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Design and Manufacturing Of Fully Automated Solar Grass Cutter

Prof.Saurabh Wanjari[1], Swapnil Nikam[2], Sunil Gaudase[3], Akshay Kuchekar[4], Sandip Radkar[5]
[1, 2, 3, 4, 5]*Department of Mechanical Engineering, RMD Sinhgad Technical Campus, Savitribai Phule Pune University*

Abstract: ***We know that there is an eternal increase within the value of fuel , conjointly the gases link up within the atmosphere and so they ruin the system. Because the energy from the sun is overabundant, we have created its use attainable to power to drive a grass cutter. This star battery-powered grass cutter is meant supported the first principle of grass cutting. The main goal of our project is to style a completely machine-controlled star grass cutting vehicle that avoids obstacles and is capable of grass cutting while not the necessity of any human interaction and is battery-powered by alternative energy.***
Keywords: ***Solar Power, Battery, Grass-Cutter, DC Motor, Controller, Arduino UNO, Automation***

I. INTRODUCTION

In the year of 1830, primary garden tool was fancied by Sir. King Budding in European nation, his aim was to chop a grass on sports ground and gardens and it vie a virtual role for the preparation of modern style sporting ovals, etc. This introduction to garden tool diode to the event of the many sports, as well as for soccer, court game, etc.

Ten additional years later Thomas inexperienced introduced a lawn tool referred to as silent cutter that used a sequence drive to transmit power, so field mowers became a additional economical various for domesticating grazing animals. Everything is machine-controlled today and also the new technology is like each manufacturer's aim in innovating a product to form it all convenient for humans. With the continual development within the technology, we tend to see that many peoples create its wide use that's leading for the depletion and shortages of energy and so a significant pollution.

Therefore in recent years, there square measure many study approaches created for the navigation and designing of vehicles. So it became necessary to introduce a star high-powered garden tool with the appliance of solar power to power an electrical motor that successively rotates a blade that will the mowing of a field.

The major modification we've tried to create in our system is that the employment of Arduino Uno that acts as a heart of the grass cutter additionally use of motor drives makes the grass cutter simple to maneuver associated stop once it encounters an obstacle with the assistance of unhearable sensors.

The grass cutter and also the motors square measure interfaced to a microcontroller that controls the operating of all the motors. The detection of objects could be a vital considering the issue for safety of the assembly moreover as human safety, that the small controller is interfaced with a sensing element unit that carries out object detection. On detection of object or obstacle a pre programmed action is taken by the controller as per the conditions perceived by the sensing element.

II. LITERATURE REVIEW

A. Solar Based Grass Cutter : A Review

" Ms. Bhagyashri R. Patil, Mr. Sagar S. Patil" , in the paper titled "Solar Based Grass Cutter : A Review " states that , conventional grass cutter consumes non-renewable sources of energy. So in order to be an alternate green grass cutter can be powered by using solar energy. [1]

B. Sensor Based Multipurpose Agricultural Cutter

" Prof.J.P.Wagh, Aishwarya Chaudhari", in the paper titled " Sensor Based Multipurpose Agricultural Cutter " states that, the rotary mower can rotate about a vertical axis with the blade spinning at high speed and this tends to result in a rougher cut and shreds the grass leaf easily.[2]

C. Solar based Grass Cutter with MPPT Tracking Panel

" Ms. Gurav Sayali, Ms. Desai Pritam ", in the paper titled "Smart Solar based Grass Cutter with MPPT Tracking Panel " states that, adding an interfacing of automatic power bank to charge the battery instantly can help the grass cutter run for long time.[3]

D. Modification of Solar Grass Cutting Machine

"Prof. Praful P. Ulhe", in the paper titled ," Modification of Solar Grass Cutting Machine" states that, the self- powered design objective helped to make the grass cutter portable, durable, easy to operate and maintain. [4]

III.OBJECTIVE

The solar grass cutter which is a fully automated and powered by solar energy that also avoids obstacles and is capable of grass cutting without the need of any human interaction. The grass cutter and vehicle motors are interfaced to L298 H bridge and Arduino Uno using ATmega328P microcontroller that controls the working of all the motors.

