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Design and Fabrication of Scrap Collecting Vehicle Using Solar Panel

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Abstract: ***The main objective of this paper is eliminating the need to manually collecting the scrap in small scale industries. For the purpose, we are designing automatic scrap collecting vehicles running using solar power. In the available methods of scrap collecting man power, fuel power vehicle is used. By the end of 2020, fuel deposits in the world completely depleted . To avoid this type of problem and reduce manpower requirement we need another type of automation is called solar operated scrap collecting vehicle.***
Keywords: Lithium Battery, Photo-Voltaic (PV) module, Scrap Collecting Vehicle, Solar Energy

I. INTRODUCTION

The main objective of this project is eliminating the need of manually collecting the scrap from different places. For the purpose, a scrap collecting vehicle using a solar panel is designed. In the available methods of scrap collecting, man power and fuel power is used. In this project, by eliminating the fuel power solar power with battery support is used. So, now our project of "Design and Fabrication of Scrap Collecting Vehicle Using Solar Panel" is making by using natural energy of solar, the Solar panel energy uses the energy from the sun stored in a battery. This allows more sunlight to be captured. by this the solar energy is capable of producing mechanical energy Solar panel requirement is significant for growth between the year of 2008 and 2013. Due to that growth many start-ups had projects that were not "ideal" solar roof tops to work with and had to find solutions to shaded roofs and orientation difficulties. This challenge was initially addressed by the re-popularization of micro-inverters and later the invention of power optimizers. A solar cell panel, photo-voltaic (PV) module or solar panel is an assembly of photovoltaic cells arranged in a framework for gathering energy. Solar panels use sunlight as a source of energy to generate direct current electricity. A collection of PV modules is called a PV panel, and a system of PV panels is called an array component. The fundamental of the task is to plan scrap gathering vehicle to expel scrap with any zone with assistances of sheet metal. A greater application of the automobiles and advanced mechanism, the usage of fuel based automobiles is increased. In order to reduce the usage of fuel based automobiles solar based scrap collecting vehicle is introduced in industry.

II. LIST OF COMPONENTS

A. SOLAR PANEL
B. DC Motor (3 No's)
C. Wheels
D. Frame
E. Conveyer
F. Container
G. Scrap collector
H. DC Motor

III. 3D MODEL

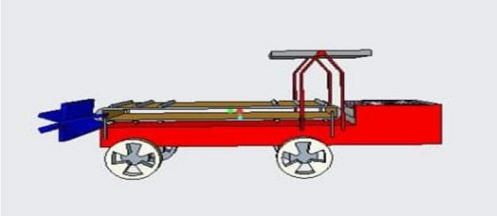


Fig.1: Side View

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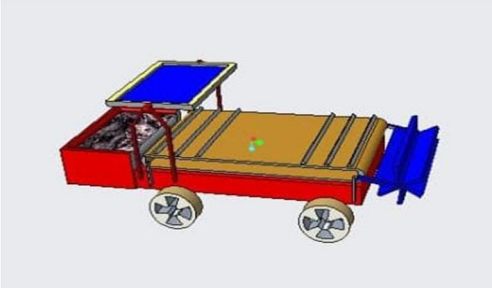


Fig.2: Perspective View

IV. BENEFITS

A. Easy to operate
B. No fuel required
C. Simple in construction
D. Occupies Less area
E. It reduces the downtime of the machine
F. It saves the investment on the worker.
G. It increases the productivity of the industry

V. RESULT AND DISCUSSION

To reduce manpower requirements we need another type of automation is called battery operated automatic scrap collecting vehicle. In this vehicle, we used a rechargeable battery for supplying power to the automatic scrap collecting. The vehicle which we designed, it has the A.C blower is used to collect the scrap automatically. We can redesign this scrap collecting vehicle for the different kinds of attachment.

Like the separate compartment for the different scrap vehicle for example plastic and different types of metal. We can also use the hydraulic mechanism for the compacting of scrap inside the bin. We can use the heavy-duty hydraulic system for the reduction of fuel consumption in the operation of the mechanism

The different mechanism of scrap collection are semi-automated controlled as above with side attachment would result in increasing the work efficiency and this would lead to automation for the time saving. More amount of operation can be done in short time with a single operator for vehicle as well as the mechanism. Now due to these automation will be comparatively more percentage of less time consumption from the same quantity of scrap collection as compared to manually controlled vehicles. So the arrangement of this design with a core features such as the belt drive and guide post with the collecting arms would provide us high quantity of the torque from the electric motor as compared to other mechanism. Thus, adopting the above design would be beneficial in all terms instead of manually controlled vehicles

