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Automatic Controlling of Fish Feeding System

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Abstract: This paper proposes the design of automatic fish feeder system using raspberry pi.The Fish owners of the pet fish are usually distressed when they are away from home environment because they could not feed the fish on time. Both reasons, food starvation and overfeeding risk the health of fish and leads to poor water quality in indoor fish tanks. Thus monitoring the fish feeder is of great importance which can be very beneficial for the fish owners. This work is aimed to design a fish feeder system using microcontroller and Raspberry Pi based web application to relax the distressed fish owners in feeding their fish on time. This system is designed to overcome the problem of fish dying due to fish feeder malfunction. With this design, the fish owner can monitor the fish tank for correct functioning of the fish feeder. Also, the user can set schedules for feeding the fish through the web application.
Keywords:Raspberry Pi 3,Web Interface, DC Motor, L293D Driver, Camera.

I. INTRODUCTION

An automatic fish feeder is an electronic device that is designed to feed fish at regular intervals. They are often used when the fish's owners is on vacation or too busy to maintain a regular feeding schedule. However, this device does come with their own drawback. Most automatic fish feeder had problem of controlling the amount of fish feed released. Too much and it will pollute the water in the tank and too little will led to starvation. Another drawback is the lack of monitoring and instant feedback from the fish feeder. Due to this, the fish owners are unaware of the problems with their fish or if their feeder malfunctions. As such, this paper is designed to overcome previous systems' flaw and give more advantages and benefits to the fish owner. In this work, the user has the ability to customize the feeding time or choose to feed their fish immediately without any preset schedule. Also, since the Raspberry Pi is connected to the internet, they also can check their fish condition and make sure the food disperse properly. The Raspberry Pi also allowed the user to check their previous feeding status. The proposed system will help the user feeding their fish every day, even when the user is far from their home.

There are certain drawbacks that exist in the current automatic fish feeder. One of the problems of most fish feeders was their inability to check their feeder function and the risk of returning to dead fishes due to malfunction on the feeder machine. The other drawback is, where the fish feeder feed the fishes too less or too much amount of food, thus risking the fish health from starvation or overfeeding. There are two main problems identified in most of the fish feeding systems as listed below.

A. Quantity of food dispersed: Each automatic fish feeder has different amount of food to be dispersed to fish. This could lead to overfeeding or sudden starvation. The excess food could pollute the fish tank and can cause harm and health problems to the fish.

B. Lack of real-time monitoring: Some fish owners might be away from the fish for a long period of time. In such situations, the fish owners will not have any idea about the condition of their fish. This might lead to unawareness of the problems that occurred in home such as their feeder malfunction or sudden changes in the behaviour of fish.

II. LITERATURE SURVEY

In [4]The development of automatic fish feeder system using arduinoUNO ,the increase in growth of fish farming/aquaculture has led to a lot of research work in this field. Management of food delivered plays an important role here. The purpose of this research is to reduce the manual work and save labour time through making system automated. This is related to a system device which feeds the fishes with predetermined amount of food at the decided time. The principle of the working model is based on controlling the amount of food fed in the fish tank unit at different intervals of time. The prototype which is a combination of mechanical and electrical devices, uses the concept of step wise rotation of stepper motor for giving precise amount of food output in proper time thus, saving labour time . This helps in order to get good spreading of food across the water body and by own it feeds the fishes after

a day, thereby making the system reliable and accurate. The fish feeder system prototype is the technique which can be used in the aquaculture or fish farming if implemented on large scale.

III. PROPOSED DESIGN METHODOLOGY

The proposed method for the Automatic controlling of fish feeding system is illustrated in the below figure.

