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Robokisan- Autonomous Solar Powered Voice Controlled Multilingual Support Over IOT

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ABSTRACT:

Indian economy is based on agriculture. The backbones for food production are farmers. Traditionally Agriculture is the backbone of economic system of a specified country standard techniques of farming rely on Man power and old procedures such as the application of synthetic chemical fertilizers, pesticides, herbicides and genetically changed creatures. To carry out similar tasks with efficiency, we make use of agricultural robotics. Agribots can spot the existence of diseases, weeds, insect infestations and other stress circumstances. Agri robots are lightweight. Agricultural robot can be controlled by an android application which is helpful for the farmers livelihood. An android application is used to monitor Agribot. This indeed supports the farmer's livelihood. This will assist us to associate plant genotypes in additional to the molecular and ecophysiological responses with the interpretation of particular phenotypes in retaliation to the flourishing surroundings. The device can be controlled from any corner of the world using voice commands by farmers.

1. INTRODUCTION

Indian economy is based on agriculture. The backbones for food production are farmers. Traditionally Agriculture is the backbone of economic system of a specified country standard techniques of farming rely on Man power and old procedures such as the application of synthetic chemical fertilizers, pesticides, herbicides and genetically changed creatures. To carry out similar tasks with efficiency, we make use of agricultural robotics. Agribots can spot the existence of diseases, weeds, insect infestations and other stress circumstances. Agri robots are lightweight. Agricultural robot can be controlled by an android application which is helpful for the farmers livelihood. An android application is used to monitor Agribot. This indeed supports the farmer's livelihood. Nevertheless, current methodologies that permit highly mechanised group of primary phenotypic data for compact numbers of plants in the greenhouse fall far short of the requirement to look into and distinguish plenty of plants under real world circumstances. Building structures that can gather multi-modal, multicharacter data in real time in the field needs joining plant biology and crop science with robotic vision and computer engineering. These structures should be precise and dependable, and should supply exceptional facts than the present routine accessible for automated greenhouse or physical field phenotyping. This will assist us to associate plant genotypes in additional to the molecular and ecophysiological responses with the interpretation of particular phenotypes in retaliation to the flourishing surroundings.Farming is done by human being with the help of bullock carts, tractors

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and tillers etc. In modern era, the main problem in agricultural field include lack of labor availability, lack of knowledge regarding soil testing, increase in labor wages, wastage of seeds and more wastage in water. To overcome all these disadvantages the robot for agriculture has been developed.

This work has dealt with the development "Robo Kisan- An Agrobot for automated agricultural operations". This device can be controlled from any corner of the world using voice commands by farmers.

2. LITERATURE REVIEW

The project a brief literature review was done regarding the solutions available in the market. Additionally the number of research papers by different research scholars are also studied to arrive at the scope of the project. The paper [1] offers a system which performs the seeding process in the agricultural field. The main idea behind this development is to perform agricultural tasks without human intervention and to implement a prototype of an effective low cost agribot. This project is based on a wireless communication by making use of Arduino and Bluetooth.

A robot to detect weed in corn crop, by making use of image processing [2] The advantages of this project is time saving as it detects the beets with the help of a camera and the herbicides are sprayed on the infected crop, saves the farmers from tedious work.

A robot for monitoring of soil. this robot is capable of sensing the moisture an the temperature of the soil through stevens hydra probe II and it consists of GPS to navigate [3].

A multitasking IOT based technology in the agricultural field [4]. The idea of this structure is to help farmers produce high quality yields to meet the rising demand of food with the increased population, by making use of wireless sensors, UAVs, cloud computing, and communication technologies.

A prototype model of image processing based IOT robot which helps in identification of the leaf infection {5]. This consists of UGV and UAV usage which helps in detecting the disease, soil data connection and in the classification of the field to provide solutions for mixed cropping. The main purpose of this paper is to help farmers with early detection of disease.

A system consists of Arduino UNO which acts as the hearth of the system [6]. This system consists of a camera, to detect the obstacles falling in it's path which will help in taking the required actions and it proposes three main functions: Ploughing seed dispensing and harvesting. The main idea behind this is to design a multitasking robot which in turn reduces the working hours, cuts down on labour expenses and helps in the correct way of seeding.

An agribot consists of Arduino, solar panel, GSM module and sensors [7]. solar panels are used to charge the robot. the ultrasonic sensors detect the hurdles and also helps in digging of holes for sowing seeds at a predefined distance. pH sensors help in the computation of the moisture content in the soil. Electrochemical sensor helps in identifying the fertility of soil and the optical sensor helps in the movement of the robot. The main aim behind this system is to reduce farmers burden and help obtain good amount of yields.

