SOLAR POWERED MULTITASKING AGRICULTURE ROBOT

[1]Suriya C R, [2]Naveen M, [3] Jacob Santhoshkumar, [4] Dr K Arunkumar,
[1][2][3] UG scholars of Robotics and Automation, [4] Assistant professor,

Abstract-- Agriculture is the principal occupation of more than 40% of the global population. Growing interest has been shown in the development of autonomous vehicles like farming robots in recent years. But most of the worker are not willing to work in the field. During pesticide the workers gets skin disease problems also. The solar powered multitasking robot helps in those times, it can also do multitasking like seeding, pesticide spraying and harvesting. These robots are employed to ensure appropriate irrigation and resource usage while minimizing human interaction.

Index terms - Agriculture

I. Introduction:

In a developing nation like India, husbandry is the main assiduity. Yet, there are smaller individualities working in the agrarian business moment for a variety of reasons. The product and effectiveness of husbandry must be increased We can carry out a number of agrarian tasks with this design. Despite expansive modernization of the agrarian sector in some regions of the nation, the maturity of agrarian conditioning are still conducted by people exercising straightforward outfit and tools like rustic sickles and ploughs. Machines are used sparingly or hardly at each when cultivating, weeding, or irrigation the crops. Particularly with small and borderline granges, this is the case. Large quantities of force are wasted as a result, which lowers yields per worker. therefore, we must denuclearize agrarian processes to help labor waste and to make husbandry accessible and effective. By using this vehicle in the agrarian sector, we suppose some progress will be made. The yield for numerous agrarian goods in India is poor, and the country's current agrarian practices are neither economically feasible nor environmentally sustainable. Irrigation systems that aren't duly maintained and a general lack of quality extension services are the main causes. therefore, this action also aims to regulate irrigation conditioning. Its design allows for automatic monitoring and operation of the required water force. Some growers aren't apprehensive of agrarian technology advancements. Increased crops helped to reduce hunger while also relieving the population of its nutritive constraint on unborn growth. So, sustaining expansion necessitates indeed more agrarian advancements. therefore, we must find whatever means necessary to advance husbandry and enhance the quality of life in our nation. India is a country grounded on husbandry. Nearly seventy percent of our population depends on husbandry. One third of our nation's income comes from husbandry. Agriculture is the foundation of our frugality. Our nation's profitable well- being is significantly impacted by the growth of husbandry. For a veritably long time, our husbandry was underdeveloped. For our people, we did not produce enough food. Vegetables and cereals had to be imported into our nation, but effects are now different. India is growing further food grains than it requires. Other nations admit certain food grains. Our five- time plans have redounded in significant advancements in husbandry. The agrarian assiduity has embraced the Green Revolution Our nation is presently tone- sufficient in food grains. China is now suitable to export redundant agrarian products, including grains, to other nations. In terms of groundnut and tea affair, our nation leads the world. In terms of producing rice, sugarcane, jute, and oil painting seeds, it comes in alternate place encyclopedically. Our crops reckoned on downfall before we gained our independence. As a result, we had nearly little agrarian productivity. However, we had a good crop; if not, the crops failed and there was starvation in some areas of the nation, If the seasons were favorable. With independence, the government developed plans for the growth of husbandry. There weren't acceptable irrigation installations in the history. For irrigation, growers largely used downfall. There were hardly any conduits or tube-wells. In order to produce power for our businesses and husbandry, water is kept in gutters, lakes, and budgets. levee water is transported to far- out locales for irrigation. growers have entered pumping sets and tube wells. More crops are produced moment thanks to the increased irrigation of land. growers must deal with multitudinous difficulties while working. They must deal with some breathing diseases while scattering chemical liquids. Humanity is exposed to poisonous and dangerous chemicals when using fungicide liquids, and if sprayers aren't careful, problems will affect. The process of scattering liquids in the field takes longer. [1] "Development of an Autonomous Solar-Powered Agricultural Robot" (2018) by Jangwoo Lee, et al. This study presents the design and development of an autonomous solar-powered robot that can perform tasks such as planting, weeding, and fertilizing. The robot is equipped with GPS and sensors for navigation and task performance. The study concludes that the robot can improve efficiency and reduce labor costs in agriculture. [2] "Design and Development of a Solar-Powered Multi-

