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Design of Automatic Seed Feeding Machine

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Abstract: The present review provides brief information about automatic seed feeding machine. The basic objective of seed feeding machine is to inseminate seeds at a required depth with certain spacing and covering the seeds with the soil with the help of closing jaw which is fixed at the rear side of the machine and simultaneously gushing water on the seeded part of the ground .Therefore a wide area can be seeded with low input cost and the time required for this process is comparatively less.
Keywords: Inseminate, Gushing, transmission belt,Seed Sowing, Ploughing, Hopper, Camshaft and Triangular Side Plates.

I. INTRODUCTION

Agriculture has a significant role in the socio-economic fabrics of India. As per the world ranking for population India ranks second. So, there is a greater need for multiple cropping in the farms and these in turn efficient and time saving machine. Thus this automatic seed feeding machine fulfills the above cited requirements. As Agriculture is the back bone of Indian economy. In India around 70% of the population earns its livelihood from agriculture.

It is an important source of raw material for many agro based industries. India's geographical condition is unique for agriculture because it provides many favorable conditions such as plane areas, fertile soil, long growing season etc.The Indian agriculture is going through a constant process of learning aimed at conquering nature. The Indian agriculturalscientist and farmer are telescoping into a few brief year's achievements which have taken decades or even centuries to accomplish in the agriculturally advanced countries.

So this project helps to minimize the human efforts involved in plantation and save the time. This will give perfect plantation with less effort.

II. PRESENT SITUATION

A. Present Methodology

To get a good crop farmers have to follow a number of steps like ploughing, sowing, watering, harvesting, and storing the crop. Ploughing is the digging up of soilto prepare it for growing crops.

It is done with the help of the plough which is pulled either by animals or by tractors.Nursery is the part of agriculture. So as in farm the feeding of all parts of seeds are not feasible because in the farm proper environment will not present, the wastage of seeds are possible. Also the chances of falling of unnecessary seeds during sowing are possible. Hence in the nursery by maintaining proper environment required for growing of plants care is taken. After growing of plants those plants are taken and then they are used to plant in farm. For this the plants are produced by using a tray which has number of holes as per the requirements in those whole the coco-peat powder is used to fill half of the hole and is followed by the seeds in those holes. Again the powder is filled. As per requirements of customers the nursery produces different kinds of plants. Now a days in Nursery seed feeding is done manually which affects on productivity of the Nursery.

The seed feeding activity takes more time which results in less plantations of the seeds.Then the weeds are removed with the help of a rake. the soil is broken down into lumps and smoothened with a help of a harrow. Once the soil is ready different crops are grown. Healthy and ripe seeds of the best variety are selected and sown.crops grow well if they get the right amount of water at right time. watering can be done by several ways. The soil is made more fertile by adding manure or fertilizer to it. Manure is obtained from animal and plant waste.Protecting the growing crops from diseases and harmful insects is done by spraying insecticides and pesticides.it is very important to store the harvested crops properly. Now a day's seed feeding in Nursey and on the agriculture field is done almost manually which effects productivity of the crop.As this manual method requires more time which Inturns reduces plantation of seed .Therefore,agriculture rate increases then economy of the country rises as agriculture activity is the backbone to the Indian economy.

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III. AUTOMATIC SEED FEEDING MACHINE

