A REVIEW: SOLAR POWERED MULTIPURPOSE AGRICULTURAL ROBOT

Dhiraj N. Katole[1], Ashwini M. Wankar[2], Pooja S. Buradkar[3], Apurva P. Mahajan[4], Ritu R. Jivtode[5], Pranjali M. Vaidya[6]

[1] *Asst. Prof., Department of Electrical Engineering, PJLCOE, Maharashtra, India*
[2] *Student, Department of Electrical Engineering, PJLCOE, Maharashtra, India*
[3] *Student, Department of Electrical Engineering, PJLCOE, Maharashtra, India*
[4] *Student, Department of Electrical Engineering, PJLCOE, Maharashtra, India*
[5] *Student, Department of Electrical Engineering, PJLCOE, Maharashtra, India*
[6] *Student, Department of Electrical Engineering, PJLCOE, Maharashtra, India*

ABSTRACT

Agriculture in India being the major source which provide food, feed and fuel for meeting necessary requirements, farmer play vital role in it. But today's conditions is unsatisfactory as far as production in farms is concerned .Due to lack of mechanization in the agricultural field and cost of machineries ,farmers are still stuck to the conventional methods of farming leads to consumption of time, increase in labor work and decrease in efficiency. This paper aims to introduce a remedy against the tremendous manual efforts done by farmers, introducing a multifunctional machine. This multipurpose agricultural robot, implements function mainly as a sprinkler, grass cutter, plant cutter and a bird hitter. Triggering on the main problems faced by farmers except harvesting, that also affect production actually, this machine works as a solution reducing manual efforts thereby helps in earning profit.

Keyword: - *Harvesting, Mechanization, Sprinkler, etc.*

1. INTRODUCTION

Developing countries, most precisely in agriculture sector, are affected by insufficient man power [1]. So on the other hand, the scope of developing innovating, automatic and intelligent machineries has increased in huge amount and has become one of the trends in 21th century [6]. In earlier days where farmers were facing a lot of problems due to inadequate amount of man power ,less availability of machineries which were huge and costlier and lack of knowledge about innovation in the agricultural sector ,to overcome this problem, with the introduction of robotics in agricultural field offered satisfactory solutions in various processes like harvesting ,sowing ,weeding, picking, cutting ,land supervising and more [2]. These multifunctional robots now are much better than the huge and bulky machines which may disturb the land texture. These multitasking machines appeared advantageous by improving productivity and enhanced safety of workers [3]. In today's farming by the applications of such kind of robots, ultimately reduces time consumption on field, labor work and increases the efficiency.

Our proposed model is a multipurpose agricultural robot that performs function as grass and plant cutter, water and a pesticide sprinkler and acts as a scare crow too but with an intelligent system which helps to save the production in the farm from birds and cattle. Focusing on, the labor work required other than sowing, harvesting, weeding and picking , this robot perform operations which too takes much time , required manual efforts and also harmful for the human being. Very first with the assembly of the body of robot, this cut plants with the help of blades fitted at the front of the chassis horizontally. It cuts the grass vertically according to the axis, as the blades fitted below the chassis [4][5]. To avoid harmful effects by spraying chemicals and pesticides and also to reduce labor work, for spraying water and other liquids, robot has sprinkler, operated by remote, reducing time of such tedious operation, thereby increasing efficiency. Birds and cattle in farms try to destroy the production. Traditional method of scare

crow is not much efficient and even though in the presence of scare crow animals try to ruin the field output, so with help of IR sensor which detects obstacle present and blow a loud siren to keep animals away from the farm.

2. Proposed System

This multipurpose agricultural robot is designed for farming and lawn purpose. Our machine can operate wirelessly and can be controlled manually, perform various functions as well. In this project, we require solar panel, charge controller, battery, sprinkler, relay, IR sensor, blades for grass and plant cutting. This machine performs all the functions stated above, with the help of push buttons. We have utilized solar energy as a source to battery which will supply power to equipment. This machine make move with the runner wheels operated by remote and ideal wheels help the robot to do complete movement.

