ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 6, Issue 11, November 2021

An Autonomous IoT-AGROBOT Controlled Over A Google Assistant With Solar Powered Agriculture Machine

[1] Rakhee Patil, [2] Chetana Gumaste Desai, [3] Manasa B, [4] Anjum.K.M., [5] Sowbhagya Shree N

[1] Assistant Professor, Department of Electronics and Communication Engineering, RYMEC, Ballari, INDIA.
[2][3][4][5] UG student, Department of Electronics and Communication Engineering, RYMEC, Ballari, INDIA

***Abstract*--- Agriculture is the strength of our nation. India being a land of agriculture, wide range of population in India still follow agriculture as their prime occupation. However due to shortage of labour and mechanized equipment's, Indian agricultural still follows obsolete & conventional methods which profoundly affect productivity of agricultural crop. With technological advancements in many other fields, agriculture is still followed by age old obsolete methods, as majority of the farmers are not literate to operated highly complicated technological devices. Thus this paper simplifies the technology for farmers using Google Voice Assistant. This paper focuses on development of completely autonomous agricultural machines which can be used for different applications such as spraying, sowing, and irrigation using voice commands over IOT where farmers can operate the machine in the farm from any corner of the world using google voice assistant. The machine is capable of performing multiple operations such as sowing, spraying, cutting and much more. The machine is voice activated, so the farmers can easily control the machine as it involves just voice commands. Further the machine operates over IOT and is autonomous which facilitates the farmer to control the machine from anywhere in the world. Thus this paper provides an completely cost-effective solution to problems faced by farmers and also helps in improving productivity by means of automated agricultural operations.**

***Keywords*--- Google Assistant, IOT, AGROBOT, Solar Power, Agriculture**

I. INTRODUCTION

The significant control of most of towns in India is agriculture. About 70% of individuals are reliant upon agriculture. Farming has been the foundation of the Indian economy and it will keep on excess so for quite a while. Indian horticulture is portrayed by agro-biological varieties in soil, precipitation, temperature, and trimming frameworks.

Agriculture needs to help very approximately 17% of the total populace from 2.3 percent of the world topographical territory and 4.2 percent of the world's water assets. The monetary changes, started in the country during the mid-1990s, have put the economy on a higher development direction. The yearly development rate in gross domestic product has speed up from under 6% during the underlying long periods of changes to in excess of 8% lately.

The profitability of homesteads relies incredibly upon the accessibility and reasonable utilization of ranch power by the ranchers, agricultural machines, incremental efficiency of land and work by meeting the practicality of ranch tasks and expanding work out-put per unit time. Other than its fundamental promise to the numerous trimming and enhancement of agribusiness, automation likewise empowers proficient use of data sources like seeds, composts and water system water.

Most of the farming tasks are as yet following out dated strategies. The Innovation and Man-made reasoning extension are dramatically growing step by step. The proposed project manages the advancement of "RAITHA BHANDAVA"- [1]A self-sufficient IOT-agrobot constrained by Google help with sun oriented/Solar controlled farming machines. The proposed task could be controlled from any region of the world utilizing voice orders by ranchers. The proposed venture can perceive the order the farmer provides for a Google right hand and can begin playing out that specific activity in the field.

II. LITERATURE SURVEY

A) This paper proposes the smart agricultural IOT implementation which gives a better performance for producing a crop agricultural field and cloud based agricultral system can gives a performance and store the data for future use. This hybrid[3] method may be actualized through reducing time and manual power.

