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Solar Powered Mobile Operated Farmer Friendly Multifunction Agribot

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Abstract: ***Many advances in technology have made agribusiness very labour intensive to be a part of the industry. As we spoke only 50 years ago, farmers began to incorporate methods into their farming practices. Those involved in the agricultural industry are said to be less likely to change. They were very firm in the ways that came before them. Now when we examine the agricultural industry, we can see that it is changing rapidly. Farmers are looking for new ways to implement technology to reduce costs and reduce working hours. Farmers have come up with an autonomous robot as a way to explore new technology in agriculture. Solar-powered mobile-powered robots are new to the agricultural industry, but are rapidly gaining popularity from agricultural research institutes across the United States. These tractors are described by Farm Industry News as a tractor that drives its solution with a computer under control. Despite being in the research stage of development, autonomous robots are becoming more of an idea than a reality. When the robot is moving on the surface, it is controlled by a Bluetooth technology based mobile remote.***

Keywords: Multi Agribot, Wireless technology, Solar energy, Microcontroller etc.

I. INTRODUCTION

Autonomous farm robots are very new to the agricultural industry, but are rapidly gaining popularity from agricultural research. This autonomous mechanical function robot rapidly becoming more of a reality than an idea. When the robot is moving on a surface, it is controlled by a Bluetooth technology. It can be forward and reverse using gear motors. Using these equipped motors, the robot can move in left and right directions. This project uses AT89S52 Microcontroller and comprises of performing Soil ploughing, seeding, watering, pesticide spraying with Bluetooth decoder commands. whole system is powered through Solar Panel.
Soil Ploughing operation is done by geared mechanism arrangement. Seed sowing operation is done by Dc geared motor mechanism. And cutting operation is done by high-speed dc motor with cutter arrangement. Water sprinkler and pesticide sprayer added advantages in it. This project uses controller board to control all the operation. Bluetooth is used which converts the desired frequency in to analog signals which is received by Bluetooth Decoder and given to AT89S52 microcontroller. The microcontroller is used for controlling the robot according to the frequency received by the Bluetooth receiver. To control the devices from remote place we are using a Bluetooth technique. Connect the mobile to the receiver end (towards the controller built into the robot). If we give a command from another mobile automatically it gets received by the Bluetooth decoder unit placed on receiver end.

II. PROJECT BACKGROUND

Robotics plays an important role in agricultural production and management. Effective farm management requires autonomy and time-saving technology in agriculture. Since traditional farm machinery is crop and terrestrial, researchers are now focusing on different agricultural operational standards for the design of autonomous farm vehicles. Agricultural robots have been researched so far and are mainly developed for harvesting, chemical spraying, fruit picking and crop monitoring. Such robots are the right choice for manpower as they are equipped with unmanned sensing and machine systems.
The main advantages in developing autonomous and intelligent farm robots are repetitive accuracy, efficiency, reliability and soil compaction and hard work. The robot is capable of multi-tasking, sensory acuity, functional stability and adaptability to a variety of operating conditions. Studies on agricultural robotic systems have been carried out using a composite prototype architecture with various precision agricultural machinery. Some models have been developed by the European Union with CROPS, USA-ISAAC2 and Michigan-Hartibot, Australia-Agbot, Finland-Demeter, Indo-Agribot and many others. Agricultural robots are designed using various localization methods such as vision, GPS, laser and sensor-based navigation control systems.
In this project, comparative studies will be explored, including an overview of robotics approaches to precision agriculture and global development in India.

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III. OBJECTIVES

A. Design and development of solar powered agricultural robot which can be able to perform multitask in agriculture field.
B. Control of this tractor will be wireless through Bluetooth Mobile technology.
C. Design and analyze a real time system for this robot to give a solution and propose a model which can be used.
D. Analyze the design of plough tool and develop by using solar panel.
E. To propose a low cost but effective real time agriculture robot system.
F. To demonstrate the working model of this robot.

