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Versatile Agribot Using Solar Panel

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Abstract: ***Over and above 70% of the inhabitants in the world takes agriculture as the primary profession, in contemporary years the improvement of the autonomous vehicles in the agriculture has skilful enhanced interest. The paper intentions on the design, expansion and the fabrication of the robot which can crack the soil, lay the seeds, leveller to adjacent the grime and sprayer to sprig water & insecticides, these entire systems of the robot mechanism with the battery and the solar power. The compensations of these robots are wireless and fast data input operations with latest technology. In the field of agronomic self-determining vehicle, a conception is been developed to scrutinize if multiple small autonomous machine could be more efficient than customary large tractors and expand the working speed, quality and growth in farming. One of the most beneficial thought is that decrease the human physical efforts .Observance the above ideology in concentration, a unit with the many feature is designed who works smartly with latest technology and natural energy sources. [1]***

Keywords: Scrutinize, Grime, Sprayer; Sprig, Insecticides, Self-determined, Autonomous, Compensations, Wireless

1. Introduction

The foremost intention for emerging Agricultural Automation Technology is upsurge the speed of machines, wireless controlling, distract the harmful pesticides and decreasing manual labour, machine size, and their cost, an occurrence mutual in the developed world. The reasons are the necessity for upgraded food and crops superiority or increase the protection level of crops. We used the some approaches of Robotics and Artificial intelligence realizations which give the deal for solutions in accuracy agriculture to processes related to planting, gathering, weed control, plantation management, chemical applications, etc. to improve productivity and proficiency. The idea of spread over robotics technology in agriculture is very new, low cost and we can be related to digital world with latest technologies and the robots are appearing on farms in various excuses and in increasing numbers. This Agriculture robot can executes straightforward farming functions like griming, digging, planting and sprays the pesticides. In the last decades the size of machineries is very large , high cost and based on old methodology ,working speed and ability was very slow and now this autonomous robot with latest methodology work better than before with high speed ,accuracy and based on wireless technology or natural energy sources. It is capable for work anywhere like hazardous places and small fields. [2][3] At present correctness agriculture expanding thoughts and technology knowledgeable an increase in speculation and exploration due to the use of robotics applications in the machinery strategy and task implementations. Strictness autonomous farming is the operation, supervision, and control of autonomous machines to fulfil agricultural tasks. It encourages agricultural robotics and their need for smart farming. The object of agricultural robotics is more than just the presentation of robotics technologies to agriculture. These agricultural robots are planned to achieve the basic utilities required to be carried out in farms. These robots are used for agricultural operations perform autonomously such as cultivating, seed planting, adjacent to grime and pesticides spraying.

We can expect the robots performance agricultural operations originally such as cultivating, seed sowing, adjacent of grime and water (pesticides) spraying. The applications of helpful robotics are spreading every day to shield further areas, as the opportunity of interchanging human efforts to wireless technology in agriculture fields. Looking the farms day and night for an operational report, approve to farmers to decrease the environmentally friendly impact, increase the working speed, ability, accuracy, machineries size and efficiency, and manage individual plants in fresh techniques. This is especially important when the workers need be performed their duties, are actually harmful for the safety or the health of the workers, In spray time used fertilizers of pesticides or insecticides are work as a typical poison for humans and this attacks directly to brain of the human or more conservative problems are allowed by robotics The objectives of the proposed system are to crack the soil provisional on humidity level in the soil, and increase the level of workers health and to cultivate the seeds with teeth's like structure at the end to the digger by using pipes to lay the seeds, adjust the grimes the seeds automatically and to offer irrigation system by spraying water with a pump in the field. [3]

