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ADVANCE SEED PLANTATION MECHANISM USING RECONFIGURABLE ROBOT

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ABSTRACT

In India, agriculture is crucial to the country's economic situation. India is the world's second-largest producer of both rice and wheat. Farming still uses traditional agricul tural practises, which is quite expensive due of the farm employees. The availability of agricultural labourers encourages farmers to spread more seeds because sowing costs are high and labour costs are minimalised by this vehicle. When compared to the conventional approach, this method provides a number of advantages for planting seeds and getting rid of weeds throughout the harvest sea- sons. When compared to conventional planting, which was carried out by farm labourers, the use of a hand-operated, controlled seed-sowing machine reduces farmer exercise while increasing the capacity of the seed sower.A seeding machine may be used for many kinds of seeds and little plants. It has a straightforward design that even inexperi- enced farmers can use. Machine is created with low-cost tools so that small-scale farmers may readily access it.
The equipment of this versatile sowing machine con-
sists of a cylindrical container that may hold seeds. The container is fastened to the four-wheel carrier unit. It fea- tures two holes at the bottom and a metering plate beneath the machine through which the seeds fall apart from machine at specified distances with respect to specified crop. Based on type of seed, there is particular gear mechanism that adjusts based on the size of the seed. Seeds will run down the pipe and into the soil when the bottom holes of the container and the hole in the working plate line up. Here, the metering plate is rotated by a bevel gear assembly that is driven by the rear wheels, and the bevel gears are driven by a help chain and sprocket assem- bly.

1. INTRODUCTION

The majority of nations now do not have enough trained labour, particularly in the agricultural sector, which has an impact on the development of developing nations. The pri- mary goal of automation in our nation is to eliminate the need for human labour; this term is typically associated with electrical, electronic, and mechanical components in all industrial businesses. Automation speeds up the manu- facturing processes and eliminates a lot of tiresome manual labour. Hence, in order to solve this issue, it is now neces- sary to automate the industry. 70 of the population in India depends on agriculture. Since prehistoric man tamed the first crop plant, seed has been a crucial component of agri- culture. With this concept, the process of planting seeds is automated to save labour costs and boost yield. As we all know, agriculture is the foundation of our nation. Sev- eral innovations in agricultural technology, such as those to

ploughing, sowing, fertilising, weeding, harvest- ing, and spraying, have recently occurred. Increasing our agriculture output and quality is also crucial for improving our economic situation. from them One of the most significant and regular tasks of farmers is seed planting. Automation makes labour easier and less prone to mistake. The perfor- mance of robots with small wheels is good, and their mod- est weight prevents soil compaction DC motors are used to autonomously plant the seeds. With a microcontroller, the distance between the two seeds may be adjusted and changed. Moreover, a variety of seeds may be grown at various distances. We can use remote switches to modify the robot's course after it has reached the field's end. Mi- crocontrollers are used to control the entire operation. In farms, seed planting is a daily task carried out by tractors. Agriculture technology, such as ploughing and sowing, has seen several advancements recently. It is essential to improve our agricultural output and quality in order to ad- vance our economic situation. One of them, seed planting, is among the farmers' most significant and regular tasks. The task is made simple and error-free with the use of automation. Little robot wheels work well, and their tiny weight prevents soil compaction. The agricultural industry has done a good job of keeping up with the growing de- mand for food. The contribution of expanding the amount of land used for agriculture has decreased over time, and the advances in production over the previous two decades have mostly been attributable to rising productivity. Grow- ing agriculture has had a significant role in the advance- ment of society. The poor have been fed thanks to in- creased production, which has also increased farm revenue and opened up prospects for both direct and indirect em- ployment. In India, there are 70on agriculture. So we need to study the agriculture. Innovative idea of our project is to automate the process of sowing crops such as groundnut,