IV. LITERATURE SURVEY

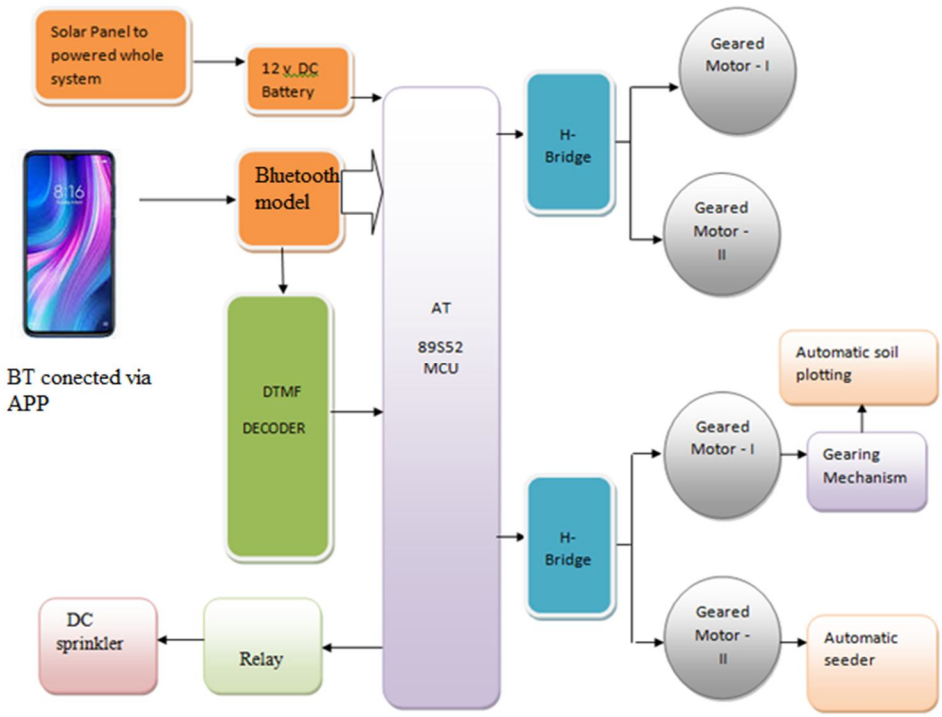
A. Design and Implementation of a Mobile Agricultural Robot for Remote Sensing Applications, Eduardo P. Godoy , Engineering School of São Carlos – University of São Paulo, Brazil.

This paper distributed fieldbus architecture development and agricultural mobile robot control for tele operation. Application of the ISO11783 standard based on the CAN protocol provided an effective platform for developing the robot's distribution control system. Individual control nodes or electronic control units (ECUs) reduce the computational burden of the task computer by implementing feedback control logic in the ECU and facilitating data communication between robotic devices. The distribution control system at the reception of control commands allowed the CAN network to transmit in transmission mode with no time delay or lack of synchronization (e.g. between four controllers of propulsion motors). An important contribution of this paper is the development of the ISO11783 library of high-level functions (initiating, maintaining and communicating) for microcontrollers.

B. Multipurpose Agricultural Robot, Gerard Elston Shawn D'Souza, Alva's Institute of Engineering & Technology, Mangalore, Karnataka.

The multipurpose farm robot gives a sophisticated way to sow, plow and harvest crops with minimum manpower and effort so that it becomes an efficient vehicle. The machine cultivates the field taking into account specific rows and specific columns at a certain distance depending on the crop. Robots will improve our quality of life and increase the chances of creating a modern model for the well-being of farmers for future humanity. In agriculture, the opportunities for robot-enhanced productivity are enormous and robots appear in various forms and in growing fields. Other problems associated with autonomous farm equipment can be overcome with technology.

V. BLOCK DIAGRAM



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VI. WORKING

A. Solar-powered mobile-powered robots are new to the agricultural industry, but are rapidly gaining popularity from agricultural research institutes across the United States.

B. Farm Industry News described these robots as a tractor that plows it with a controlled computer. Despite being in the research stage of development, autonomous robots are becoming more of an idea than a reality. When the robot is moving on the surface, it is controlled by a Bluetooth technology based mobile remote.

C. It can be forward and reverse using gear motors. Also, this robot is able to make sharp turns in left and right directions. Soil ploughing is performed by a gear system setting.