"AGROBOT structure has a vehicle operated ATMEGA328 microcontroller which acts as the master operator [8]. It performs four functions such as ploughing, seeding and harvesting of crops and irrigation. solar panels are made used in order to recharge the batteries. The robot moves automatically if the length and the width of the field

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is provided. the aim of this system is to help farmers with good yield of crops and to minimize the usage of non-renewable sources

3. METHODOLGY

The actual fabrication of the proposed work begins the material survey, to be made to select the appropriate materials for the entire project. The second step is to layout a proper plan for the project so that project can be caarried out in stages. Based on the concept of the project the following material was needed to the completion of the project.

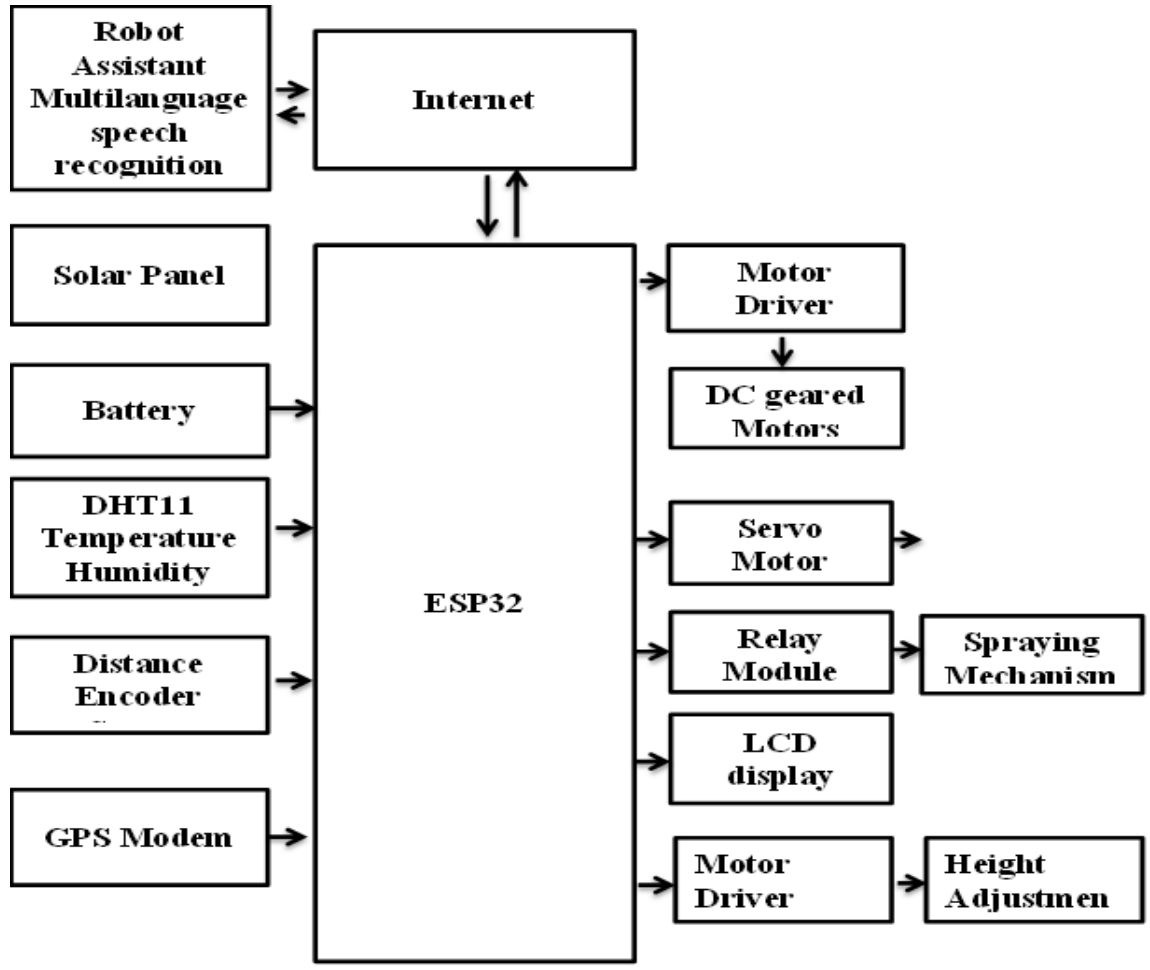

Fig. 3.1: Block Diagram of Intelligent all terrain IoT Robotic Vehicle

3.1.1Selection of frame material:

Since the frame or chassis forms the integral part of the project on which all the othercomponents can be mounted, care has to be taken while choosing th material for the frame of the project.

3.1.2 Choosing the optimum drive system:

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A proper drive system is needed for transmitting the power from motors to the spinning disc. Thus it is necessary to select the drive systme in such a way that it is most efficient to with minimum maintenance.Also the slected drive system for the machine should have a proper transfer of energy and have least maintenance.

3.1.3 Hopper Fabrication:

The hopper is ued for storing the seeds to be sowed. The hopper is proposed to be made using 1.6 mm sheet metal using welding and cutting.