IV.SYSTEM DEVELOPMENT

A. Solar Grass Cutter Frame

The grass cutter frame as shown below is intended in laptop motor-assisted software system referred to as CATIA V5. This software system permits the creation of 3D components and provides tools to finish product definition, the fabric accustomed manufacture the frame is PVC, that could be a thermoplastics material consisting of PVC organic compound.

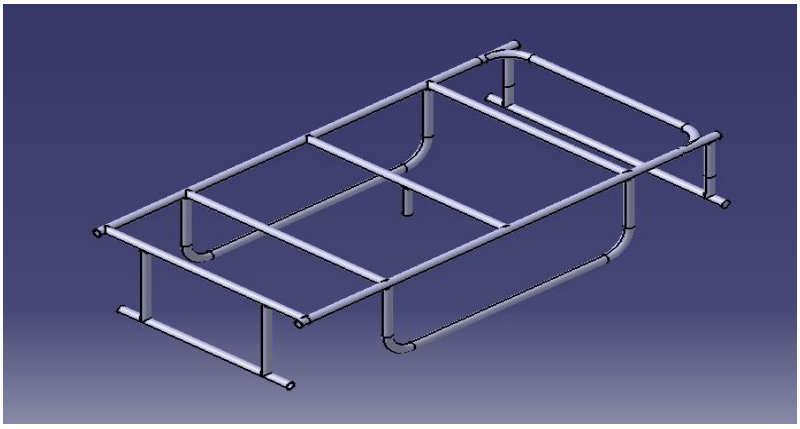

Fig. 1 Solar Grass Cutter Frame

B. Controller Unit

The most important innovation in this system is the use of Arduino to use as control board which allows us to obtain a project that is a bit more user friendly. To allow the maximum usage flexibility, instead we thought of using a specific shield.

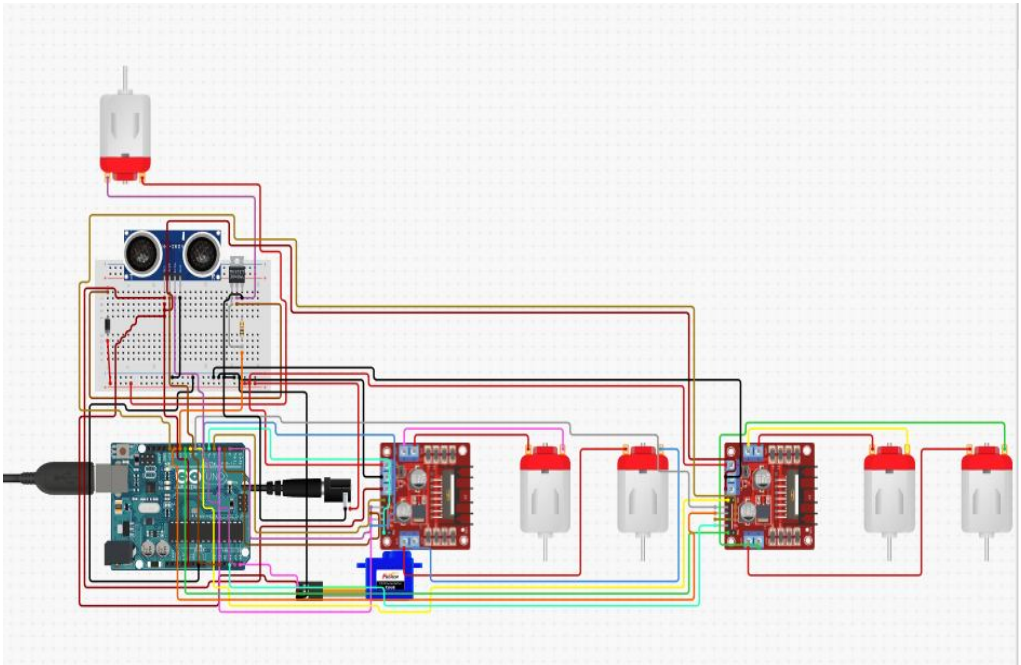

Fig. 2 System Circuit

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C. System Architecture

This is the most important part of grass cutter and this was put more into the consideration. Also the circuit box and how to mount it on the frame is also a key consideration as the grass cutter motor is vertically mounted with the help of two rods fabricated on the motor base. The circuit needed to be provided with protective casing so that it does not get wet.

