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Automation in Seed Sowing by using Smart Agri-Robot

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Abstract: ***Introducing of advanced technology in the agricultural field may helpful for farmers in getting higher yield. The most difficult task in the farming process are sowing, cropping, irrigation, and cutting. The conventional seed sowing machine is considered to have less efficient and requires lots of human effort. Implementing automation in farming may provide feasible solutions.***

The purpose of automation is to eradicate the human clerical effort and to provide accuracy in the operations. This robot is capable of digging the soil at a certain depth and the seeds from the hopper is dropped into the field at a particular time interval in order to achieve the seeds spacing and proper compaction over the seeds. Covering of seeds with soil is done by the bent rod which is at the backside of robot and then water is pumped from the tank in order to supply adequate water to the soil after the seed has been sown.

This advancement in robot may overcome the drawbacks in the conventional method of seeding which includes wastage in seeds, high wage of labor.

Keywords: Horticulture, Automation, Economy, Advancement, Conventional etc…

I. INTRODUCTION

In present scenario, Most of the countries are suffering from inadequate labor and power supply especially in the field of agriculture. There are different operations are performed in the farming they are seed sowing, cutting, spraying fertilizers and weeding. The most significant task is sowing seeds in agricultural field.

In conventional methods process of sowing is very difficult and inconvenient to perform it. The development of the advanced technology in the field of farming is much needed, especially seed sowing in terms of proving row to row spacing, seed to seed spacing which results in the higher yield and the placement of seed depth is different for various crop to crop based on the weather conditions.

Automation in the agriculture is still in the developing stage due to lack of technical knowledge, advanced technology and machinery. Most of the countries do not have adequate skilled man power in agricultural sector and that affects the growth of developing country. Hence using the new technology in farming activity may provide greater support to the farmers. The activity includes seed sowing, fertilizing and sprinkling of water.

The main objective of the project is to improve the seed sowing process by means of automated way. In India 70% people are dependent on the agriculture. This robot is controlled by the microcontroller which means it is programmed in it. In most of the countries tractors are used for performing sowing operation in agricultural field. It causes pollution and consumes large power that can be decreasing with this system.

II. PROBLEM STATEMENT

In Conventional method of seed sowing is usually done by human especially broadcasting and dibbling method which requires high human efforts in performing operation like digging, cropping and irrigation.

The uniformity of seed distribution and depth of the seed placement in the soil and also equal distance between the seed to seed spacing is not properly attained in the conventional method.

In addition to this the overall utilization of the field is less due to the shortage of labor and adequate of water supply. Germination of the seeds will be low due to uneven depth of the seeds sowing. This problems should be eliminated by means of using automated smart agricultural robot.

The farmers have to use upgraded technology for cultivation activity such as digging, seed sowing, fertilizing, spraying etc… Automation may helpful in assisting the farmers for cultivation, which in turn will also eliminate the requirement of Labors and also avoid the wastage of seeds.

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III. BLOCK DIAGRAM

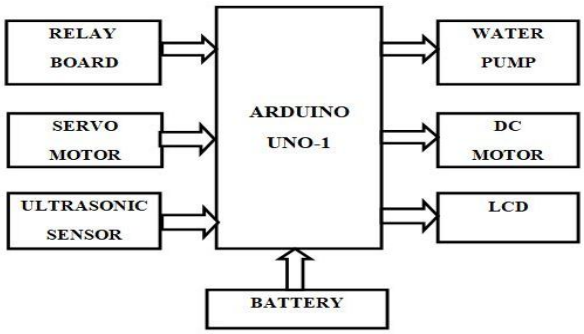


Fig 1 Block diagram of automated seed sowing robot

The block diagram of automated seed sowing robot is shown above. It is mainly consist of ARDUINO MEGA AT328P microcontroller, relay and its driver, battery, charging unit, server motor with its driver, sprinkling valve and tank. The Arduino Mega AT328P which is controller for the overall operations. And the lead-acid battery is provides the power supply circuitry which is providing 5V for Arduino board and 12V supply for driving DC motors. Servomotor is used for sowing the seeds on the field with programmed period of time.

