SOLAR POWERED AGRICULTURAL ROBOT DESIGN FOR WATERING AND SEEDING

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Abstract - *– In this paper a agricultural robot is designed to automate work of farmer. . In the field of agronomic self-automated vehicle, a commencement is been developed to examine if numerous small self-directed machine could be more efficient than habitual large tractors and expand the working rate, quality and expansion in farming. One of the most beneficial thought is that decrease the human physical efforts .Observance the above ideology in concentration, a unit with the many feature is designed who works elegantly with latest technology and natural energy sources. This project outlawed by distantly and solar panel is used to charge DC battery of 12v.Robot work for seeding and watering inside the field.*

Key Words: *solar panel, DC motor, AT mega 16,Blutooth module*

1.INTRODUCTION

In the recent generation most of the countries do not comprise sufficient trained man power exclusively in agricultural sector and it affects the expansion of developing countries. So it's a time to mechanize the segment to conquer this issue. In India around 70% people dependents on agriculture. So we need to learn agriculture. [1]pioneering idea of our project is to automate the procedure of watering and sowing seeding such as sunflower, corn, groundnut and vegetables like beans, lady's finger, pumpkin and seed of wheat etc to the agricultural field.To decrease the human effort and increase the yield. The seeds are proscribed and varied by using microcontroller. When the robot reaches the end of the field we can change the direction with the help of remote switches.

Seeding of firm and plantation of seeds is robotically done by using dc motor. The distance between the whole processes is controlled by microcontroller. Watering of firm and seed plantation is our day to day life is done by tractor in farms. But it requires more time & the man authority shortage is faced continuously. The requirement of automation in our country is to reduce man power.; the catchphrase in all industrial firms generally involves electrical, electronic component as well as mechanical part.

Automation saves a lot of monotonous manual work and speeds up the production processes.

Now a day we have lack of man power. Energy for this machine is less as compared with tractors or any agricultural instrument pollution is also a big dilemma which is minimized by using solar plate. a manual farm consumes more time & leads to more pollution. So it is a point to automate the procedure of watering and sowing of seed. Another is also need is to increase high speed of operation. Development of a robot that can carry out automates watering and seeding operation can be manually navigated by the farmer and stabilize the environment. Robotics and automation can play a major role in enhancing agricultural production needs. Automation can be done by man in operations such as seeding and watering.

2. BLOCK DIAGRAM
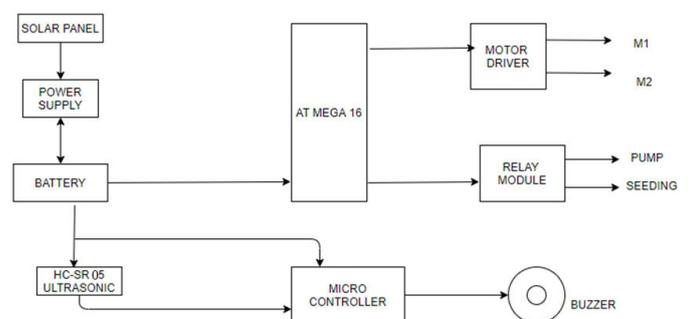
Fig 1: **BLOCK DIAGRAM OF AGRICULTURAL ROBOT**

This Robot consist of solar panel which is used to imprison solar energy where the solar energy converted into electrical energy which in used to charge 12V battery, which then gives the necessary power is utilized to operate DC motor. The Arduino is used to control the Robot. Here Arduino is the mind of the robot which is used to manage all the operations of the Robot. That gives the desired track to inner motors and motor drivers. The block diagram of model given above. This whole structure of automated-robot works on the battery and the solar power. Solar panel is placed on the top of frame and this is connected with the battery for charging. The Robot requires 12V battery to work the system generated by the Solar panel. The base frame is made for Robot with 4 wheels connected with the DC motors which is responsible for the movement and the speed

of the Robot. One end of the frame, seeding structure is in suite with the DC motor which is used to seed on soil.

For the Seed Sowing a funnel is used which is made up of plastic, this funnel is connected to the soil and used for sowing.For watering motor used to pump and supply water.

3. COMPONENTS

3.1 SOLAR PANNEL
Solar panels are devices which are used to absorb the sun's rays and convert them into electrical energy or heat.A solar panel is actually a set of solar (or photovoltaic) cells, which can be used to produce electricity through photovoltaic effect. The solar panel used here is 3W/12V.