2. LITERACY SURVEY

The seed sowing machine is an essential tool in the agri- cultural sector. The efficiency of seed sowing equipment significantly affects the price and output of agricultural goods. Nowadays, there are several methods for determin-ing a seed-sowing device's performance. According to [4] agriculture must be upgraded in order to fulfil the demands of an expanding population and a rapidly industrialising world. Mechanization makes it possible to conserve in- puts by assuring accurate metered distribution, lowering the amount required for a better response, and preventing losses or wasting of applied inputs. Brief summaries of the many sorts of advances made in seed sowing equipment are offered in [8] and [2]'s reviews. The primary goal of a sowing operation is to arrange the seeds in rows at the cor- rect depth and seed-to-seed spacing, cover the seeds with soil, and apply the proper compaction over the seeds. For each crop and for various agroclimatic conditions, there are varied recommendations for row to row spacing, seed rate, seed to seed spacing, and depth of seed planting in order to get the highest yields. Devices for sowing seeds are widely used in agriculture.

2.1 Hardware Software Requirements

NodeMCU ESP8266, L289N Motor Driver Wheels Jumper Wires Battery Gear Motors Servo Motor Aurduino IDE Blynk Android Application

3. SYSTEM ARCHITECTURE

3.1 Block Diagram

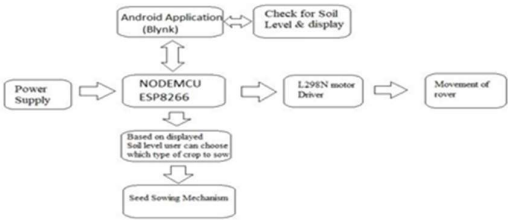

Fig.1 : Block Diagram

3.2 Working of Robot

The majority of ranchers employ the furrow approach. This method entails manually placing the seeds into the neighbourhood furrows that have been prepared for plant-
ing. •When seed is manually placed in furrows, the tech- nique is known as "Kera," and when it is placed through a special link with a nearby furrow (Pora, Nai, or Hazara), the technique is known as "Pora." In this method, seeds are sown at a depth of 5 to 6 centimetres, and germination is agreeable. Manual sowing has the drawback of not provid- ing adequate push to push and plant to plant driving to less crop population than recommended by agronomists. Ad- ditionally, there is the matter of planting the seeds at the proper depth and soil depth.

3.3 Seed Sowing Mechanism

This technique uses a seed drill to plant the seed. With the aid of this tool, seeds are dropped at a consistent depth, which leads to uniform germination and regular stand. For the usage of a seed drill or ferti-seed drill, the seed bed has to be smooth Robot is interfaced with the mobile and we can control the robot using mobile. We have use nodemcu as a microcontroller also for connecting robot and mo- bile nodemcu wifi module to achieve maximum range and stronger connectivity between robot and mobile. In front of Robot we have a mechanisn of digging a sharp object is attached at bottom front while will dig the soil first then the seed will be sowed. And also to cover the seed and to put mud again back on seed we have used a flap which is attached at bottom back and will make the surface Flat. In Multicroping we have implemented algorithm for three seeds as the sowing distance for each seed is different. So the Robot will move at a constant speed. And the seed dropping mechanism is control with speed of servo mo- tor. Suppose for distance is less for some crop then speed of servo motor will be high and seeds will be dropping at higher rate.

3.4 Working of Dc Motor Drive

L293 and L293D drivers, quadruple highcurrent half-H transistors. The L293 is designed to sustain up to 1 A of bidirectional driving currents at voltages between 4.5 V and 36 V.The L293 is intended to generate 600 mA bidi- rectional driving currents at voltages between 4.5 V and 36 V. Relays, solenoids, dc and bipolar motors, as well as other high-current/high up-voltage loads are just a few examples of the inductive loads that both devices are de- signed to drive in positive supply applications.TTL is sup- ported by all inputs. With a pseudo-Darlington source and a Darlington transistor drop, each output is a fully work- ing totem-pole driving circuit.Drivers 1 and 2 are near to being enabled at 1,2EN, while drivers 3 and 4 are close to being enabled at 3,4EN.When an enable input is high, the linked drivers are turned on, and their outputs are ac- tive and in phase with their inputs.When the enable input is low, these

drivers are off, and their outputs are in the high- impedance state. For solenoid or motor applications, each pair of drivers produces a full-H (or bridge) reversible drive with all available data inputs. International high-speed out- put clamp diodes should be used for the L293's inductive transient suppression. A VCC1 connection, which differs from VCC2, is supplied for the logic inputs to help prevent device power disintegration. The L293 and L293D can op- erate in temperatures between 0°C and 70°C.

