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DESIGN AND FABRICATION OF ECOROBOTIC AGRICULTURAL MACHINERY

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Abstract: Percentage of Indian population depends on agri-culture for income. Most farmers are still using conventional methods for farming. These methods are found to be less efficient and time consuming. It is high time that farmers need modernized farming ideas to reduce their effort and increase production. Automatic agricultural machine is a major and important development that came in the field of agriculture. The vehicle had been designed for purposes such as seed sowing, water springling etc. Another important feature regarding the vehicle is that it fully operates on clean energy, say, solar and electric energy. By the introduction of this ecorobotic agriculture machine we are able to replace human and animal efforts for more than 60 %.

Index Terms - AT mega328, Electric Vehicle, hybrid model, solar power, electric energy, Arduino, line follower.

INTRODUCTION

Agriculture is the most important feature in the Indian economy. Over the past four decades India record of progress in agriculture has been quite impressive. The agriculture sector has been successful in keeping pace with rising demand for food. The Increased productivity has helped to feed the poor, enhanced farm income and provided opportunities for both direct and indirect employment. But the agriculture system in India still faces difficulty such as lack of skilled labour, rising of input cost, lack of proper crop monitoring etc. The automation in the field of agriculture helps farmers reduce these efforts. The Automatic systems plays vital role in all sections of societies, organization and industrial units. The primary objective of our project is to develop a system that helps farmers in operations like seed sowing and fertilizing at pre-designated distance and depths with all applicable as well as water spraying. The proposed machine has functions such as seed sowing water sprinkling and temperature sensor. This machine is an ecorobotic machine which runs only on electric and solar power.

OBJECTIVES

- a.To reduce human and animal effort in the agriculture field
- b.To save time and increase productivity
- c.The usage of solar and electric energy, there is minimum or no trace of pollution

COMPONENTS

A. Arduino Uno

ATmega328 is an AVR family micro controller. It is based on advanced RISC architecture. It is an 8-bit controller. It has 32K Bytes of Programmable Flash memory, 1K Bytes of EEPROM and 2K Bytes of SRAM

B. Solar Panel

Solar panels capture sunlight as a source of radiant energy, which is converted into electric energy in the form of direct current (DC) electricity. A solar panel of 100 W and 12 V is being used in this project.

C. DC gear motor

A gear motor is an all-in-one combination of a motor and gearbox. Four 12V dc motor with rated speed 435 rpm is used

D. Battery

A lithium-ion or Li-ion battery is a type of rechargeable battery which uses the reversible reduction of lithium ions to store energy. A lithium ion battery of 12V and 12 A h Capacity is used.

E. Sprayer Pump Motor

The pump forces this liquid down a narrow barrel and out a small hole at the spray valve. Inside the shroud, there is a small spring which compresses the fluid once pulled back by the trigger.

F. Line Follower

Two IR sensors to check if the robot is in track with the line and two motor to correct the robot if it moves out of the track. If left sensor comes on black line then the microcontroller instructs the robot to turn left by rotating the right wheel alone. If right sensor comes on black line, then the microcontroller instructs the robot to turn right by rotating the left wheel alone. If both sensors come on black line, robot stops.

G. l293d motor driver

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors

METHODOLOGY

This hybrid machine uses solar as well as electric supply to run. Initially the 12V battery is charged by the AC supply and this stored power is utilised to run the motor attached to the wheels. The Atmega is used for the automation of the system. It will automatically dig a hole, Sow the seed and sprinkle water. Solar panel keeps on charging the battery whenever a charge controller attached to the system indicates the battery charge drops below a particular level

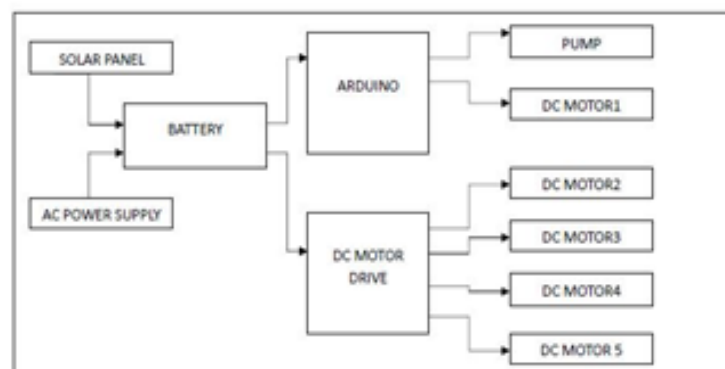


Fig. 1. basic block diagram for the proposed methodology

PROPOSED MODEL

It is worth to be noted that, our research On ecorobotic agricultural machinery is successful. The whole process re-quired careful planning, including the design of efficient and well aligned coils, consideration of safety regulations and integration with vehicle systems. Even without the help of a professional expertise, our research and project has been successful.



Fig a. side view of proposed model

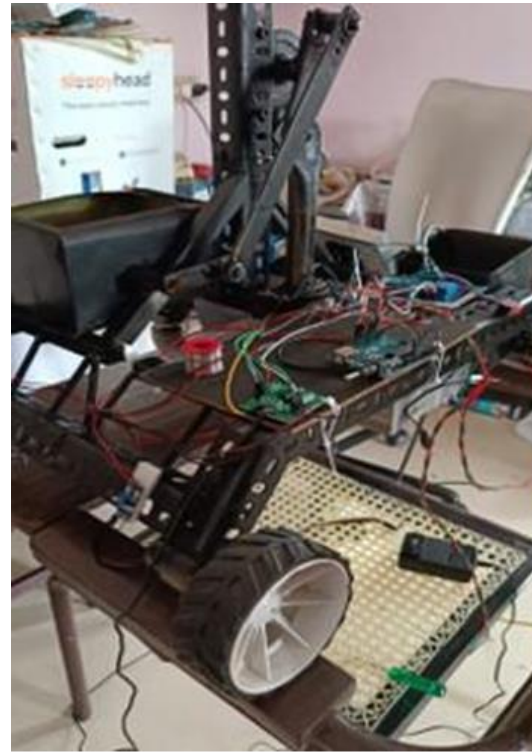


Fig c. electronics assembly of proposed model



Fig b. top view of proposed model



CONCLUSION

The machine will satisfy the needs of small scale farmers as it is not costly compared to other agriculture machinery. The machine requires very less human effort, thereby saving time and energy. This machine is an eco-friendly machine and thus giving less or no pollution. This project will reduce major difficulty faced by Indian farmers such as lack of skilled labour.

FUTURE SCOPE

By increasing the equipment strength and quality to its peak, we can have multipurpose agricultural equipment for life time usage. By providing hydraulics, gear arrangements and some minor adjustments the equipment can also be made as tractor powered equipment. Our project is a prototype which is using line follower. It can be replaced by GPRS module and gyro scope for full automatic. The machine can be converted to remote control type. The temperature sensor can be further developed in such a way that amount of water sprigled depends upon the temperature of soil.

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