IV. EXISTING MODEL

In existing model of seed sowing machine there is no presence of any smart work in it except the process of seed sowing. It requires high man effort to move the machine in all four directions. After the seeds has been sown it has to be covered therefore it again requires the man power to cover the soil and then it may also requires water supply which is again done by the Farmer. Hence it requires greater human effort and high time consumption.

V. PROPOSED MODEL

The robotic system plays a major role in all sections of societies, organization and industrial units. In this proposed model, automated robot is simple in construction and employed to reduce the human effort and saves times in farming operations. It has a programmed control towards all directions in the field and also covering the soil after the seed has been sowed on the field. The main objective of the project is to develop a microcontroller based system which helps in accuracy in the operation of sowing seeds at desired depth and compaction over the seeds. This proposed model consists of four wheels that are driven by the dc motors. In the seed funnel or hopper seeds are poured into it. At the bottom of the seed funnel, servo motor is fixed that helps in opening and closing of the hopper with a certain period of interval. The seeds spacing is mainly based on the programming of the microcontroller. It is also possible to cultivate different kinds of seeds with different distance. The function of ultrasonic sensor is used to senses the obstacles in the field path and it also detects turning position of vehicle at end of land.



Fig 2 Fabricated model

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VI. DESIGN DIAGRAM

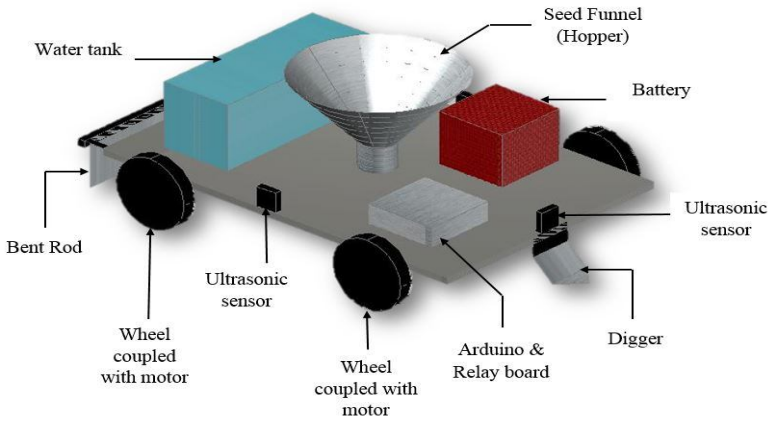


Fig.3. 3D CAD model

VII. WORKING PRINCIPLE

In this system we are operating all control systems like ploughing, seed sowing and water sprinkling through an automated seed sowing robot and which is operated by rechargeable battery. Seed Sowing Robot consists of Arduino Mega AT 328P microcontroller, relay and its driver, battery, charging unit, servo motor with its driver, digger, pump, sprinkling water system and tank. Robot will sow the fixed quantity of seed to the entire row and seed sowing varies depending on the types of seed. Before sowing the seed on the field it usually digs the soil with a certain depth. The servo motor is used to enables the opening and closing of the hopper bottom through that opening the seeds are falls on to the field. After the seeds has been sown, covering up the soil is done by means of using a bent rod. Then water is pumped from the tank and it is supplied to the soil for the growth of cultivation. It has a programmed control toward all path, seed sowing and covering the soil. It simplifies the operation of seed sowing and also increases the yield crop.

VIII. METHODOLOGY

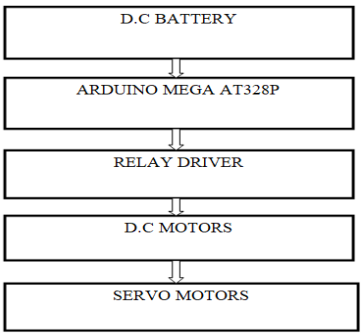


Fig 4 Methodology of seed sowing robot

IX. COMPONENTS

A. Arduino

It is a microcontroller board in perspective of the ATmega328P. This board is generally consists of a USB connection, a power jack, an ICSP header and a reset button, 14 digital I/O pins and 16 Mhz quartz crystal, And it has 1KB of Electrically Erasable Programmable Read Only Memory (EEPROM).