4. RESULT AND DISCUSSION

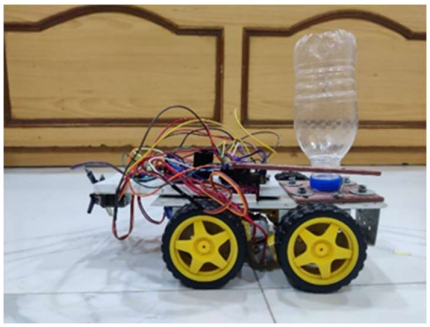

Fig.2 : Final Model

The suggested system was developed utilising the Blynk Application and NodeMCU. The goal of this model is to create a real-time application that levels the field after seeding in addition to digging the soil and scattering the seeds. Accordingly, the wheels move left, right, forward, and backward. It speeds up seed planting.

to boost production, improve factory efficiency, and minimise physical labour. After producing all the assem- bly, we determine that the cost is lower than the cost of manual seed feeding. The time required for seed feeding is shorter than manual seed feeding. The automated seed feeder requires very little space. may be updated without putting the system to sleep. Simple route changes or the addition of additional systems. Cars were restarted after being manually moved. Poly house seeds were lost and de- stroyed because they were dispersed on the ground. Seeds must be correctly sown in the soil since they are expensive and the farmer cannot afford them.

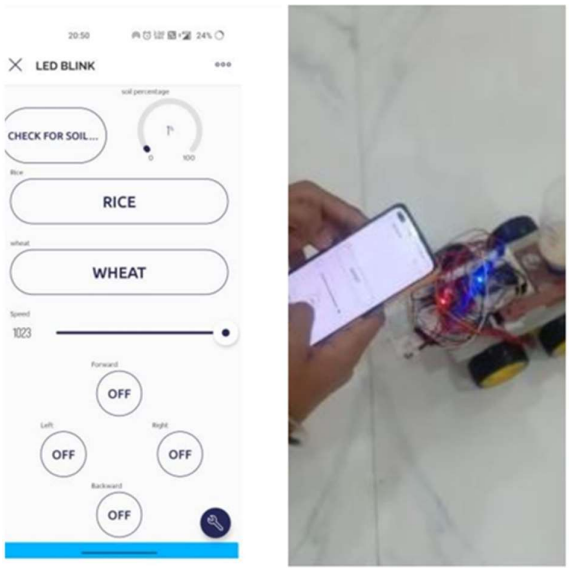

Fig.3 : Operation through software

4.1 Future Scope

The project might be improved depending on how many arms we are using to plant the seed. We may extend up to six or eight rows at once. This reduces the amount of time needed to sow seeds. The system may be further modified using one or more systems that a GSM system is capable of monitoring. A camera module for long-distance seeding might also be included. Comparision of Result with old Models

	Single Crop Seed Sowing Robot	Multicrop Seed Sowing Robot	Reconfigurable Robot For Seed Plantation
Methodology	This robot is designed to sow a single crop at a time, with the seeds being placed at precise intervals in the soil.	This robot is designed to sow multiple crops simultaneously, with different seed types being sown in different rows or sections of the field.	This robot is designed to sow multiple crops. The robot uses soil moisture sensor to detect the soil conditions and suggest user about seeds on virtual display. By giving input in app Robot will automatically sow the seed.
Proposed System	The single crop seed sowing robot typically consists of a seed hopper, a planting mechanism, and a set of sensors and controllers. The robot can be programmed to sow seeds at different depths and spacing, depending on the requirements of the crop	The Multicrop seed sowing robot typically consists of a set of seed hoppers, a planting mechanism, and a central control system. The robot can be customized	The Robot is Fully controlled with Mobile application. User can select the crop button which he wants to sow. The moisture recognizing feature in this system is a add-on to existing system. The moisture detecting not only detects the moisture of the soil but also it tells if the soil is suitable for that particular seed.

