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AUTOMATIC FARMING ROBOT FOR SMART AND EFFECTIVE CULTIVATION

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Abstract: **In this paper we are going to present about the Automatic Farming Robot designed for agriculture purposes. It is designed to minimize the labor of farmers in addition to increasing the speed and accuracy of the work. This robot helps the farmer to perform plowing, seeding, sprinkling water, harvesting, weed cutting and weed collecting in fields. We are using the android application to provide the input to the robot. By using Bluetooth we are going to communicate with the robot. As per the user instruction the robot will perform the operation without human presence. It automatically stops when there is any obstacle comes in between.**

Index Terms **- Farmer, Automatic Farming Robot, Application, Bluetooth.**

1. INTRODUCTION

Indian agriculture has begun in early days by 9000 BCE as a result of early cultivation of plants, and domestication of crops and animals. Agriculture is the one of the main occupation in INDIA. It serves to be the backbone of Indian economy. They were using animals to perform these operations. Our history of agriculture contains many examples of the use of tools, such as the hoe and the plough. Due to rapid development in technology farming become much less labor sensitive and many other problems are occurred in the agricultural field. By this People are tired of doing the agricultural activities in the sunlight and their health is also affected very much by doing the heavy work in the fields. People were seeding by manual method includes broadcasting the seeds by hand.

It is very important to improve the efficiency and productivity of agriculture by simultaneously providing safe cultivation of the farmers. The first development of robotics in agriculture can be dated as early as 1920s, with research to incorporate automatic vehicle guidance into agriculture beginning to take shape. An agricultural robot is a robot deployed for agricultural purposes. The main area of application of robots in agriculture today is mostly at the harvesting stage.

Emerging applications of robots in agriculture include weed control, cloud seeding, harvesting and soil analysis. They can also be used to automate manual tasks, such as weed or bracken spraying, where the use of tractors and other manned vehicles is too dangerous for the operators. For any mobile device, the ability to navigate in its environment is important. Robot navigation means the robot's ability to determine its own position in its frame of reference and then to plan a path towards some goal location. Path planning is effectively an extension of localization, in that it requires the determination of the robot's current position and a position of a goal location. This paper is based on developing a robotic vehicle used in agriculture for sowing seeds. This project is an automatic seed sowing robot which involves the usage of sensors to detect the obstacles and helps in proper navigation of the robot. This cost-effective robotic vehicle can improve productivity, safety in agricultural applications and meet the demand for labour.

1.2 LITERATURE SURVEY

i. Sensor Based AGROBOT for Sowing Seeds

In this paper, we have presented a system-of-systems approach to design and development of a mobile robotic platform for agricultural applications. This proposed robot is used for sowing seeds. It can navigate on any agricultural land and sow seeds effectively. The infrared sensor and ultrasonic sensor is used to detect the obstacles and for proper navigation of the robot. The moisture sensor measures the humidity in the soil.

ii. Agricultural Robot for Automatic Ploughing and Seeding

This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing and pesticide spraying. It also provides manual control when required. Initially the robot tills the entire field and proceeds to ploughing, simultaneously dispensing seeds side by side. The device used for navigation is an ultrasonic sensor. On the field the robot operates on automated mode, but outside the field is strictly operated in manual mode.

iii. SOLAR POWERED WEED CUTTING ROBOT

The project aims at designing of weed cutting robot which tends the unwanted plant cutter motor running through solar energy mechanism. The “Solar Powered Weed Cutting Machine” is a robotic vehicle powered by solar energy and is capable of automated weed cutting. This system includes 12V battery to power the vehicle movement motors as well as the grass cutter motor. Solar plate is used to provide the source to the battery charging. Wheels and cutting operations are done using dc motors.

iv. Robot Farming System Using Multiple Robot Tractors in Japan Agriculture

The objective of the research is to develop a robot farming system using multiple robots. The research will discuss the application of multiple robots in Japan agriculture for rice, wheat and soybean. The robot farming system includes a rice planting robot, a seeding robot, etc., One of the key elements of the robot farming system is that it should be more economical to the farmers.

2. DESIGN AND DEVELOPMENT OF AUTOMATIC FARMING ROBOT

The aim of the designed system is to plowing, seeding, spraying and harvesting. The robot is controlled by mobile application. The designed system involves navigation of robot to the destination successfully and does the above functions. The direction of the robot is controlled via application. The robot and the application is connected through Bluetooth.

This paper presents a system with high speed of operation for an advanced agriculture process which includes cultivation based on robotic platform. The farm is cultivated by the machine, depending on the crop considering particular rows & specific columns. The machine can be controlled remotely and solar panel is used to charge DC battery. Relay is used to convert from high voltage to low voltage. By using tiller we are going to plow the land. L293 is driver which is used drive the DC motor. 4 wheels are used to drive the robot. Seeding is done by flexible and distributed pipe.

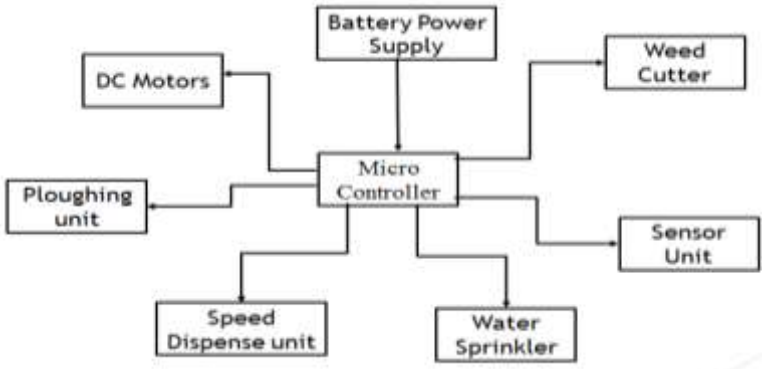

Fig 1 : Block Diagram

3. CONCLUSION

An initial outcome of this study indicates that most of these systems that which work autonomously are more flexible than traditional systems. The benefits of reduction in labor costs and restrictions on the number of daily working hours significantly improved. Thus it has made possible to automate the most significant working routines. However some have failed due to the requirement of accuracy of specific tasks. In addition, at this stage of development, the initial investment and annual costs of expensive GPS system are still relatively high but it seems possible to design economic viable robotic systems for grass cutting, crop scouting and autonomous weeding. Findings show that there is a significant potential for applying these systems if it's possible to impose adequate control and safety regulations systems at reasonable costs. Moreover, a comparison between different European countries indicates that labor costs, cost rotation and farm structure may have a tremendous impact on the potential use of these systems.

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