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A Review Paper on Design and Fabrication of Solar Operated Automatic Grass Cutter

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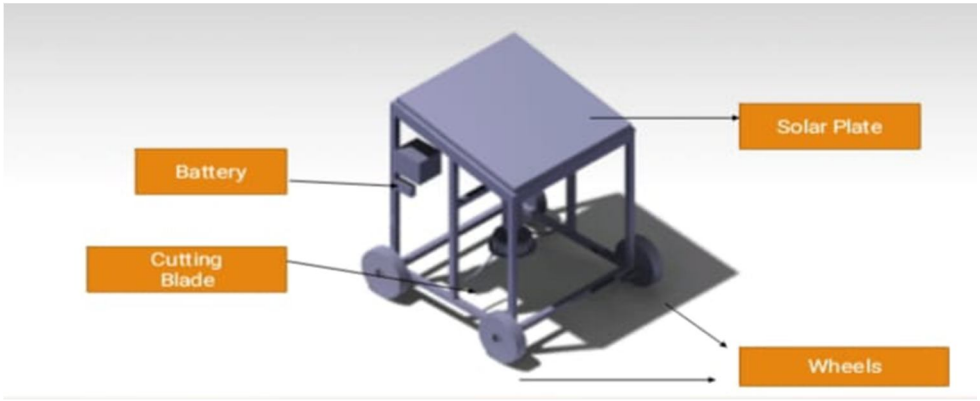
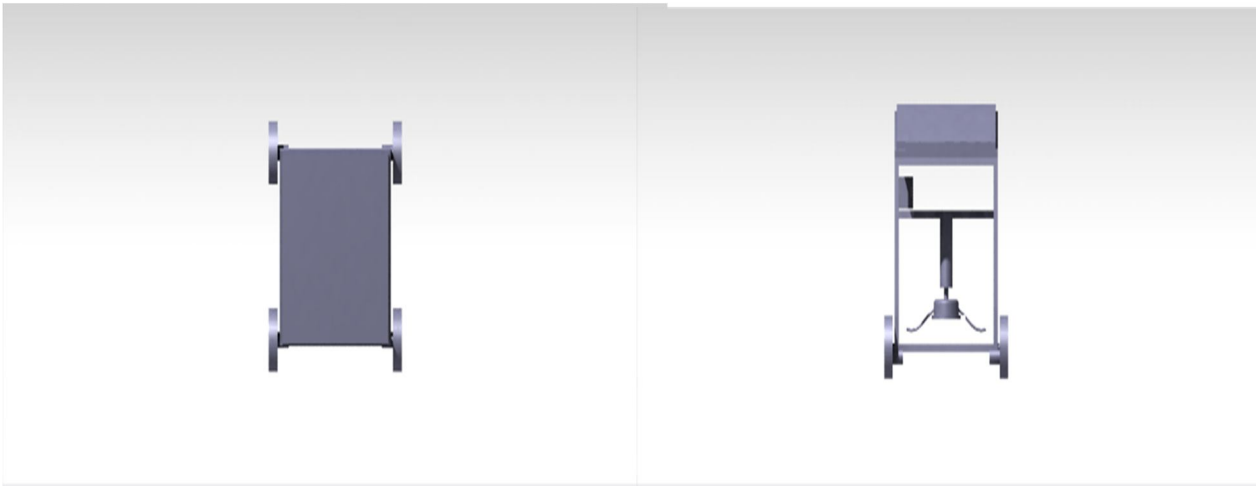
Abstract: ***A solar grass cutter could be a machine that uses rotating blades to cut a field. Power consumption becomes essential for future. Solar grass cutter could be a terribly helpful device that is incredibly simple in construction. We have made some changes within the existing machine to make its application easier at reduced price. Our main aim in pollution management is earned through this. The paper deals with solar grass cutter employed to chop the various grasses for the various application. Solar grass cutter could be a terribly helpful device that is incredibly simple construction. We have made some changes within the existing machine to make its application easier at reduced price. Our main aim in pollution management is earned through this. Unskilled person will operate simply and maintain the grass. The paper deals with solar grass cutter are employed to chop the various grasses for the various application.***

I. INTRODUCTION

Moving the grass cutters with a customary motor gives inconvenience, and nobody takes pleasure in it. Cutting grass can't be simply accomplished by old, younger, grass cutter moving with engine produce sound pollution because of the loud engine, and gives pollution because of the combustion within the engine. Also, a motor supercharged engine needs periodic maintenance like dynamical the engine oil. Even if electrical solar grass is environmentally friendly, they can also be associate inconvenience.

II. CAD DESIGN





III. CALCULATIONS

1) Wheel Calculation

Motor= 60 rpm [Johnson Gear Motor]
Mass= 6.80 KG
Acceleration due to gravity= 0.9144 m/sec^2
Force= Mass× Acceleration due to gravity
= 6.80× 0.9144
Force= 6.74 N
Force per wheel (having four wheels & motors)
= 6.74/4
Force= 1.686 N (Per wheel)
Torque= Force ×Distance→ (Wheel Radius)
= 1.686 ×0.0508 diameter=2×0.0508→ ϕ=0.1016 m
Torque= 0.0856 Nm
→The required Torque on each wheel is 0.0856 Nm.
Total torque= 0.0856 × 4 wheel
= 0.3439 Nm
0.0349 which is less than 0.7845 Nm.
→Design is Safe.