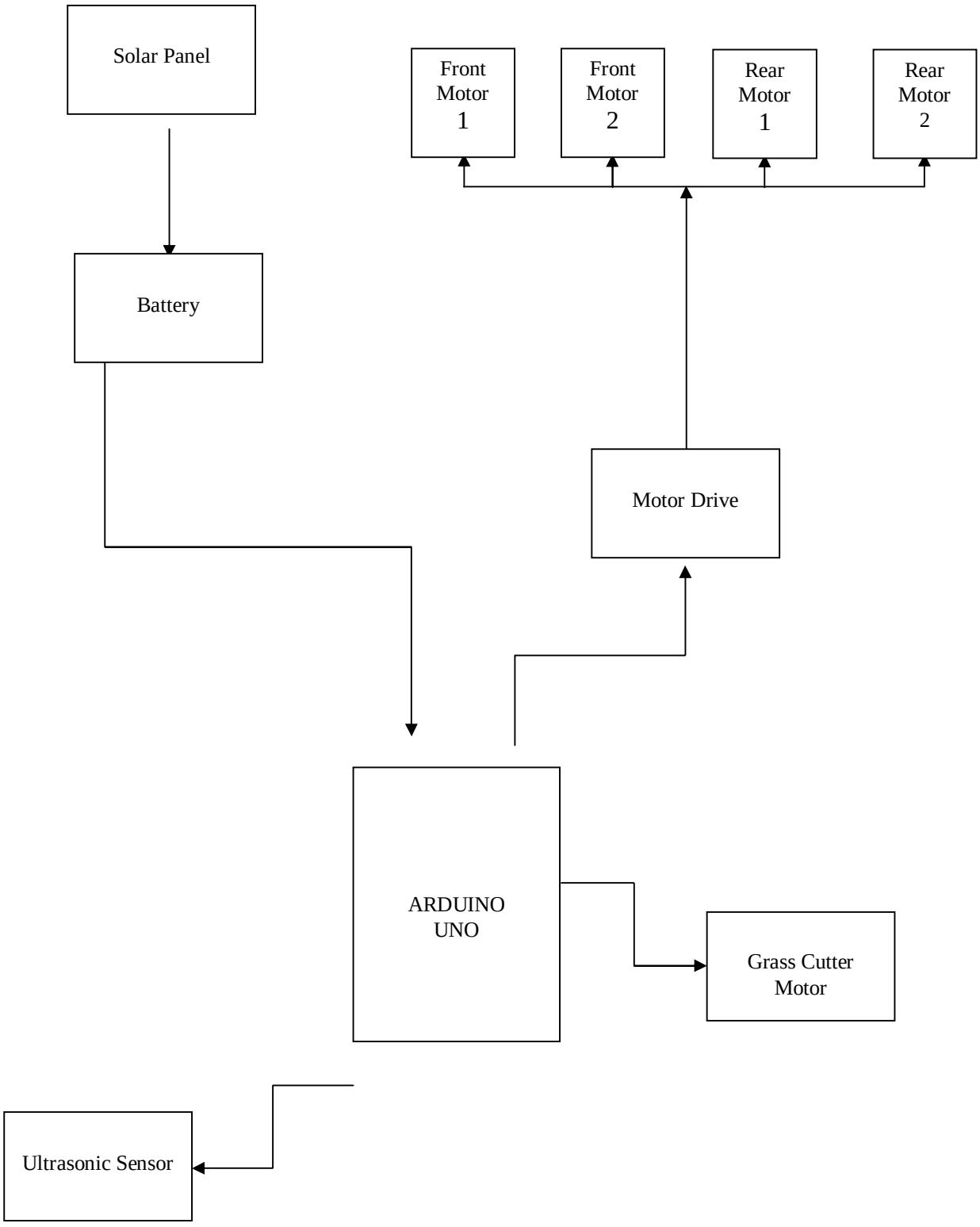

Fig. 3 System Architecture

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D. Rack to Mount Solar Panel