B) IOT based smart agriculture gives information about irrigation having facilities like smart control and making intelligent decision depending upon real time data from fields. All these operations will be controlled through any smart device placed remotely and the interfacing sensors are

ISSN (Online) 2456 -1304

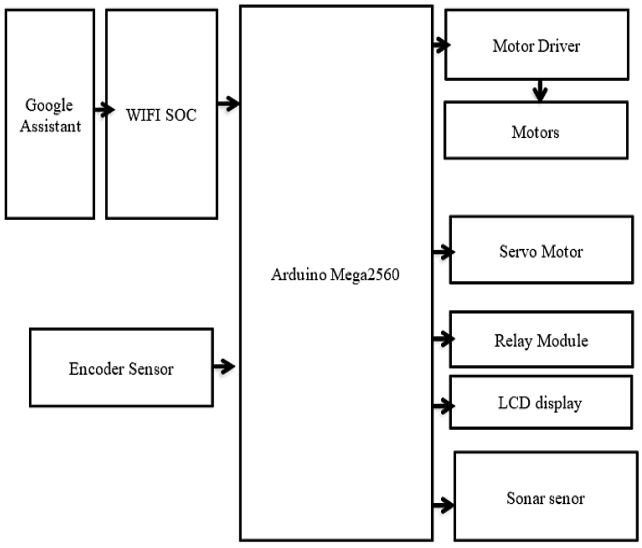
International Journal of Science, Engineering and Management (IJSEM)
Vol 6, Issue 11, November 2021

used to perform operations along with Wi-Fi, actuators and other hardware devices.

C) The whole system was developed using infield sensors which collects data from farm and using GPS[2] data is sent to base station where necessary action is determined to control irrigation according to base available with the system. It takes its own decisions and control the installed devices and user can control the operations of the system using android app or commands in auto and manual mode respectively.

III. METHODOLOGY

A. BLOCK DIAGRAM



a. ESP8266SOC Wi-Fi:

It is a very useful, cost effective Wi-Fi module for controlling the devices over the internet.

b. Arduino Mega 2560:

It is a low power, 8-bit AVR RISC-based microcontroller that executes powerful Instructions in a single clock cycle.

c. Encoder Sensor:

A rotary encoder/shaft encoder, is an electro-mechanical device that converts the angular position or motion of shaft to an analog or digital code.

d. Sonar Sensor:

It is a technique that uses sound propagation to navigate, communicate with or detect object under the surface of water, this project uses ultrasonic sensor for sensing the obstacles in the path.

e. Battery:

This supplies required power to the entire system. Battery chosen for project is 12v 1.2AH battery.

f. Solar Panel:

Used to convert into electricity or heat by absorbing the sun's rays.

g. Display (LCD) I2C:

The LCD display is used to give the visualization to the farmer regarding the data entered.

h. Servo Motor:

It is an actuator that allows for precise control of angular or linear position, velocity and acceleration.

i. Relay Module:

It is used for remote device switching. It is an electrical switch operated by electromagnet.

j. DC geared Motors:

It uses a Geared DC motors which has a gear assembly attached to motors.

B. STEPS FOR FABRICATION OF AGROBOT:

i) Fabrication of the Robot and mechanical structure of the project:

The first phase in the project's progress is the creation of the Robotic agricultural vehicle, which will execute all of the operations[5] in the region. The welding of the frame, the implementation of the drive train, and the assembly of the solar panel are all part of this process. This entails preparing the robotic vehicle for the implementation and incorporation of other mechanisms.

ii) Developmemt of Seed sowing, Cutting and spraying mechanisms:

Following the completion of the robotic vehicle, the next phase is the construction of mechanisms for various operations such as seed sowing,[6] spraying, and cutting. This includes the construction of a constant pitch seed sowing process that will sow seeds at a constant pitch, as well as spraying and cutting systems to be used in the field.

iii) The Google Voice control system:

During this point, Google Voice is connected to the agrobot through the internet. This entails the development of both hardware and software[7] to link the computer to the internet. Farmers will use their phones' Google Assistant to issue the computer voice commands.

iv) The Internet Control system:

The voice commands given by farmers using google assistant are sent to internet. In this phase the internet control system is developed to make the machine solar powered and automated. This provides the facility for farmers to control the machine remotely from anywhere in

ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 6, Issue 11, November 2021

the world.

v) Hardware development and programming:

In this phase the hardware for the project is developed. The PCB is designed and fabricated[8] and the programming of the entire system is done to complete the project.

vi) Assembly and Testing:

The components fabricated in the above phases are assembled to fom a complete machine in this phase. The testing is carrried out in this phase and optimizations if any are done.