B. Dc motor

A DC motor is defined as the electrical machine which converts the direct electrical current energy into mechanical energy. Its works on the principle of “Fleming’s left hand rule”. The speed of dc motor has a wide range of control can be done by varying supply voltage.

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C. Ultrasonic Sensor

Ultrasonic sensor is used to senses the objects or obstacles in the path by means of ultrasonic waves. It can also use to measure the distance. It can detect transparent objects or target and complex shaped objects. It is resistant to mist and dirt.

D. Servo Motor

The function of servo motor is to control the precise control of angular or linear position, velocity and acceleration. It works on the closed loop operation. It is most commonly used in the robotics, industrial applications for positioning, automated guided vehicle etc…

E. Relay

It is a kind of electrical switch which enables "turn off" or "turn on" the current supply. It is usually integrated with the arduino board. It is of 5v channel board.

F. Pump

It is a mechanical device which is mainly used to move the liquid or fluids from one place to another based on the pressure difference.

X. CONCLUSION

This robot is meant to operate automatically in the field of agriculture. The important thing is to automate the operation like seed sowing, digging and irrigation in order to obtain the greater yield and assist the farmers to move towards the using of advanced technology. It helps them to attain globalization. The seeds are been sown in a proper sequence which results in proper germination of seeds. The effect of inaccuracies in seed placement is eradicated by means this automation. This advancement in agricultural sector is quite possible achieve greater productivity rate and reducing the power consumption and labor requirement. This Smart Agri-Robot is designated to increase the productivity and to decrease the human efforts.

