional systems, what is expected of automatic irrigation system is decreasing water utilization

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without diminishing production rate. Although an automatic system could meet the needs without permanent human presence and monitoring during the growing season, continual presence of the worker to control irrigation automatic instruments is not economic. Through advancements in technology and advent of processors and controllers, it will be more serious improving the role of farmer as an observer offfield particularly in the light of new irrigation systems. Human errors resulted by operators' mistakes or delays in taking required steps, which leads to reduce productivity. Thus, with waterworks development and various instruments, the underpressure units would be contortion, which are allocated the most bulk of sources.

II.PROPOSED METHOD

This project is based on the implementation of an agriculture robot vehicle which navigates in between the crops based on the instructions given by the farmer using android application. This vehicle uses cheaper components, so that the vehicle becomes cost effective. The farmer can use any android smart phone for this application to move the robot and track any intruder if detected in the field. Farmer will receive a picture of his farm when an intruder is detected. He will obtain a message or notification from Agribot about the event occurred in the farm. Farmer can control pesticide sprinkling device through IOT application. The signal is received at the operating end and viewed using mobile. Thus, identification of the intruder is made very much possible and simple as well, the image and sends it to the farmer.

The automation in the agriculture could help farmers to reduce their efforts. The vehicles are being developed for the processes for Ploughing, seed sowing, Grass cutter, Sprinkler. All of these functions have not yet performed using a single vehicle. In this the robots are developed to concentrate in an efficient manner and also it is expected to perform the operations autonomously This idea implements the vehicle to perform the functions such as ploughing, seed sowing, grass cutting and water spraying. Energy required for this machine is less as compared with tractors and agricultural instrument pollution is also a big problem which is eliminated by using solar plate. As there are no efficient equipment's to aid the farmers. There is a need for new techniques to be implemented. Previously the idea was formulated, design options were finalized. For many varieties of crops, high precision planting has been developed for a wide range of seed sizes, resulting to uniform seed distribution in seed spacing along the travel path.Wi-Fi is used as receiver.

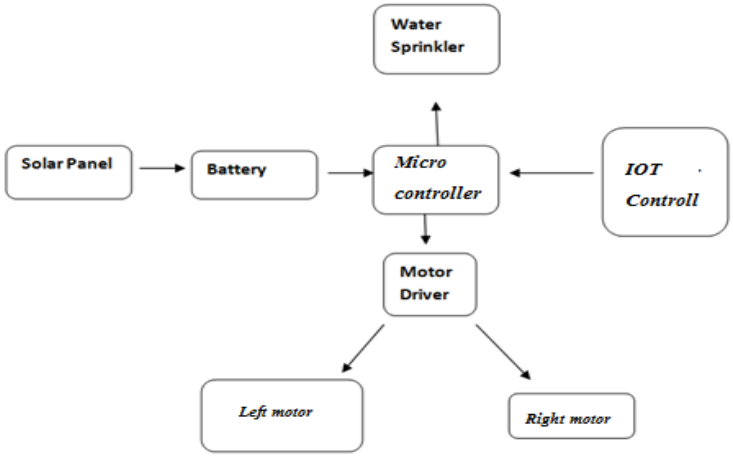

Fig.1: Block Diagram of the proposed method

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The main component here is the AVR at mega microcontroller that controls the entire Solar Powered Multi-Function Agri-Robot process. Initially the robot tills the entire field and proceeds to ploughing, simultaneously sowing seeds side by side. Disadvantage of this robot is on the field the robot operates on automated mode, but outside the field is strictly operated in manual mode.

III.SIMULATION RESULTS

Proteus 8 Software which requires Windows 7 or 10 operating system to function. Proteus isn't a name that rings a bell. If we work in the medical field we've probably heard of it because it's a bacteria genre which, 9d includes different species such *as* mirabilis *or* vulgaris *that* reside in our digestive tract. But beyond microbiology, in the software sector, it turns out to be one of the most acclaimed electronic designprograms by engineering students and electronics professionals, capable of offering us an advanced simulation of electronic circuits and microprocessors. It's one of the most complete electronic tool packs on the market as in its version 8.5 (the newest of them all), it allows us to create from our PC all sorts of PCBs or printed circuit boards using almost 800 different microprocessors.

