

# AUTOMATIC SEED SOWING MACHINE

<sup>1</sup>K.A.Kale,<sup>2</sup>J.S.Ramane,<sup>3</sup>G.R.Patil,<sup>4</sup>S.D.Shelke

Department of Electronics & Telecommunication Engineering

Dr. D. Y. Patil Institute of Engineering, Management and Research, Akurdi, Pune-44

**Abstract:** Agriculture plays a crucial role especially in Indian economy. In traditional seed sowing system, a lot of man power is required and efficiency is very low, so we intend to overcome such a problem using Automatic seed sowing machine. In this project we focus on farming related problem i.e. sowing process and try to solve the problem by bringing some automation in that particular field. In Automatic seed sowing machine, control seed flow uniformly and also provided platform for adjacent intercrop sowing. This machine gives the indication about blockages in seed pipe, seed level in tank and moisture level in soil. Such a innovation helps us to all Indian farmers and give a beautiful and smooth platform.

## I. INTRODUCTION

In India, near about 70 percent people are dependent upon agriculture. An agricultural system in India should be advanced to reduce the efforts of farmers. Various operations are performed in the agriculture field like seed sowing, weeding, cutting, pesticide spraying etc. Very basic and significant operation is seed sowing. The present methods of seed sowing are problematic. An equipment used for seed sowing are very difficult and inconvenient to handle hence there is a need to develop equipment which will reduce the efforts of farmers. In this project we focused on agricultural related problem i.e. sowing process and tried to solve the problem by bringing some automation in that particular field. In traditional seed sowing system, a lot of man power is required and accuracy also low, so we intend to overcome problem using Automatic seed sowing machine.

Presently for seed sowing purpose traditional seed sowing machine is used but in traditional seed sowing machine uniform seed sowing not achieve accurately. The production of crop is depend on the quality of seed sowed by farmer. If there will be less quantity of seed sowed or more quantity of seed sowed by farmer it effect on production of crop. In traditional seed sowing machine seed pipe continuously contact with soil so it may be chances to block the pipe. The farmer does not get idea till the pipe is full with seed. cause of this blockage the sowing process completely disturb. Using traditional seed sowing machine some time the farmer sowing seed in the dry soil or the soil which is not having moisture, due to that the plants does not comes up or germinates. Intercropping is the process in which we can take more crops on same fields. In Intercropping the two crops helps each other to grow up. Such like ground nut and sunflower. The groundnuts plants provides nitrogen to the sunflower plants for its good growth. This facility is not available in traditional seed sowing machine.

The rest of paper is organized as follows: Section II describes the proposed system of automatic seed sowing machine and working. Section III shows hardware specification. Section IV shows system flow diagram. V presents results obtained from sowing machine VI finally discusses the conclusion.

## II. THE PROPOSED SYSTEM

In Automatic seed sowing machine, Arduino is used to control seed flow uniformly with help of DC motor and Speed sensor. Speed sensor continuously sense the speed and according to speed DC motor control the seed flow with help of mechanical arrangement. Mechanical arrangement and tank partition provide the platform for intercropping sowing. In seed sowing machine seed pipe continuously contact with soil so it may block the pipe. using limit sensor we find the blockages in the pipe and stop the sowing with help of DC motor, buzzer warn about the blockages and Liquid Crystal Display (LCD) shows the status.

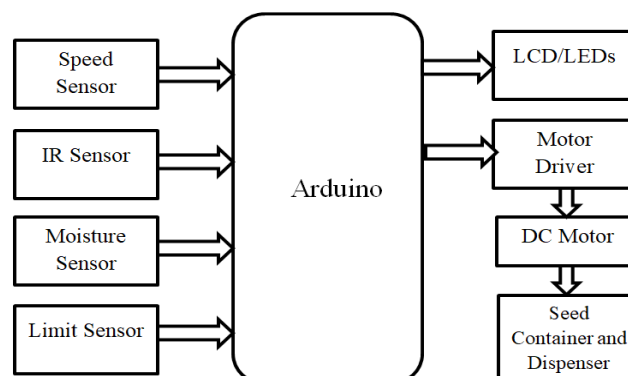


Fig. 1: System Block Diagram.

Moisture sensor is used to detect moisture level in soil and ensure that sowing in wet soil. Infrared sensor which is unaffected to seed used to observe seed level in tank. Display the sowing conditions on Liquid Crystal Display.

## III.HARDWARE SPECIFICATION

As the aim is to design the Automatic system, Sensors is used to collect the data from various sowing machine parameters and actuators is used to control the sowing machine parameters. The sowing machine parameters are collected using the speed sensor, moisture sensor, IR sensor and limit sensor, which are interfaced to Arduino. The sowing machine parameters are control using the DC motor and indicates using LEDs and LCD, which are interfaced to Arduino, as shown in Fig. 2. shows system circuit diagram.