TABLE.1 : Comparision of Result

The moisture recognizing feature in this system is a add-on to existing system. The moisture detecting not only detects the moisture of the soil but also it tells if the soil is suitable for that particular seed. As for example if the user wants to check if the soil is suitable for rice plantation and if the feeded value for rice plantation is beyond 70-percent, the user will get the output that the soil is suitable for rice or not. Also due to ESP8266 has WIFI and our remote tool is connected to nodeMCU through wifi, we get good connec- tivity (approximately 50-60m) which is great as compared to other Bluetooth connecting devices that provide certain meter's range. Alongwith that the backup provided allows us immense time of around 10-20 hours continue usage backup and as it is rechargeable it is one time investment. So, this system will provide better choice in the market for farmer who want to optimize the sowing process.
The following are some of the uses for rain sensors.
This sensor is attached to the irrigation system as a wa- ter conservation device and is used to turn the system off in the case of rain. This sensor supports the usual wind- screen wiper mode in addition to protecting the interior of a car from the effects of precipitation.

4.2 Limitations of Existing System

Low germination rates resulting in seed loss. creation of a gap as a result of seed failure. decrease in overall yield. a lack of labour and excessive salary demands. The Ma-
chine is heavier in weight. accessible for driving tractors. There is no depth control arrangement. No plans have been made to prepare a seed bed. improper soil compaction over ridges. The machine is more expensive.

[1–14]

REFERENCES

[1] D. Danfeng, "Research on a forestation hole digging robot," Northeast Forestry University, Harbin, Inter- national Conference on Intelligent computation Tech- nology and Automation,, vol. A, no. B, pp. 111–222, September 2014.

[2] G. D. Dattatraya, Robotic Agriculture Machine. Gho- lap Dipak Dattatraya, More Vaibhav Mhatardev, Lokhande Manojkumar Shrihari, Prof. Joshi S.G, 2014.

[3] P. Chandran, "Autonomous system for cultivation pro- cess," I. J. F. A. R. I. Engineering and I. .-. Technology, Eds., 2014, pp. 58–102.

[4] A. R. K. . D. B. Patel, "Dec 2014 "design and devel- opment of manually operated seed planter machine," in Design and Research Conference (AIMTDR 2014), 2014, pp. 689–694.

[5] P.Pote, "A review on iot based health care monitoring system." In Lecture Notes in Electrical Engineering, vol 570. Springer Singapore.

[6] O. S. et al., "The future for quality of services. in: Ku- mar a., mozar s. (eds) iccce 2019." Lecture Notes in Electrical Engineering, vol 570. Springer, Singapore.

[7] Kshirsgar, "Iot based baby incubator for clinic. in: Ku- mar a. mozar s. (eds) iccce 2019." Lecture Notes in Electrical Engineering, vol. vol 570 Springer Singa- pore.

[8] P. Piper and J. Vogel, "Designing an autonomous soil monitoring robot" (ieee - 2015)." K. Prema, "Online temperature control based on vir- tual instrumentation ieee," Communication and Energy Conservation 2009 Perundurai India 4-6 June, 2009.

[9] A. Singh and A. Gupta, "agribot" (ijarcce-2015)."

[10] S. J. B. ShubhadhaThakre, "Near infrared spectroscopy based soil nitrogen measurement," International Jour- nal of Current Engineering and Technology E-ISSN 2277 – 4106.

[11] R. C. J, "Automated soil testing device," ITSI Transac- tions on Electrical and Electronics Engineering (ITSI- TEEE) ISSN (PRINT): 2320 – 8945 Volume - 1 Issue -5 2013.

[12] J. P. K. V, "Soil testing in india," Department of Agri- culture Co-operation Ministry of Agriculture, Govern- ment of India New Delhi.

[13] B. Y. R. et a, "Green growth management by using arm controller."