Fig 2-SOLAR PANNEL

3.2 ATMEGA 16 MICROCONTROLLER
ATMEGA16 microcontroller is one of the popular controllers in AVR series. With its features and purchase cost it became one of preferred controller for both hobbyists and engineers. ATMEGA16 programming is alike to any other AVR controller. It is particularly a replica to ATMEGA32 except for the memory. Even though it has only half the memory of ATMEGA32, it is still more than enough to please most Embedded Systems**.**

Fig 3-ATMEGA 16 Microcontroller

3.3 HC-SR 05 ULTRASONIC:

Send a pulse signal to I/O TRIG which is at least 10us long, this will turn on the module to start detect the device .The ultrasonic module will routinely send eight 40khz square waves, and will automatically sense when there is a echo signal; When there is an reflect signal back, the ECHO I/O will output a high level, the period of the high-level signal is the time from ultrasonic start to return. As a result, the Measured distance = (T(Time of High Level output) * (340M / S)) /2.The cause for the division by two

is that since this is a echo it has traveled both to and from the entity. Note the speed of sound is reliant of the temperature so keep in mind for precision.

Fig 4-HC-SR 05 ultrasonic sensor

3.4 MOTOR DRIVER-L293D

L293D is a Motor driver .It allows DC motor to drive on both directions. It is a 16-pin IC which manages a set of two DC motors concurrently in any direction of motor. It means that we can control two DC motor with a single L293D IC at a time. Driver IC which allows the DC motor to drive on any direction as per the motor moment.
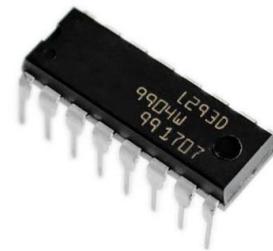

Fig 5 - L293D motor driver

3.5 DC MOTOR

Stepper Motor is an electromechanical device which converts the sequence of electric pulse applied at their excitation winds into exactly defined step-by-step mechanical shaft rotation. The shaft of the motor rotates throughout the fixed angle for each discrete pulse there. This rotation can be linear or angular depending on the motor. It gets one step movement for a single pulse input.
When a train of pulses is applied, it gets turned through a certain angle. The angle through which the stepper motor shaft turns for each pulse is referred as the step angle, which is generally expressed in degrees. The number of input pulses given to the motor decides the step angle and hence the position of motor shaft is controlled by controlling the number of pulses. This unique feature makes the stepper motor to be well suitable for open-loop control system wherein the precise position of the shaft is maintained with exact number of pulses without using a feedback sensor.
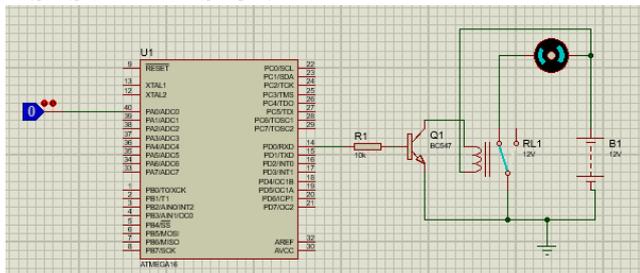
Fig 6- DC MOTOR

4. SYSTEM DESIGN

Fig 7: Circuit diagram of agriculture robot in multisim

Remote provides command to the transmitter, via Radio Frequency signal, the transmitter transmits the signal to robot. The following signal received by receiver section of the robot and is physically operated. DC motor will activate and the motor get revolution as per the receiving command. Wheels are connected to DC motors, so that the motors get revolution the wheels are also rotated as given order reverse, forward, left and right with respective button present on remote. Firstly burn the code into microcontroller IC using flash and switch on the command supply. Now send the command to the receiver by means of transmitter and receiver receives the commands after that robot performs the watering and seeding operation as for each the given commands.

5. CONCLUSION

This Multipurpose Robot is useful to reduce the cost of the Seed Sowing and watering and all this work is done in the less time rather than the human effort. As we know that in the agriculture all other equipment is work on the conventional energy like oil, fuel, etc. that is costly for the farmer so reduce that parameter the project is work on the nonconventional energy means that is based on the solar energy. The Solar energy is renewable energy that is favorable for the farmer. At the same time by using solar energy environment pollution can also be reduced. Thus aiming to save the revenue of government & also most demanded fossil fuel. By the help to the single robot more objectives with flexibility in changing the operation will motive the farmers. This robot is purely operated by the human. So it is expected that the robot is very useful for the farmer to increase the efficiency of operations in their farms.

6. FUTURE WORK

The paper relates effort of agricultural robot as manual labor problem can be abridged as compared to the manual and tractor based sowing time, energy required for this robot machine is less. At the same time by using solar energy environment pollution can also be concentrated. Rests of modules are pending, such as flow chart, programming, graph.

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