IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 8, August 2021

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.282

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

Solar Powered Multipurpose Farming Machine Tool

Shilpa S.K[1], Mahesh V[2], Vinayaka Kariger[3]

Assistant Professor, Dept. of Electrical & Electronics Engineering, BIET College, Davangere, Karnataka, India[1]

UG Student, Dept. of Electrical & Electronics Engineering, BIET College, Davangere, Karnataka, India[2]

UG Student, Dept. of Electrical & Electronics Engineering, BIET College, Davangere, Karnataka, India[3]

ABSTRACT:This paper aims on the design, development and the fabrication of the vehicle which can plough the soil, sow the seeds, leveler to close the soil and pump to spray water, these whole systems of the vehicle works with the battery and solar power, the vehicle is controlled by toggle switch. In recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The advantage of this vehicle is fast input operations. In this field of agricultural autonomous vehicle, a concept is been developed to investigate if multiple small autonomous machine could be more efficient than traditional large tractors and human forces. Keeping the above ideology in mind, a unit with the following features is designed.

KEYWORDS: Agricultural Autonomous Vehicle, toggle switch

I.INTRODUCTION

Indian Agricultural system faces lots of problems such as uncertain climatic conditions, quality of crops, fertility of soil, fertilizer, shortage power supply, falling market prices of crops, agents problem, bank debts and labour problem. Among these, manual labour has been an integral part of rural agricultural systems in India for hundreds of years and is still continuing. Improper weeding reduces the crop yield which varies from 45 to 65 %. The developed equipment is operated reduces the human efforts and can eliminate the labour problem. Many parts of our country still adopting traditional tools and implements are usually used in connection with specific operation in the sequence of agricultural operations such as land preparation, sowing, weeding, irrigation, harvesting, post- harvesting operations and transportation. It is necessary to reduce human and animal efforts and can be replaced by some advance mechanization. The design of machinery & its cost should be such that small scale farmer can afford it easily. The machine can be made multifunctional such as inter-cultivating, sowing, digging and spraying etc. can be performed with cheap cost as compared to other agriculture machine. . Inter-cultivating is the process used to remove unwanted plants to protect the regular crop in respect to soil nutrition's and wetness.

The cost of Tractor is around 7 to 8 lakhs and small farmers cannot afford it. In Indian villages, for agricultural activates, the small farmers depends on ox-ploughing and some farmers may heir tractors for work .It may cost 1500/- to 2000/- per acre .It is also quite difficult to get tractor on peak time. So keeping in small farmers as a point of view, an portable machine tool is designing which is operated by Solar Power .It can perform the agricultural operations such as sowing, fertilizer spraying are going to be done along with tilling process.The small farmers and farm owners of scattered lands in India are unable to use tractors and in that case ox-ploughs are highly preferred. This paper concentrates on reduction of efforts of using the manual farming. This avoids labour problem small farmers need not heir tractors for ploughing purpose and this equipment is mainly design keeping small farmers in point of view. The developed equipment is operated on the solar power, hence no need to worry about power supply

Most of the farmers in India are economically weak. Their main objective is to reduce labour work and to save the time. It consists of a bicycle power tiller. Working of this project is based on solar panel and it generates energy to run the machine which moves the tiller. It is easy to design with the low maintenance cost. This paper also explains the solar power tiller design which is made for using in primary and secondary tillage. Various methods used for weed removal in the crops have been mentioned. His study has revealed that most of the farmers can afford small price for the farming. They can afford only portable weeders. As the petrol and diesel rate is high nowadays. The solar Taylor can be used to perform tillage without petrol and diesel with the help of solar power. Majority of the farmers are having the small land. It reduces the human effort. Bicycle system, DC series motor, battery, Rotary tool, solar panel, gearbox,

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

mainframe have been used. Working of the project is based on solar panel and it generates energy to run this machine which moves tiller. It will save the time. Tillage depth is analyzed and made it to function. It will also reduce the pollution which is going to happen in our environment. This can be used for either farm field dealing or wedding. This system requires heavy initial investment but did use the energy output for lifetime with low maintenance. [1]