D. Seeding of seedlings is done by DC gear motor mechanism. And the cutting operation is done by a high-speed DC motor with cutter fitting. Water sprinklers and pesticide sprayers add a lot of benefits to this. The project uses a board of controllers to control all functions.

VII. COMPONENTS

A. Solar Panel

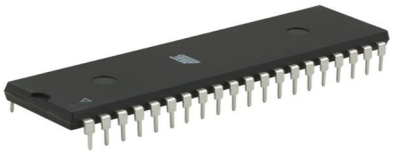
Solar Panel are devices which collect the light and convert it into electricity.
It is Used for power generation form solar energy.
Which is further stored in 12 V battery.
Solar Panel (12v, 20W) Power is used.

B. 12 v battery

12 V , 1.3 Amp Battery is high power battery easily handle all the function.
Main things are to collect electrical energy from solar panel and provide to various components For running specific function.

C. 8051 (AT89S52 Micro-Controller)

It is main controller AT89S52 belongs to 8051 family. which is used to measure the voltage from battery. It is attached LCD display to show the command. It works on 5V.



*D. Liquid Crystal Display (2*16)*

This device can be use to display any message, status of name of project and its function. In this project it indicates the status power. It works on 5v.

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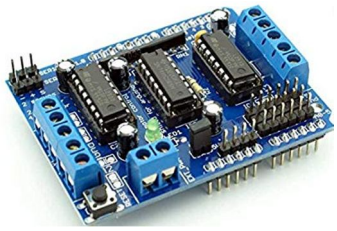
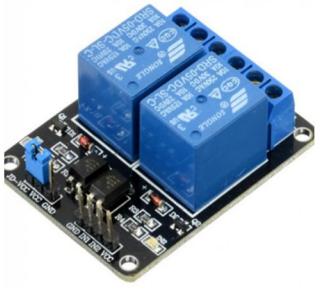
E. Motor Driver (L293D IC)

L293D Dual H-Bridge Motor Driver Integrated Circuit (IC). Motor drivers act as present-day amplifiers because they have low-present day manage alerts and provide excessive-present day signals. Powered by 12v energy.



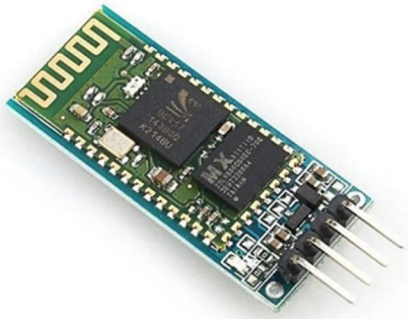
F. Realy Board

The relay is usually an electromechanical device that is powered by an electric current. Current flow in one circuit causes another circuit to open or close. 12V relay board. It is used to operate a DC motor.



G. Bluetooth Module

A Bluetooth module is often a hardware issue that offers a wireless product to work with the controller.
HC 06 Module is used for wireless operation.



VIII. ADVANTAGES

A. It works faster than human efforts, which definitely saves time.
B. This system observes various environmental conditions and takes measures that humans cannot do properly.
C. Advanced security.
D. Monitors all accidents and hazards.
E. Solar energy was used in a better way for agriculture.
F. The developed system is used to spray fertilizers, pesticides, fungicides and pesticides.
G. More economical
H. Clean is easy to clean and maintain
I. It is powered by renewable energy
J. It does not cause air pollutants and noise
K. Easy to maintain
L. It requires less fuel and is lighter in weight

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IX. DISADVANTAGES

Skilled workers are required to maintain and maintain the vehicle.

X. FUTURE SCOPE

A. Wireless camera surveillance adds an added advantage.
B. More equipment such as soil testing works can be added to this project.

XI. CONCLUSION

The project provides implementation of farmer-friendly solar powered mobile tractors / robots for automated plowing, seeding, harvesting, watering and pesticide spraying using Bluetooth technology in the mechanical system domain. Designed and implemented with Atmel 89s52 mcu.