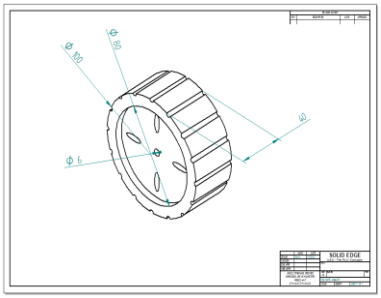


Fig1: Wheeling Drawing.

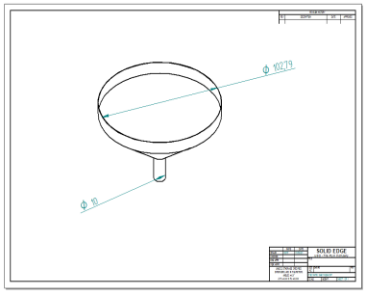


Fig2: Seedhopper Drawing.

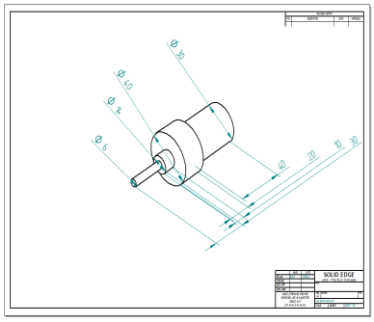


Fig3: Motor Drawing.

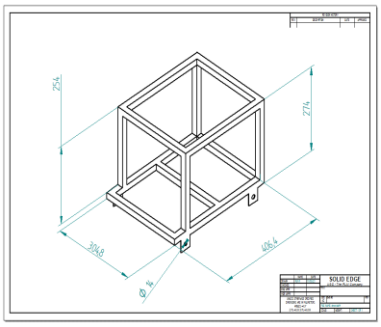


Fig 4: Chassis Drawing.

C. WORKING PRINCIPLE OF AGROBOT

The illustrative diagram below shows the working principle of the project. As shown in the illustrative diagram, the system consists of google kisan- a google assistant controlled agriculture vehicle. The Google Kisan is an AGROBOT which will reside in the farm waiting for farmer's commands. When the farmer gives voice commands using the google assistant present in farmer's phone, the system starts working. The farmer's voice is detected and google assistantfinds out which particular command farmer has given. The command is recognized and sent to the cloud server which will then command the machine to perform those operations. The machine is also totally autonomous and does not require any manual intervention. The solar energy provides all the energy to the machine to operate.

Fig 5 Solar Panel Unit of AGROBOT

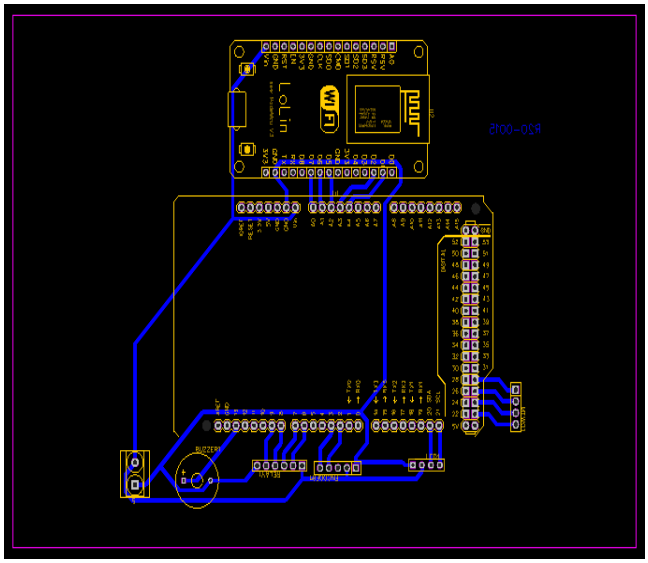
ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 6, Issue 11, November 2021

Fig 6 Working Model of AGROBOT

IV. FABRICATION OF PCB

The hardware is designed using an EDA software and PCB for the same is fabricated. The figure below shows the PCB. The Routed PCB is taken for fabrication on PCB fabrication CNC machine



