AUTOMATIC AGRICULTURE PROCESS USING EMBEDDED CONTROLLER.

Sakthivel S[1],John Selvaraj C[2], Dheerthi S[3], Divya K[4] , Nalini N[5]
[1,2]*Assistant Professor, Department of Electrical & Electronics Engineering, Kings College of Engineering, Pudhukkotai – 613303, India.*
sakthimekings@gmail.com
sundar20482@gmail.com
[3,4,5]*UG Students, Department of Electrical & Electronics Engineering, Kings College of Engineering, Pudhukkotai – 613303, India.*
sdheerthi@gmail.com
divya999@gmail.com
nalinirajan98@gmail.com

Abstract*--The paper aims on the design, development and the fabrication of the robot which can plough and dispense the seeds. More than 40% of the population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The real power required for machine equipment depends on the resistance to the movement of it. Even now, in our country 98% of the contemporary machines use the power by burning of fossil fuels to run IC engines or external combustion engines. This evident has led to widespread air, water and noise pollution and most importantly has led to a realistic energy crisis in the near future. Now the approach of this project is to develop the machine to minimize the working cost and also to reduce the time for digging and seed sowing operation by utilizing solar energy to run the robotic machine. A concept is been developed to investigate if multiple small autonomous machine could be more efficient than traditional large tractors and human forces.

Keywords: Direct Current Motor; Infrared Sensors; Internal Combustion Engines; Special Purpose Vehicle.

I.INTRODUCTION

The idea of applying robotics technology in agriculture is very new. In agriculture, the opportunities for robot-enhanced productivity are immense - and the robots are appearing on farms in various guises and in increasing numbers. We can expect the robots performing agricultural operations autonomously such as ploughing and seed sowing. Watching the farms day & night for an effective report, allowing farmers to reduce the environmental impact, increase precision and efficiency, and manage individual plants in novel ways. The applications of instrumental robotics are spreading every day to cover further domains, as the opportunity of replacing human operators provides effective solutions with return on investment. This is specially important when the duties, that need be performed, are potentially harmful for the safety or the health of the workers, or when more conservative issues are granted by robotics.

II .OBJECTIVES

The objective of this paper is to present the status of the current trends and implementation of Agricultural and autonomous systems and outline the

potential for future applications. Our aim is to fabricate a Prototype Multi Purpose Agricultural Robot which can perform the following functions: Agricultural robot.

- This project objective is to fabricate a robot vehicle which can plough the soil and dispense the seeds these whole systems of the robot works with the battery and the solar power.
- To reduce human effort in the agricultural field with the use of small robot.
- To perform these two operations at single time, hence increases production and saves time.
- To complete large amount of work in less time.
- Farmer can operate this robot through remote by sitting at one side and he can operate easily.
- The usage of solar can be utilized for Battery charging. As the Robot works in the field, the rays of the sun can be used for solar power generation.
- To increase the efficiency, the solar power is used and the Power output can be increased.

III. PROBLEM STATEMENT

The existing method of seed sowing process is associated with extensive human effort. In the traditional method of seed sowing process it is difficult to achieve uniform soil depth for seed placement and to obtain uniform distance between the seed placement. In addition to this the overall utilization of the field is less due to the low germination rate of the seeds as its difficult to achieve uniform cover of soil over the seed. The seeds will not germinate if the depth of the seeds placed is more.

The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller. On the field the robot operates on automated mode, but outside the field is strictly operated in manual mode.

For manual control the robot uses the Bluetooth pairing app as control device and helps in the navigation of the robot outside the field.

- Repetitive manual process
- Doesn't provide the remote monitoring facility.
- No proper methods to preserve the quality of the stored products over time.
- No automated system for decision making.

In order to overcome these limitation in the existing process, a robot is developed that can perform the seeding operation autonomously.

IV. SCOPE OF PROJECT

The Present project aims at designing an intelligent robotic vehicle which can be controlled wirelessly through RF communication. The main aim for our project has been to develop a solar operated digging and seed sowing machine, which is solar powered. In this machine we used a solar panel to capture and convert solar energy into electrical energy which in turn is used to charge a 12V battery, which then gives the necessary power to a shunt wound DC motor. This power is then transmitted to the rear wheel through gear drives. In this project an attempt is made to make the electric and mechanical systems share their powers in an efficient way. Thus taking into consideration the ever increasing pollution levels and the stringent pollution norms (EURO-II and onwards) set up by the POLLUTION CONTROL BOARDS, and since the fossil fuels are depleting, probably may last within the decades to come or earlier, and to reduce the running cost of the digging machine, we are in an attempt to incorporate the above mentioned features in our agriculture robot.

