

AUTOMATIC SEED SOWING ROBOT BASED ON PIC18F4520 MICROCONTROLLER

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Abstract: This paper presents construction, working and principle of Automatic seed sowing robot based on PIC18F4520 Microcontroller. This prototype model is able to do automatic Seed Sowing process in farms. It only provides automatic working operation manual option is not available. Only one personal is required to supervise robot operation. This prototype robot works on programmed saved in PIC18F4520. Servo motor is used to do proper operation of seed dispensing unit.

IndexTerms - PIC18F4520, IR sensors, Servo motor, DC Geared motor

I. INTRODUCTION

Our country is mainly depending on agriculture sector. India has 70% of agricultural sector. In today's world of automation number of changes is occurring in agriculture methodology like seed sowing, pesticides and irrigation. Increasing farmer's economy it is needed to increase our agricultural productivity and quantity. Out of them Seed sowing is first step towards increase productivity and quality. It is a standout amongst the most imperative and everyday occupation of the farmers.

The today's process for seeding is manual one by help of tractor but it requires more time and accuracy is less. Physically seed plantation strategy experiences different issues. The labour deficiency is one of the most serious issues confronted constantly to farmers in nation like Japan and less populated nations. Due to labour shortage the cost should be increased. Now in today's world Microcontroller and microprocessor based plays an important role. This is a system for "seed sowing robot" using PIC18F4520 microcontroller. This system is very economical and accurate for this application. Because of mechanization the work become least demanding, productive. This framework is only the four wheel vehicle which is driven by four equipped DC motor. As per PIC microcontroller program seed ought to be dropped through the spout, which is worked by Servo motor. Nozzle estimate is relies upon the distance across of the seed. Same activity is reshaped after some time delay.

II. COMPLETED WORK

The electronic system of agriculture robot received the signals from nearby object by sensing the white color. This robot analyzes the simple flag got from sensors and transmits to microcontroller.

This robot can be partitioned into a few sections:

- IR sensors
- Driver IC
- Servo motor
- Actuators (electrical motors, wheels etc.)
- Frame and body structure

SEED DESPENSING UNIT

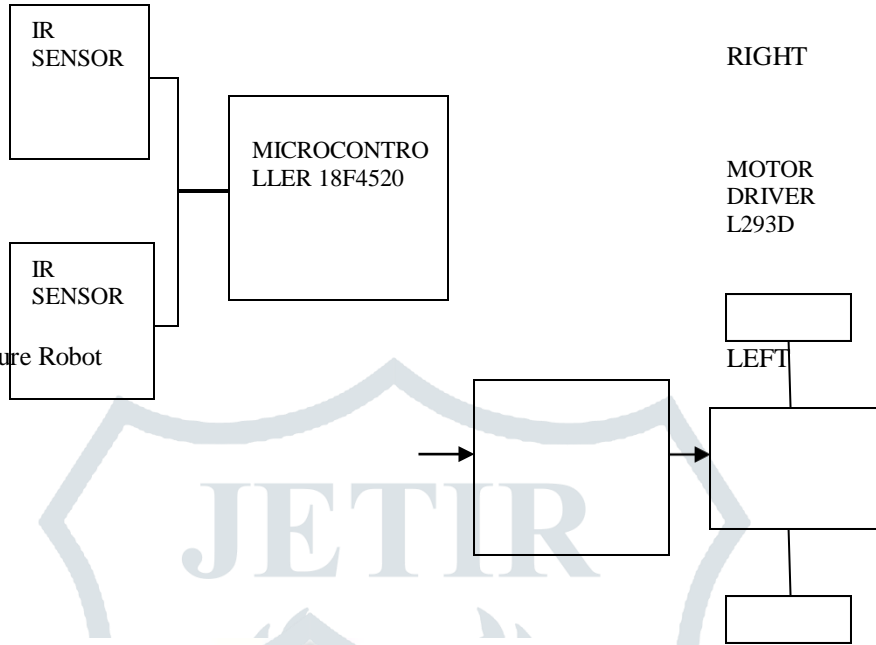
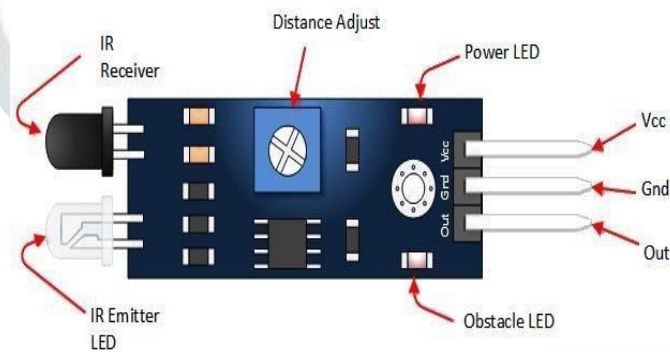


