iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** IV **Month of publication:** April 2021

DOI: https://doi.org/10.22214/ijraset.2021.33889

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue IV Apr 2021- Available at www.ijraset.com

Solar based Multitasking Agriculture Robot

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Abstract: ***Agriculture is the major sector upon which 70% of the population is dependent directly or indirectly. There were not many advancements seen in this sector as globalization is not much. But in the past few decades, there has been immense development in this sector and the whole process is about to be automated. The last years we have seen developments in the field of agriculture. From automatic tractors to crop monitoring systems we are now seriously considering the possibility of completely autonomous vehicles that can pretty much conduct themselves with minimal human intervention. Although tremendous research has gone into this discipline, the lack of knowledge and awareness among the farmers are big influencers in terms of how this technology can be brought to its flaws. Over the last few years after the launch of autonomous robots, many farmers have witnessed an increase in the yield and production of crops. We aim to understand this technology and to comment on how these technologies may be perfected or analyze if they can be perfected at all to the point where they can deal with various agriculture hazards with the help of intelligent algorithms.***

Keywords: AV – Autonomous Vehicle, IPC – Inter-Process Communication, DMI – Distance Measuring Instrument, INS – Inertial Navigation System

I. INTRODUCTION

Developing countries, almost exactly within the agriculture sector, are plagued by inadequate men. therefore on the opposite hand, the scope of developing innovating, automatic, and intelligent forms of machinery has enlarged in Brobdingnagian amounts and has become one of all the trends within the twenty-first century. the main issues in Indian agriculture are rising input prices, availability of skillful laborers, lack of water resources, and crop observance. The agricultural census offers important info on the distribution of landholdings in our country. in step with the census majority of the farmers are having land of but one square measure. this is often one of all the main drawbacks of mechanization within the agricultural sector in the Republic of India. The autonomous robot will have the following functionalities as plowing, seed sowing, soil leveling, water spraying integrated into a single robot. All of these functions haven't nevertheless performed employing a single vehicle. In this, the robots area unit developed to concentrate in Associate in Nursing economical manner, and additionally it's expected to perform the operations autonomously. The planned plan implement the vehicle to perform the functions like tilling seed sowing, mud leveling, water spraying. These functions can performed by single robot.

II. LITERATURE SURVEY

A. Smart And Auto Controlled Agricultural Robot

The automatic agricultural system is a robot designed for multiple agricultural use. This solar based multitasking agriculture robot very effective for saving time ,energy and money required for farming . It is based on multiple parameters. This performs functions such as plowing the field, sowing the seeds, and grass. Its working is based on previous old agriculture which enables ancient seed sowing at required depth and at optimal distances between crops and equidistance from every crop, we can adjust for every crop. The digital soil sensors are placed which monitor the humidity, temperature, soil moisture levels.. Bluetooth device is used to pair the robot with a mobile .Solar panel is used for energy and its renewable source of energy which is effectively used for reduce energy cost and solved many problems for farmer and environment.

B. Functions Of Agrobot

The main purpose of the project is to build a solar based multitasking robot for agriculture that could run automatically. The agrobot is designed to reduce the task of farmers and increase the speed and accuracy of the work.The controlling and monitoring depends on the Internet of things, due to which the status of the field can be monitored and controlled using the internet.. In our project, management system is divided into two parts, i.e. field management and mechanism management. In field-management the soil humidity, temperature associated humidity can be detected using appropriate sensors and, also the field is controlled by appropriate actions because the data is updated to the farmer by an app. The thieving of crops by humans and also the attack of animals within the agricultural land cause serious loss in cultivation. For persona non grata notices within the agricultural field we can use a PIR detector and do image process technique to detect them. Usually, fires occur naturally within the agricultural fields, lit by heat from the sun or a lightning strike.

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So, we tend to style a system within the field to extinguish such hearth at terribly early stage. The entire system area unit usually switched to associate car mode for complete management of the farm by the mechanism and manual mode for management by farmer. The mechanism sprays pesticides, cussicides and weedicides to manage attack of pest and weeds at intervals the sector. Also, the batteries area unit usually recharged by the electrical device unbroken above the vehicle. This ensures the eco-friendly energy offer and prevents frequent charging of the vehicle.