The type of rack depends upon where the solar panels will be mounted. The design is done within our specific panel dimensions, modifications can be done to accommodate other panel sizes. Some factors that were taken into considerations like-

1) Ensuring steady positioning.
2) The height from the ground.
3) The weight and strength of the materials used.
4) The corrosion resistance of the materials.

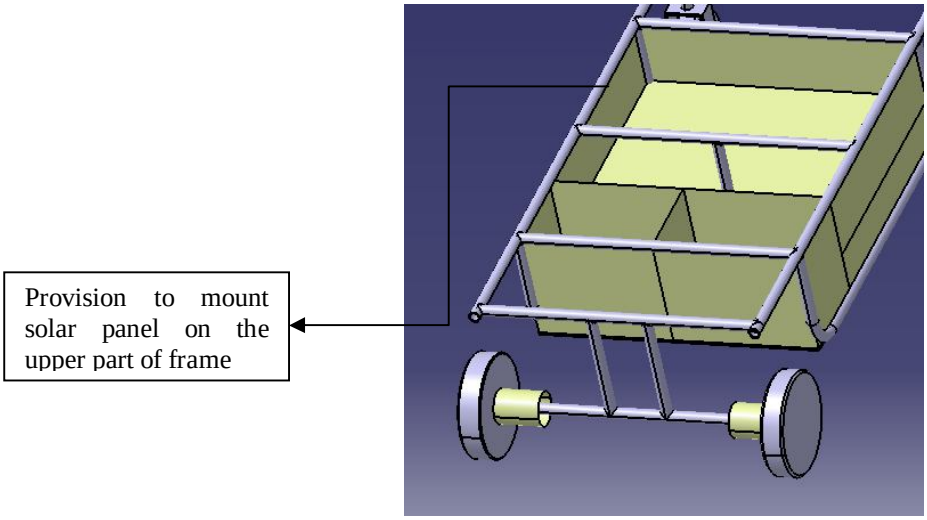

Fig. 4 Solar Panel Mounting

V. SYSTEM FEATURES

A. Quiet Working Environment With Electric Cutter Motor And Solar Energy

Absolutely there no need to convince anyone of the fact that it is much easier to focus on a task in a quiet room, rather than in a loud one.

B. Zero emissions and zero waste of conventional sources.

As there is no use of any fuel run engine, there is no waste products that pollute the environment or disrupt the climate.

C. Low Maintenance and Ease to Human.

It requires very little time, money, and effort to look after there is no need of regular maintenance and is friendly to handle.

D. Electrical Charging also Present if Required..

It can also be charged with the use of power cables if there is no effective sunlight to charge the battery or during rainy seasons. hence the grass cutter is provided with two way charging points.

E. Easy to move From One Place to Another Place for Cutting.

It is light in weight and hence is easy to carry from one place to another and also requires less place to store.

F. Operating Principle is Simple, Totally based On Motor Speed.

Grass cutter operation depends totally on the motor we are using. The motors used are of high torque which provides better traction control on off roads.

G. Non-skilled Person can Operate this Cutter Limitations.

There is no need of any skills before operating this cutter vehicle as it has only one thing to consider is the switch position in order to ON / OFF the switch.