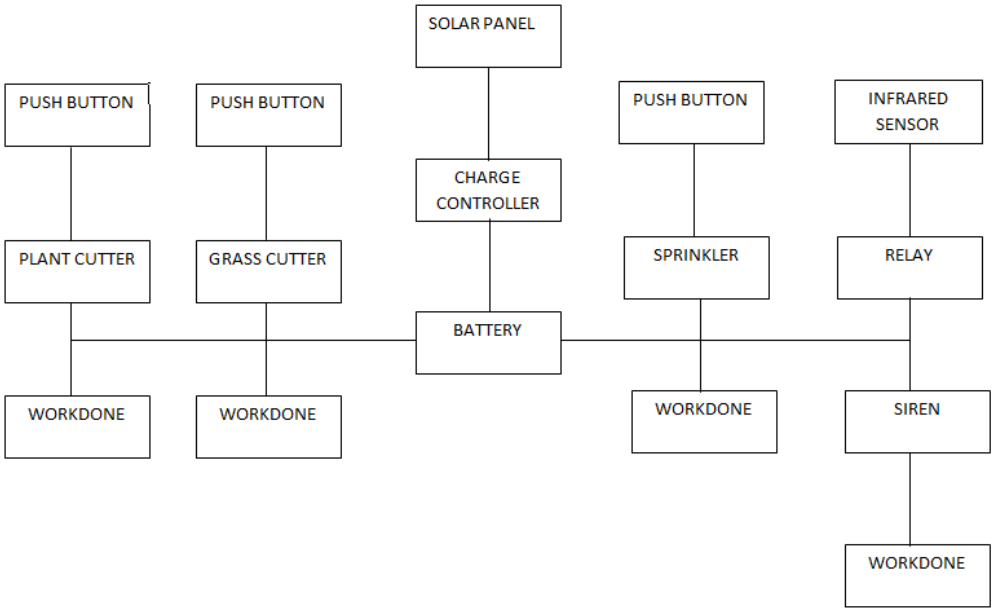

Fig -1: Block diagram

As shown in the block diagram, solar panel receives solar energy from Sun and store in battery. These battery supply powers to the equipment are sprinkler, IR sensor, grass cutter and plant cutter and are operated by remote. This project costs approx. Rs.8, 860. In future this machine can be made to work wireless. As the proposed system is a prototype model, more functions can be inserted to it to work efficiently. In wireless model, IR sensor can be rotated 360 degree to detect the obstacles by placing it in the middle of the farm. It is a single, multifunctional machine can be the remedy against the tremendous labor work done by farmers.

2.1 Equipments:

- Solar panel: This receives solar radiations and is of 12 Volt, 10 Watt and 7 Ampere.
- Battery: This store the solar energy which is of 12 Volt, 8 Ampere.
- Charge Controller: A 6 Ampere charge controller is used to avoid a complete discharge of battery.
- IR Sensor: It detects the obstacle present in the vicinity as per the preset distance, is of 12 Volt and rotate 180 degree to find the disturbance clearly.
- Sprinkler: It is used to sprinkle water in farms and lawns, which ultimately can reduce cost of pumps, motor and electricity bill.

- Blades: These blades are used to cut the grass and unwanted crops in farms and lawns.

2.2 Objectives:

- Implementation and use of robotic technology in the field of agriculture.
- Modify the existing technology.
- To prepare cost effective system.
- To make the earth non pollutant.

3. CONCLUSIONS

This robot is designed basically for the agricultural field and lawn purpose. This will help farmers for cutting unwanted plant and grass, also spreading water, pesticides and prevent the crops from birds, which reduce the human efforts and work is done simultaneously as per the requirement. This is the low cost machine, which is easy to handle. The main advantage is, no extra cost is required for fueling. By using solar energy, battery is charged and work can be done as per the command. It also reduces the labor cost. By the use of machineries in this field save time, increase efficiency and indirectly increase the production in farms. In this era of automation we need to develop the machines related to the farming applications.

4. REFERENCES

[1]. S. Chavan[1], et.al, "Agricultural Based Robot (AGRIBOT)," IJARIIE-ISSN (0)-2395-4396, Vol-3, Issue-1, 2017.

[2]. ASHISH LALWANI, MRUNMAI BHIDE, S.K. SHAH, "A Review: AUTONOMOUS AGRIBOT FOR SMART FARMING", International journal of Industrial, Electronics and Electrical Engineering, ISSN: 2347-6982, Volume-4, Issue-2, Feb 2016.

[3]. Jaison Mathew[1], et.al, "Fabrication Of Autonomous Agricultural Robot", SSRG International Journal of Mechanical Engineering-(ICE TM-2017)- Special Issue- March 2017, ISSN:2348-8300.

[4]. Venkatesh.k[1], et.al, "Fabrication and Analysis of Lawn Mower", International Journal of Innovative Research in Science, Engineering and Technology, Vol.4, Special issues-May-2015, ISSN (online):2319-8753,ISSN.

[5]. Sanjana Arunesh, et.al, "Design and Implementation of Lawn Cutter", IJSTE, Volume 2, Issue 11, May 2016, ISSN (online):2349-784X.

[6]. Ahuja Jayesh, et.al, "An Innovative Modal For Multipurpose Agriculture Use", SJIP;427, International journal of Advance Engineering and Research Development, Volume 1, Issue 3, March-2017, e-ISSN(P): 2348-6406.