Fig.1.Block Diagram of Agriculture Robot

A. The Sensors



This sort of robot utilizes Infrared Beam sensors to discover the way and headings; Infrared Beam sensors contain a match infrared transmitter and infrared collector pair. White surfaces large reflect well, but while dark surface reflect poorly. If the recipient gets the reflection beam, it implies that the robot is on white. These gadgets work by estimating the measure of light that is reflected into the receiver. Because the beneficiary likewise react to surrounding light, the gadget works best when very much protected from encompassing light, and when the separation between the sensor and intelligent surface is little. IR reflectance sensors are regularly used to recognize white and dark surfaces. Thus the separation is critical and it is progressively essential that how we put sensors close to every other. Distance between every sensor is reliant on the line width.

Specifications:

- Detection distance: 2-30cm
- Working voltage:3-5V DC

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Fig.2. IR Sensor Circuit

B. The Driver

Specifications:

- Four channel driver IC
- 600 mA output current per channel
- 1.2 A peak output current
- Over temperature protection

Robot needs a driver IC for controlling and offering capacity to the motors. The microcontroller sends a flag to the driver which go about as a switch. The microcontroller just sends a flag to switch and after that the switch must give expected voltage to the engines. Whenever got motion by the driver is high it will pivot the motors. A decent motor driver is IC L293D which can be utilized to control four motors. It is high voltage, high flow double H bridge driver inductive loads, for example, transfers, solenoids, DC and venturing motors. The microcontroller sends guidance to the driver in the wake of handling the information originating from sensors part. The driver offer voltage to the engine as indicated by the data sources.

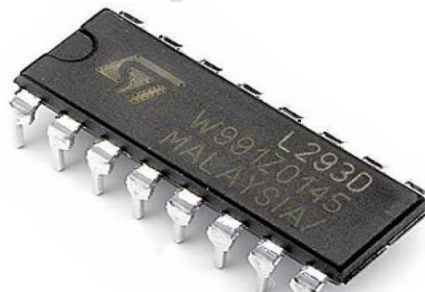


Fig.3.Motor Driver L293D

C. Actuators

The development framework is a vital piece of a robot and its goal is the manner by which to move robot starting with one point then onto the next point. This framework has a few details which tell us the best way to utilize motors and wheels. There are numerous sorts of motors and wheels. Our decision is reliant on the robot function, power, speed and accuracy. All things considered, it is smarter to utilize gearbox motors instead of basic DC motors since it has gear and an axle and its speed does not change towards the highest point of the slope or downhill. It is smarter to pick a motor that has programmed RPM. Inevitably we utilized four DC gearbox motors.

Fig.4.DC gear motor

Specification:

- Voltage: 12V
- RPM: 200rpm at 12 V
- Max load current:330 mA

D. Servo Motor

Servo motor has been around for a long time and is utilized in many applications. They are small in size but pack a big punch and are very energy efficient. In our project we use servo motor for the seed dropping process.

Specifications:

