

MULTIPURPOSE AGRICULTURE ROBOT USING SOLAR ENERGY

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ABSTRACT

Agriculture is an essential thing for survival of the humans and the farmers who do agriculture spend so much of time in ploughing the field and spraying fertilizer into the field etc. The proposed system is a boon to farmers which combines the robotics with agriculture and capable of moving around the field like a farmer and plough the field and sow the seed in the pre determined row and irrigate the field along the rows autonomously. In addition to this, harvesting of crops and clearance are also done. All these operations are controlled via Bluetooth application. These project will also help farmers to reduce labour cost as today we are facing labour shortages due to pandemic disease or any such situation occurred in future of unavailability of labours, these project will reduce human work.

I. INTRODUCTION

Agriculture is considered to be the basis of life for the human species as it is the main source of food grains and other raw materials. It plays a vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, the traditional methods of farming are still used by many farmers which results in low yielding of crops. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. This paper therefore proposes a system which is useful in ploughing field as well as controlling the field operations which provides the flexibility. The paper aims at making agriculture smart using automation and Bluetooth technologies. The proposed system concentrates on performing functions like ploughing, sowing seeds, irrigation, closing the mud, fertilizing.

II. LITERATURE SURVEY

1. Multi purpose agricultural robot Nithin P V1, Shivaprakash S2 1UG Student, Mechanical Engineering, NHCE, Bengaluru, Karnataka, India 2Assistant Professor, Mechanical Engineering, NHCE, Karnataka, India, International Journal of Engineering Research, 20 may 2016.

The paper aims on the design, development and the fabrication of the robot which can dig the soil, put the seeds, leveller to close the mud and sprayer to spray water, these whole systems of the robot works with the battery and the solar power. More than 40% of the population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The vehicle is controlled by Relay switch through IR sensor input. The language input allows a user to interact with the robot which is familiar to most of the people. The advantages of these robots are hands-free and fast data input operations. In the field of agricultural autonomous vehicle, a concept is been developed to investigate if multiple small autonomous machine could be more efficient than traditional large tractors and human force.

2. Seed sowing robot, Abdul rahman, Mangeshkori, Umeshkori, Ahmadakbar, Department of computer science and engineering, Theem college of engineering, Boisar(East), Dist. Palghar, Maharashtra, India, International Journal of Computer Science Trends and Technology (IJCTST), Mar - Apr 2017.

Agriculture is the backbone of Indian economy. About half of the total population of our country has chosen agriculture as their chief occupation. The states like Maharashtra, Punjab, and Kerala, Assam are highly involved in agriculture. It all started due to the impact of, "Green Revolution" by means of which farmers came to know about the various techniques involved in farming and the advantages in it. As centuries passed, certain modern techniques were invented in agriculture due to the progress in science. These modern techniques included the use of tractors for ploughing the field, production of pesticides, invention of

tube wells etc. Since water is the main necessity in this scenario, techniques were discovered which would help in watering the field easily, consume less water and reduce human efforts. These discoveries improved the standard of living of farmers. Agro-Technology is the process of applying the technology innovation occurring in daily life and applying that to the agriculture sector which improves the efficiency of the crop produced and also to develop a better Mechanical machine to help the agriculture field which reduces the amount and time of work spent on one crop. Hence in this work of project we decided to design a better mechanical machine which is available to the farmers at a cheaper rate and also which can sow and seed the crop at the same time.