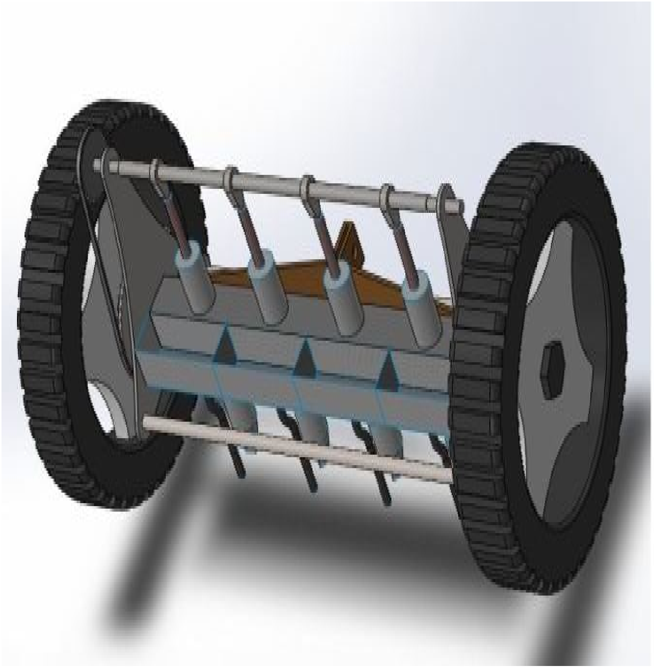

Fig.4.Automatic Seed Feeding Machine

As the whole assembly is mounted on the frame hence it should be rigid and having more strength to withstand forces. The materials suitable for automatic seed feeding machine are mild steel and galvanized iron. The frame consists of two triangular side plates which is mounted adjacent to the wheels as shown in figure 5.

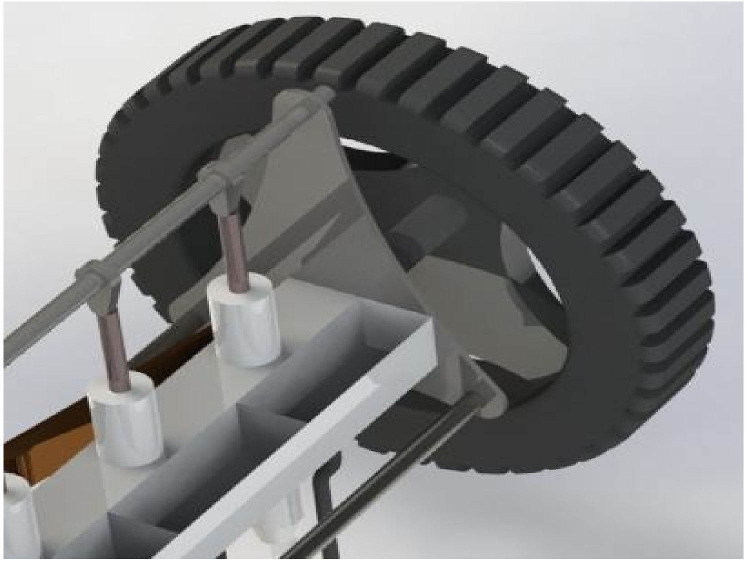

Fig.5.Arrangement of Side Triangular Plates and Wheel

In between the two triangular side plates placed oppositely at a certain distance, four hoppers are arranged with equal spacing connected to the camshaft which is operated by the rotation of wheel for sowing the seeds. Separate opening is provided at the top of each hopper for the storage of seeds. A water storage tank is installed at the rear end of the machine which is operated after sowing the seeds. Plough is connected to the bottom end of the hopper which is used to retain back the soil.A tow hinge assembly is provided to link up with other vehicle or animals etc.

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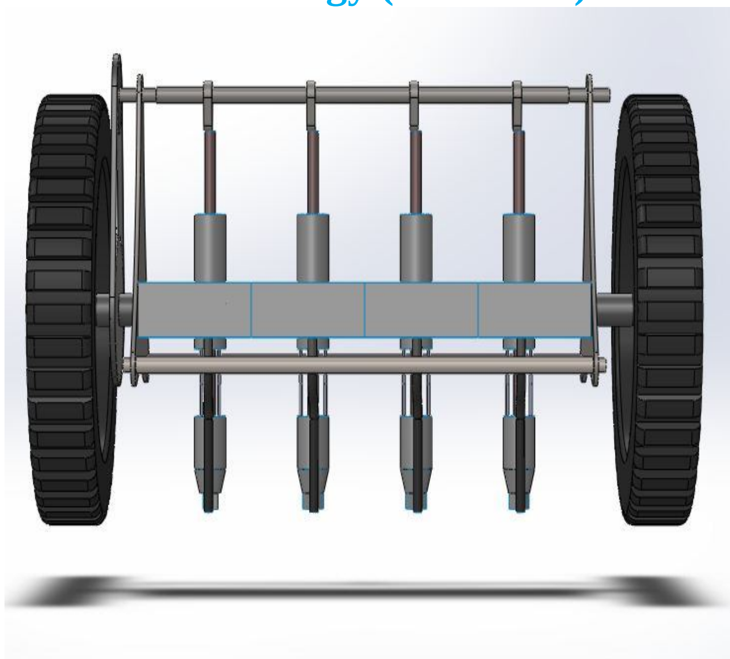