V. PROPOSED SYSTEM

Design and development of an agricultural robot, which can be able to plough and dispense seeds side by side in agricultural field. The control of this robot should be wireless and can be able to show digging and seeding operations.
Fabricate the model operated by wireless control which able to show operations likes ploughing and simultaneously dispensing the seeds. Also design and analyze a real time system for this robot to give a solution and propose a model which can be used in real time field.

VI.BLOCK DIAGRAM

(i).TRANSMITTER SECTION

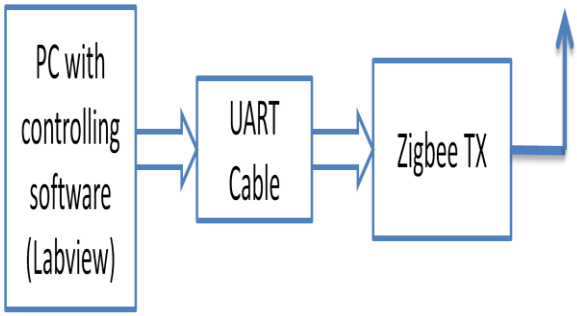

Fig.1 Block Diagram of Transmitter Section.

(ii) RECEIVER SECTION

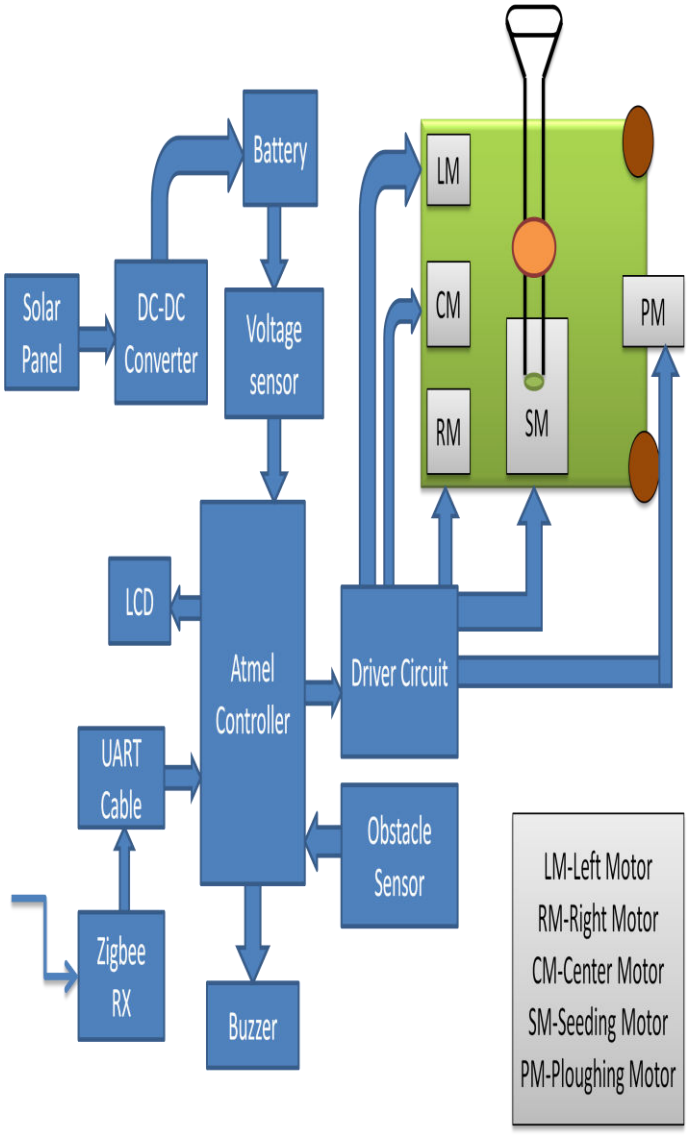

Fig.2 Block Diagram of Receiver Section.