III.PROPOSED SYSTEM

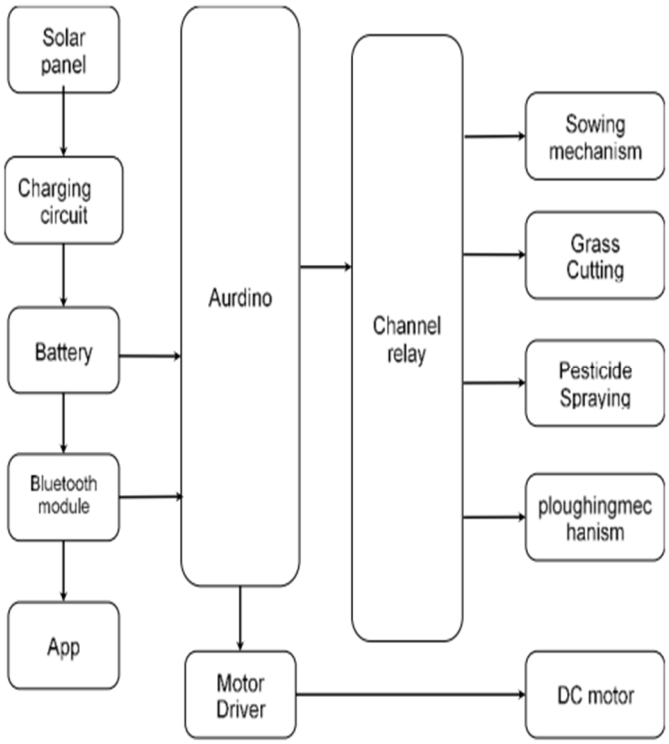

Figure 1: Block diagram

Block diagram of the machine-driven Seed Sowing, Grass Cutting, and chemical Sprayer mechanism victimization Bluetooth/Android App. The diagram consists of associate ATmega328p microcontroller that controls the entire system as shown in Fig.1 and a 9-watt solar array that's connected to the battery for storing energy and any it's given to power offer charging electronic equipment that is providing +5 V for Arduino board and +12 V offer for driving DC motors victimization L298 motor driver module. Bluetooth HC05 is connected with the ATmega328p associated wirelessly with an robot smartphone to regulate the entire system.

A. Working

The proposed idea of this project is to design a utile agriculture automaton, which is able to dig the soil, sow the seeds and spray the water with the least changes in accessories with lowest value. This whole system of robots works with the battery and also the alternative energy. the bottom frame is formed for the automaton with four wheels connected and also the rear wheels area unit connected with the motor. At one finish of the frame, a cultivator is fitted that is additionally driven by a DC motor, and also the style is formed to dig the soil. Funnel is employed to store the seeds and fertilizers, it flows through the funnel by trained hole on the shaft to the mammary gland soil. On the end, a sprayer is fitted to spray water. solar is placed on the highest of the automaton and is connected to A battery for charging the battery.

Firstly, we are able to send information through our app that's developed by us, with the assistance of Bluetooth property. Bluetooth module receives the information per our program that's in Arduino. Then Arduino sends information to the relay module so the switch is place on/off.

B. Flow Chart

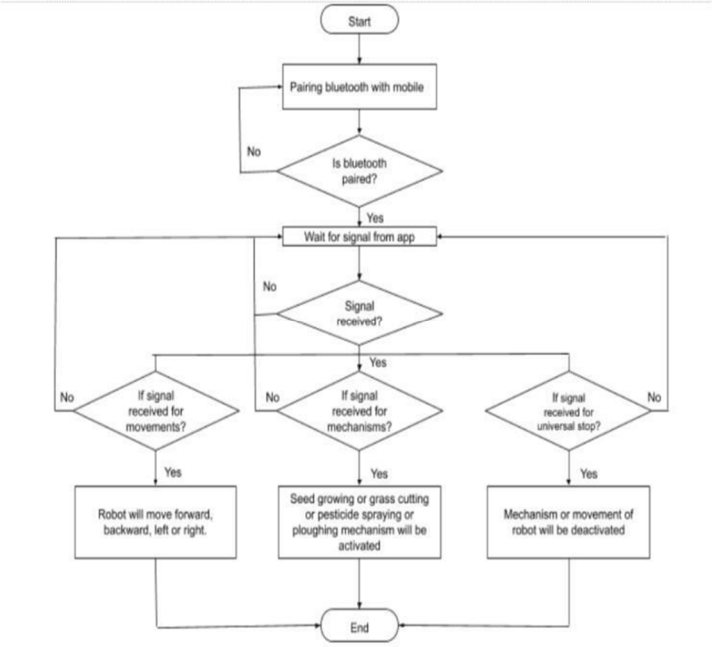

Figure 2: Flow-Chart.