Fig.6. hopper arrangement(rear side view)

IV. SPECIFICATION

The complete dimensioning of Automatic seed feeding machine is shown in the figure below:-

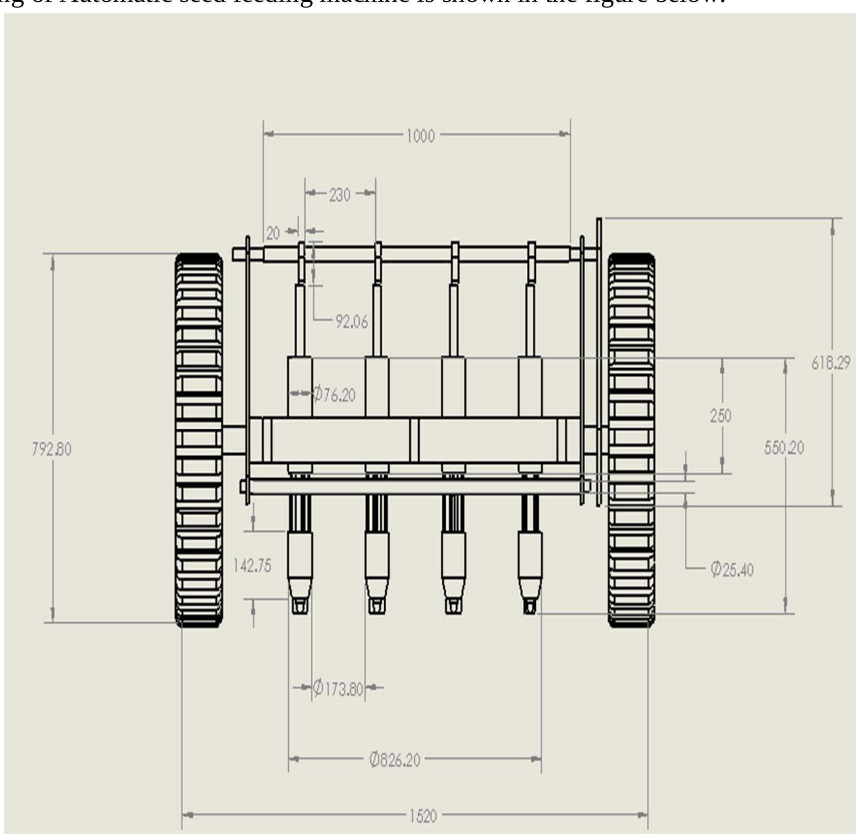

Fig.7.Dimensions of Automatic seed feeding machine

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PART NAME	QUANTITY	MATERIAL	DIMENSIONS (mm)
WHEEL	2	MILD STEEL	Ø799
TRIANGULAR SIDE PLATE	2	MILD STEEL	THICKNESS=10
HOPPER	4	MILD STEEL	DIA=173 LENGTH=250
CAM	4	CAST IRON	THICKNASS=20
TRANSMISSION BELT	1	RUBBER	THICKNESS =10
DISTANCE BETWEEN TWO HOPPER	-	-	250
WATER TANK	1	STEEL	180*100*100
CAM SHAFT	1	CAST IRON	Ø92,L=100