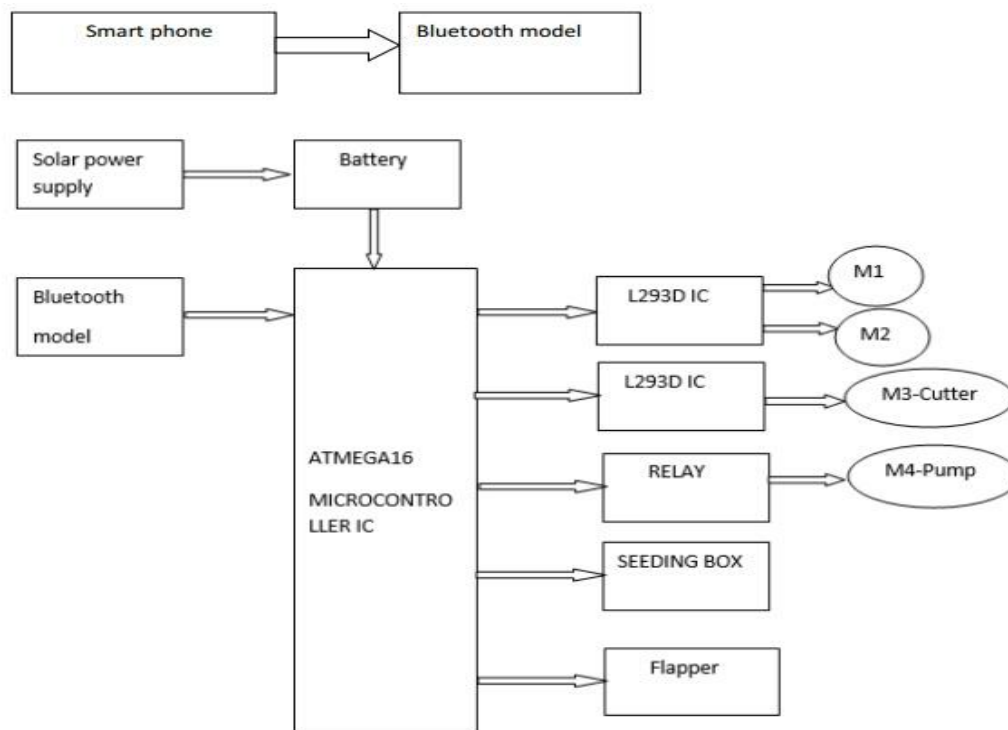
3. Robotic Agriculture Machine, Gholap Dipak Dattatraya, More VaibhavMhatardey, Lokhande Manojkumar Shrihari, Prof. Joshi S.G BE[E&TC], Vishwabharati Academy's College Of Engineering, Pune university, Ahmednagar, Maharashtra, India^{1,2,3}Assistant Professor, Dept of E&TC, Vishwabharati Academy's College Of Engineering, Pune university, Ahmednagar, Maharashtra, India.

This paper presents a system with high speed of operation for an advanced agriculture process which includes cultivation based on robotic platform. The robotic system is an electromechanical (conveys a sense that it has agency of its own) and artificial agent which is steered by DC motor which has four wheels. The farm is cultivated by the machine, depending on the crop considering particular rows & specific columns. The infrared sensor detects the obstacles in the path and it also senses turning position of vehicle at end of land. The seed block can be detected and solved using water pressure. The machine can be controlled remotely and solar panel is used to charge DC battery. Assembly language is used in programming the microcontrollers. The microcontroller is used to control and monitor the process of system motion of vehicle with the help of DC motor. The result of implemented unit is also presented.

III. SYSTEM OVERVIEW

The hardware components and various sensors are interfaced with the microcontroller. The Obstacles in the field are detected using various sensor. Microcontroller integrates all the functions like ploughing, sowing of seeds, obstacle detection, obstacle clearance and irrigation. These functions are controlled with the help of Bluetooth module.

IV. WORKING



The smart agriculture robot can be directed to various directions like forward, reverse, left and right. These directions are commanded by the user clicking on the respective options on the . On receiving the command, the arduino will send it to the microcontroller. The microcontroller then drives the motor driver circuit to move the robot. In addition to these movements, several functions like ploughing, seed sowing, watering, obstacle detection and obstacle clearance are performed.

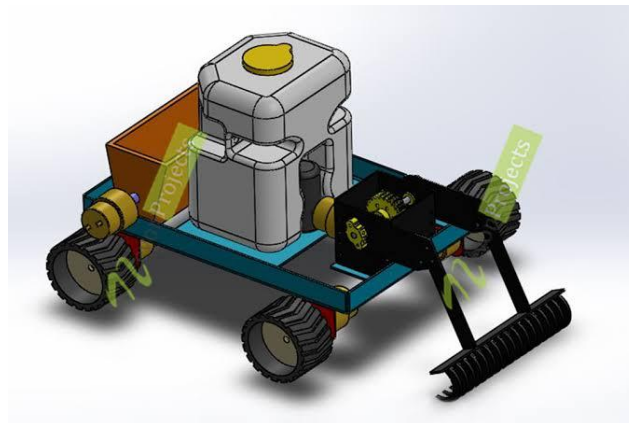
A. PLOUGHING

The Ploughing tool is interfaced with the Microcontroller. The ploughing tool can be operated in three modes namely on, off and mid. The microcontroller will receive the command to work on any of these three modes and it directs the ploughing tool to plough the field accordingly.



