ARDUINO ENABLED SEED SOWING MACHINE

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Abstract:
Agriculture is the most important field in the life of human beings. It is an important of our country's economy system. In our country, sufficient machineries are not available in the agricultural sector. In this aspect, the load and labor of the farmers is to be increased. In this project, problems faced by the farmers on seed sowing have been focused. In the seed sowing machine system, a relay board is used to control an input and output supply. The motor used for seed sowing is Battery powered. Two IR sensors are used. One IR sensor is used to sense the wheels' one revolution and then it operates the seed sowed. The other is identifies obstacles come in front of the machine or diverts its path. The seed sowing machine can detect an obstacle very easily with the help of an IR sensor and a timing sensor to feed the seed on the ground. The fertilizer is also used in the machine to reduce the work for farmers by using the DC pump motor. This system provides a facility to complete the work efficiently.

Keywords:
Database, agriculture, seed sowing.

Introduction:

The objective of this study was to improve the seed sowing work in the agricultural field by using the machine. The agriculture is the most important field in the human life. Arduino Uno sensor is used to control the system process of the machine. The battery powered wheel, DC motor is inbuilt in these wheels separately. When the machine is operated obstacle in front of the machine can be detected easily with the help of IR sensor. By changing The tyre size of the wheel and the seed thrown outside the machine will vary to the corresponding size of the seeds. The storage size of the seed drum is upto 2-3kg The plate which is feed to the machine can be replaced based on the seed size. The system provides all facility to enforce the work more efficient and fast.

Literature survey:

1) Agrawal S K, 'Design and implementation of multi seed sowing machine.'_____ stated that the seed sowing is done by a machine, the seeding timing is calculated and reduce the labor cost.

2) Sahu R, Design and Development of automatic operated seed sowing machine._____ experimented that complicated gear system can be replaced by hall effect sensor for easier seed sowing solar powered.

3) Foque D, Characterization of different pneumatic sowing machines. _____ *stated that* In case of bulk, precision drill is used and reference trace seeds traitor design, as it is traitor design, dust emission.

4) Kalash Singhal, Solar powered seed sowing machine.in his paper, he mentioned that the machine reduces the labor work, effect and total cost of sowing the seed and fertilizer placement.

Proposed System

It is proposed that a machine which can carry out various farming activities like digging, sowing and irrigation etc. as mentioned in Figure 1 shows that the block diagram of the experimental setup. The machine is operated manually and is equipped with a four-wheel drive. Arduino enabled seed sowing machine is developed at a very low cost which is easily affordable by rural farmers.

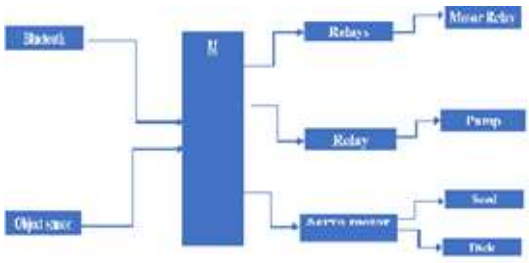

Figure:1 Block Diagram

Hardware

The machine consists of the following components:

1) Node MCU

Node MCU ESP-8266 WIFI Board CP2102. The Development Kit based on ESP8266 integrates GPIO, PWM, IIC, 1-Wire, and ADC all in one board. Power your development in the fastest way to combine with Node MCU Firmware R2 version had CP2102 USB-TTL instead, larger current support, the slim board can be utilized on a breadboard.

- 4MB Flash Memory
- ESP-12E Processor
- Integrated low power 32-bit
- Power: 5V via micro USB port
- Misc: Reset and Flash Buttons

2) DC Pump Motor

This DC 3-6 V Mini Micro Submersible Water Pump is a minimum cost and small in size. Submersible Pump Motor which can be operated from a 3 ~ 6V power supply and take up to 120 liters per hour with a very low current consumption of 220mAh. Just connect Tube pipe to the motor outlet is to be submerged it in water.