Table 1.description of machine

V. CONCLUSION

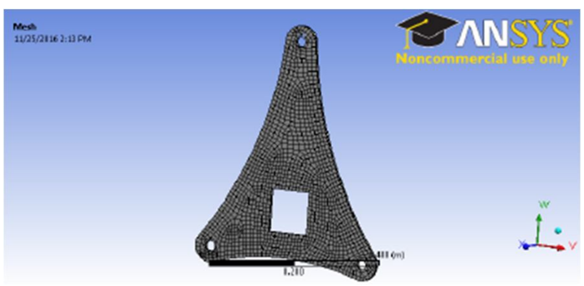

Fig.8.Side plate

Object name = Side plate
Bonding box:
Length X = 0.47588m
Length Y = 0.57616m
Length Z = 1.e-002m
Properties:
Volume = 1.1355e-003m^3
Mass = 8.914kg
Centroid X = -19368e-017m
Centroid Y = 7.2079e-002m
Centroid Z = 5.e-003m
Moment of inertia Ip1 = 0.1987kg-m^2
Moment of inertia Ip2 = 9.0129e-002kg-m^2
Moment of inertia Ip3 = 0.27985 kg-m^2

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Nodes = 15074
Elements = 2566

Static Structural:
Physical type = Structural
Analysis type = Static Structural
Environmental temperature = 22.c

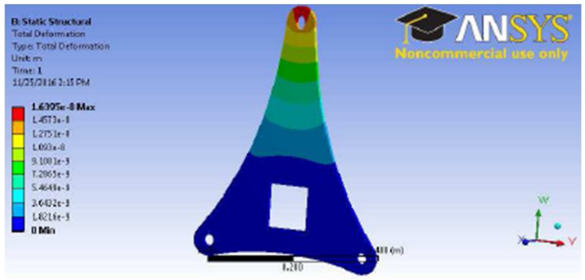

Fig.8.1.Side Plate Mesh

A. Static structural Result

Table 2.Static Structural Result

Type	Total deformation(m)	Equivalent stress(pa)
minimum	0.3	0.28727
maximum	1.6395e-008	34969

Density = 7850kgm^-3
Coefficient of thermal expansion = 1.2e-005c^-1
Specific heat = 434jkg^-1c-1
Resistivity = 1.7e-007ohm m
Compressive yield strength pa = 2.5e+008
Tensile yield strength pa = 2.5e+008+tensil ultimate strength pa = 54.6e+008

B. Isometric Elasticity

Table 3.Isometric Elasticity

Young modules (pa)	Poisson's ratio	Shear modules (pa)	Bulk modules (pa)
2.e+011	0.3	1.6607e+011	7.6923e+010

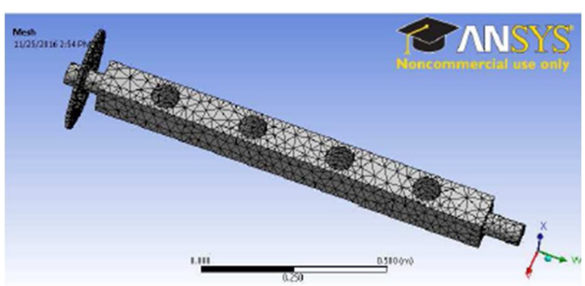

Fig.9.Centre square rod

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Object name = Centre square rod

C. Bonding box

Length X = 0.27843m
Length Y = 1.3m
Length Z = 0.27843m

D. Properties

Volume = 1.0271e-002m^3
Mass = 8.624kg
Centroid X = -2.0896e-017m
Centroid Y = -3.0931e-002m
Centroid Z = -3837e-018m
Moment of inertia Ip1 = 10.681kg-m^2
Moment of inertia Ip2 = 0.16787kg-m^2
Moment of inertia Ip3 = 10.688kg-m^2
Nodes = 9490
Elements = 4675