Due to increase in the rate of fuel the productivity decreases. Working depends on the solar panel It is a motorized equipment driven by solar energy which moves blades to cut the weeds by chain sprocket mechanism. It reduces the labour work and saves time. It is easy to maintain at an affordable price. The designed equipment is a type of agricultural weeder operated with the utilization of solar power. The drive mechanism of this machine includes one solar panel, two electrical dc motors, two batteries, rotary blades and chain sprocket mechanism. One electrical dc motor is connected to the wheels of the machine with the help of chain sprocket mechanism. These mechanisms transmit the power from the motor to the shafts of the wheels and weeder blades. In this machine J-type rotary blades are used. This shape of blades mainly used for tilling hard soils such as dry lands. These rotary blades are attached to the rear end at the roots of weeds and are driven by another electric dc motor. The two motors are connected to the two batteries individually in series. Batteries are connected to the solar panel... By this process the generated solar energy is converted into electrical energy. This energy is stored in batteries. This stored energy is supplied to the dc motors when they needed through which the wheels and weeder blades are rotated. The motor speed is varied by altering the operated voltage output through the speed controller this fabricated equipment is easy to operate and suitable for dry land crops. The depth of cut is maintained at 3 to 5cm. [2]
It is possible to implement all the functions of the agriculture in a one single machine tool. Solar powered multipurpose agricultural machine is designed for weeding, seed sowing and pesticide spraying purpose. The working of this tool is based on principles of motion transmission due to motor chain and sprocket arrangement. .By some adjustments it can be made as tractor powered equipment. All the parts can be connected in such a way that in every stage of agriculture the equipment can be rearranged or easily assembled with fasteners to required length and specifications of field operation. [3]
Utilizing non conventional sources as they are Eco-friendly,by introducing Buck boost converter to convert DC to DC high voltage range,which could run the machine at its rated value. As the fuel price is increasing day by day non conventional sources must be used. [4]

II.SYSTEM REQUIREMENT SPECIFICATION

There are only Hardware Specifications have been used in this Project. Some of the Hardware specifications which have been used here are.Table 1.1shows the list of Components with specifications.

Table1.1:List of Components with Specification

Sl No	Components	Specifications	Images
1.	Battery	12V,7.5AH	
2.	DC Motor with Gear	12,2A 30 rpm	

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

3.	Mechanical Tools		
4.	Solar Panel	20V,2A	
5.	Pump Motor	12V,2A	
6.	Toggle Switch		

III.METHODOLGY

The basic aim of the project is to develop a multipurpose machine, which is used for digging soil, seed sowing, and leveller to close the mud and fertilizer sprayer to spray fertilizers with least changes in accessories with minimum cost. Thee whole system of the multipurpose tool works with battery and solar power.Battery is used during the rainy season.Sowing process is not mentioned in block diagram.Fig 1.1 shows the Block diagram ofModel Designed.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