C. Results

Figure 3: Solar panel Installation.

9-Watt Solar panel connected to the battery and Arduino unit.

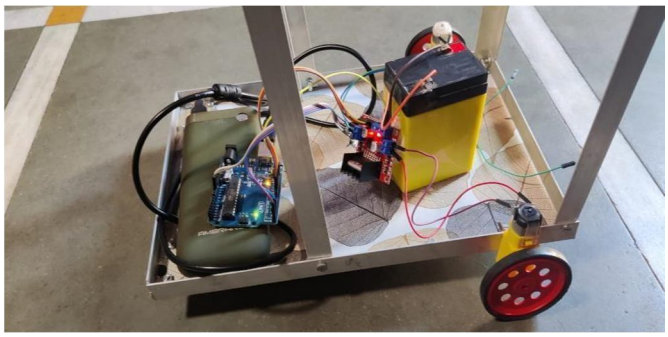

Figure 4: Base frame of robot.

Base frame of the robot made with aluminium sheets inside which whole Arduino unit along with sensors are incooperated..

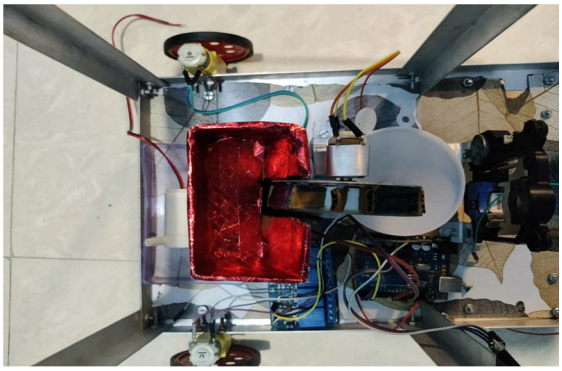

Figure 5: Seed sowing mechanism

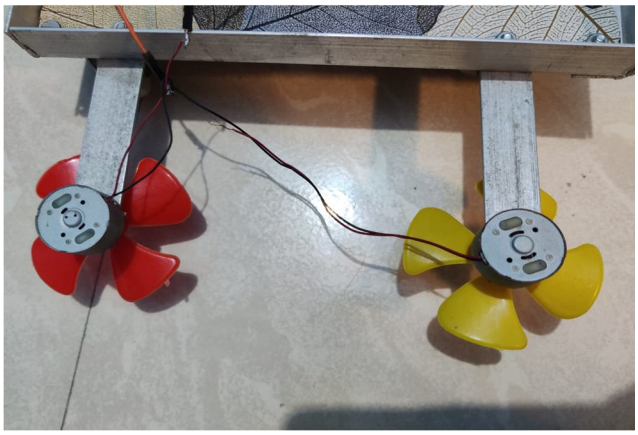

Figure 6: Grass cutting mechanism.

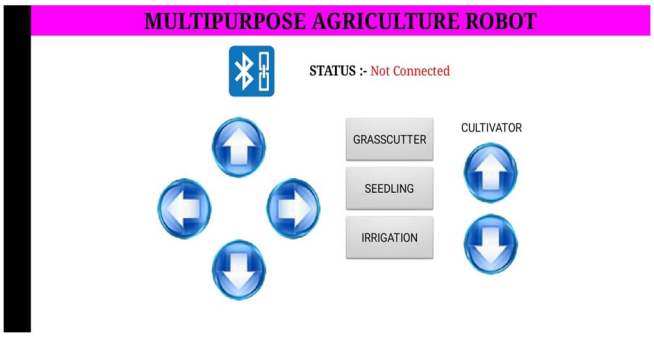

Figure 7: App to control all the functions of the robot.

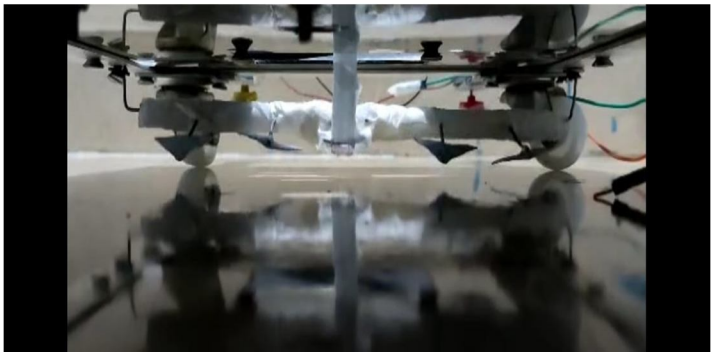

Figure 8: Cultivator

IV. CONCLUSION

The agricultural robot shows advanced multiple methods of sowing, plowing and cutting the crops with minimal manpower making it an efficient vehicle. The machine will fertilize the field by considering the particular rows and columns . Farmers can easily operate robot using app. Which is connected by bluetooth so any internet connection is not required. Solar energy is used for robot. Depending upon the fixed distance on the crop, It can improve the quality of our lives and enhance the moment for future mankind to create an Improved model for the betterment of farmers.