2. Literature Survey

The robotics fields are progressively growing its throughput in agriculture field. Some of the foremost technical hitches in the Indian agricultural are going up of input expenses, accessibility of skilled labours, surplus of aquatic resources and crop monitoring. To stun these complications, the automation technologies with robots were charity in agriculture. The automation in the agriculture could comfort farmers to minimize their struggles. The robot which performs action similar to Plough, dampness testing, plant seeds, spewing pesticides, removes fertilizer from the field, which also performs obstacles prevention operation and metal detection in the conduit. The robot is precise using cell phone with DTMF technique. Because of using DTMF technique it overcomes the collection or distance problem of using Bluetooth or RF module which having limited operational range. Agribot integrated system which uses Wi-Fi to communicate between two robots which perform activities like seeding, preparing, spraying of fertilizers and insecticides. It is controlled using Arduino controller and powerful Raspberry pi minicomputer to control and monitor working of robot. It has hexapod body which can move in any direction as per required. It has ultrasonic proximity sensor to avoid the obstacles in the path, and under body

sensor system to detect that seed is implanted or not. It can dig a fleapit in soil plant seed in it and cover the hole again with soil and necessary preference fertilizers applies on it, and move on along with communicating with other robot near to it using Wi-Fi. Command based self-guided digging and seed sowing drifter, a sensor conducted rover for tunnelling, accurate seed positioning and sowing has been anticipated to reduce the human effort and also to increase the income. The rover's navigation is performed by remote guiding devices praised with the positioning system. It uses Arduino Atmega326 controller and ultrasonic radar sensor for hurdle prevention. It is controlled using wireless module that can be control by PC/ TAB/ Mobile. [4] It rigidities salutation massage of seed tank empty or full to the farmer. The agribot which perform only two operations like digging hole in field that is cultivating in the field and then International Conference on Electronics, Statement and Aerospace Technology embedding a seed at a regular interim and cover the reinvest area with soil. To fall the seed stepper motor is used and to dig a fleapit, spike wheel is used. Motivation for the investigation is to decrease picking budget and increase the efficiency. Straight picking manner is highly laboured exhaustive and ineffective in terms of both frugality and time. Machine harvesting systems by robot are a restricted solution to overcome these disputes by takes away ovaries from the trees efficiently. Thus shrink the harvesting cost to about 35-45% of partial production cost. An Agribot is designed to reduce harvesting cost. [5]

3. Methodology

In this Robot a solar panel is used to imprison solar energy and then that solar energy converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power is utilized to operate DC motor. The Arduino is used to control the Robot. Here Arduino is the brain of the robot which is used to control all the operations of the Robot. That gives the desired direction to internal motors and motor drivers. [5] [6] The block diagram of model and control section given below.

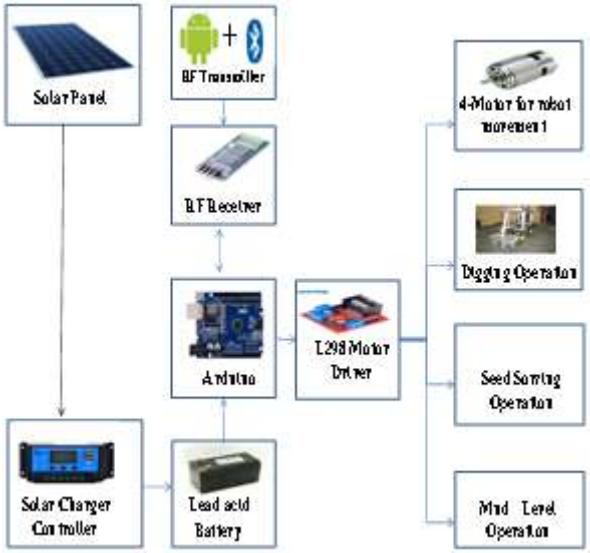

Figure 1: Block Diagram of Project

- This whole system of robot works on the battery and the solar power. Solar panel is placed on the top of frame and this is connected with the battery for charging.
- The whole Robot requires 12V battery to operate the system which is generated by the Solar panel.
- The base frame is made for Robot with 4 wheels connected with the DC motor which is responsible for the movement and the speed of the Robot.
- One end of the frame, digging structure is en suite with the DC motor which is used to dig the soil.
- For the Seed Sowing a funnel is used which is made up of plastic, this funnel is connected to the digging soil and used for sowing.

