International Journal of Research in Advent Technology (E-ISSN: 2321-9637) Special Issue
National Conference "NCSEEE-2016", 19 March 2016
Available online at www.ijrat.org

Solar based Agricultural Weeding Machine

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Abstract-Weeding is the process in which grass between the crop is removed . These grasses are unwanted& it should be removed from its root. These unwanted part absorbs all the nutrients from the surroundings. This affects a lot on an average yield of the crop. In traditional times , two ox and a person is required for doing the weeding process. Specific distance is kept between the ox in such a way that they can walk through the crop and can able to cut down the unwanted part of the field. Generally the distance between the crop line is 15-18 inch. In that space grass starts competing with the crop for water fertilizers and space There are two types of weeding manual and machine weeding. There are many other machines that are also available for the same purpose. These machines requires at least one skilled person to handle it .We can design a machine that could be handled by a remote. Solar panel is used to store the solar energy and this solar energy is used to charge the machine. By this approach we can minimize the man-power. The overall efficiency of the field can be increased.

Keywords-Weeding machine, Solar energy, Reduced man – power.

I. LITERATURE SURVEY

BOSCH'S GIANT WEED KILLING ROBOT (IROS)

Bosch's start up called deepfield robotics presented a paper on "vision based high speed manipulation for robotic ultra precise weed control". Treating weeds chemically is only the practical way, but that may affect the plant which we want to eat plant. Thus the better solution can be obtained by smashing those weeds by robots can be achieved in the BOSCH'S ROBOT . This can be easily achieved by robots.

Design : The maximum capacity of the system is 1.75 weeds per second at a Speed of 3.7cm per second for weed density of 43 weeds per meter . If the density is lower then speed can be controlled at 9 cm per second.

WEED SEEDS IDENTIFICATION BASED ON STRUCTURE ELEMENTS DESCRIPTOR (APSIPA)

The goal of this paper is to identify and classify the structure of the seeds. As in ocular inspection, the automatic classification of seeds should be based on the knowledge of size, shape, colour and texture. In this work we assess the discriminating power of these characteristics for unique identification of the seed of 216 weed species. Ther is optimal set of 4 seed characteristics as classification parameter ,using performance of support vector machines as a classifier . Among these parameter, colour and textural features are extracted and described as SED (structure's elements descriptor) which performs better than any other image retrieval methods. Experimental result shows that recognition rate reaches the peak with the combination of morphological characteristics and SED.

II. GENERAL BLOCK DIAGRAM

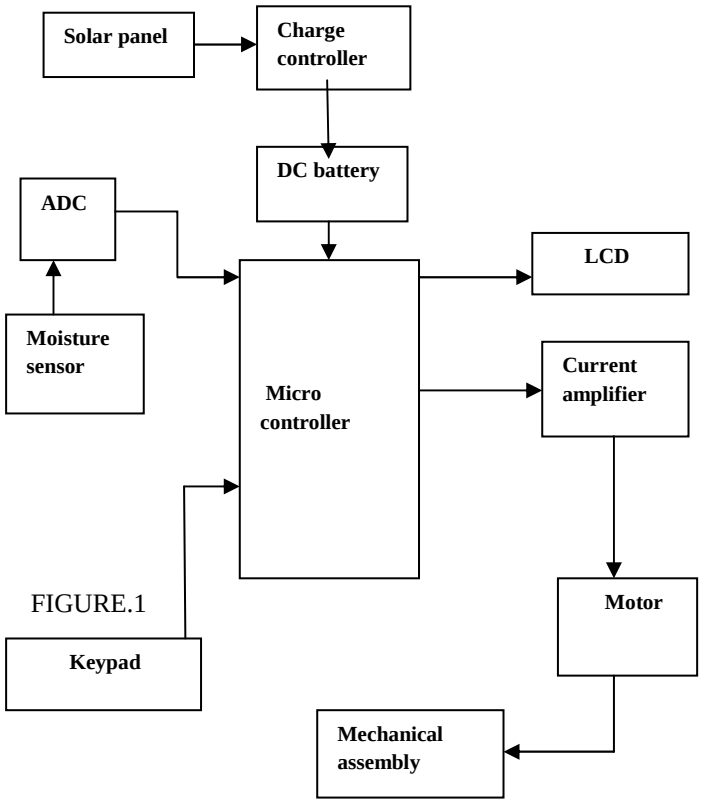


FIGURE.1

Our agriculture weeding machine is based on solar energy. Through solar panel solar energy can be fetched. Solar panel is used for operational charging of the battery. Solar panel does not provide constant current as due to variation in the radiation intensity. So 10 watts are required by the panel hence the separate circuitry is provided. Charge controller is build up to provide constant current to the battery. By the use of moisture sensor moisture is detected. If its above threshold then weeding is done. There are two blades from either side of the machine driven by dc motor. The width of the blade can be adjusted. LCD is used to display the moisture in the soil. Keypad is provided which is connected to the micro controller for the movement of the machine. The overall functioning of the system is controlled by the microcontroller (pic16). Thus the approach of minimizing labor work is achieved.

