Portable And Automatic Seed-Sowing And Root Crops Harvesting Machine

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Abstract- *This paper deals with the challenges that exist in the field of agriculture sector that mainly focuses on the seed-sowing and harvesting of root crops. It also highlights the topic of making agriculture without much manual labour. As we are well aware of the fact that, agriculture is laborious process which needs much more human effort and care. So,in this article ,we have built portable and automatic seed-sowing and root crops harvesting machine which does the work of sowing the seeds into the ground as well as harvesting the root crops. And the feature making this work automatically gives a better perspective of this working efficiency. This embodiment of technology in the agriculture sector brings back the prosperity of doing agriculture in a better way within the stipulated time.*

Keywords- Automatic Seed-Sowing, Portable Root Crops Harvesting Machine, Smart farming, Integrated automatic agriculture machine.

I. INTRODUCTION

The history of agriculture in India takes back to the Neolithic. India ranks second worldwide in farm outputs. As agriculture employed more than half of the Indian workforce and contributed 17-18% to the country's GDP. Agricultural development which is one of the prominent powerful tools toend poverty and boost the prosperity in the present era. Healthy, sustainable, and inclusive food systems are crucial in achieving the world's development goals. Growth in the agriculture sector is just the same as strengthening the backbone of the economy. The portable and automatic seed-sowing and root crops harvesting machine would be of great help to agriculture sector by paving the way to the fusion of technology and agriculture. .As the procedure of seed-sowing is a primary yet necessary step in the field. It took as much of time, man power, and money. And the model of seed-sowing brightens the idea to make this happen in a stipulated time. The root crops harvesting machine model aim is to make the process of harvesting root crops easier. It was modeled in such a way that, it plows the root crops such as potato, turmeric, ginger etc. This can be happened by monitoring it to plow as per the mechanism. And automation which is basically the integration of mechanical models of both seed-sowing and root crops harvesting, which enable us to monitor and operate it automatically. This decreases the redundancy and promotes the agricultural roots in the technological field, which was quite helpful to the majority of people who are living on the agricultural sector.

Our proposed project will address the three issues highlighted in the preceding paragraphs. In the first, we'll make the model of seed-sowing mechanism. In the second challenge, we'll make the model of root crop harvesting machine. At the last, we will integrate the models to automate the machine which will act as either as a seed- sowing machine or root crops harvesting machine. Which act as one of the prominent feature that answers a simple approach to two prominent aspects in agriculture.

II. LITERATURE REVIEW

Manual plantation of seeds method suffers from various problems. And it is the same with the harvesting of root crops which was a careful and time taking task. The tendency of manual work is reducing as the technology aces in the world.[1]. An "Automatic Seed-Sowing Robot" which is based on an electromechanical platform that performs the agricultural process as seed-sowing without much effort. It was steered by DC motors to drive wheels. The spacing between two seeds in acolumn is fixed according to convenience. The proximity sensor is used tomeasure rotation of wheels. To detect the obstacle in the path of thevehicle IR LED with a TSOP receiver is used and the turning position also depends on the sensor.[2]. And to make the harvesting of root crops possible, the potato-Soil separation device is one of the great use. It addresses the potato soil separation which was basically based on the kinetic analysis. The shape size and structural form of the machine determines the factor at which the depth of digging can be done. [3] discusses how to create an automatic seed- sowing machine with another prominent feature added to the existing one. And the automatic seed-sowing machine equips and runs on following the instructions given by Arduino.

[4].The power is transmitted to a shunt DC motor. This power is then transmitted to wheels. IR sensors are used to aneuverrobots in the field. And a 12V battery is used as a source to the machine which drives the machine.[5]. Using Arduino we integrated them and allow it to act as particular machine based on the instructions of Arduino and how it is handled and operated. This brings the flexibility of the machine where we can let it work as per our requirements within the scope of usage.

III. METHODOLOGY

The methodology of this project had been divided into three parts

1) Mechanical working of Seed-Sowing Machine
2) Mechanical working of root crops harvesting Machine
3) Automation of seed-sowing and root crops harvesting machine.

In the first one, the user need to plow the ground evenly before the seed-sowing occurs. The mechanical model of seed-sowing works in a manner such that the seed were sowed into the ground in a linear manner. As the DC supply is given to the motor the seeds will go into the inlet of seeds followed into cardboard wheels and reach the ground.

And the seed-sowing interacts with the following components as shown in the below figure.

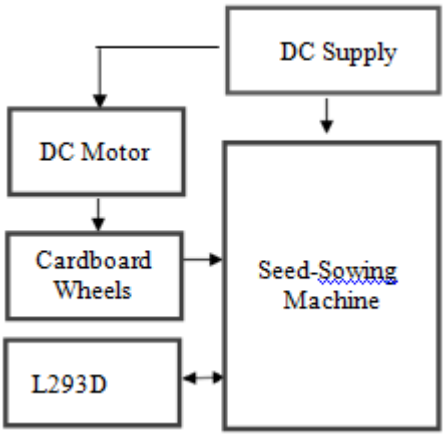

Figure 3.1 Block Diagram of Seed-Sowing Machine

In the second one, the user need to install the shovel part into the machine. And when the bike sprockets are steered by DC motor the escalator mechanism moves and the crop shoved move to the container after filtering it without the sand particles.