VII METHODOLOGY

In this machine a solar panel is used to capture solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the

necessary power to a shunt wound DC motor. This power is then transmitted to the microcontroller. The basic objective of this robot is to plough and dispense the seeds in rows or columns at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement can vary from crop to crop and for different agro-climatic conditions to achieve optimum yields. Typical application of seed sowing of Cereal's including ground nut, all types of dal's, oil seed crop's etc.

AT89S52 Microcontroller is used to automatically control the machine. IR Sensors are fitted to the machine for automatic turning operation and to sense the obstacle in the moving path. An infrared sensor is an electronic instrument.

The robot is fixed to two wheels and the movement of these wheels is controlled using DC motors as. An additional DC motor is also used to control the spiked wheels which ploughing. The control of the seeds can be done in two ways: It can be controlled using stepper motor or it can be done using a relay. A tough metal sheet is attached at the end of the robot to cover the seeds with soil. To enable this function the metal sheet is attached such that its slope touches the ground.

VIII. MECHANISM

The robot is placed in the field and is operated by solar supply. This enables the movement of its wheels. To start ploughing another switch is turned on. This starts the rotation of spiked wheels and thus starts ploughing which is done simultaneously as the robot moves forward. As the spiked wheels are in the front, a container is used for holding the seeds. A hole is drilled in the bottom of this container and that is covered with a small metal sheet. This sheet acts as a flip-flop and caters to the dropping of seeds at periodic intervals. The control of the robot is done by wireless transmission system i.e. zigbee.

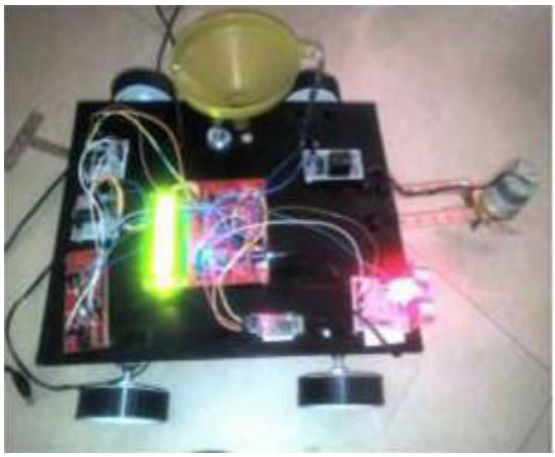

Fig 3 .Snapshot of Agrirobot

Fig 4.Snapshot of ploughed land.

IX.CONCLUSION

As we know that in our country about 70% of population lives in villages & their mainly income depend on the agricultural source. Hence my prominent aim of this project Solar operated automatic machine is to fulfill the tasks like ploughing and seeding by using non-conventional energy sources. Thus solar operated automatic seed sowing machine will help the farmers of those remote areas of country where fuel is not available easily. And also they can

perform their regular cultivation activity as well as saves fuel up to larger extent. At the same time by using solar energy environment pollution can also be reduced. Thus aiming to save the revenue of government & also most demanded fossil fuel.

In agriculture, the opportunities for robot-enhanced productivity are immense – and the robots are appearing on farms in various guises and in increasing numbers. The other problems associated with autonomous farm equipment can probably be overcome with technology. This equipment may be in our future, but there are important reasons for thinking that it may not be just replacing the human driver with a computer. It may mean a rethinking of how crop production is done. Crop production may be done better and cheaper with a swarm of small machines than with a few large ones. One of the advantages of the smaller machines are that they may be more acceptable to the non-farm community. The jobs in agriculture are a drag, dangerous, require intelligence and quick, though highly repetitive decisions hence robots can be rightly substituted with human operator. The higher quality products can be sensed by machines (color, firmness, weight, density, ripeness, size, shape) accurately. Robots can improve the quality of our lives but there are downsides. The present situation in our country all the agricultural machine is working on manual operation otherwise by petrol engine or tractor is expensive, farmer can't work for long time manually to avoid this problem, we need to have some kind of power source system to operate the digging machine.

- To implement a prototype model of drilling and seed sowing machine system within the limited available source and economy.
- The system can be subjected to further development using advanced techniques.
- It may become a success if our project can be implemented throughout our country.

X. REFERENCES

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