- Operating voltage: 3-6V DC
- Current: 1A

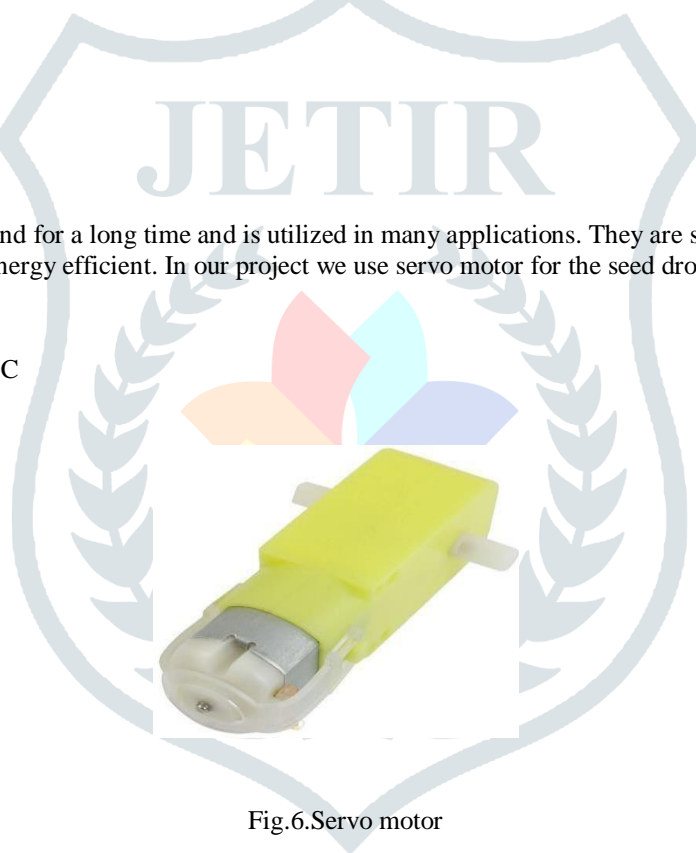


Fig.6.Servo motor

E.The Frame And Body

There are some great materials for design robots, for example, wood, plastic, aluminum and metal combinations. In the structured robot, aluminum has been utilized for case due to its lightweight and being sufficient for our venture.

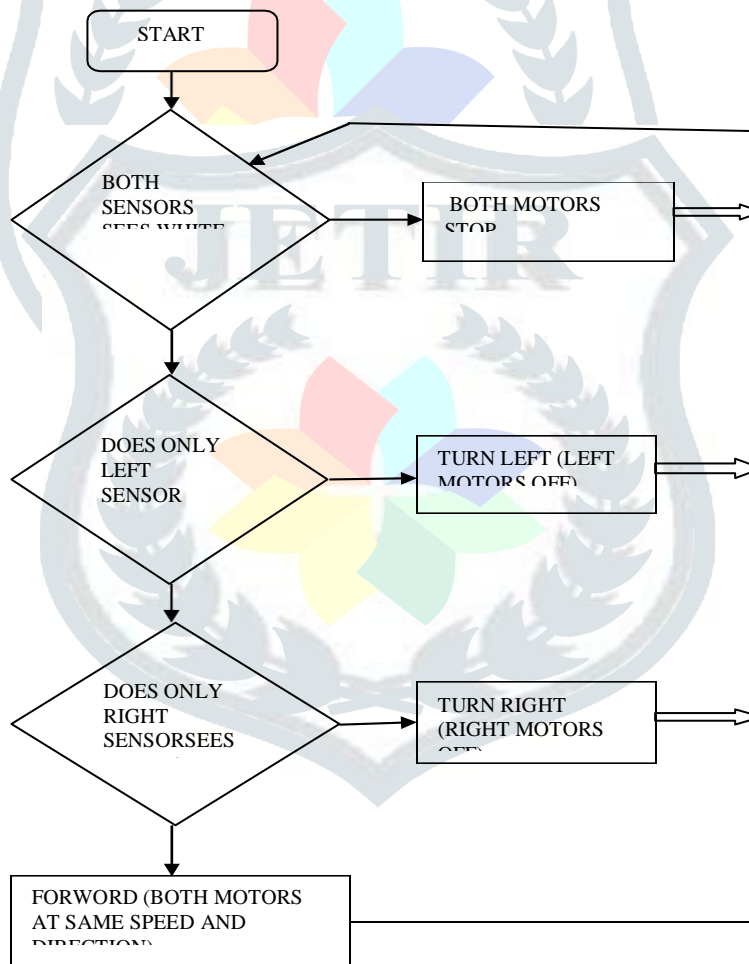


Fig.6. Actual image of prototype Automatic Seed Sowing Robot

By using motor drive it follows the line drawn on the floor. There are two sensors are used in the system. At the left turn of the line, left side sensors operate and both the motors of left side will get stop and right side motors will turn to left side. At the right turn of the line right side motors will stop and left side motors will turn to right side. If both the sensors come on white surface robot will stop as well as servo motor also will get stop.

Flowchart-

A flowchart is the pictorial representation of working of Agricultural. With algorithms it is easy to understand a program. The main purpose of a flowchart is to analyze different processes.



Algorithm:

Step 1: Read the signal from IR Sensor

Step 2: If both signals are zero, both motors will run.

Step 3: If IR2 is one right motor will stop and IR1 is one then left motors will stop.

Step 4: If both IR gives signal one then both motors will stop.

Step 5: Process will continue till both motors is in off condition.

Step 6: End

Conclusion

This paper presents prototype model of seed sowing robot to overcome the problems faced by the agriculture sector. In today's method of farming sector requires more people but accuracy not in their work. Using this system the accuracy is increases. The time required with system to do the work done is very less compared to conventional method.

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