Design of Seed Sowing Machine

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Key Words: seed sowing, sowing robot, seed dropper etc.

I.INTRODUCTION

Seed sowing machine is designed for small farmers to improve their productivity. In this machine a common seed storage place is introduced to reduce the cost of the machine. This machine can be made by raw materials also which saves the cost of whole project and is easily manufactured in available workshops. The only cost is of metering device. Hence by using this machine we can achieve flexibility of distance and control depth variation for different seeds. Hence usable to all seeds. Traditional sowing methods have following limitations: In manual seeding, it is not possible to achieve uniformity in distribution of seeds. A farmer may sow at desired seed rate but inter-row and intra-row distribution of seeds are likely to be uneven resulting in bunching and gaps in field Poor control over depth of seed placement. Labour requirement is high because two persons are required for dropping seed and seed.

II. PROBLEM IDENTIFICATION

The major occupation of the Indian rural people is agriculture and both men and women are equally involved in the process. Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17% of world population from 2.3% of world geographical area and 4.2% of world's water resources. The present cropping intensity of 137% has registered an increase of only 26% since 1950-51.The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed.

Over the years, seed drills became larger and more sophisticated, but the technology remained substantially the same. Early drills were small enough to be pulled by a single horse, and many of these remained in use into the 1930s. The availability of steam, and later gasoline tractors, however, saw the development of larger and more efficient drills that allowed farmers to seed ever larger tracts in a single day.

Recent improvements to drills allow seed-drilling without prior tilling. This means that soils subject to erosion or moisture loss are protected until the seed germinates and grows enough to keep the soil in place. This also helps prevent soil loss by avoiding erosion after tilling. The development of the press drill was one of the major innovations in pre-1900 farming technology.

III. REVIEW OF LITERATURE

1)Design and Fabrication of Semi-Automatic Seed Sowing Vehicle

Mr.Sagar B.S1, Prakash Hullur2, Sangappa Ankush3, Vikramraj Kannolli4, Vinayak Rayakar5. 1Assistant Professor, 2345Students, Mechanical Department. Alva's Institute of Engineering and technology MijarMoodbidre Dist. Dakshin Kannada, India. IJARIIE-ISSN(O)-2395-4396

ABSTRACT: This review paper present brief information about semi-automatic seed feeding vehicle. The main importance of this semi-automated seed feeding vehicle is to inseminate the seed as per the required depth with certain space and covering the seed with the soil with the help of closing jaw or furrow closer. And this machine is also used for the furrow in order to feeding the seed as per the depth. This semi-automated seed feeding vehicle will not affect the soil, it will increase the overall crop production. This machine reduces the effort and total cost of feeding the seed.

2)International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Website: www.ijirset.com Vol. 6, Issue 6, June 2017 Copyright to IJIRSET DOI:10.15680/IJIRSET.2017.0606215

11891 Automatic Seed Sowing and Moisture Control Using ARM Controller Anuradha G Parvatikar 1 , Meghana Kulkarni2 P.G. Student, Department of VLSI Design and Embedded Systems, VTU, Belagavi, Karnataka, India 1 Associate Professor, Department of VLSI Design and Embedded Systems, VTU, Belagavi, Karnataka, India 2

ABSTRACT: Increasing population requires the food production to be increased, which requires better cultivation in the form of proper utilization of seeds and fertilizers with minimum labour work. The qualitative approach is to develop a system which minimizes the work of farmer and also reduces the time for seed sowing operation, digging operation and water wastage. Moisture level indicator is important which helps for water saving. A soil sensor is used to measure the moisture level in the soil and is sent to the ARM controller. The robotic system developed is completely automatic, which reduces the farmers work.

3) International Journal of Mechanical Engineering and Technology (IJMET) Volume 9, Issue 4, April 2018, pp. 903–912, Article ID: IJMET_09_04_103 Available online at http://iaeme.com/Home/issue/IJMET?Volume=9&Issue=4 ISSN Print: 0976-6340 and ISSN Online: 0976-6359 © IAEME Publication Scopus Indexed FABRICATION AND AUTOMATION OF SEED SOWING MACHINE USING IOT Senthilnathan N, Shivangi Gupta, Keshav Pureha and Shreya Verma School of Mechanical Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India

ABSTRACT: Agriculture is the major sector in the world that plays a vital role in developing the economy of a nation. Agro technology is the process of implementing the recent technologies to develop the crops that are being produced. The use of agro technology not only helps in improving the efficiency of the crop that are being produced but also helps in developing devices that are suitable for doing mechanical works in the fields. This results in minimization of the total cost of production, saving of time and reduction in the effort involved in the process. The new technology should also be economically feasible and hence the behavior of the technology and its role in the society is an important consideration before developing a new product or process. In this work a seed sowing machine has been developed that help the farmers in harvesting the best crop with least efforts. A mechanical device that helps in sowing operation and controlled using IoT (Internet of Things) has been developed.