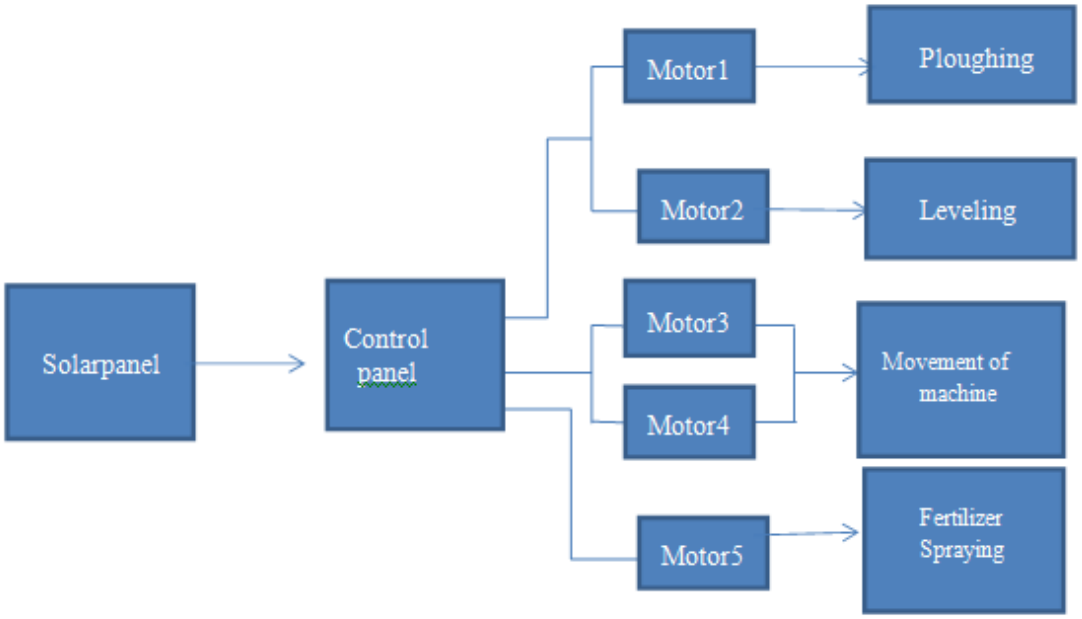


Fig 1.1Block Diagram of Model Designed

- The base frame is made for the multipurpose tool with 4 wheels is also driven by DC motor and design is made to dig the soil
- Funnel is made by the sheet metal, to pour the seeds and the seeds flow through the drilled hole on the shaft to the plough soil.
- At end leveller is fitted to close the seeds to the soil, and fertilizer pump sprayer to use to spray the fertilizers. The whole multipurpose tool requires the 12 volt battery to operate the system.
- Toggle switches are used to control the operation of the vehicle.

Figure 1.2 shows the Circuit diagram for designed Model which includes Motors,Toggle switch & four switch connections