III. SYSTEM DESIGN

Microcontroller: We have used PIC16F877A microcontroller. It is a 8 bit microcontroller. It has built in 10 bit analog to digital converter.

Parameter name	**Value**
Program memory type	Flash
Program memory(Kb)	14
RAM bytes	368

Battery : Battery used to store the solar energy which is of 12 volts. Continuous battery charging is provided by charge controller circuit.

LCD : 16x2 type of LCD is used to display the moisture in the soil. It also displays the flow of the system and battery status.

Motor : Motor driven IC that is L293D is used to drive the DC motor. Motor with 90 rotation per minute is used.

Keypad : The rows and the columns are connected to the single port of the microcontroller. Push button switches are used in the 4x4 keypad. It is used to move the machine forward or backward in the farm.

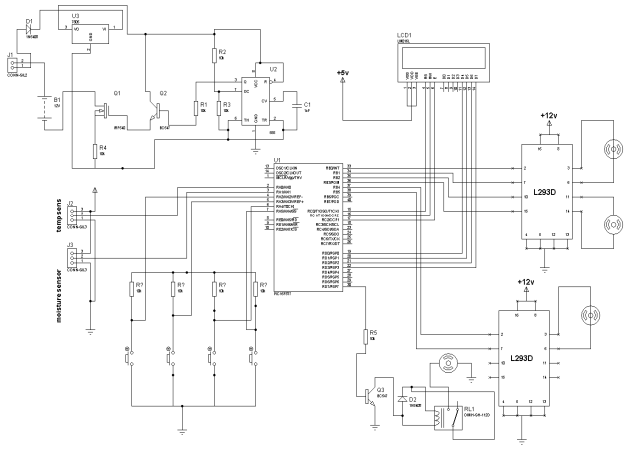
Mechanical assembly : It consist of a blade which is driven by dc motor of 100 rotation per minute. It also consists of solar panel, motor, wheel etc.

Result : Simulation has done, which shows the correct output.

Algorithm:

1. Start the system by switching on the power supply.
2. Initialize the LCD.
3. Set the moisture sensor on, moisture sensor will indicate the moisture in the soil through ADC and displays it on LCD.
4. If the it is below threshold then the cutting of the weeds proceeded else weeding cannot be done.
5. Using blades at the back machine will cut the weeds .
6. Set the keypad for the forward or backward movement.
7. Initialize the solar panel to store the energy in a battery.

CIRCUIT DIAGRAM



IV. CONCLUSION

In conclusion, it was found during observations after the development and testing of weeding machine overall benefits are associated with the use of the equipments includes:

1. It was faster than traditional method of removing weeds.
2. Solar energy can be used to charge the battery.
3. Keypad provides user the control over the machine.
4. Machine can be controlled from one place.

V. SCOPE OF FUTURE WORK

1. The weight of the weeding machine can be reduced by using light weight material .
2. Seeder and pesticides can be attached to it so that it can be used in many applications.

VI. ACKNOWLEDGMENT

A dissertation work of the nature requires co-ordination and support from many for its successful completion and I am fortunate enough in this direction. It gives me great pleasure to acknowledge and express my deep sense of gratitude to those who have helped me throughout the work. I take this opportunity to show my heartfelt gratitude to my guide Prof. PRADHAN professor at the department of electronics and telecommunication from MITCOE.

VII. REFERENCES

Journal paper

[1] Anonymous,1985. RNAM test codes and procedure for farm machinery , technical series No. 12, economical and social commission for Asia and the pacific, regional network for agricultural mechanization, Bangkok, Thailand.

[2] Dryden, R.D. and C.H Krishnamurthy. 1977. Year round tillage, *Indian journal of weed science 14-18.*

Conference

[1] Signal and information Processing Association Annual Summit and Conference (APSIPA).

[2] Gunasena, H.P.M and L.M. Arceo.1981. Weed control studies, *Proceedings of 8th Asian Pacific weed science society, conference, Bangalore, India.*

[3] International Journal of Modern Engineering Research(IJMER)

Books

[1] PIC microcontroller and embedded system by Mazidi and Danny cousey.

[2] Rangasamy, K.M. Balasubhramanyam and K.R. Swaminathan. 1993. Evolution of Agricultural weeding mechanism