

AUTOMATIC SEED SOWING & IRRIGATION AGRIBOT USING ARDUINO

¹M.Aravind kumar,² Akkarapalli sanjeev reddy,³ k.sagadevan.

^{1,2,3}Department of ECE, IFET College of Engineering and Technology, Villupuram, India

Abstract: The zone of horticulture is so wide, thusly this field requires the advance technologies in the process of sowing, cropping, cutting& irrigation. So the disclosure of Agriculture is the primary enormous advance towards acculturated life. Advancement in agricultural tools, is the fundamental pattern of rural change. This advancement in technology will not affect the nature of soil and increase the efficiency of getting crop. Nowadays the accessibility of work is a major problem faced by farmer. The proposed machine limits the working expense and furthermore decreases the ideal opportunity for burrowing seed sowing & irrigation operations by utilizing solar energy to operate the agribot. An adequate water supply is important for plant growth. When rainfall is not sufficient, the plants need additional water. Our undertaking encourages the ranchers to inundate the farmland in a proficiency route with computerized water system framework in view of soil dampness sensor. It depends on the edge esteem and the sensor esteems. This water system averts soil disintegration, spare water and can likewise supply manure to crops. The most essential procedure is it permits water preservation as water provided in a focused on way close to the root zone. Seed sowing, digging & irrigation robot will proceed onward different ground shapes and performs burrowing, sowing the seed and gives an good environment for proper growth.

Keywords: Seed sowing, Irrigation, Agribot .

1. Introduction

Today the environmental influence of agricultural production is very much in focus and the demands to the industry is Increasing. In the present situation, a large portion of the urban areas in India don't have adequate talented labor in agrarian segment and that influences the progress agriculture in developing country [1]. Agriculture field contribute their presence in the Indian economy and it will continue to remain

so far a long time. In any procedure of horticultural field opportuneness is required. Is most imperative factor and it can be accomplish by utilizing a fitting utilized of little ,convenient and propel innovation. Physically seed sowing will cause the wasteful and erroneous seed sowing [2]. Manual technique incorporates broadcasting

the seeds by hand.Sometimes method of digging i.e. making gaps and dropping seeds by hand is utilized. Likewise a couple of bullocks is utilized to convey the substantial hardware of leveling and seed dropping. Subsequently agriculturists need to utilize redesigned innovation for development movement (digging, seed sowing, irrigation etc.). So it's an ideal opportunity to computerize this procedure by cutting edge machine. The propelled machine is called as "Agribot". While planning this machine contamination has as been control, by utilizing sun oriented board. The vitality required for agribot is less as contrasted and different machines like tractors or any horticulture instruments; additionally this vitality is getting from the sunlight based vitalitywhich is found abundantly in nature. Driverless robots are designed to replace human labour. The proposed Agribot performs digging, seed sowing, irrigation and covering seeds simultaneously and powered by solar panel with a automatic control. India is the freshwater user in the world. The agricultural sector is the biggest user of water, followed by the domestic sector and the industrial sector. Ground water contributes to around 65% of the country's total water demand. Today water has become one of the most precious resources on the earth. At, 1790 the world's population is 800 million to just over 7 billion today [3]. Population growth is one of the major disadvantages of water reduction. Majority of the world's poor people live in rural areas. Their main income from the agriculture. Poverty and Hunger must be eradicated in our generation. But nowadays agriculture is reduced. Modern agriculture depends on engineering and technology. To increase the agriculture to save our country from poverty and Future Generation [4]. By using this type of system to develop our agriculture.

2. Existing Model

In the existing model there is a similarity in previous seed sowing machine are developed so far and there is no smart work done by it except seed sowing [1]. It need some man power to pull the machine (forward, left, right or back) and after seed sowing covering the soil by man power. Else one man can stand on their to operate the machine. At present irrigation robot are developed and implemented. Irrigation robot which is capable of performing action such as watering. But in the existing

model we need more number of moisture sensor to cover 1 acres [2]. E-MAIL concept used in drip irrigation system. Sender and receiver are assigned. Ultrasonic sensor is used to measure the water level. This system is watering the plants automatically without any manual method and also depends on the weather conditions [8]. IOT concept is used. Hardware and software systems are developed. Monitored and control the field automatically. Assembly language is used to store data. LCD can display the status of the system. This system can reduce the human factor, energy, power [9]. To measure the soil moisture and roughness retrieval is performed by the optimization. This also shows the measurement and roughness of the soil. In previous days microwave remote sensing technology is used to measure the soil moisture [10].