- Operating Voltage: DC 3-6 V
- Power: 3 W
- Maximum lift: 40-110cm / 15.75"-43.4"
- Flow rate: 80-120L/H
- Material: Engineering plastic

3) IR Proximity Sensor

The IR Proximity Sensor module has a great adaptive capability of the ambient light, paired of infrared transmitter and the receiver tube. The infrared emitting tube emits a certain frequency, and encounters an obstacle, immediately infrared reflected back to the receiver. The tube receiving a comparator circuit process, the green LED lights up, while the signal output will output digital signal, through the potentiometer knob to adjust the detection distance. The effective distance ranges from 2 ~ 30cm working voltage of 3.3V-5V.

4) DC Motor

DC geared motors are widely used for robotics applications. It is easy to use and available in all standard size.. The most popular L298N H-bridge module with onboard voltage regulator motor driver can be used with this motor that has a voltage of between 5 and 35V DC. The precise motor diver module from the wide range is available in Motor divers' category as per specific requirements.

- Operating Voltage: 12V DC Max.
- Gearbox: Attached Plastic (spur)Gearbox
- Torque: 1 kg-cm
- No-load current = 60 mA (Max)Load current = 300 mA (Max).

5) SERVO MOTOR

- Power Input: 3.0V~7.2V
- Servo Plug: JR
- Stall Torque 4.8V: 1.2kg-cm
- Stall Torque 6.6V: 1.6kg-cm

6) Bluetooth Module

To setup Wireless Serial Communication, HC-05 Bluetooth Module is the most demanding and popular, due to its lowest price and extremely high features. This module can be used in Master or Slave Mode and easy switchable. Between these two modes, by default Slave mode is configured. Modes can be changed using AT Commands. The slave mode in HC-05 cannot initiate a connection to another Bluetooth device, but can accept connections. Master mode can initiate a connection to other devices.

- Frequency: 2.4GHz ISM band
- Speed: Asynchronous: 2.1Mbps (Max) / 160 kbps, Synchronous: 1Mbps/1Mbps
- Power supply: +3.3VDC 50mA
- Working temperature: -20 ~ +75Centigrade

Methodology

1. There are two node MCU used in the seed sowing machine. The one node MCU is used to control the moment of the machine by the Bluetooth module HC-05. The other node MCU is used to activate the DC servo motor to move the seed container.

2. There are two IR Sensor used. The one IR sensor is used to deduct the object in front of the machine. The other IR sensor is used to sense the wheel for one revolution, so the seed activate the DC servo motor to move the seed container and planting the seed.

3. The wheel in this machine can be replaced with different size tyre, so

planting the seed at different distance shall be recommended..

4. The DC pump motor is used to water the seed or pesticides the land to do a multi work in the seed sowing machine.

Photograph of machine

Figure:2 Experimental setup-1

Figure:3 Experimental setup-2

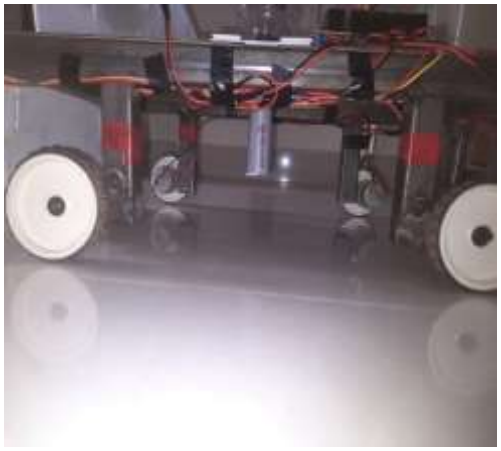

Figure:4 Experimental setup-3

Future Scope

1. If, the moisture deduct sensor is installed the pump pumps automatically and spray the water to the field.

2. The seed container deducts the lower part of seed and message to the mobile through sensing it.

3. Without changing the tyre many seed plantation at different distance can be sowed to reduce the tyre changing c cost.

Conclusion

The agriculture is the most important field in life of human being. It is an important of our country's economy system. So, the focus on the agricultural field is to improve the efficiency by implementing the latest and advanced technologies. This is leads to more production rate of the crop of our country. This machine can be recommended because of the highest yield in the production and it result in;

1. Easy to handle the machine

2. Different size of seeds can be sowed

3. No pollution is caused

4. Labor work is reduced

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