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

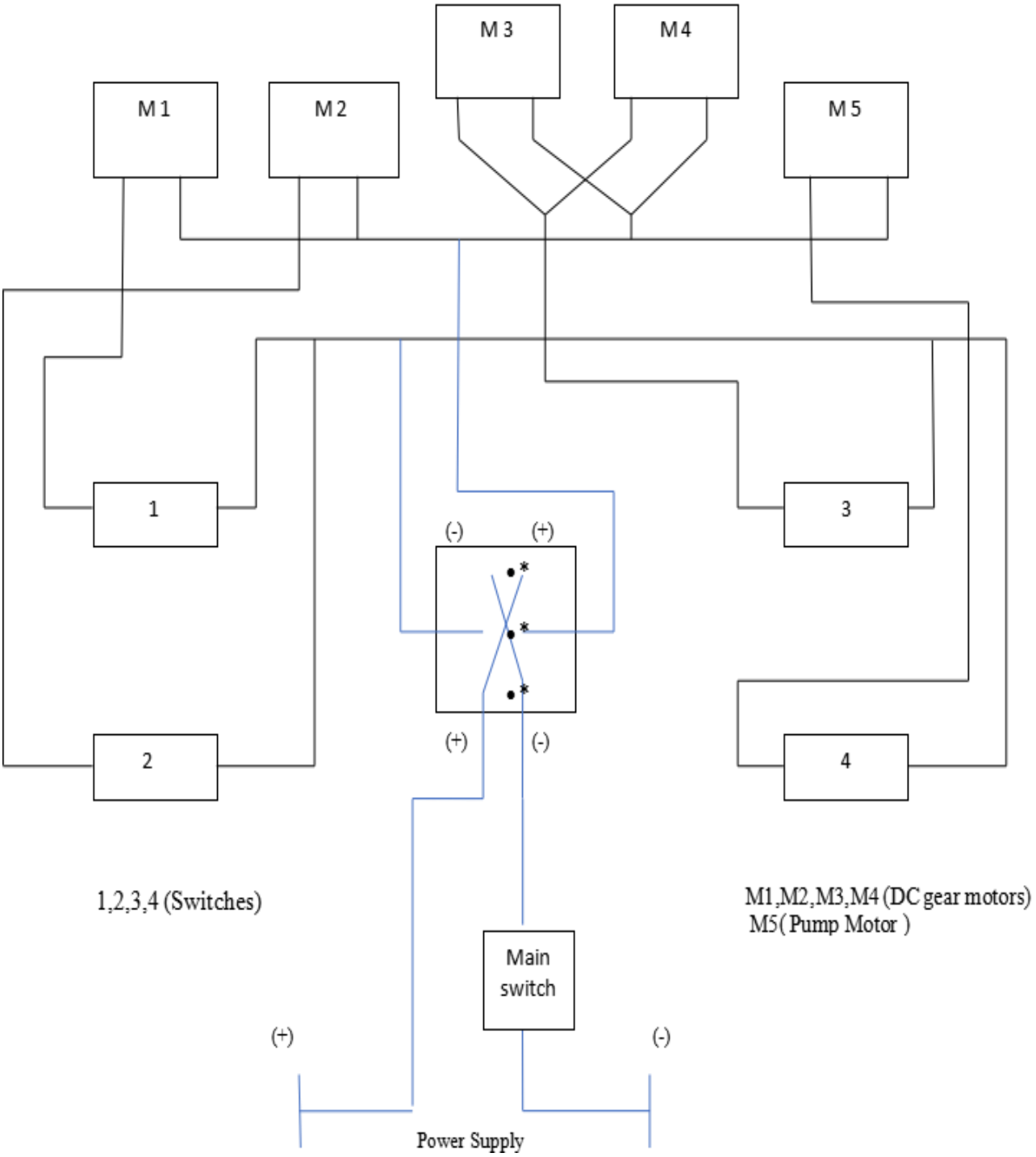


Fig1.2 Circuit Diagram of Designed Model

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

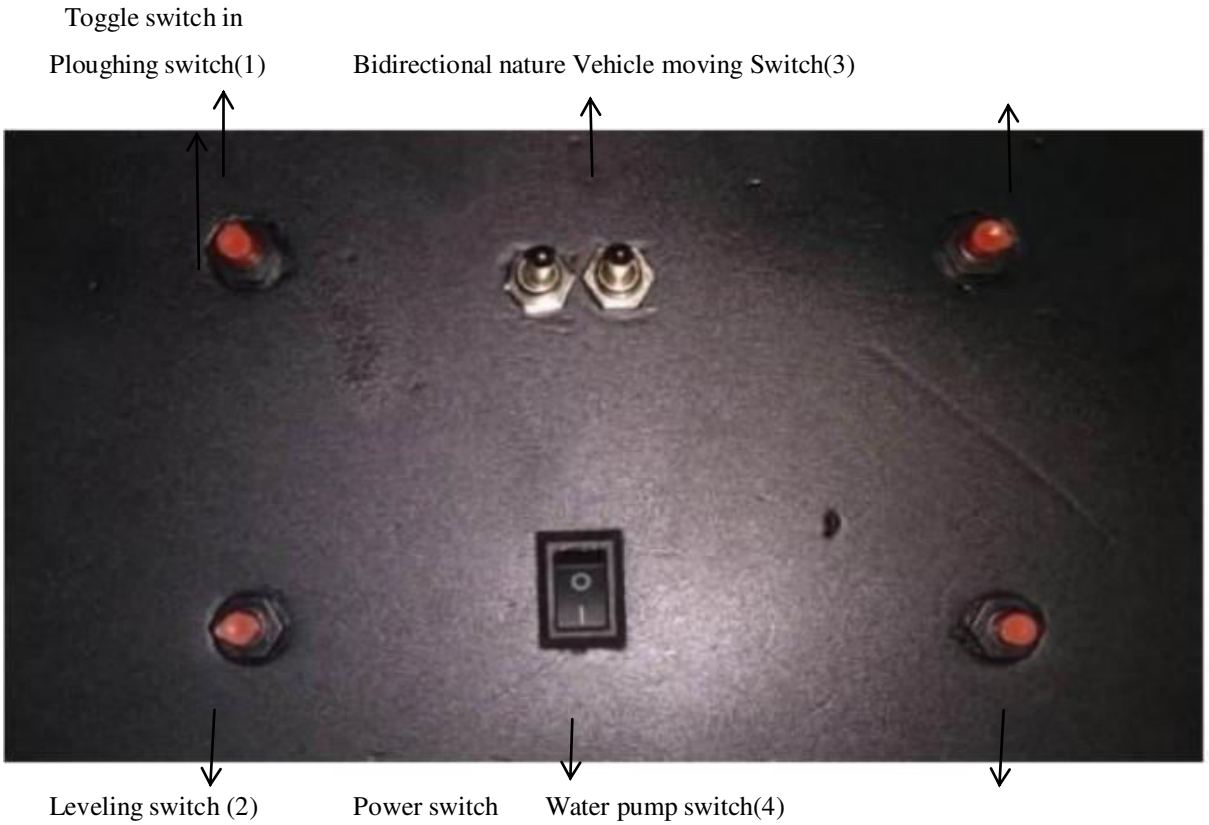


Fig1.3 Switch Board connection

Fig1.3 shows the how all motors are controlled through all four single through switches and Toggle bidirectional switch.In this circuit diagram we have installed a toggle switch which is bidirectional in nature, main power switch and sub switches which will be connected to the dc gear motors and the solar panel to perform the whole operation. At first the supply from the solar panel will reach the main power switch. The main power switch is made to be in the on position. Then it will receive the supply from the solar panel. When we will move the toggle switch in the forward direction the polarities from the solar panel and the toggle switch will be same. Through this the dc gear motor will run in the clockwise direction. Similarly when the toggle switch is moved in the backward direction the polarities from the solar panel and the toggle switch will be opposite. Through this the dc gear motor will run in the anticlockwise direction. We have also used four sub switches which will be connected to the toggle switch to perform the various operations like ploughing, levelling, fertilizer spraying, movement of the machine with the help of dc gear motors. These sub switches will be pressed only after the movement of the toggle switch either in forward or backward direction.

IV. RESULT AND DISCUSSION

Practically our multipurpose agricultural machine toll can be used for ploughing, fertilizer spaying, seed sowing and leveling. All the parts are connected in such a way that in every stage of agriculture the equipment can be rearranged or easily assembled with fasteners to required length and specifications of field operation. The working model of solar powered multipurpose agricultural machine tool successfully functioned the operations such as ploughing, seed sowing, fertilizer spraying and leveling the soil successful

V.CONCLUSION

Designed Model helpful to small scale farmers who cannot afford tractor.It has lots of advantages such as easy in construction,more economical, easy to clean and maintain, it is a renewable energy powered,it does not create air

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008034 |

pollution and noise ,easy to handle ,and it is light in weight.his makes agriculture more effective and easier.Various types of agricultural operations can be performed in a single machine tool.