Robots for agricultural purpose A robot works in agricultural activities if it proves to be close to the performance and cost of a product. The robot structure is adequate to meet the challenges of this sector. Once this concept is properly presented to the Indian market, we know that it will help differently in reducing the mobility rate of 15% found in Indian farmers associated with agricultural spraying activities.

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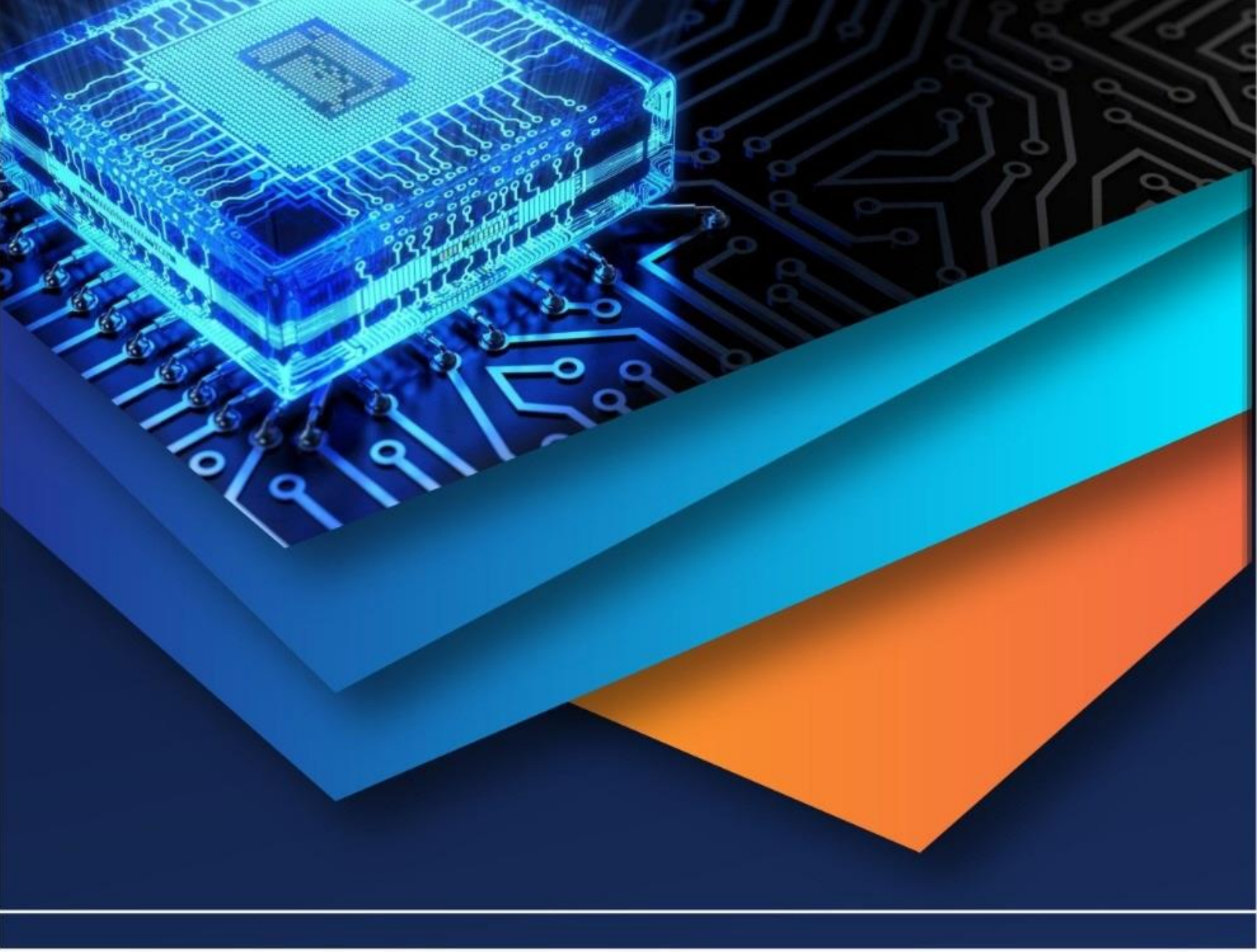

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