



SOWING AND TILLING ROBOT CONTROLLED BY IR SENSORS

K. NishanthRao, G Shraavan Kumar²B, Sowjanya, N. Nithinkumar, P. Gnanender,G.Rakesh
Assistant professor ¹, Associate Professor², under graduate

Dept. of Electronics And Communication Engineering,MLR Institute of Technology, Hyderabad, India

Abstract -- During the farming, the major task is to till the land and sow the seeds. We can see that many farmers employing a person for sowing the seeds which needs a lot of man power. In order to avoid these problems, we are introducing sowing and tilling robot[1]. The robot is controlled by IR sensor and is developed by 8051 micro controller. This robot will have two wheels to move which are run by two motors and controlled by a micro controller. To sow the seeds we use a gear which will pick the seeds and drop them through a hollow tube. As the tooth of the gear is equally spaced, the seeds we sow will be with equal distance. These robots are fully automated and have sensors to detect the obstacles. After sowing the seeds, the arm attached to this robot will cover the tilled soil. This paper helps the farmers to reduce the labor power and other machine power.

Key-words-- 8051 micro controller, motors, IR sensors, mud leveler

1. INTRODUCTION

The design of applying robotics machinery[4] in agriculture[2] is very novel. In farming, the prospect for robot enhanced production are huge - and the robot are appear on farm in a variety of guises and in growing statistics. We can be expecting the robots performing farming operation separately[8] such as tilling the ground, seed sowing and level the land. This paper objective is to build a robot vehicle[5] which can plow the soil, place the seeds, and seal the mud, these entire systems of the robot mechanism with the battery and autonomously. To diminish person effort in the farming field with the use of small robot. To perform all 3 operations at single time, hence increases manufacture and saves time. To complete large amount of work in less time.

2. LITERATURE SURVEY

The introduction of robots in the field of agriculture was done with the intention to reduce the hard work and use of heavy machines like tractors, harvestors, etc. at the very beginning an agrobot[7] was developed which will sow the seeds in tilled land. Later, the additional features like tilling the land, levelling the land, watering the plants came into existence using many modern and updated technologies. Previously, an agricultural robot was developed based on the DTMF[5] technology. This agricultural robot was able to perform the two operations Tilling the land and Sowing the seeds. All the motors and the sowing and tilling arms are controlled by the remote which made the project a complex one with many switches.

Our project sowing and tilling robot, is an advancement over the previous project. It is an autonomous robot which is controlled by IR sensor input and the main component is Atmega 8051[8-10] micro controller. As this is an autonomous robot, there is no need of complex switching and controlling.

3. METHODOLOGY

The base framework is prepared for the robot with four wheels driven by DC motors. One end of the structure, tilling arm is fitted which is also driven by DC motor and design is made to dig the soil.[6] Funnel is made by the sheet metal, to store the seeds and the seeds pour through the funnel through the drilled hole on the shaft to the tilled soil. On the other end leveler is fitted to close the soil on the seeds. All the DC motors are driven by the L293D motor drivers. The whole robot requires the 12v battery to operate the system. IR transmitter and IR receiver is used to control the operation of the vehicle.[9] The paper is virtually simulated in PROTEUS and then dumped in to the micro controller.

Block Diagram :

Our project mainly depends on the timing behavior of 8051 controller. Here in the instruction set given to the controller is given considering the timing characteristics and properties of the controller. When a regulated power supply is given to the robot, it starts moving. The motors attached to the tilling, sowing and levelling arms also starts which ultimately performs the three assigned tasks. When the timer exceeds the given time period, the motors attached to the wheels and sowing arm will stop and the motors attached to sowing and levelling arms starts rotating in reverse direction[3] in order to remove the mud in them. When an IR sensor input is detected, i.e, if there is any obstacle in the way of robot, the robot turns right side and continues the tasks.

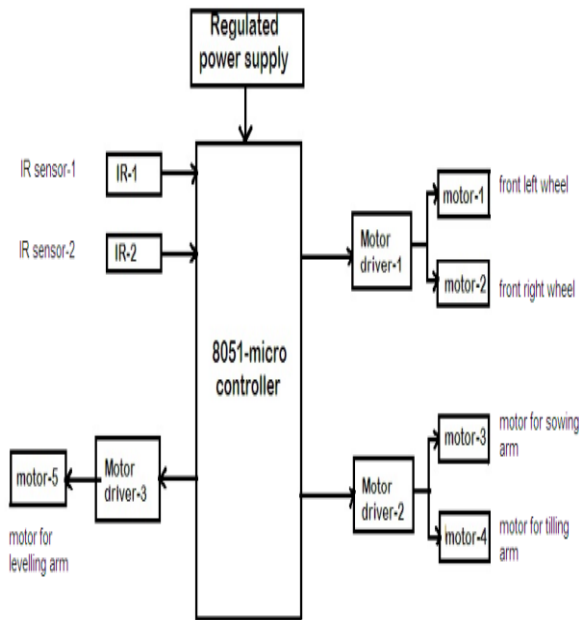


Fig 1: block diagram of Sowing and Tilling robot

Simulated Design:

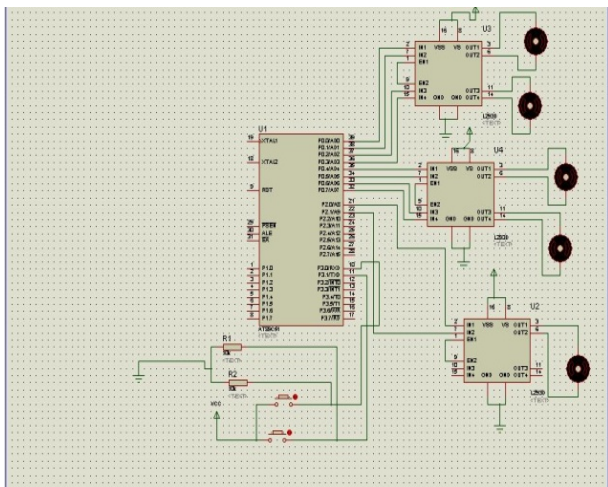


Fig 2: simulated Design

The virtually simulated design of sowing and tilling robot

4. RESULT:

Tilling arm of Robot:

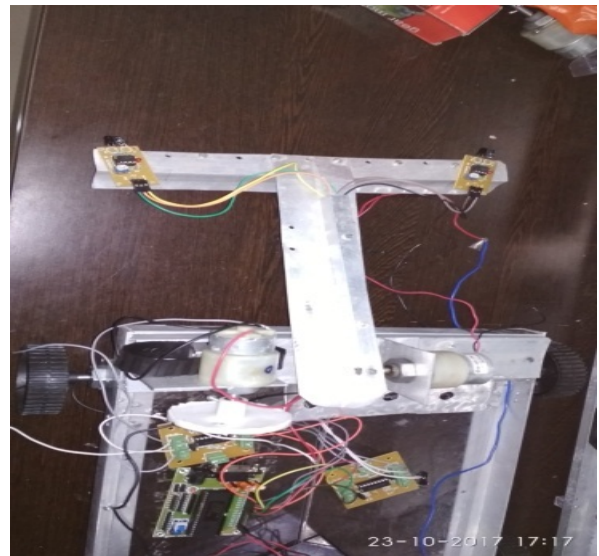


Fig 3: Proto type model

The tilling arm is driven by the DC motor which is driven by L293D motor driver[4]. 12v is supplied to the motor driver with battery. When the timer[8] reaches the given value, the motor rotates in opposite direction for a smaller duration[11]. When an obstacle is detected by IR sensors, the motor turns to its right-side.

Sowing arm of Robot:



Fig 4: Sowing arm of robot

A storage box is placed where we can store the seeds and it has holes at the bottom. The holes will be opened with the help of a shaft attached to the motor[12] which moves forward and allows seeds to fall through the holes[6].

Leveling arm of Robot:



Fig 5: Leveling arm of robot

The leveling arm of robot is driven by DC motor which is run by a motor driver L293D. similar to the tilling arm, the leveling arm rotates in opposite direction after given time. Thus allows the mud stuck to fall.

Finalised Sowing and Tilling Robot:

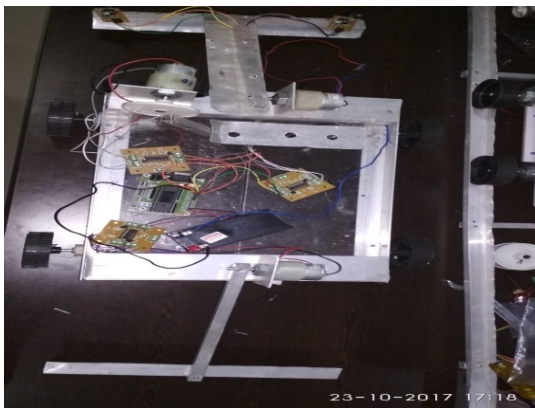


Fig 6: Finalised Sowing and Tilling Robot

5. CONCLUSION

This robotic farming machine [1] is designed to facilitate the farmers to reduce human effort in the agricultural field for sowing the seeds and improving the production, with its multitasking. These robots are fully automated and have sensors to detect the obstacles. After sowing the seeds, the arm attached to this robot will cover the tilled soil.

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