V. OUTCOME OF PROPOSED WORK

- The proposed AGROBOT is expected to solve the problems faced by farmers by providing them with an IOT based voice control system for farmers to automate majority of the tasks in the field.
- It is expected to provide farmers with relief from physical stress and burden by development of IOT based voice control autonomous robots for agriculture.
- It can autonomously perform different operations such as seed sowing, spraying etc. in the filed autonomously by receiving commands from farmers from any corner of the world.
- It also provides farmers with the facility to control the Robot over google voice, which makes it feasible to control the robot in the field remotely just by giving voice commands from the android enabled mobile from any corner of the world.
- It is also solar powered which makes it green and eco-friendly.

USES OF AGRICULTURAL ROBOT'S [RAITHA BHANDAVA]

- The AGROBOT is powerful to run in actual agricultural fields.
- It is self-sustained and does not require any additional support such as tractor.
- It is economical for farmers to afford.
- It is easy to operate.
- It can be used for tilling, sowing, spraying, urea dispending etc., thereby making it a powerful agricultural machine.

VI. CONCLUSION

The proposed paper is mainly based to solve the problems faced by farmers by providing them with an IOT based voice control system to automate majority of the tasks in the field. It can autonomously perform different operations such as seed sowing, spraying, cutting etc. in the field by receiving commands from farmer from any corner of the world. This will not only help the farmers to effectively use the technology for agriculture related tasks but also help them to autonomously and remotely perform the operations in the field. Thus the proposed paper is expected not only help farmers, in current pandemic times when the whole world is in critical situation even then farmers will be able to keep their work in progress without any hindrance to perform agricultural operations remotely over IOT but also provide them with cost effective and free to operate solution as the system is solar powered.

REFERENCES

[1] Sindhu B R, Raghu Asha K Chethan Shindhe R, Sahana P "Automation in Agriculture using AGROBOT "International Journal of Engineering Research & Technology (IJERT, ICACT – 2021 Conference Proceedings Special Issue - 2021 ISSN: 2278-0181

[2] Prajith A S Nowfiya B S Nadeem Noushad Muhammed Ashik SAutomatic "Agricultural Robot-Agrobot",: IEEE Bangalore Humanitarian Technology Conference(B-HTC), IEEE Xplore Dec2020, DOI: 10.1109/B-HTC 50970 .2020.9297922.

[3] MobasshirMahbub "A smart farming concept based on

smart embedded electronics, internet of things and wireless sensor network", Internet of Things, Elsevier,ScienceDirect Volume 9, March 2020, 100161,

[4] IAndresVilla- HenriksenGareth T.C. EdwardsLiisa A. PesonenOle GreenClaus Aage Grøn Sørensen "Internet of Things in arable farming:Implementation, applications, challenges and potential", , open access Jornal,Elsevier,ScienceDirect, January 2020

[5] Prakruti Prashant Kulkarni1 , Balkrishan Nandoskar2 , , Swati Pednekar4 ,Chandan Satam5 "IOT based Smart Agricultural System" International Journal for Research in Applied Science & Engineering Technology (IJRASET), IJRASET, Volume 7 Issue IV, Apr 2019-, ISSN: 2321-9653

[6] V Bagyaveereswaran, Ankita Ghorui, R. Anitha Automation of Agricultural Tasks with Robotics- Agrobot: Innovations in Power and Advanced Computing Technologies (i-PACT) March2019, IEEE Xplore: DOI: 10.1109/iPACT44901.2019.8960155

[7] Nikesh Gondchwar, Prof.Dr.R.S.Kawitkar, "IOT based Smart Agriculture",International sJournal of Advanced research in computer and Communication Engineering (IJARCCE), vol.5, Issue6, June 2016.

[8] Narayut Putjaika, Sasimanee Phusae , Anupong Chen-Im,Dr.Phond Phunchongharn and Dr.Khajonpong Akkarajit Sakul, "A Control System in Intelligent Farming by using Arduino technology" Fifth ICT International Student ProjectConference(ICT-ISPC), 2016.