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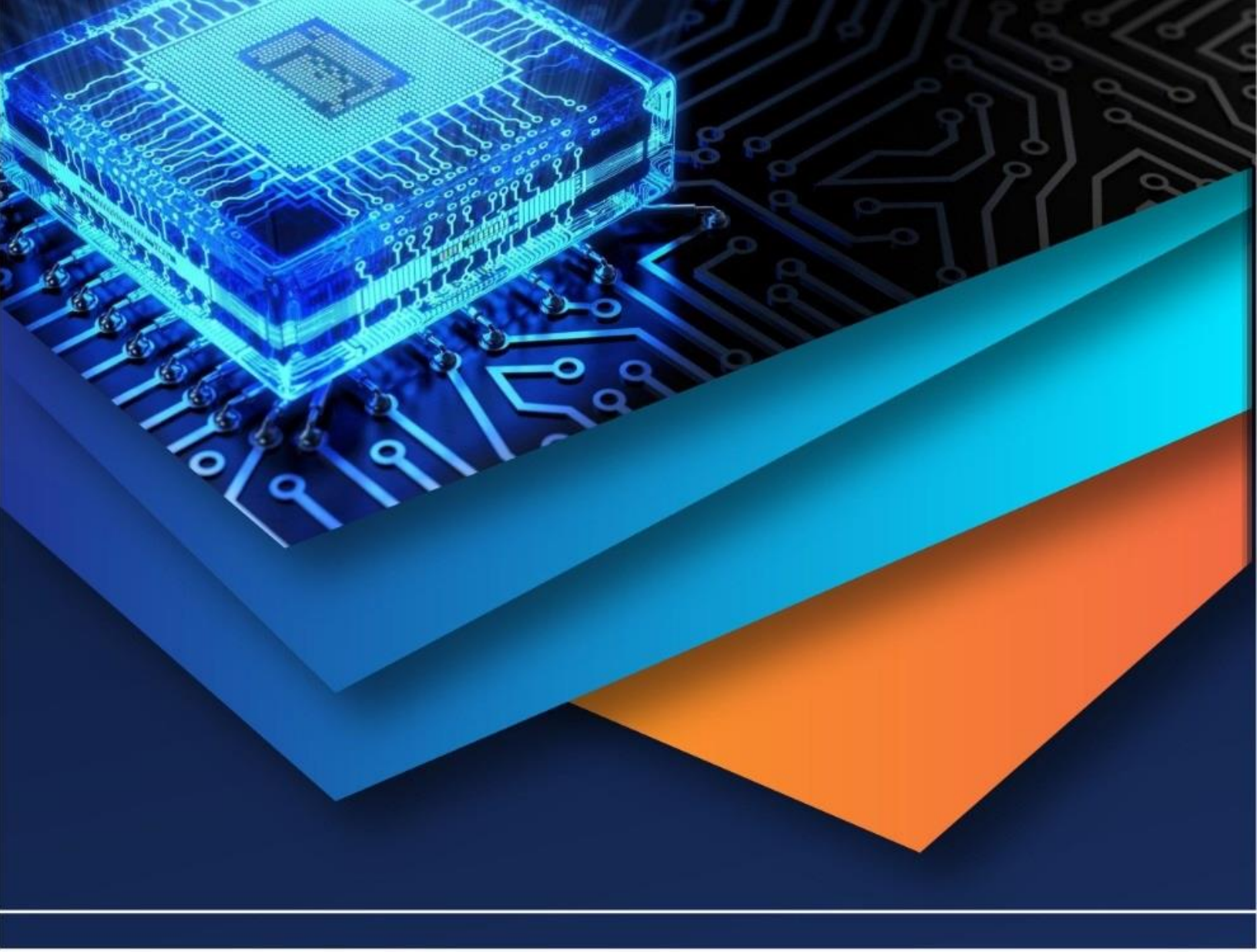

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