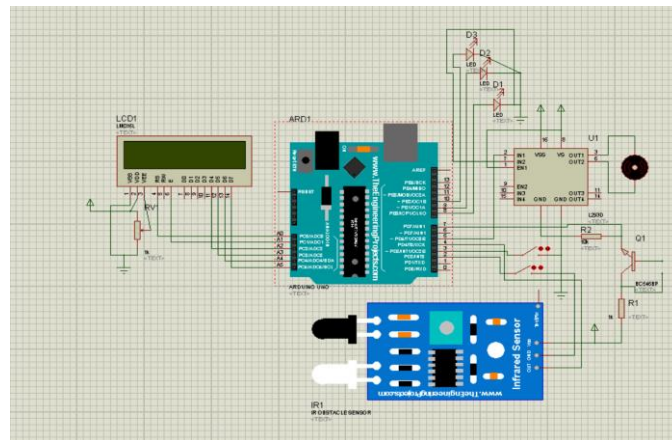


Fig. 2: System Circuit Diagram.

### Arduino

Arduino is an open-source microcontroller board, based on the microchip ATmega328P IC. The board is provided with the sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino Integrated Development Environment is a type of B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it allows to accept voltages between 7 and 20 volts.

### Speed Sensor

In order to measure speed of a machine we used an LM393 Speed sensor with Arduino. The Speed Sensor Module is basically an Infrared Light Sensor integrated with LM393 Voltage Comparator IC. The sensing part of the LM393 Speed Sensor module consists of an Infrared LED and an NPN Photo Transistor. These two components are placed facing each other in a special housing made of black thermoplastic. A signal from the photo transistor is given to the LM393 and based on the presence or absence of an object between the Infrared LED and the Photo Transistor, the Output of the LM393 IC will either be both LOW or HIGH. Its operating voltage is 3.3-5V DC and output current up to 40mA.

### Moisture Sensor

Here we have used a BC547 based soil moisture sensor to sense the moisture in the soil and an NPN transistor to trigger the input pin of Arduino. Whenever we apply some voltage to the base of an NPN transistor it gets turned on and permits current to pass through the collector to emitter. The sensor's probe contacts with the soil and according to soil moisture passes the voltage to the base of an NPN transistor and detects the moisture level in soil. It has an operating voltage of 3-5V DC and an output current up to 30mA.

### IR Sensor

The FC51 is used to detect proximity. It is a single-wire digital output sensor. It has a detection range from 2 to 30 centimeters. It has a 35-degree detection angle. Its operating voltage is 3-5V DC. The purpose of using this sensor is to detect the seed level in the seed tank. When the FC51 IR sensor detects an object, its output voltage is LOW; otherwise, the output voltage is HIGH.

### Motor Driver

Here we have used an L293D motor driver to control the DC motor. Motor drivers act as current amplifiers since they take a low-current control signal and provide a high-current signal. The drive motors are used for high-current signals. In its common mode, operations of two motors can be driven simultaneously, both in forward and reverse directions. It has an operating voltage of 4.5-36V DC and it can drive current up to 600mA.

### Limit Sensor

A limit switch is an electromechanical component that consists of an actuator mechanically linked to a set of contacts. Whenever an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection. They can find the presence or absence of an object. It has an input voltage range from 7 to 24V. It has an operating speed of 1 to 500 mm/s and an operating frequency of 30 operations/minute.

### Seed Container and Dispenser

Here a seed container is used to store the seed and a seed dispenser is used to drop the seeds. Inside the seed container, a partition is provided to store different types of seeds. The seed container and dispenser are shown in Fig. 3.



Fig. 3: Seed Container and Dispenser.

The hardware of system is shown in Fig. 4, with sensors & LED connected to arduino.

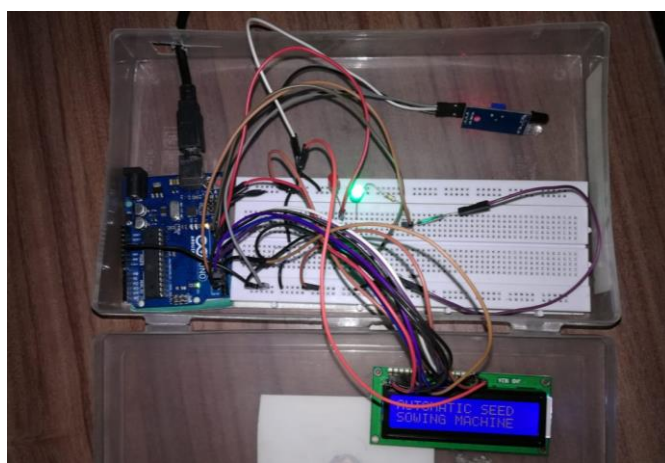


Fig. 4: Hardware of System.

