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Agrobot

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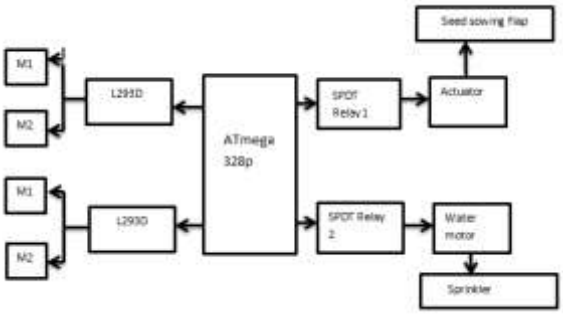
Abstract: *The paperelaborates the design implementation and experiments of Agrobot. The objective of projectis to create an agricultural robot whichwillperform all the basic farmingactivitieslikesowing, ploughing, and sprinkling. Farmingis a verytedious job to do. So, to make the activityeasierwe have developed an Agricultural Robot whichwillperform all theseactivitieswithoutanyhumaninvolvement. Throughthiswe are aiming to achieve a highpercision and reliability in farmingactivities. Agro technologyis a process of applying the technology, innovation occuring in daily life and usingthat in agricultural sectorwhichimproves the efficiency and productivity of cropsproduced. It alsodevelops a bettermechanical machine to help agricultural fieldwhichreduces the amount of time of workspent on one crop.*

I. Introduction

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 & Kerala, Assam are highly involved in agriculture. It all started due to the impact of "Green Revolution". As centuries passed, certain modern techniques were invented, 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, technique were discovered to improve the standard of living of farmers. Numerous automatic farming techniques have been found over years but they were not able to work with the high level of efficiency and precision like our Automatic robot. In this paper, a vision-based row guidance method is presented to guide a robot platform which is designed independently to drive through the row crops in a field according to the design concept of open agriculture. Then, the offset and heading angle of the robot platform are detected in real time to guide the platform on the basis of recognition of a crop row using machine accuracy of row guidance is up to $\pm$35mm, which means that the robot can move with a sufficiently high accuracy[1]. In this paper, the main component here is the AVR At mega microcontroller that supervises the entire process. The alerting mechanism is GSM module that sends a text message to the farmer informing him about the breach in set point [2]. This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing, fruit picking and pesticide spraying. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors[3]. A multipurpose agricultural robot to implement precision irrigation, fertilizer addition and de-weeding apart from continuous monitoring of crop and soil conditions. This will involve efficient utilization of water resources, intensive plant and soil monitoring, condition based use of fertilizers and the ability to work in unstructured environments. Precision agriculture involves the adequate and optimum usage of resources based on various parameters governing crop yield. The Handbook of Precision Agriculture defines that the critical factors that affect the yield are identified and the variability in soil, crop in the agricultural field are determined. The gantry robots perform various operations and help the farmers to reduce the input cost and the usage of water resources[4].

II. Block Diagram



We are basically making an agricultural robot which will perform the operation like sowing the seeds, ploughing then covering the soil again and then sprinkling water as well.

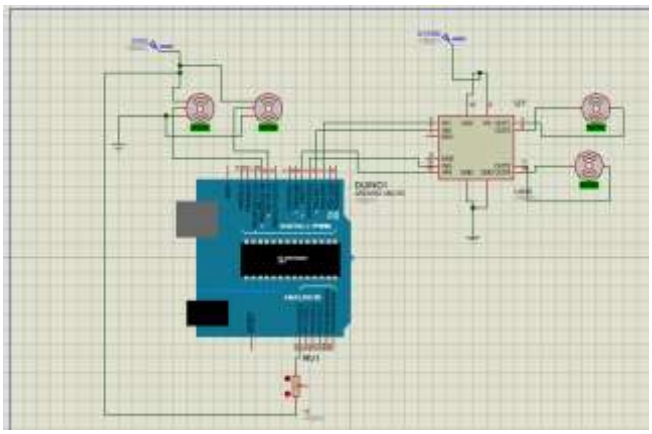
Depending upon the mode selected it will either do the sowing and sprinkling. If we want to carry out both sprinkling and sowing simultaneously there is a third option.

We are using AT mega 328p development board, relays-SPDT(Single Pole Double Throw) switches for giving the action to the actuator and motor for pumping the water. We are also using 4 DC motors for driving the agricultural robot.