E. Static Structural

Physical type = Structural
Analysis type = Static Structural
Environmental temperature = 22.c

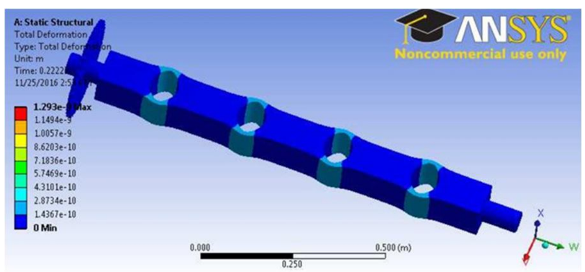

Fig.9.1.Centre square rod Mesh

F. Static structural Result

Table 4.Static Structural Result

Type	Total deformation(m)	Equivalent stress(pa)
Minimum	0	0.2696
Maximum	1.293e-009	4611.5

Density = 7850kgm^-3
Coefficient of thermal expansion = 1.2e-005c^-1
Specific heat = 434jkg^-1c-1
Resistivity = 1.7e-007ohm m
Compressive yield strength pa = 2.5e+008
Tensile yield strength pa = 2.5e+008+tensil ultimate strength pa = 54.6e+008

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G. Isometric Elasticity

Table 5.Isometric Elasticity

Young modules (pa)	Poisson's ratio	Shear modules (pa)	Bulk modules (pa)
2.e+011	0.3	1.6607e+011	7.6923e+010

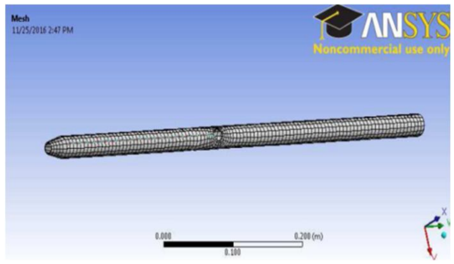


Fig.10.Seed Feeding Rod

Object name = seed feeding rod

H. Bonding box

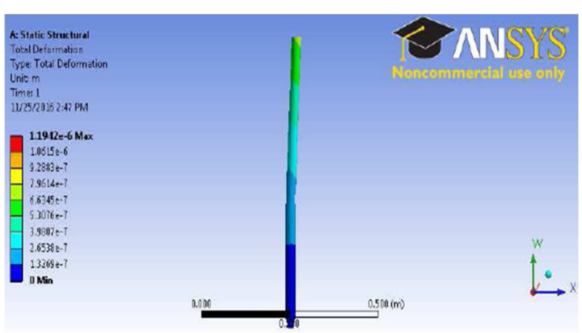
Length X = 2.56e-002m
Length Y = 0.70565m
Length Z = 2.56e-002m

I. Properties

Volume = 5.6675e-005m^3
Mass = 0.4449kg
Centroid X = 3.5418e-008m
Centroid Y = 5.9352e-002m
Centroid Z = -3.7262e-005m
Moment of inertia Ip1 = 1.854e-002kg-m^2
Moment of inertia Ip2 = 7.1091e-005kg-m^2
Moment of inertia Ip3 = 1.858e-002kg-m^2
Nodes = 1551
Elements = 1539

J. Static Structural

Physical type = Structural
Analysis type = Static Structural
Environmental temperature = 22.c



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K. Static structural Result

Table 6.Static Stuctural Result

Type	Total deformation(m)	Equivalent stress(pa)
Minimum	0	17374
Maximum	1.1942e-006	2.0351e+006

Density = 7850kgm^-3
Coefficient of thermal expansion=1.2e-005c^-1
Specific heat = 434jkg^-1c-1
Resistivity = 1.7e-007ohm m
Compressive yield strength pa = 2.5e+008
Tensile yield strength pa = 2.5e+008+tensil ultimate strength pa = 54.6e+008