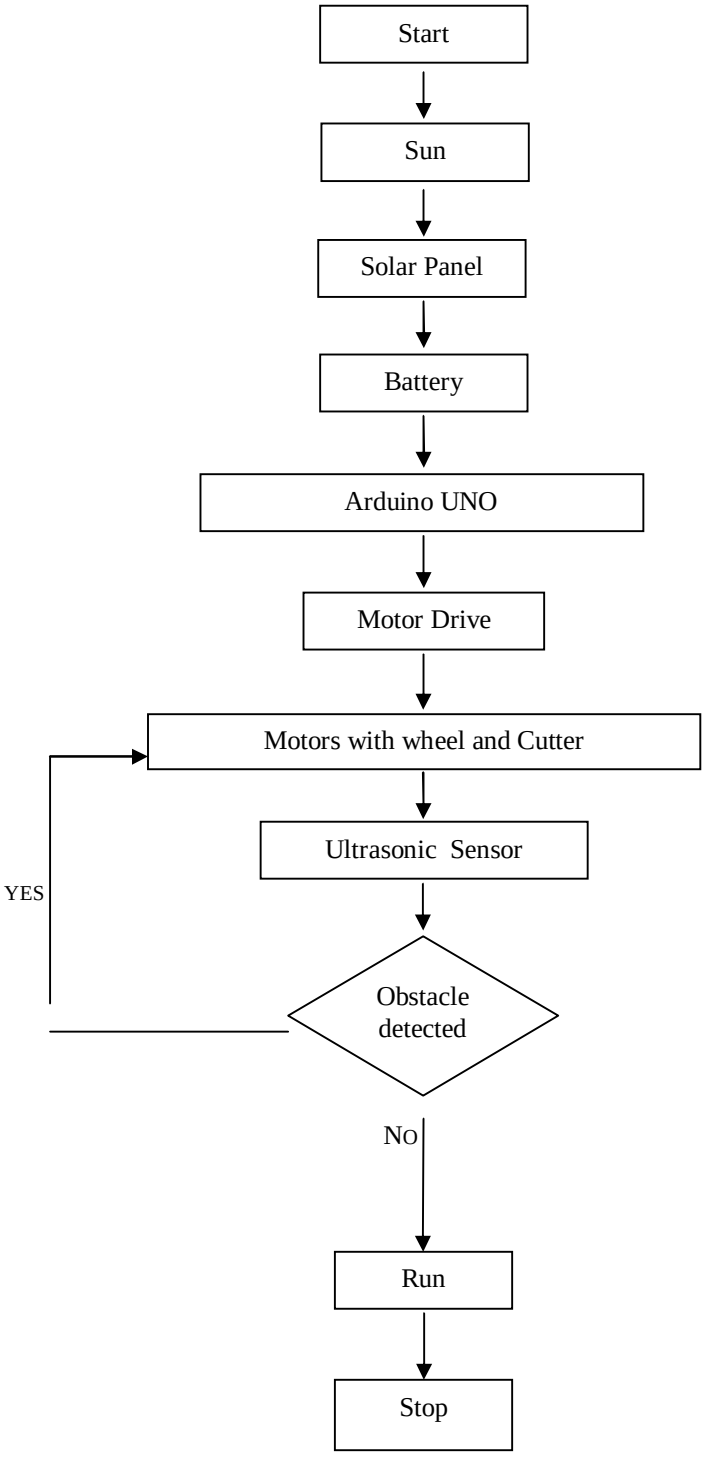

Fig. 5 System Flowchart

VI. CONCLUSIONS

This system is additional appropriate for a standard man because it has way more blessings i.e., no fuel value, no pollution and no fuel residue, less wear and tear thanks to less variety of moving parts and this will be operated by mistreatment alternative energy. It are often simply handled. This method has facility of charging the batteries whereas the star battery-powered grass cutter is in motion. Therefore it's way more appropriate for grass cutting conjointly. Constant factor are often operated in already dark conjointly, as there's a facility to charge these batteries in day light-weight.

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VII. FUTURE WORK

This the system will persuade be value effective and not location homeward with the employment completely different technologies and devices then the system are often simply reborn to run on a application which will facilitate any chase the world, moisture, height of grass, speed of motors, battery juice, etc. Analysis may be disbursed on the collected information from the work incontestable for this device, the particular implementation in programming which will even be improved. The program and also the external look are often created a lot of pleasing to the purchasers, a graphic designer is also needed for this half. Because the code is written in C it implies that most of the most program can still work once ported, counting on the chip design.

