Multipurpose Agriculuture Robot Using Solar Energy

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Abstract- *This paper aims to design in development in agriculture field using solar energy. Development is been increasing day by day, in agriculture field. Solar energy is used to supply various motors used in agriculture field. In agriculture robot motor used for cutter, water pump, as well as to move the wheels DC motors are used. In India most of the people working in agriculture field, there is need in development in this field. The solar energy is easily available by nature in free of cost, therefore solar energy is used in this paper. Due to use of agriculture robot the human work is reduced as well as in minimum time maximum work is done with minimum errors. Solar energy source is having various benefits over conventional source. The most important component to store energy are batteries. These batteries are long lasting and powerful to store solar energy in day time this energy can be used in night time also to supply the water pump. In this paper we decided to make a robot which is less costly and giving maximum features such as cutting, cultivating, seeding, water pumping and leveller or flapper.*

Keywords- Problem Statement, Objectives, methodology, Components Used

I. INTRODUCTION

Backbone of Indian economy is agriculture field, therefore there is need to improve the techniques used hence this agriculture robot is constructed using solar energy. Due to use of solar energy the cost of electric supply is reduced only cost is required to install the solar energy system. The non-renewable natural resources of energy such as solar energy are used day by day to generate electric power. The production of this electrical energy using such sources is available in less cost which is helpful in agriculture field to supply various applications. In this paper we are using this supply to work various function in agriculture field such as cutting, cultivating, seeding, water pumping as well as leveller. In this to work above functions motors are used such as DC motors. The use of agriculture robot helps farmer to increase efficiency as well as productions of his field with increase in precision. This robot helps to work without errors not only in day time but also in night time. This agriculture robot helps to spread not only seeds, water, but also fertilizers, chemicals. The objectives of this paper is to develop a system in which non renewable energy sources such as solar energy and microcontroller based system to control various function mentioned above are controlled using the ICs and controller. In this agriculture robot we are using some communication mediums to transfer data between robot and the device where we are giving control signals to the robot. Communication can be done using two methods wired as well as wireless communication model. For communication we can use different types of communication models such as GSM, Bluetooth model etc. In this paper Bluetooth communication model is used, this Bluetooth model is wireless communication type. The communication is done by using Bluetooth, which is paired with smart phone this Bluetooth model is placed over agriculture robot. The controlling of agriculture robot is done through the smart phone by sending various signals which defined for certain tasks.

II. PROBLEM STATEMENT

In the present scenario there is a need to development in the agriculture field, because farmers does not working with the latest technology still they are dealing with the old techniques which will effect on the various problems in the agriculture field. Farmers does not achieving the benefits therefore there is requirement to improve the techniques. In the agriculture field there is lack of skilled man power this will effect not only the agriculture field but also in the growth of developing countries.

III. OBJECTIVES

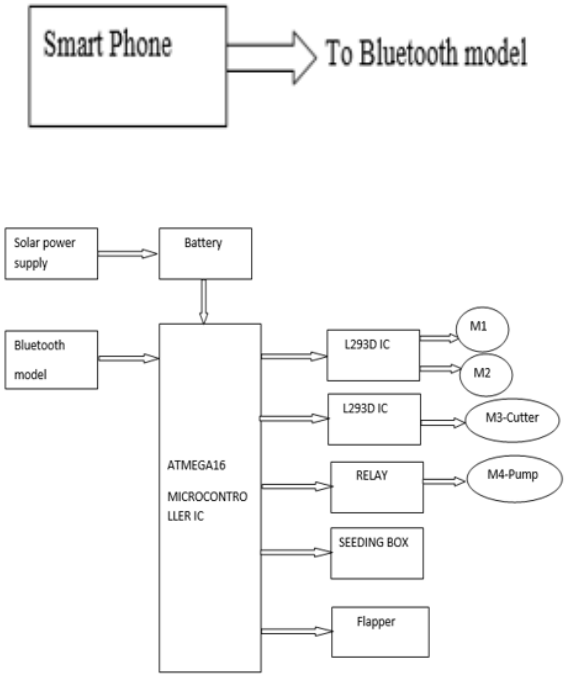
The objectives of this paper is to fabricate a multipurpose agriculture robot which can perform following functions:

The main purpose of this paper is to design a robot which can perform operations like cutting, cultivating, seeding, water pumping, etc. using solar energy. It can perform maximum work in less time .This can be operated through the remote by farmers which can not require skills, this will reduce human effort.

It will perform all operations at a time which will reduce the time span. Solar energy can be stored and used at any time night or day.

IV. METHODOLOGY

In this paper the basic aim is to develop a multipurpose machine using solar energy which can perform all above mentioned operations.



The basic frame of the agriculture robot is made up of steel metal by using four wheels along with four DC motors to drive the robot.