Purpose Agriculture Robot" (2020) by Nana Osei, et al. This study presents the design and development of a solar-powered robot that can perform tasks such as planting, irrigation, and crop monitoring. The robot is equipped with sensors for detecting soil moisture and crop health. The study concludes that the robot can increase efficiency and reduce the environmental impact of agriculture. [3] "A Review on the Development of Solar-Powered Agriculture Robot" (2021) by Muhammad Azizur Rahman, et al. This review article summarizes the current state of research and development of solar-powered agriculture robots. The article discusses the various applications of these robots and their potential benefits for the agriculture industry. The article also highlights the challenges and limitations of current technology.

[4] "Agriculture Robotic Vehicle for Solar-Powered Farming Applications" (2019) by Pranay Bhatia, et al. This study presents the design and development of a solar-powered robotic vehicle that can perform tasks such as planting, spraying, and harvesting. The vehicle is equipped with sensors for navigation and task performance. The study concludes that the vehicle can reduce labor costs and increase productivity in agriculture. [5]"A Review of Solar-Powered Agricultural Robotics for Crop Management" (2020) by Waseem Hassan, et al. This review article provides an overview of solar-powered agricultural robots and their potential applications for crop management. The authors discuss the advantages and limitations of solar power and highlight the challenges of designing robots that can perform multiple tasks. The article concludes with a discussion of the future prospects of solar-powered agricultural robotics. [6] A Comprehensive Review on Solar-Powered Agriculture Robot" (2021) by Saeed Tariq, et al. This review article provides a detailed analysis of solar-powered agriculture robots, including their design, components, and applications. The authors discuss the advantages of solar power for agricultural robotics and highlight the importance of sensor integration for task performance. The article also discusses the challenges of designing robots that can operate in different terrains and weather conditions. [7] "Solar-Powered Agricultural Robot for Precision Farming: A Review" (2021) by Hemanth Kumar, et al. This review article provides an overview of solar-powered agricultural robots and their potential applications for precision farming. The authors discuss the importance of precision agriculture for increasing crop yield and reducing environmental impact. The article concludes with a discussion of the challenges and limitations of current technology and the need for further research and development. [9] "Solar-Powered Robots for Sustainable Agriculture: A Review" (2021) by Mohamed M. Salem, et al. This review article provides an overview of solar-powered robots for sustainable agriculture. The authors discuss the different applications of solar-powered robots, including planting, irrigation, and pest control. The article also discusses the potential benefits of solar-powered robots for small-scale farmers and the challenges of scaling up the technology for large-scale agriculture.

The primary objective of this project is to increase efficiency, productivity, and sustainability in agriculture.

This project can also lessen the environmental impact of agriculture. These robots can use less fossil fuel and emit fewer climate gases by employing renewable energy sources like solar electricity. Also, they can cut back on the usage of pesticides and herbicides, both of which can be detrimental to the environment and public health.

This work is to create a more sustainable and efficient agriculture industry that can meet the growing demand for food while minimizing its environmental impact.

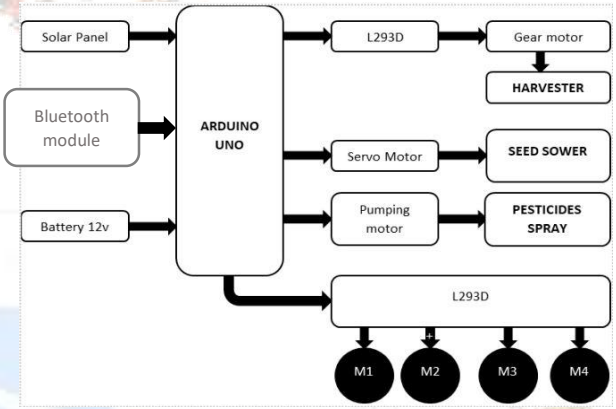

Figure : Solar powered multitasking agriculture robot

The block diagram of a solar powered multitasking agriculture robot is shown above.