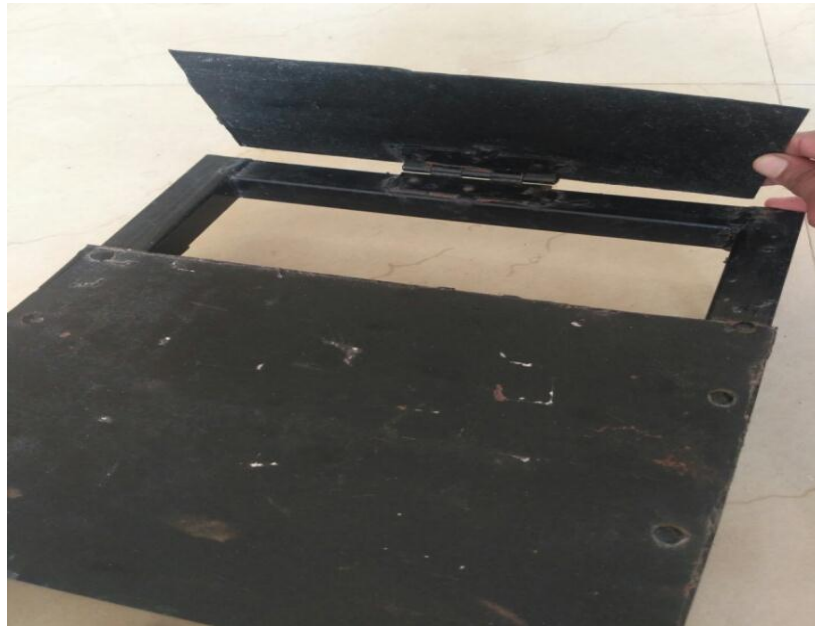
B. SEED SOWING

The seeds are stored in a small container and it is closed with a small flip. This flip is controlled by the servomotor to open and close the container. The servomotor is capable of rotating to 180 degrees. It automatically opens the container and hence the seeds are sown in the field.



C. Grass cutting motor:

This motor is used for cutting unwanted grass or plants (harvesting). Selective harvesting involves the concept of only harvesting those parts of the crop that meet certain quality thresholds. It can be considered to be a type of pre-sorting based on sensory perception. Examples are to only harvest barley below a fixed protein content or combine grain that is dry enough (and leave the rest to dry out) or to select and harvest fruits and vegetables that meet a size criteria. As these criteria often attract quality premiums, increased economic returns could justify the additional sensing. To be able to carry out selective harvesting effectively, two criteria are needed; the ability to sense the quality factor before harvest and the ability to harvest the product of interest without damaging the remaining crop.



D. Spraying fertilizer

Sprayer pump have been engineered to provide a full range of operation pressures and max flow rates, size dimensions, material compatibility, and power source options so select pumps will be most suitable for farming applications. Centrifugal pumps are simply designed, durable, and versatile. They make excellent choices for semi-abrasive spraying commodities and wettable powders due to the additional mixing performed by the pump. Centrifugal pumps are excellent pumps for low pressure, high flow rate applications. Stainless steel models are approved for potable water operations. The flow control systems of centrifugal pumps are very simple and easy to control, which contributes to the pump's common use for pesticide applications.



E. FLAPPER:

A plate is attached to the bottom of the Frame backside to closing of seeds .It is made up of metal like iron.

IV. CONCLUSION

In agriculture, the opportunities for robot-enhanced productivity are immense – and the robots are appearing on farms in various guises and in increasing numbers. The other problems associated with autonomous farm equipment can probably be overcome with technology. This equipment may be in our future, but there are important reasons for thinking that it may not be just replacing the human driver with a computer. It may mean a rethinking of how crop production is done. Crop production may be done better and cheaper with a swarm of small machines than with a few large ones. One of the advantages of the smaller machines is that they may be more acceptable to the non-farm community. The jobs in agriculture are a drag, dangerous, require intelligence and quick, though highly repetitive decisions hence robots can be rightly substituted with human operator. The higher quality products can be sensed by machines (colour, firmness, weight, density, ripeness, size, shape) accurately. Robots can improve the quality of our lives but there are downsides. The present situation in our country all

the agricultural machine is working on manual operation otherwise by petrol engine or tractor is expensive, farmer can't work for long time manually to avoid this problem, we need to have some kind of power source system to operate the digging machine. To implement a prototype model of drilling and seed sowing machine system within the limited available source and economy. The system can be subjected to further development using advanced techniques. It may become a success if our project can be implemented throughout our country

V . REFERENCES

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