- On the end of digger a leveller is attached which is used to level the mud after digging.
- Pesticide spray is harmful for human health so pesticide sprayer is used by Robot that is beneficial for human health
- IR Transmitter and IR Receiver is used to communicate and controlling the Robot. [6]

4. Operations

a) Moving Operation
- The pinion is coupled with the DC Motor.
- The direction of motor rotation can be controlled by remote controller for moving the vehicle to either left or right side direction.

b) Digging Operation
- A DC Motor coupled with the screw rod is used.
- As the cultivator is lowered down, dig the soil up to 1.5 inches.
- The direction of motor rotation can be controlled by remote controller for up and down movement of the cultivator [6]

c) Seed sowing operation
- A Plastic box is used for Seed storage.
- We have provided 5 holes to the main wheel shaft, where the Storage box is placed above it.
- The main wheels are powered by DC motor and are controlled by a Transmitter.
- As the motor is switched on, the wheels tend to rotate and rotation of shaft makes the seeds fall on the cultivated filed.

d) Mud Level operation
- A Sheet metal Plate is used as mud closer and leveller.
- The sliding mechanism is used for leveller up & down movement.
- The Leveller is powered by a DC motor which is regulated by mobile Bluetooth app and controlled by a mobile phone.
- As the levelling plate moves downward to the ground level, the mud is closed in the sowed soil

e) Pesticide operation
- Pesticide Operation is used in farm to sprayer the Pesticide to reduce the effect of insects and this process is also beneficial to human health.
- Pesticide is stored in the plastic box and the DC motor is connected with the plastic box and the pipe.
- The power for pump is regulated by a toggle switch
- The water flows to the sprayer through pipe. [1] [7]

5. Advantages

Agricultural robots or Agribots are changing the appearance, sensation and speed of traditional farming practices. Robots size and cost is graceful to significantly impact the agricultural sector over the next decade. Essentially, where consumer demand and labour requirements are the greatest, automation will prove most useful .So we develop this robot which has following advantages:-

- Pesticides spray operation has been promoted as a nontoxic solution to herbicide conflict with assertions that it significantly reduces the crops familiarity to chemicals.
- One of the operations is pesticides spray that is very beneficial for labour health.
- A field planted using a seed sowing (Digger) is much more identical, normally in clamours, allowing preparing with during the rising season. Dig over by hand is strenuous and wasteful. Poor preparing reduces crop yield, so this benefit is exceptionally significant.
- This robot reduces the size of large mechanisms or their exceptive costs.
- This robot is noiseless, pollution free and based on natural energy sources.
- Multipurpose Autonomous Agriculture Robot is used for time saving, reduce human physically efforts and reach any hazardous, typically and small places.

6. Conclusion

As we know that in our country about 70% of population lives in ruler area & for the most part of income depend on the agricultural source. This Project is favourable as cost of the equipment's. This Multipurpose Robot is useful to reduce the cost of the Digging, Seed Sowing, Mud leveller, pesticides Spray and all this work is done in the less time rather than the human effort. As we know that in the agriculture all other equipment is work on the conventional energy like oil, fuel, etc. that is costly for the farmer so reduce that parameter the project is work on the non-conventional energy means that is based on the solar energy. The Solar energy is renewable energy that is favourable for the farmer. At the same time by using solar energy environment pollution can also be reduced. Thus aiming to save the revenue of government & also most demanded fossil fuel. By the help to the single robot more objectives with flexibility in changing the operation will motive the farmers. [8] [9] [10] this robot is purely operated by the human. So it is expected that the robot is very useful for the farmer to increase the efficiency of operations in their farms.

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