L. Isometric Elasticity

Table 7.Isometric Elasticity

Young modules (pa)	Poisson's ratio	Shear modules (pa)	Bulk modules (pa)
2.e+011	0.3	1.6607e+011	7.6923e+010

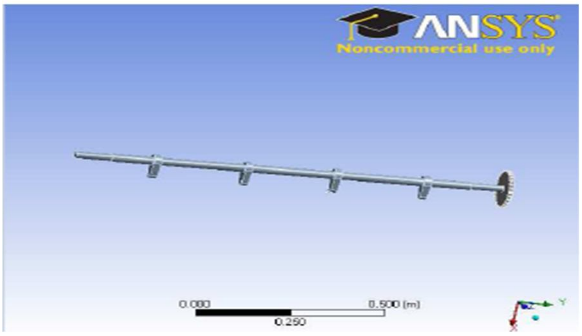


Fig.11.Cam Shaft

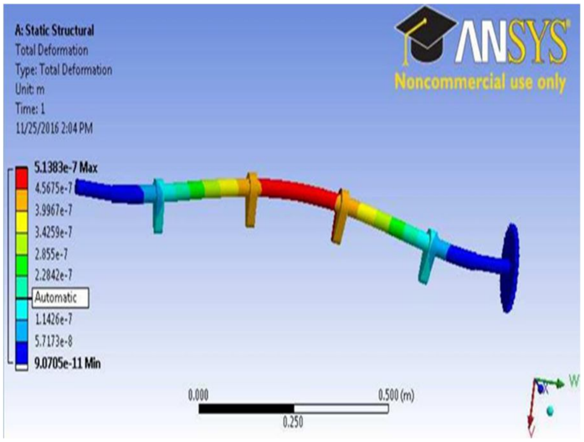
Object name = Cam shaft

M. Bonding box
Length X = 0.14406m
Length Y = 1.2m
Length Z = 0.14482m

N. Properties
Volume = 1.1582e-003m^3
Mass = 9.022kg
Centroid X = 3.857e-003m
Centroid Y = 7.2139e-002m
Centroid Z = 6.2773e-018m
Moment of inertia Ip1 = 1.1689kg-m^2
Moment of inertia Ip2 = 5.1617e-003kg-m^2
Moment of inertia Ip3 = 1.1702 kg-m^2

Nodes = 11332
Elements = 2931

O. Static Structural
Physical type = Structural
Analysis type = Static Structural
Environmental temperature = 22.c



P. Static structural Result

Table 8. Static Stuctural Result

Type	Total deformation(m)	Equivalent stress(pa)
Minimum	3.17e-013m/m	9.0705e-011m
Maximum	2.9525e-007m/m	5.1383e-007m

Density = 7850kgm^-3
Coefficient of thermal expansion = 1.2e-005c^-1
Specific heat = 434jkg^-1c-1
Resistivity = 1.7e-007ohm m
Compressive yield strength pa = 2.5e+008
Tensile yield strength pa = 2.5e+008+tensil ultimate strength pa = 54.6e+008

Q. Isometric Elasticity

Table 9.isometric Elasticity

Young modules (pa)	Poisson’s ratio	Shear modules (pa)	Bulk modules (pa)
2.e+011	0.3	1.6607e+011	7.6923e+010

Hence the method of seed feeding fulfills the existing limitation it includes: -
To reduce seed sowing time
To give equal depth to all the seeds
Equal spacing between the corresponding seeds.

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To bring down manual efforts.
Less cost of feeding as compared to manual seed feeding cost
To increase productivity
increase efficiency
No separate irrigation method is required

V. ACKNOWLEDGEMENT

It gives us immense pleasure to present our research paper titled “DESIGN of AUTOMATIC SEED FEEDING MACHINE”. We are thankful to our honorableResearch and development Director Dr Mohammed Masood and HOD Dr Syed Azam Pasha quadri Department of Mechanical engineering LORDS institute of engineering & technology Hyderabad for his support and encouragement.