3. Proposed Model

In the proposed model, there is no need of man power and operate the agribot the man where ever it. It has a programmed control toward all path and programmed seed sowing and covering the dirt. It keep up legitimate separating starting with one plant then onto the next and it has appropriate usage of seed should be possible with less misfortune. It performs different concurrent task and thus spares work necessity, work cost, work time, add up to cost of sparing and can be reasonable for the agriculturist. It achives programmed in rural area. We need to build up a versatile computerize water system robot framework that plays out the assignment of the ranchers, for example, sowing the seed, straightening the land, manures and water and supply to the product.

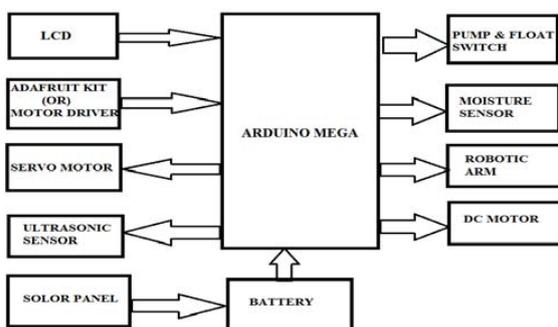


Fig 1 : Proposed System Model

The difficulties of this venture are:

- 1) To straighten the water system arrive through smoothing.

- 2) To integrate fertilizers mechanism on the robot and in addition watering the plant.
- 3) To incorporate a system for sowing the seed in the yield arrive.

Pump is associated with the pipe used to nourished the specific plant where there is a requirement for water. Water level sensor is utilized to screen the level of water in the farm. Relays are used as remote control switches and allows a little current stream circuit to control higher current circuit. It depends on rule of electromagnetic induction. This method limits the loss of water. The programming language used in Arduino is C++ language and is known as arduino language. The principle of proposed system is efficient, handles water consequently and collects the environmental parameter.

The agribot is started through the configuration of Adafruit driver. After that robot can start moving forward and performs two jobs simultaneously. Like digging & sowing are covering the dirt. The sharp pointed iron appended on the front of agribot dig the soil for sowing seed. Parallely seed are taken by seed taken by and are ready to fall in digging area. Once the seed are dropped in the soil the supporter is connected at the back end of agribot covers the land with soil. If obstacle is detected by ultrasonic sensor, it will stop the agribot and seed sowing operation. The arduino tells agribot to move left, right, back or front based on the ultrasonic signal and continue its operation. After every 3 seconds the agribot will stop the seed sowing and the adafruit drive operate the robotic (ARM) move forward and downwards to the soil digging the moisture sensor. The soil moisture level is low, the sensor send the information to arduino mega and ON the pump for water flow. The servo motor will sowing the fertilizer like (urea,complex..etc) for a plant growth. The float switch will indicate the water level of the tank. If the field reaches the threshold level of the sensor pump will automatically OFF and the robotic ARM backs to the home position. Once the agribot complete the seed sowing process in the entire agriculture area, it find obstacle at two side. We can stop the operation of agribot completely. Servo motor is used for seed taken. LCD is used for display the direction.

4. Proposed Model Diagram



Fig 2 Proposed Model

5. Components Of Proposed System

1) Arduino Mega:

The Arduino Mega is a microcontroller board in perspective of the ATmega2560. It has 54 modernized info/yield pins (of which 14 can be used as PWM yields), 16 basic data sources, 4 UARTs (hardware serial; ports), a 16 MHz valuable stone oscillator, a USB affiliation, a power jack, an ICSP header, and a reset get.

2) Ultrasonic Sensor:

This sensor is utilized to compute the separation by utilizing ultrasonic waves. The time between the sending and getting the waves gives the separation.

3) Dc Motor:

A DC engine is any of a class of revolving electric machines that change over direct current electrical vitality into mechanical vitality. The most widely recognized writes transfer on the power deliver by attractive field. Almost all kind of DC engine have some interior instrument, either electromechanical or electronic, to intermittently alter the course of current stream in part of the engine.

4) Servo Motor:

The MG995 Metal Gear Servo on PWM standard, implies its point of revolution is controlled by the length connected heartbeat to its control PIN.