For sowing we are using an actuator which will drop seed one by one by opening and closing of flap. The flap can be opened with the help of mechanical actuator.

For ploughing, we are using plough which will plough the field after that seed will be sown in the farm. For sowing we have programmed the controller to stop a specific timing and sow the seed and sprinkle water. Then move forward again and stop and sow the seed. For sprinkling the water first the moisture sensor will sense the soil moisture and then water it accordingly. The turning of the robot is after completing the single length across the field. This length varies field to field.

III. Schematic



In this project there are different components used for carrying out the different parameters such as ploughing, sowing and sprinkling. The working is basically divided into working of motor, sprinkler, sowing,

As shown in the schematic block diagram the movement of the Agrobot is done with the help of wheels. The use of L293d motor driver IC is used. The working of motor driver IC in the project is that it can handle two wheels. This means two motors can run using a single motor driving IC. As there are four wheels we require two motor driver ICs(L293d).

The board used for the operation is the Atmega Development Board. Actuators are also used for two different operations that are sowing and sprinkling.

For sowing, theAgrobot will cover a certain distance and then sow the seed and again cover it with the layer of mud and in that way the sowing process is done.

For irrigation, after the seed is sown the pipe will come out and small amount of water is sprinkled above the sown seed.

Actuators are used for the sowing and the sprinkling process. To activate the actuator SPDT relay are used. There are two actuators so we need two SPDT relays. With the help of two actuators the circuit complexity is increased but the efficiency of the circuit is well enhanced.

IV. Advantages

1. The efficiency of the overall system will be very high.
2. The system will be highly reliable.
3. The requirement of the skillful labor will be reduced.
4. The system will be an all-weather system for operation.
5. It will help in increasing the farm yield.
6. Robots do not get sick or tired or do not take rest.
7. Replacement for a tractor.
8. They are small in size which allows them to accumulate data close to the crops.
9. They are also capable of spraying pesticides or killing weeds.
10. Robots are useful when the duties are potentially harmful for the safety or health of the workers.
11. Price efficient.

V. Applications

1. Used in farms for sowing seeds.
2. Used for sprinkling water on particular seed.
3. Used in fields where seeds are to be sown at specific distance.
4. Used for sprinkling liquid pesticides.
5. Rather than farms, it can be also used in sports ground and gardens for sprinkling water.
6. Can be used for ploughing.

VI. Future Advancements Possible

1. The capacity of water tanks can be increased for larger fields.
2. The range of obstacle sensor can be increased by using more powerful sensors.
3. The size and capacity of solar panels can be increased.
4. The torque of DC motor can be increased for higher applications.
5. The size of wheels can be increased to be used for larger applications.
6. Rather than using a switch, the robot can be made to stop on its own as the process completes.

VII. Conclusion

This automated robotic machine named as "Agrobot" is specifically designed to facilitate the farmer so that the demand of food can be met easily. Agricultural robot serves better than the manual system. It is an automated robot which works on the basis of size of the field, size of the seed and in which mode it is meant to be operated. This robot can be controlled by using algorithm for the comfort of farmers and interfaced by using Arduino board. It is expected that this robot will change the trend of farming in the upcoming days from manual to automate. The implementation of Agrobot has significant saving in the term of time, efficiency, man power, wastage of resources and also it works at much cheaper price. This also makes farming easy to learn and implement. By the help of this robot we can create the interest of youth in farming which is very important for our development. These robots can be created in different sizes as per the requirement of farm which will make it more affordable. Robots can overcome the difficulties in farming and it also leaves scope of further advancements in it.

References

[1]. XueJinlin, Xu Liming, "Autonomous Agriculture Robot and its row guidance", International Conference on Measuring Technology, 2010.
[2]. Yan Li, Chunlei Xia, Jangmyung Lee, "Vision based pest detection and automatic spray in green house plant", International Symposium references, pp. 920-925.
[3]. A. Gollakota, AgribotSrinivas, "A Multipurpose agricultural robot", INDICON, vol. 1, no. 4, pp. 16-18, 2011
[4]. Martin Holm Pedersen, Jens Lund Jensen "Autonomous agricultural robot" June 2011
[5]. Satish Kumar KN, SudeepCS,"Robots for Precision Agriculture (National Conference on Mechanisms and Machines-2007)"
[6]. Ankit Singh, Abhishek Gupta ,"Agrobot (International Journal of Advanced Research in Computer and Communication Engineering-2015)"