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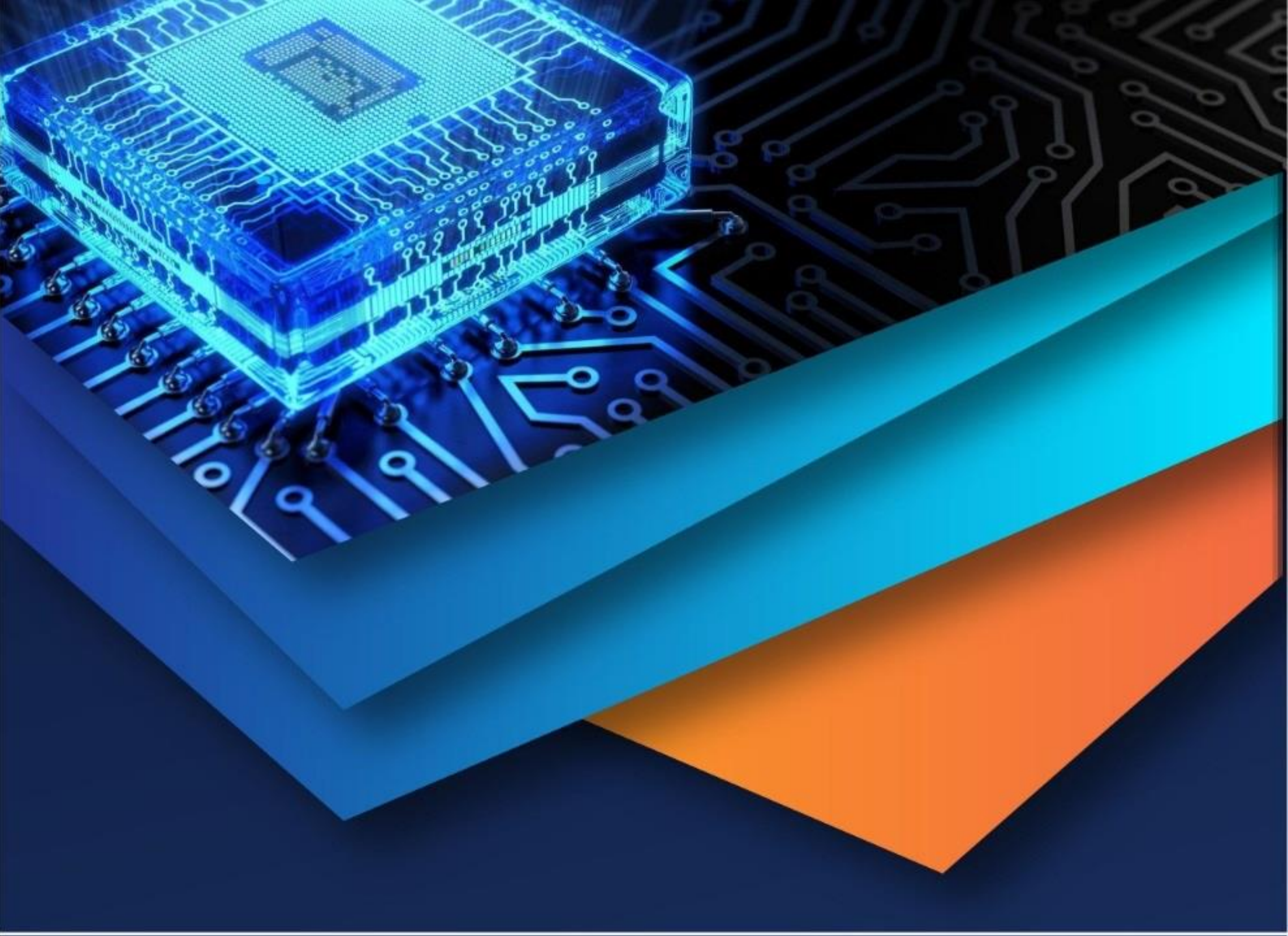

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