3.1.4 Chassis Fabrication:

With the selected frame the next step is fabrication of the chassis. The chassis should be so fabricated that is is light weight , withstaand all the forces and should have sufficient space for mounting all the components. The chassis also should sustain the forces which are induced as a result of tilling mechaism as tilling attachment is a part of chassis and is fabricated during the chassis fabrication itself.

3.1.5 The Spraying sytem development:

In this phase the spraying system of the project is developed. The spraying system is responsible for performing the spraying operation in the farm once the farmer commands the spraying operation from Robo assitant.

3.1.6 The cutting attachment:

The cutting attachment is responsible for cutting . Once the command for cutting is received the same will be performed by the agrobot across the field.

3.1.7 The Robo Voice control system:

In this phase the Robo voice is linked to the agrobot over internet. This involves development of voice recognition application to connect the machine to the internet. The farmers can give voice commands to the machine using speech recognition app developed which can detect the control commands in English as well as Kannada or local language.

3.1.8 Constant pitch seed sowing mechnism:

In this phase the constant pitch seed sowing mechanism is fabricated. This mechanism is responsible for dropping the seeds exactly at one feet as the machine is operated across the farm.

3.1.9 Development of spraying and cutting system height adjsutment:

In this phasehe spraying and cutting system height adjustment is devised. This phase consists of devlopment of lead screw based motorized mechanism which can be used to vary the height of the spraying system to sparay at different heights. The Lead screw based mechanism is also implemented to the cutting system which can be used to vary the height of the cutting

3.1.10 The Internet Control system:

The voice commands given by farmers using Robo 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 from anywhere in the world.

3.1.11 Assembly:

The components fabricated in the above phases are assembled to fom a complete machine in this phase

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3.1.12 Testing

The testing is carrried out in this phase and optimizations if any are done.

3.2 Flow Chart

The flow chart of the work is represnted as in below fig. 3.2

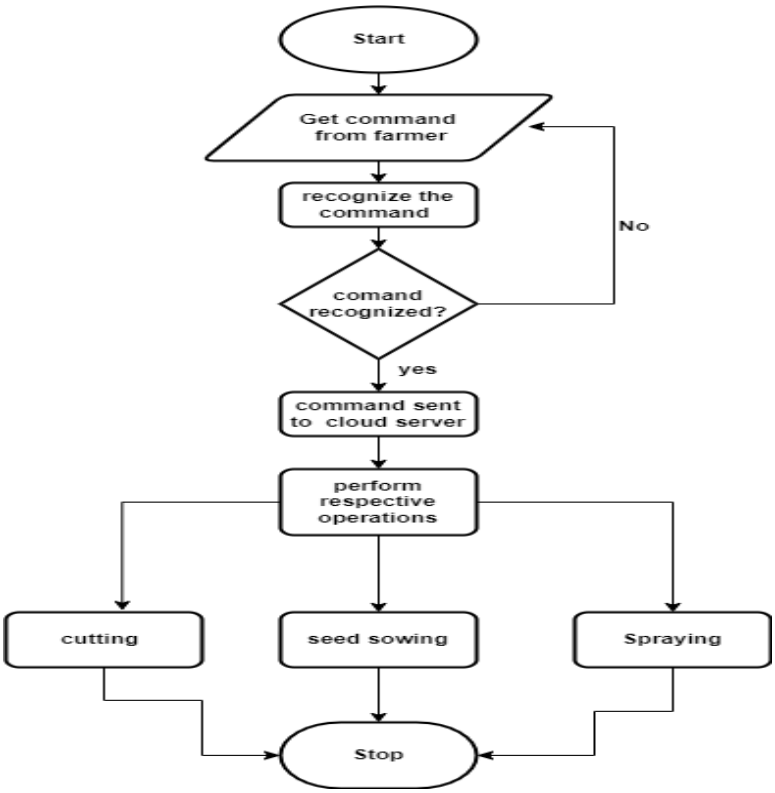

Fig. 3.2: Flow Chart

3.3 Result

Fig. 3.3.1: Model of the Work

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Fig. 3.3.2: Jowar Seeds

The jowar seeds placed in hopper effectively drop from the hopper at required distance. However, the rate of seed drops is too much because of small size of the seeds.

3. CONCLUSION

The work deals with the innovative concept of Robokisan - An autonomous solar powered agricultural Robot which can be controlled over IOT using speech recognition system. The system is expected to provide farmers with a multipurpose autonomous robot to carry out day to day agricultural tasks. The innovation is in the speech recognition method used to control IOT devices using local language. The farmer can reside anywhere in the world and give voice commands in local language to operate the machine. The machine is completely autonomous and completes the task given by the farmer remotely and autonomously using internet of things protocols. The system also provides farmers with the data in the field so that farmer can monitor the farm as well in addition to performing multiple operations in the farm over IOT and speech recognition with multilingual support.

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