Development of model

The system has been built to accept a variety of inputs in order to control the robot. The sensors' inputs are combined and processed. Signals are transmitted using the Bluetooth module, which is linked to the controller board, once the user has established a connection with the receiver device. The user can provide inputs to the board using the end-to-end transmitter that is connected. The Board is associated with three distinct tasks, including planting, applying pesticides, and harvesting. Signals for harvesting are sent to the controller, followed by the L293D driver, who in turn operates the gear motor. In order to sow, signals are sent to the controller board, which turns on and off the servo motor. Send commands to the controller to turn on and off the pumping motor when spraying pesticides.

Each wheel on the robot is equipped with a dc motor to power its motions. Each motor is controlled by the L293D driver, who receives signals from the controller board and the controller before sending them to the driver.

II. Hardware and Software used

Hardware components required for this robot:

- Arduino Uno
- Motor Driver - L293D
- Gear Motor
- Battery
- Pumping motor
- Servo motor
- Solar panel
- Gear motor

Software components required for this robot:

- ARDUINO IDE

III. Results and discussions

This robot can be used wide range of applications in agriculture.

- Seeding
- Spraying
- Harvesting

IV. Conclusion

Solar powered multitasking agriculture have the potential to transform the sector by boosting productivity, cutting costs, and enhancing sustainability. These robots can conduct a wide range of duties, such as planting, irrigation, and pest management, while being fueled by clean, renewable energy. However, building such robots presents its own set of difficulties, such as making sure the robots are strong, dependable, and able to function in a variety of environments and climates. To overcome these obstacles and introduce these technologies to the mainstream of the agricultural industry, more research and development is required. The potential advantages of solar-powered multitasking agriculture robots should not be understated as they offer a promising answer to some of the major problems that modern agriculture is currently confronting.

V. References

[1] Shubo Liu, Liqing Guo, Heather Webb, Xiao Ya1, And Xiao Chang "Internet of Things Monitoring System of Modern Eco-Agriculture Based on Cloud Computing" IEEE transaction on IoT Monitoring System of Modern Eco-Agriculture Based on Cloud Computing April 2019

[2] K Durga Sowjanya1, R Sindhu1, M Parijatham1, K Srikanth1, P Bhargav "Multipurpose Autonomous Agricultural Robot" International Conference on Electronics, Communication and Aerospace Technology ICECA 2017

[3] Fernando Alfredo AuatCheein ; Ricardo Carelli "Agricultural Robotics: Unmanned Robotic Service Units in Agricultural Tasks" IEEE Sept. 2013. Vol 7. pp 48-58.

[4] Sanku Kumar Roy ; Arijit Roy ; Sudip Misra ; Raghuwanshi ; Mohammad S. Obaidat "AID: A prototype for Agricultural Intrusion Detection usingWireless Sensor Network" IEEE :10 September 2015. Vol 32. pp 703-714.

[5] Aishwarya.B.V ; Archana.G ; C. Umayal "Agriculture robotic vehicle-based pesticide sprayer with efficiency optimization" 17 December 2015. Vol 12. pp 324-329.

[6] Sarita Gupta ; Ajay Mudgil ; Prashant Bhardwaj ; Mahendra Gupta "Design and Development of Automatic Fire Alert System" 26 October 2017.

[7] Ram Krishna Jha ; Santosh Kumar ; Kireet Joshi ; Rajneesh Pandey "Field monitoring using IOT in agriculture" IEEE 23 April 2018. pp 1417-1420.

[8] Yunseop Kim; Robert G. Evans ; William M. Iversen "Remote Sensing and Control of an Irrigation System" IEEE Transactions on Instrumentation and Measurement.-July 2008 Vol 57. pp 7-11.