A.SOLAR POWER ON – When we switch on the circuit, the controller and the other devices will get powered and turns on. After that the LCD display shows name of the project which indicates the circuit is powered on.

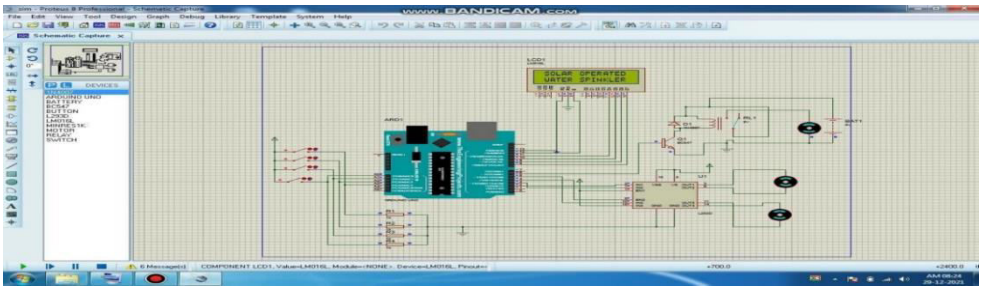

Fig 2. Solar Power On Mode

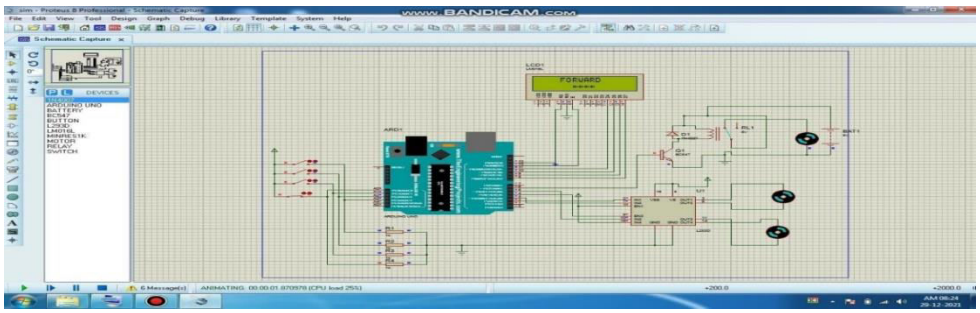

Fig 3. Forward Movement

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B. FORWARD MOVEMENT - When this command is given, both the motor starts to run in forward direction and the sprinkler moves in reverse direction and in the LCD, it displays as "FORWARD".

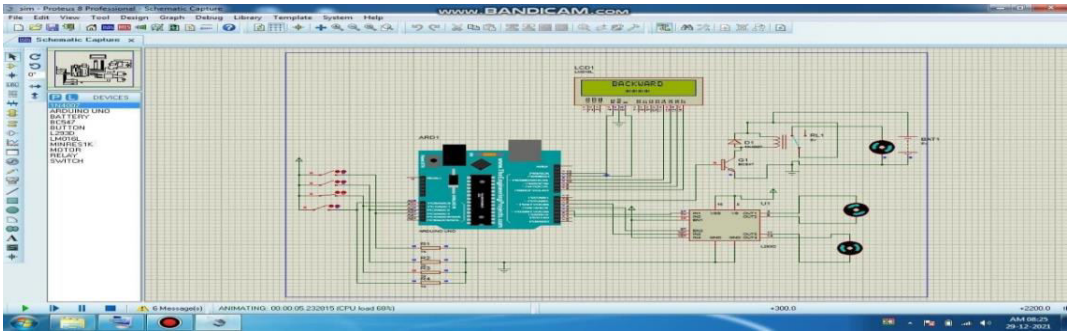

Fig 4. Backward Movement

C.BACKWARD MOVEMENT - When this command is given, both the motor starts to run in backward direction and the sprinkler moves in reverse direction and in the LCD, it displays as "REVERSE".