The prototype of system with two different types of seed dispensing facility is shown in Fig.5. Here wheat and chickpeas are used. There are commonly eaten grains in all parts of india.

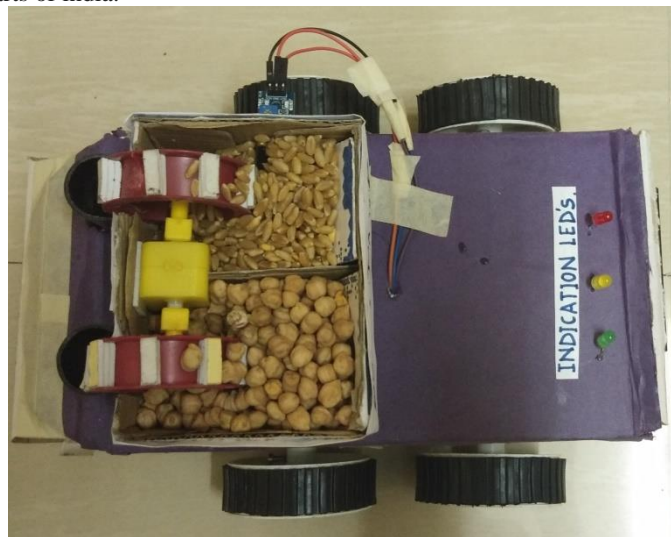


Fig. 5: Prototype of System.

#### IV.SYSTEM FLOW DIAGRAM

The software flow for the given system is given in three approaches as data collection, data processing and display of data. The decision of the sowing is decided based on the different speed level, moisture level, seed level and blockages taken from the farm. The decision is made whether the seed sowing is uniform and accurate or not. Fig. 6 shows the flow diagram of system.

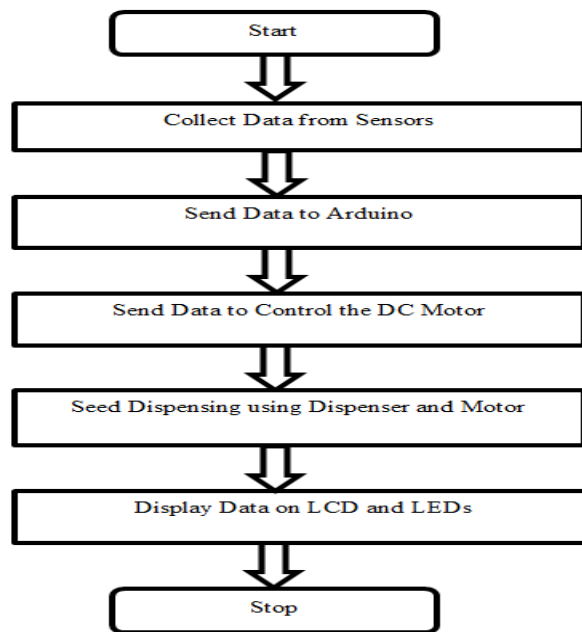


Fig.6: Flow Diagram of System.

**IV.RESULTS**

The sowing conditions are decided by taking the moisture value, seed tank level and pipe blockage value collectively, as shown in Table I.

TABLE I. Conditions for motor ON or OFF

PIPE BLOCKAGE	SOIL MOISTURE	SEED TANK LEVEL	LED INDICATION	MOTOR
YES	-	-	RED	OFF
NO	DRY	HIGH	YELLOW	ON
NO	WET	LOW	YELLOW	ON
NO	WET	HIGH	GREEN	ON

The collected data from the sensors are display various conditions of the sowing machine using red, yellow, green LED and seed sowing control using the DC motor. Red LED indicate that blockage in sowing pipe and DC motor is OFF. Yellow LED indicate that dry moisture in soil or low seed level in tank and DC motor is ON. Green LED indicate that no blockage, wet moisture level, high seed level in tank and DC motor is ON , as shown in Table I.

**VI. CONCLUSION**

The system discussed in this paper is beneficial to the farmers for the basic seed sowing operation. A mode of operation of this machine is very simple. The wastage of seeds can be reduced by the use of this system and also we can achieve uniform and accurate sowing. The problems that occur while sowing process like pipe blockage and moisture level can be solved by this system. The use of this automatic seed sowing equipment can save more time required for sowing process and reduce labour cost. It is very helpful for all farmers.

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