The functions performed by this agriculture robot is discussed in the following points respectively:

Cutter: Cutter is used to cut the grass, or unwanted plants in the field. Cutter is mounted on the robot at front side of the robot, for this purpose DC motor of 1000rpm is used with the help of L293D IC.

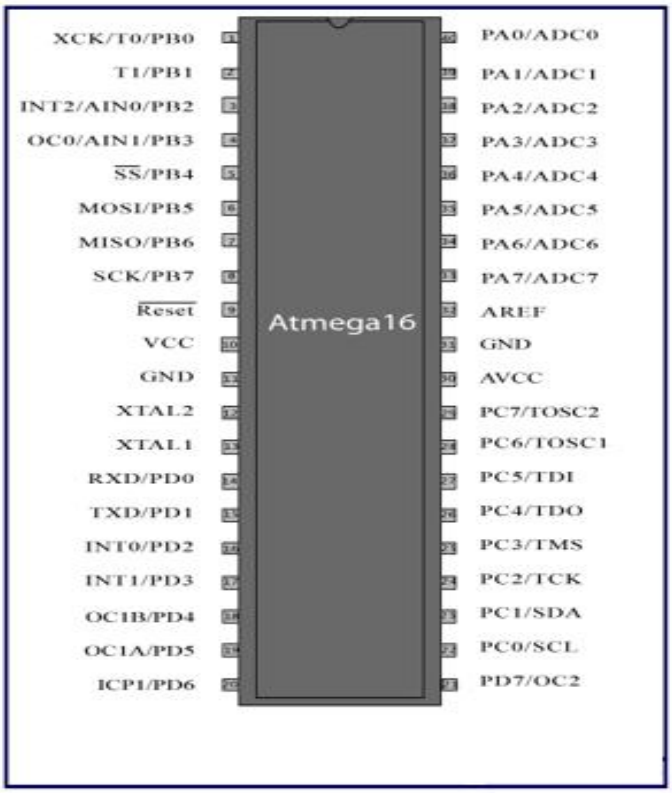
Cultivator: This performs a cultivating operation which can dig the soil for seed sowing purpose. This will be done when the base frame of the robot is move in the forward direction.
Seed sowing: The seed sowing operation of the robot is done when the cultivation operation is done then the seeds are thrown in the soil.

Water pump: The pumping operation is done using a pump. For this the signal to the pump is given through the IC using relay circuit.

Flapper/Leveller: This arrangement is mounted at end of the robot it will level the mud or soil. This will work when the base frame model is runned.

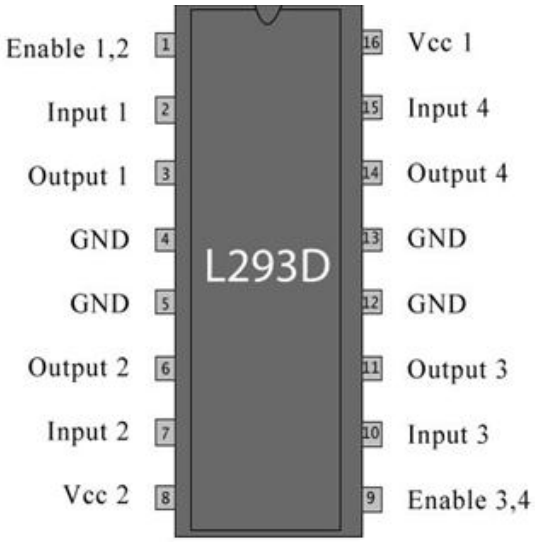
V. COMPONENTS USED

ATMEGA16 IC:



ATMEGA16 is a 8 bit microcontroller which is of Atmel's Mega AVR family with low power consumption. Atmega16 is based on enhanced RISC architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle.

L293D IC:



To drive the DC motors used for cutter as well as for moving the base frame of the agriculture robot there is a requirement of motor driver therefore L293D IC is used. This is a dual H-bridge integrated circuit(IC). This is used as a current amplification to drive the DC motors. This is a 16 bit IC used in both the directions. By using this L293D IC we can control from this IC maximum two motors from one IC.

Solar energy:

The use of solar energy is increasing day by day because advancement in the technology to generate electricity is improved. To generate electricity basic photovoltaic cell is used in which P-N junction configuration is used. The group of solar cell is called solar panel. When the sun energy is transferred the electric current is formed between two layers. The energy can be stored in battery this can further used for various purpose.

VI. CONCLUSION

Multipurpose agriculture robot using solar energy is designed to implement the various functions in the agriculture field. In this project solar energy by storing in the batteries are used to supply various motors such as cutter and the base frame motors to move the wheels of the robot. For communicating between smart phone and agriculture robot the Bluetooth wireless communication model is used. Through the smart phone controlling is done, from this the signals are given to perform various functions such as cutting, cultivating, seed sowing, water pumping, etc.

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Appendix