4) JETIR May 2023, Volume 10, Issue 5 www.jetir.org (ISSN-2349-5162) JETIRFX06071 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org 409 Smart Seed Sowing Vehicle Harshada Naik1, Durga Nikam2, Rohit Mahamuni3, Prasad Bhangare4, Kanchan Pujari5 Department of E&TC, SKNCOE, SPPU, Pune

ABSTRACT: In agriculture, there is a need for a technology that is more easily understood, implemented, and used by the farmers. Equipment that requires less human effort and time with less cost of implementation is much required for success in the agricultural industry. Hence, we designed a Seed sowing robot that can be controlled with the help of IoT and it helps in the sowing of seeds in the desired position hence assisting the farmers in saving time and money. This machine performs the operations like ploughing, sowing, and levelling which are used for small-scale farming. Seed sowing isone of the main processes of farming activities. It requires a substantial amount of human effort and also time-consuming. Thisprojectaimstodesignandfabricateaseedsowingrobotforthementionedtask. This robot requires less maintenance and is portable.

IV.MATERIAL AND METHODS

Sowing is the most important process in farming. It is a very tiring and time consuming process that requires a lot of human effort. Here we propose the design and fabrication of a semi automatic seed sowing robot that automates this task.

The proposed robot uses four motors for running it in desired directions. We use a horizontal cylinder for pouring seeds. The robot consists of a funnel like arrangement in order to pour seeds into a lower container.

There we use dc gear motor drive horizontal cylinder to pour the limited quantity of seeds and pour them on the ground in a steady manner in proper quantity. The front of the robot can be further fitted with a bent plate that drags on the soil to make a slot ahead of the machine before seeds are poured in it.

The back portion of the robot can be fitted with a tail like bent rod that is again used to pour soil on seeds sowed thus covering them with soil. Thus the system

completely semiautomatic the seed sowing process using a smartly designed mechanical robotic system.

V.DESIGN CALCULATION

Motor details

Voltage = 24VDC, Rated current = 8AMP,

N =2100

P= 2πNT / 60,

Here we have used permanent magnet motor with 250 watt power with 2100rpm.

The motor runs on 48volts and 7.5amps power source.

This motor can reach a peak current during starting equal to 15 amps.

P = 2 x 3.14 x N x T /60

250 = 2 x 3.14 x 2100 x T /60

T = 1.13 N m

T = 1136 N-mm Reduction in chain drive R chain = 66/11 = 6:1

Torque at wheel shaft = T x R chain

= 1136 x 6

= 6820 N mm

Speed of wheel shaft = 2100 /6

= 350 rpm

Calculation for Battery

System voltage 24 Volt,

Load current = 6343.8w/24v= 264.325A

Estimate 2 hours of tricycle running per day Load current = 2 x 264.325 x 1.2 = 634.38Ah/day

Assume 20% overall losses, Size of battery = 41.66 x 1.2 = 50 Ah/day

Energy required for 250 W motor = 25 Ah x24 V =600 Wh/day.

Therefore 25 Ah/day, 24 Volt power is required for the system which can be supplied with the help of two 12 Volt batteries of 25 Ah/day.

Solar Panel Selection

Electric motor = 250 watt

Running time = 6 hr

Sunshine time = 6 hr

Total watts = 250x6

= 1500 watt

pannel selection range = 1500 / 6hr

= 250 watt

Hence the require solar pannel selection is in range of = 200 to 250 watt

VI RESULT

SR NO	QUANTITY OF SEEDS IN GRAMS	DISTANCE TRAVELL IN CM	MOTOR RPM	DISTANCE BETWEEN ADJACENT SEEDS IN CM
1	37grams	15cm	60rpm	15 cm
2	74grams	30 cm	60 rpm	16 cm
3	109 grams	45 cm	60 rpm	15 cm
4	146 grams	60 cm	60 rpm	16 cm
5	182 grams	74 cm	60 rpm	15 cm

VIII.CONCLUSION

Seed sowing machine is designed for small farmers to improve their productivity. In this machine a common seed storage place is introduced to reduce the cost of the machine.

This machine can be made by raw materials also which saves the cost of whole project and is easily manufactured in available workshops. The only cost is

of metering device. Hence by using this machine we can achieve flexibility of distance and control depth variation for different seeds. Hence usable to all seeds. This is completely eco friendly project., Reliable system., Concept related to automation system.

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