VI. FUTURE SCOPE

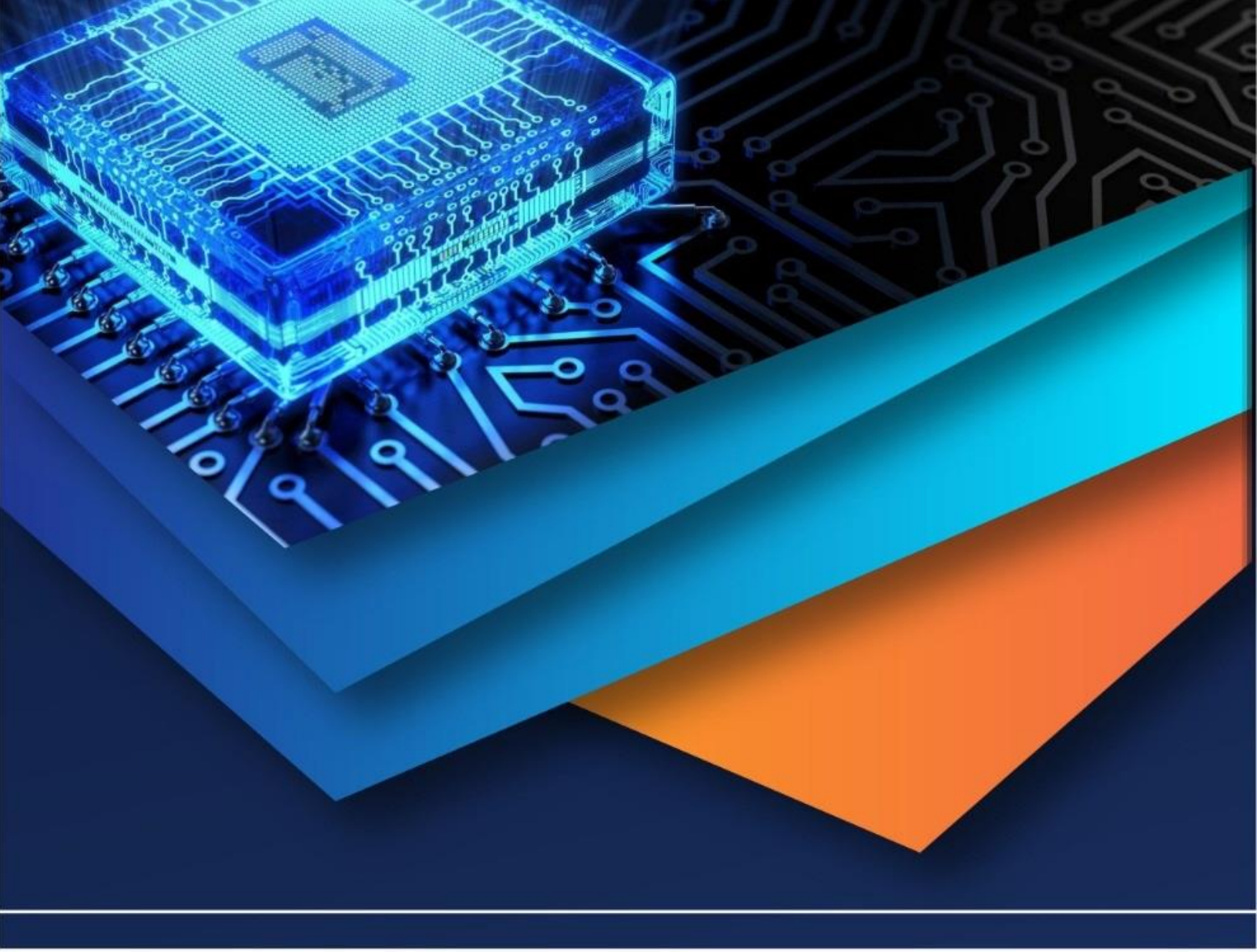
1) We can add 360^0 camera on the vehicle to have access the vehicle from one place.
2) We can add sensor to avoid crashes on walls, people, etc…

REFERENCES

[1] H.M.T. Production Technology – Handbook", 2000 Tata McGraw Hill.
[2] Saab, S.S. and R.A. Kaed-Bey, 2001 Parameter Identification of a DC Motor: An Experimental Approach. IEEE International Conf. on Elec. Circuit and Systems (ICECS), 4: 981-984.
[3] .R.K. Jain "Production Technology" Khanna Publication,17th edition, 2004.
[4] Lankarany, M. and A. Rezazade 2007 Parameter Estimation Optimization Based on Genetic Algorithm Applied to DC Motor. IEEE International Conf. on Electrical Engineering (ICEE), pp: 1-6
[5] V. B. Bhandari," Design Of Machine Elements"1st Edition, Tata McGraw Hill Education, 2007.
[6] M.H. Annaiah 2010 Design of Machine Elements II 1st Edition
[7] R.S. Khurmi and J.K. Gupta "Machine Design" Eurasia Publications, Revised edition 2010.
[8] Dr. P.C.Sharma & Dr. D.K.Aggarwal,"Machine Design (SI Units)"11thEdition, 2011
[9] Abdulrahman A.A.Emhemed, Rosbi Bin Mamat, 2012 Modeling and Simulation for Industrial DC Motor Using Intelligent Control, Procedia Engineering, 41 420-425

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[10] Jaya N.I. et al 2012 PIC Based Solar Charging Controller for Battery. International Journal of Engineering Science and Technology pp 1 – 4.
[11] .M/S. Kalaikathir Achchagam, "Design Data", Revised Edition, 2013.
[12] Sani F et al 2014 Design and Construction of Microcontroller Based Charge Controller for Photovoltaic Application. IOSRJournal of Electrical and ElectronicsEngineering,1:1, pp. 92-97..
[13] C M Dinis et al 2015 Study on sources of charging lead acid batteries, IOP Conference Series: Materials science and Engineering, Volume 85, Issue 1, Article id. 012011.
[14] Pinaknath Dewanji et al 2016 Design and Analysis of Spur Gears Volume 7, Issue 5
[15] Geoffrey J. et al 2018 Lead batteries for utility energy storage Elsevier Volume 15.



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