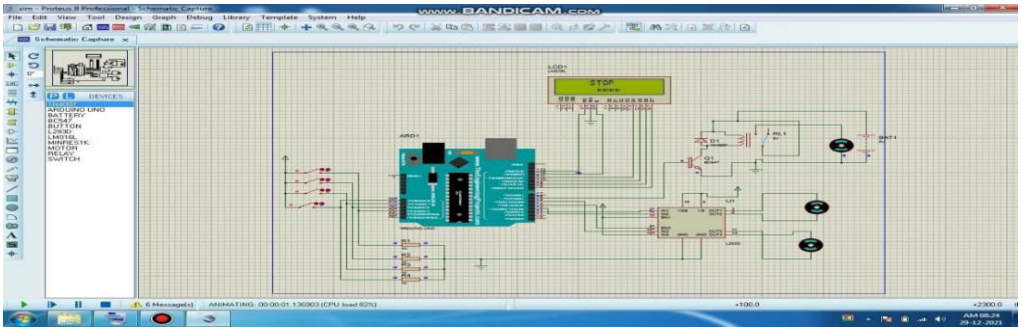

Fig 5. Stop Mode

D.STOP MODE - When we instructed the command as stop, it stops the operation and stops the movement that are functioning and in the displays it shows as "STOP".

IV.HARDWARE REQUIREMENTS

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as USB-to-serial converter. Revision 2 of the Uno board (A000046) has a resistor pulling the 8U2 HWB.

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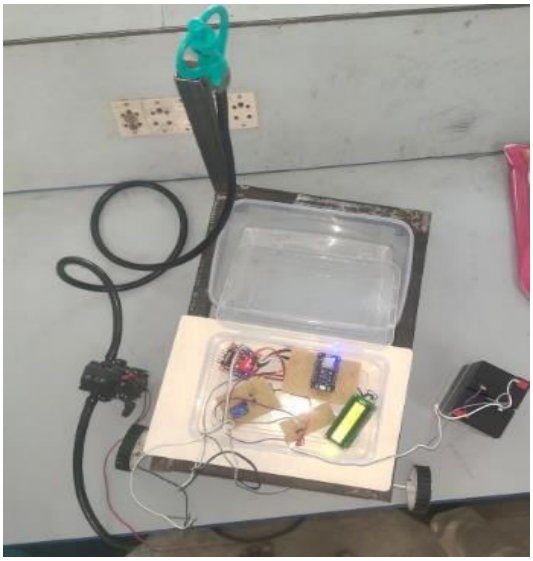

Fig 6. Hardware Model

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load.Here the power is gained by using the solar power a generated by sun, here the light energy is converted into electricity.Wireless communication is among technologies biggest contribution to mankind. It is enhanced to convey the information quickly to the consumers. In the modern health care environment, the usage of internet of things (IoT).The operations are made by using mobile phone, when we give command it acts to it. Everything can be monitored by using mobile application

V.CONCLUSION

Internet of Things' is far and wide castoff in relating devices and gathering statistics. This agriculture monitoring system serves as a reliable and efficient system and corrective action can be taken. Wireless monitoring of field reduces the human power and it also allow identify intruders causing trouble in the field. It is cheaper in cost and consumeslesspower. The smart agriculture system has been designed and synthesized. The developed system is more efficient and beneficial for farmers. It gives the information about the intruders in agricultural field through an alert message to the farmer, if the android phone is silent or is in vibrate mode, a voice alert message is sent announcing the nuisance caused in the field to the farmer. The system can be used in the current scenario of covid-19 to sprinkle sanitizing chemicals over the city without manual intervention. The application of such system in the field can definitely help to protect crops from intruders. In this project, IOT controlled robot, named, Agribot has been designed, built and demonstrated to carry out spraying pesticides in an agriculture field. The agribot will assist the farmers in increasing crop yielded and protect them from harmful chemicals of pesticides with security alert system. The method applied to build solar powered pesticide pumping using IOT is cost effective. It can be easily

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managed using android application which is user-friendly. Advanced and powerful MCU can be used to make the farming system more effective, efficient and precise. Usage of renewable resources like solar energy can help in cutting down of more battery usage. Reduces physical work by spraying pesticides and protects the farmer from harmful chemicals.

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