Fig 3.2 Block Diagram of Root Crop Harvesting Machine In the third one, we automate the both seed-sowingand root crops harvesting machine, using Arduino as the interm-ediate that passes the commands or instructions to both based on the user's necessity. With the help of Arduino programming we structure the commands in such a manner that it does the work according to the framework we've built on.

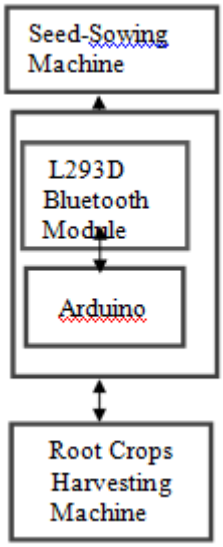

Fig 3.2 Block Diagram of Automatic seed-sowing and Root Crop Harvesting Machine

IV. HARDWARE REQUIRED

4.1 BLUETOOTH MODULE

Bluetooth module is a device which makes the working of commanding a certain operations in command mode using android phone.

Fig 4.1 Bluetooth Module

4.2 L298N Module

The L298N allows speed and direction control of two DC motors at the same time using a dual H-Bridge motor driver. The module can drive DC motors that have a12V. we enable 5V regulator and 5V as output.

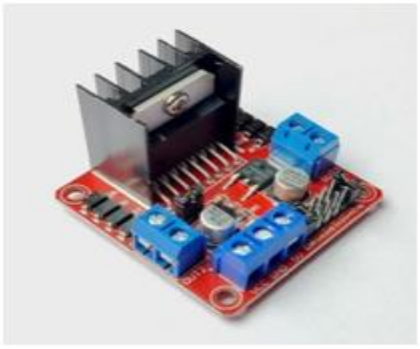

Fig 4.2 L298N Module

4.3 DC GEAR MOTOR

These are called as Center Shaft Motors, these are DC motors having gears for the shaft for obtaining the performance in optimam conditions.

Fig 4.3 DC Gear Motor

DC MOTOR SPEED CONTROLLER

DC motor speed controller is a device that can control peak current of up to 2A and voltage between 5 and 35V. the speed of DC motor which can be done either manually or through The module is either enabled or disabled using jumper that an automatic control device. This plays the role of controller the DC has an onboard 5v regulator. The supply voltage is up to motor in seed-sowing which makes us control the no of seeds sowing into the ground.

Fig 4.4 DC Motor Speed Controller

ULTRASONIC SENSOR

An Ultrasonic sensor is a device that uses a transducer to transmit and receive ultrasonic pulses to detect the distance to an obstacle.

Ultrasonic sensors detect objects regardless of color, surface, or material and are a great solution for the detection of clear objects. The sensor determines by sending and receiving of the ultrasonic pulse and find the distance of the target.

It plays an important role in detecting obstacles and let the Arduino know the information that it detected.

Figure 5.5 Ultrasonic Sensor

ARDUINO

Arduino is a small microcontroller board with a USB plug to connect to a computer and an open-source electronics prototyping platform based on flexible, easy-to- use hardware and software. It is a powerful Arduino board that has digital pins, PWM pins, analog inputs etc. By using Arduino and Arduino programming we can make the Arduino make the necessary decisions according to the instructions.

It is basically designed to make the process of using electronics in multidisciplinary ways. And it builds a basic level intelligence into an object. Once it can read sensors, make simple decisions in the real world. ARDUINO IDE has libraries in which the code is written in C++ compiler. And does the work according to it.

Figure 5.6 Arduino

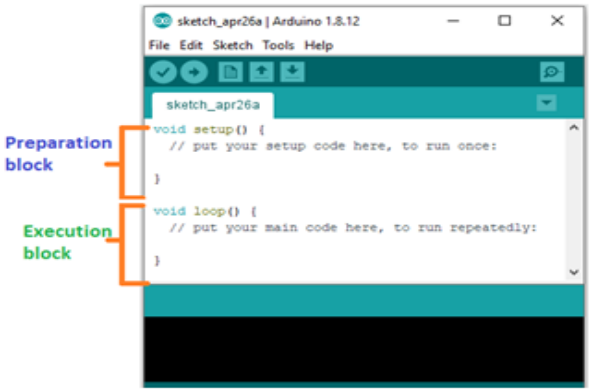

Figure 5.6.2 Programming Layout

V. RESULTS

Fig 5.1 Root crops Harvesting

Figure 5.2 Side View of Machine

Figure 5.3 Collecting Harvest

Figure 5.4 Front View of Machine

The above diagram depicts the results of the model and gives the clear view of the model in each view. In figure 5.1 we can see how the root crops harvesting model works and moves on escalator mechanism.

In figure 5.2 we can see the side view of the machine which is A illustrating the connection of seed-sowing and the root crops Harvesting machine.

In figure 5.3 ,the figure explains how the collected root crops reaches the collector and the figure 5.4 is the front view of the machine

VI. CONCLUSION

This project displays a Portable & Automatic Seed-Sowing escalator mechanism. And Root Crop Harvesting Machine which is a hybrid mach that could work as Seed-Sowing & root crop harvesting this fulfills the objective and triggers the positive aspects of getting work done in a reliable way without much manpower.

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