Abstract: To reduce the human efforts in garden/park/lawn, the unique method of using abundantly available solar power is enhanced. This practical representation will help us know how this technology can be used to reduce human efforts as well as to efficiently use renewable source of energy. The machine used to cut the lawn in equal length the “Solar grass cutter” is proposed. In every field even more sophisticated devices are used. Planning for the future, Power consumption becomes essential. Very simple designed construction of solar grass cutter is very useful device. Its application is to maintain and upkeep lawn in gardens, schools, colleges, etc. The upcoming proposed device is going to make its application more easier at reduced cost and aim in pollution control is achieved through this. Unskilled operation can operate easily and maintain the lawn with a fine and uniformed surface look.

Keywords: microcontroller, solar panel, sensor, motor driver, lawn cutter.

I. INTRODUCTION

Solar energy is the source of power available to nature in human kind in plenty. A major amount of this natural resource gets wasted. Productive use of solar energy will help to reduce the shortage of solar power for present and coming generation. To accumulate the solar energy with available technology device is shown with the help of an example of solar power cutter. The solar powered lawn mower is an automated grass cutting vehicle powered by solar energy. The system uses 12V batteries solar panel to charge its batteries. A microcontroller is the main controlling mechanism for synchronization of the system. The other components such as grass cutter, water sprinkle motors and the wheel motors are interfaced to the micro-controller that controls the working of all the motors. On detection of obstacles in the path preprogrammed action is taken by the controller as per the conditions sensed by the sensor. Keeping in mind the rapid growth in the wireless industry, there has been the increase in demand for such wireless devices. The solar grass cutter uses solar based energy resources. Such as gas and fuel based source of energy. People nowadays want their work to be fast and easy. So the basic objective is to create a device reliable and easy to operate as well as maintainable. The present technology commonly used for trimming the grass is done manually, but with the help of our device it will minimize the need of human efforts. It is eco-friendly in the surrounding. Eventually the basic objective of pollution control is also achieved. The further discussions are explained in the sections mentioned below. SectionI represents literature review followed by sectionII discusses the description of the hardware components. sectionIII describes the expected results and sectionIV concludes the paper.

II. LITERATURE REVIEW

This “solar powered vision based robotic lawn mower” is an autonomous lawn mower that will allow the user to the ability to cut their grass with minimal effort[8]. Unlike other robotic lawn mowers on the market, this design requires no perimeter wires to maintain the robot within the lawn and also with less human effort in the manual mode operation. There are
some preset pattern installed in the robot, in the automatic mode operation no human effort needed for the operation and helps to cut different patterns in the lawn very easily with less time. Through an array of sensors safety takes major consideration in the device, this robot will not only stay on the lawn, it will avoid and detect objects and humans. And also it detect the land boundaries and start mowing upon the predefine pattern with the help of installed camera and MATLAB programm.

The Solar Powered Automatic Lawn Mower “Lawn Buddy”[9]. This project is an autonomous lawn mower that will allow the user to cut their grass with minimal effort. Unlike other robotic lawn mowers in the market, this design requires no perimeter wires to maintain the robot within the lawn. Through an array of sensors, this robot will not only stay within the lawn, but it will also avoid and detect objects and humans. This design is still in the prototype stage due to financial and time constraints.

The Smart Lawn Mower for Grass Trimming[4]. The present technology commonly used for trimming the grass is by using the manually handle device. In this project we have automated the machine for trimming the grass. The device consists of linear blade which is operated with the help of the motor the power supply for the motor is by using battery. The battery can be charge by using power supply and solar panel. In case of any obstacles in the path it is sensed by using an IR sensor. If there is any variation then the device using free direction sensor and find the new path to travel. The above feature is enabled so that the damage to the hardware of the device is avoided. In future the automation of the device will play a vital role in world wide.

III. BLOCK DIAGRAM

The figure.1 shows is the basic block diagram of Automatic Grass Cutter Using Solar Harvesting.

![Block Diagram](image)

Fig.1 Automatic grass cutter using solar harvesting.

The solar based automatic grass cutter generates the required power from solar energy drawn over the solar panel controller used is 89522. Amongst the 4 ports the input and output port is used for controlling the motor driver Ic through 4 motor mentioned as below.

1. Forward motor
2. Backward direction
3. Left direction
4. Right direction

Remote side consists 5 buttons used for control robotic moments through technique known as RFID. Innovative changes to be done is level shifting wherein the pre-defined level can be set.

IV. DESCRIPTION

RFID technique:
It is a technique facilitating identification of any product or item without requirement of any line of sight. The actual data carrying tool of RFID structure in general comprises of an antenna.

Microcontroller (AT89S52):
It has 3 sixteen bit timer/counter. A watchdog timer. It can operate in the range of 4V to 5V. It is having 32 I/O lines, where each port is having 8 i/p lines. It has internal RAM of 256kB and also a full duplex serial port.

Driver IC(L293D):
It is a 18 pin IC used to drive the motors used in our project. Pin no 1 7 Pin no 9 are enable pins. These pins should be high (+5V), if connected to low(GND), the output will be turned off. Pin no 4,5,12,13 are connected to microcontrollers ground. Pin no 2, pin no 7, pin no 10, pin no 15 will be used as logical inputs. These pins will be connected to their respective motor. Pin no 3, Pin no 6, Pin no 11, Pin no 14 are the output pins connected to the motors. Pin no 16 powers the IC and should be connected to +5V. Pin no 8 powers the 2 motors and should be connected to the positive lead of the battery.

External Battery:
It is being used to store the solar energy as a backup.

V. EXPECTED RESULTS:

Response time should be as fast as possible. As soon as a command is given to the device it should operate accordingly. There are 5 switches used to give input command. Example, if the user wants to clean the lawn from the area where maximum growth of grass is present, user will just to have press respective switch whether left or right, back or forth. Also if the user wants to trim the grass only few inches then user can adjust the blade by pressing switch 3. Switch 5 is used for sprinkling water when required. Basically when we press the switch on remote input signal is transmitted through RFID transmitter which is connected to port 2 of controller to RFID Receiver which is connected to port 3 of other controller. RFID receiver will give that signal to microcontroller and accordingly it will drive the motors which are interfaced with IC(L293D) to port 1. Robot will have the cutter on arm through which grass will be cut.

VI. CONCLUSION

The lawn mower will meet the challenge of industrial production and low cost of operation since there is no cost for fueling. This lawn mower is going to be developed for the use of residences and establishments that have lawns where tractor driven mowers could not be
used. The machine’s capacity is adequate for its purpose. The machine will prove to be a possible replacement for the gasoline powered lawn mowers.

VII. REFERENCES