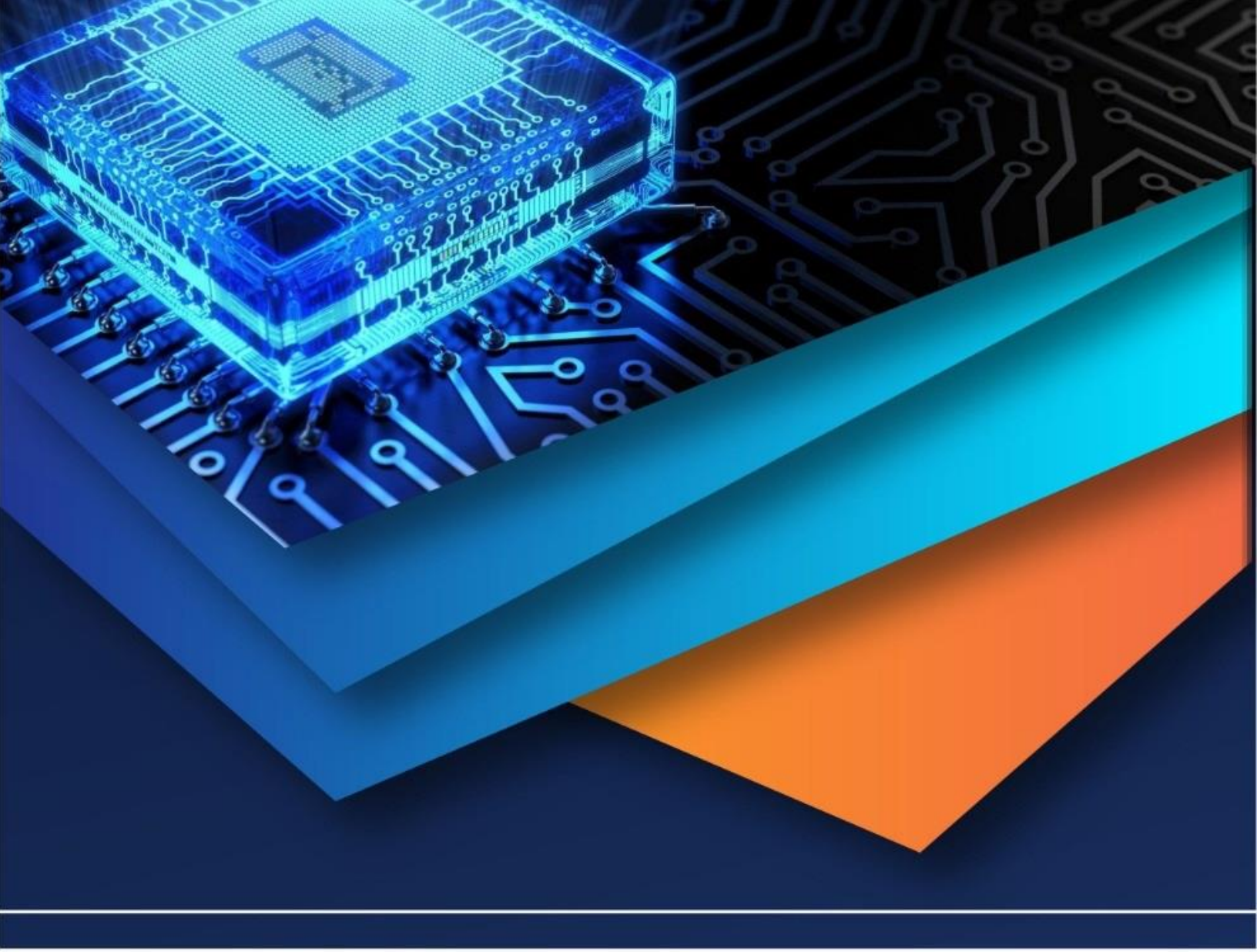
XI. ACKNOWLEDGMENT

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REFERENCES

[1] Roshan V Marode, Gajanan P Tayade and Swapnil K Agrawal, "Multi seed sowing machine", International journal of Mechanical Engineering and Robotics Research,ISSN 2278 – 0149 Vol. 2, No. 4.
[2] P.S.Gorane, Patil Nikhil, PatilShubham, Pawar Ganesh, RautMadhuri."Design and devlopment of seed sowing machine along with fertilizer sprayer,"International Conference on Recent Trends in Engineering Science & Management,ISBN 978-93-86171-12-2.
[3] Nagesh B. Adalinge, Ganesh P. Ghune,Ganesh B. Lavate, Rahul R. Mane, "Design And Manufacturing Of Seed Sowing Machine" International Journal of Advance Research, Ideas And Innovations in Technology. ISSN: 2454-132X Impact factor: 4.295 Volume3, Issue2, 2017.
[4] R.Madhavan, S.Vigneshkumar, M.Dineshkumar, "Automatic Corn Seed Sowing Process By Using Mobile Robot", International Journal of Advanced Research Trends in Engineering and Technology, Vol. 4, Special Issue 7, March 2017,
[5] P.P. shelke "Bleeding edge exhibit on bullockdrawn grower upgrades yield of soya bean edit", Universal Journal of Farm science 1(2): 123-128, 2011.
[6] Senthilnathan N, Shivangi Gupta, Keshav Pureha and Shreya Verma, "Fabrication And Automation Of Seed Sowing Machine Using Iot". International Journal of Mechanical Engineering and Technology (IJMET) Volume 9, Issue 4, April 2018, pp. 903–912, Article ID: IJMET_09_04_103, ISSN Print: 0976-6340 and ISSN Online: 0976-6359
[7] J.Govarthini, R.Thulasimani, "Automatic Seed Sowing", International Journal of Advanced Science and Engineering Research, Volume: 3, Issue: 1, 2018, ISSN: 2455-9288, ISSN 2394-3777 (Print) ISSN 2394-3785 (Online)
[8] Abdulrahman, Mangesh Koli, Umesh Kori, Ahmadakbar, "Seed Sowing Robot", International Journal of Computer Science Trends and Technology, Volume 5 Issue 2, Mar – Apr 2017.

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