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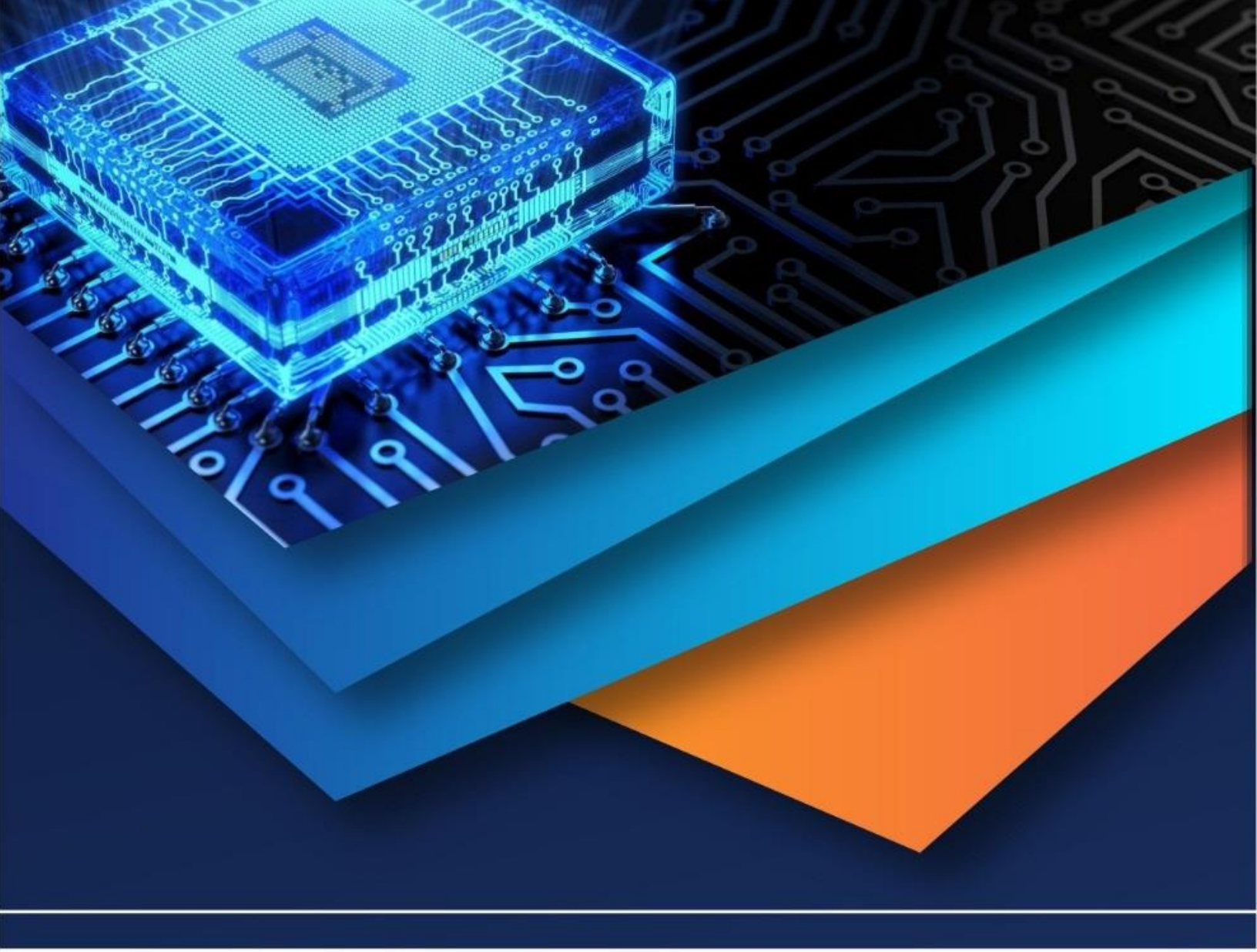

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