REFERENCES

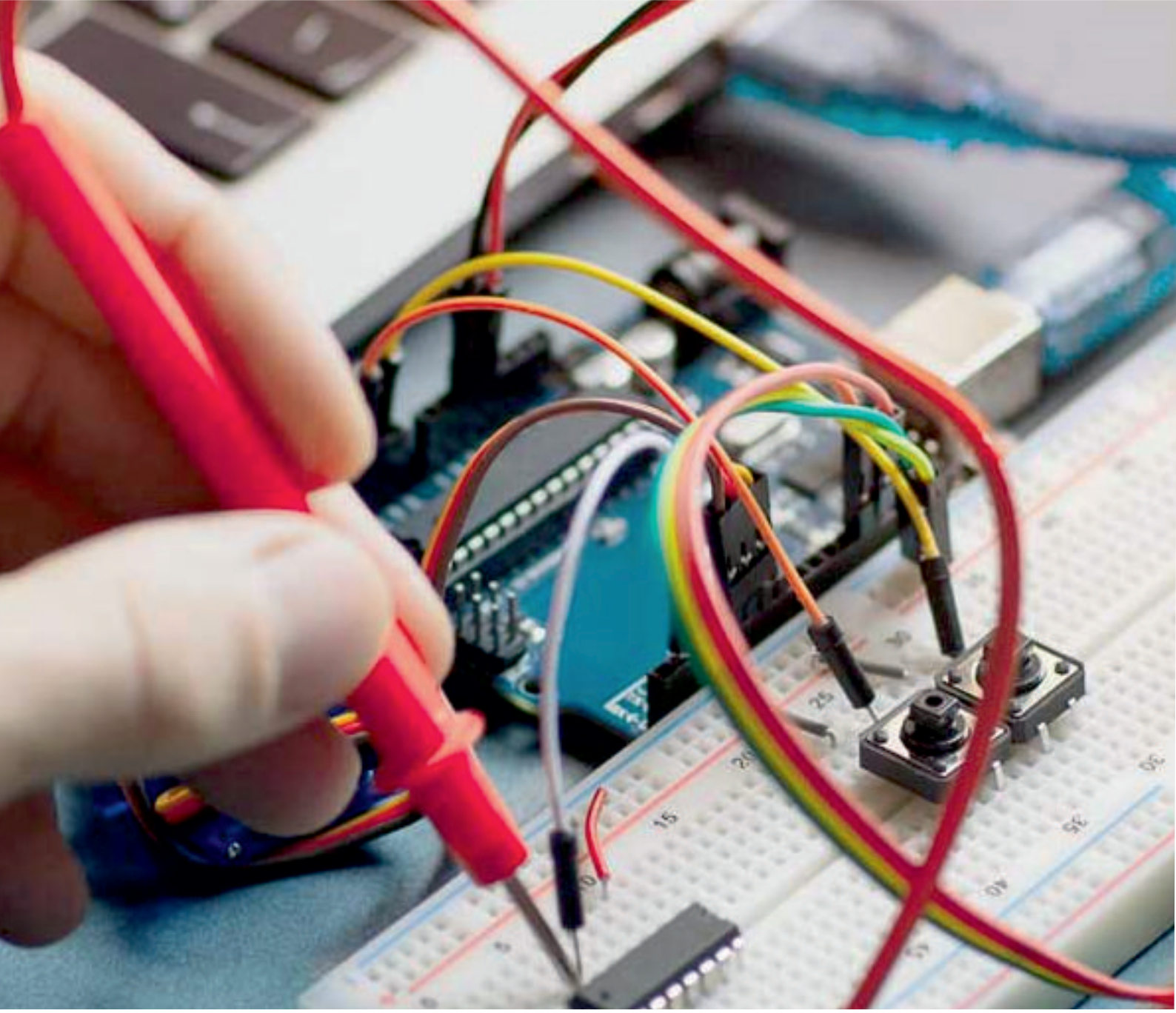
[1] Waghmode R.S, Shinde S.R, Dixit A.K, Chanchure A.A, Jadhav K. H, GudurS. E, (May-June 2015), " SOLAR POWER TILLER", (IJESAT) International Journal of Engeenring Science and Advanced Technology, ISSN:2250-3676, Volume-5, Issue-3, 149-156.

[2] M. Govardhini , Prof. K. Hemachandra Reddy, "DESIGN AND FABRICATION OF SOLAR POWERED MULTI-CROP WEEDER", Journal of Technical Innovation in Modern Engineering & Science (IJTIMES), Impact Factor: 3.45 (SJIF-2015), e-ISSN: 2455-2585,Volume 3, Issue 10, (October-2017)

[3] S. Ram kumar, K. Rajesh, V. Ranjith kumar, M. Purosothaman, "DESIGN AND FABRICATION OF SOLAR POWERED MULTIPURPOSE AGRICULTURAL MACHINE/VEHICLE/ROBOT" International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 04 | (Apr- 2018), e-ISSN: 2395-0056, p-ISSN: 2395-0072

[4] Abhinandan K.R, Akshay H.S, Parvathi M, Sybil Raj Urs, Ravikumar K. N, "MINI TILLER OR CULTIVATOR USING ELECTRIC MACHINE AND SOLARENERGY", Karnataka State Council for Science and Technology,

[5] Shree Harsha B.T, Saketh Chellur, Aparna Latha A, Sandeep Kumar Y.H.M, "MULTI-PURPOSE AGRICULTURAL VEHICLE", Imperial Journal of Interdisciplinary Research (IJIR) , Vol-3, Issue-6, (2017), ISSN: 2454-1362.



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 7.282

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details