2) Blade Dimensions

Radius of the Blade= 1.5 cm= 0.15 m
Length= 30cm= 0.3 m
Thickness= 3mm =0.03m
Breadth= 3mm
Motor Speed= 5000 RPM
Density of wire rope blade= 11.40 Kg/m^3
Acceleration due to gravity= 9.81 m/sec

3) Area of the Blade

A= Length× Breadth
= 0.3 ×0.03
A= 9×10^{-3} m^2
V= Area thickness
= $9\times10^{-3}\times0.03$
V = 2.7×10^{-4} m^3

4) Mass of the Blade

Mass= Density× Volume

$= 1140 \times 2.7 \times 10^{-4}$

Mass= 0.3078 Kg

Weight= Mass× Acceleration due to gravity

= 0.3078×9.81

Weight= 3.02 N

Torque= Radius of blade× Weight of blade

= 0.15× 3.02

Torque= 0.45 Nm

To determine angular velocity

$\mu = 2\pi N/60$

$\mu = 2 \times 3.14 \times 5000$

$\mu = 523.5$ rad/sec^2

5) To determine power generated by the blade

Power= Torque× Angular Velocity

= 0.45× 523.5

Power= 0.235 KW

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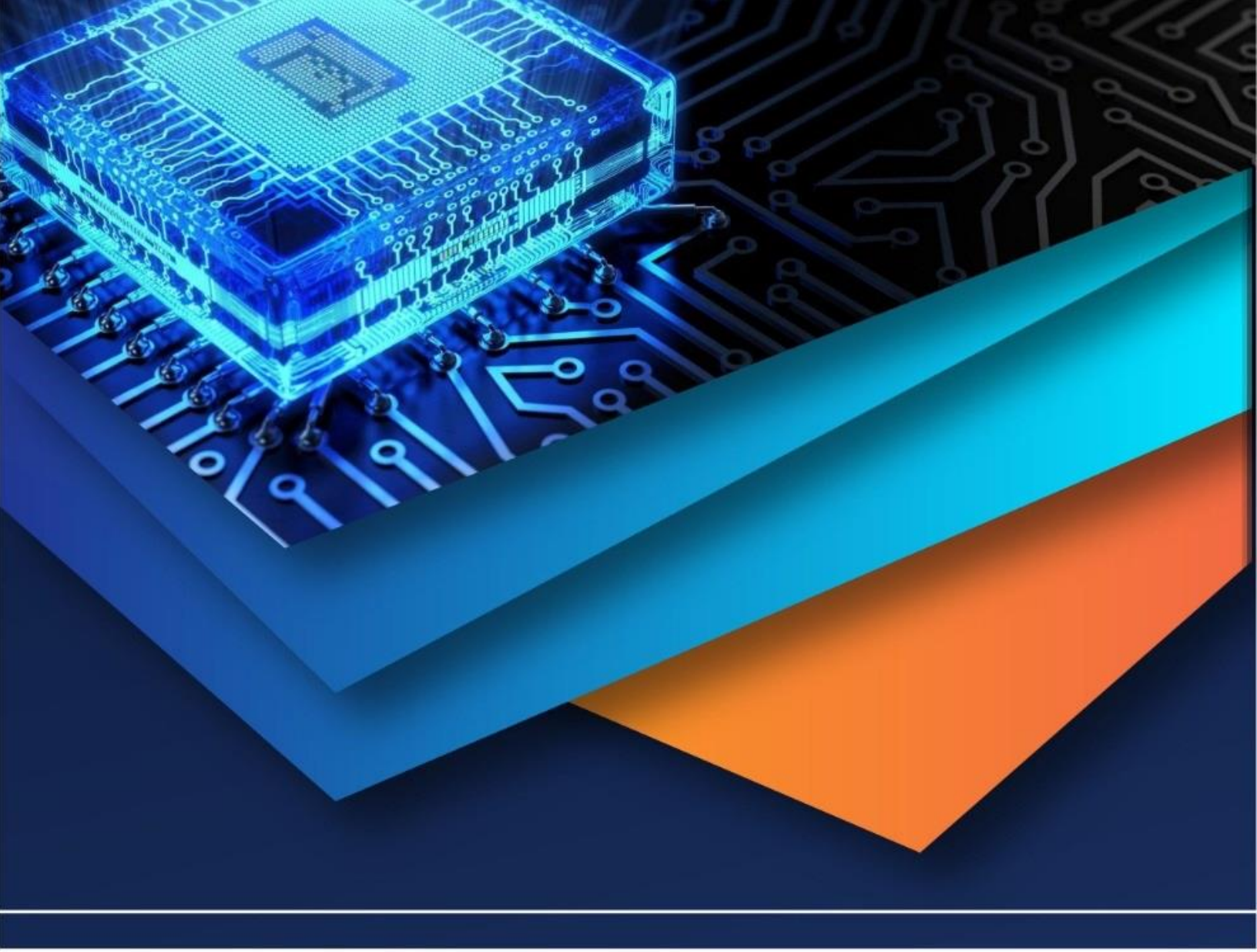

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