5) Pump:

"All pumps utilize essential power of nature to move a fluid. As the moving pump part (impeller, vane, cylinder stomach, and so on.

6) Moisture Sensor:

In soil, dielectric permittivity is a component of the water content. The sensor makes a voltage relative to the dielectric permittivity, and in this way the water substance of the dirt.

7) Robotic Arm:

"A mechanical arm is a sort of mechanical arm, generally programmable, with comparable capacities to a human arm; the arm might be the whole of the instruments or might be a piece of more complex robot."

8) Float Switch:

We recommend our float type level switch for low cost liquid measurement. The principle of float type level meter is that a float moves up and down due to buoyancy. A reed switch in a stem is actuated by a magnet in the float, and outputs detection signal.

9) Relay:

A hand-off is an electrically worked switch. It utilize an electromagnet to mechanically worked the switch and give electrical separation between two circuits.

5.1 Algorithm

- 1) Step1: Start
- 2) Step2: Initialize the system on arduino microcontroller ATmega328.
- 3) Step3: DC motor will run forward and servo motor start sowing and also simultaneously digging operation.
- 4) Step4: Ultrasonic sensor will detect the obstacle and make a decision to turn by the allocation of programming sequence.
- 5) Step5: covering the soil by an agrobot.
- 6) Step6: DC motor will stop and servomotor will stop seed sowing.
- 7) Step7: Robotic ARM will start the operation on move forward digging the moisture sensor in to the soil.
- 8) Step8: If the soil moisture level is low, the sensor sends the information to the motor at that time. Motor flows the water to the field.
- 9) Step9: Servomotor ON to sowing the fertilizer like (urea, complex...etc)
- 10) Step10: If the field reach the threshold level the sensor and motor will automatically OFF.
- 11) Step11: If step10 is complete, it will go to step3.

5. Conclusion

This Automatic seed sowing & irrigation Agribot has increase productivity for INDIAN farmer. The chassis handles the complete weight of solar panel, battery and the hardware mounted on agribot which is able to perform each and every operation skillfully and successfully. The irrigation process is done better than before to yield the proper production done before and usage of water level is limited and increase the production rate.

References

- [1] D. Ramesh and H. P. Girishkumar, "Agriculture Seed Sowing Equipment: A Review", International Journal of Science, Engineering and Technology Research, 2014, volume 3, Issue 7, Pp-1987-19992
- [2] Laukik P. Rut, Smit B. Jaiswal and Nitin Y. Mohite, "Design, development, and fabrication of agricultural pesticides with weeder", International Journal of Applied Research and Studies, 2013, volume 2, Issue 11, Pp-1-8
- [3] Sridhar H.S "Development of Single Wheel Multi-Use Mutually Operated Weed Remover", International Journal of Modern Engineering Research, 2013, Vol. 3, Issue.6, Pp-3836-3840
- [4] Adisa A f, Braide F. G, "Outline And Development of Template Row Planter", Transnational Journal of Science and Technology August 2012 release vol.2, No.7
- [5] P.P. shelke " bleeding edge exhibit on bullock-drawn grower upgrades yield of soya bean edit, "Universal Journal of Farm science 1(2): 123-128, 2011.
- [6] Mahesh R. Pundkar "A seed sowing machine: A survey" IJESS volume 3, Issue 3. ISSN: 2249-9482, International Journal of Engineering and Social Science.
- [7] D. Ramesh and H.P.Girishkumar," Development of Agricultural Seeding Equipment", International Journal of Informative & Futuristic Research, 2014, volume-1 Issue-10, J, Pp-133-138
- [8] Joaquin Gutierrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay and Miguel Angel Porta-Gandara "Automated Irrigation System Using a Wireless sensor Network and GPRS Module" IEEE2013
- [9] Ms.Sweta S.patil, prof.Mrs.A.V. Malvijay,"Survey for ARM based farming field observing system",International Journal of Scientific and Research productions, Volume 4, Issue 2, February 2014.
- [10] Thomas J. Jackson, Fellow, IEEE, Michael H. Cosh, Rajat Bindlish, Senior Member, IEEE, Patric J.Starks, David D. Bosch, Mark Seyfried, David C. Goodrich, Mary Susan Moran, Senior Member, IEEE, and Jinyang Du , "Approval of Advanced Microwave Scanning Radiometer Soil Moisture Products", IEEE 2010