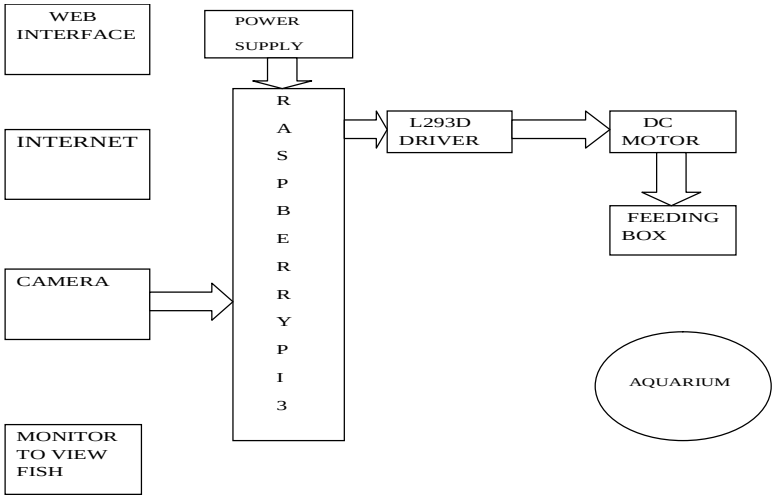

Fig. 1 The proposed method of Automatic controlling of fish feeding system

The supply of 5Volt DC is given to the system which is converted from 230Volt AC supply. Firstly, the step down transformer will be used here for converting 230Volt AC into 12Volt AC. The microcontroller will support only the Direct Current supply, so the Alternating Current supply will be converted into DC using the bridge rectifier. The output of rectifier will have some ripples so we are using the 2200uf capacitor for filtering those ripples. The output from the filter which is given to the 7805 voltage regulator which will convert the12Volt Direct Current into 5Volt DC. The output from the regulator will be filtered using the 1000uf capacitor, so the pure 5Volt DC is getting as the output from the power supply unit. The raspberry pi 3 microcontroller is capable of getting the supply of 5Volt DC so we have to convert the 230Volt AC supply into 5Volt DC supply. The web interface is design to have a user interface that the user can send command to the fish feeder. The user sends the command by pressing the input button for each fish feeder functions. The Raspberry Pi act as the intermediate between the web interface and the fish feeder. The Raspberry Pi will then send the command to the fish feeder. This command is used to control the motor for feeding. The motor can be controlled in 2 ways - manual feed and view/edit schedule. Lastly is the fish feeder module. The fish feeder is hardware that connected to the Raspberry Pi. The fish feeder is made using a plastic container, a dc motor, a web camera.

IV. HARDWARE IMPLEMENTATION

A. Power Supply

The power supply must deliver a constant output regulated supply. A 230V/0-12V (1mA) transformer is used for this purpose. The primary of the transformer is connected through switch for protection. The secondary is connected to the diodes to convert 12V AC to 12V DC voltage. And filtered by the capacitors, which are further regulated to +5v, by using IC 7805.

B. Web Interface

The web interface is design to have a user interface that the user can send command to the fish feeder. The user sends the command by pressing the input button for each fish feeder functions.

C. Camera

A webcam is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet.

D. L293D Driver Circuit

L293D is a dual H-Bridge motor driver, so with one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and if you have motor with fixed direction of motion you can make use of all the four I/Os to connect up to four DC motors.

E. DC Motor

A DC motor is any of a class of rotator electrical machines that converts direct current electrical energy to mechanical energy. A DC motor is an electric motor that runs on DC electricity. It works on the principle of electromagnetism. A current carrying conductor when placed in an external magnetic field will experience a force proportional to the current in the conductor.

F. Feeding Box

The fish feeder is hardware that connected to the Raspberry Pi. The fish feeder is made using a plastic container containing food for the fish.

V. EXPERIMENTAL SETUP AND RESULTS

The experimental consists of raspberry pi 3, dc motor, camera, fish feeding box, an aquarium**.**

Fig. 2 Experimental setup of Automatic controlling of fish feeding system

The feeding is controlled through view/edit schedule and manu]al feed which is shown in below figure

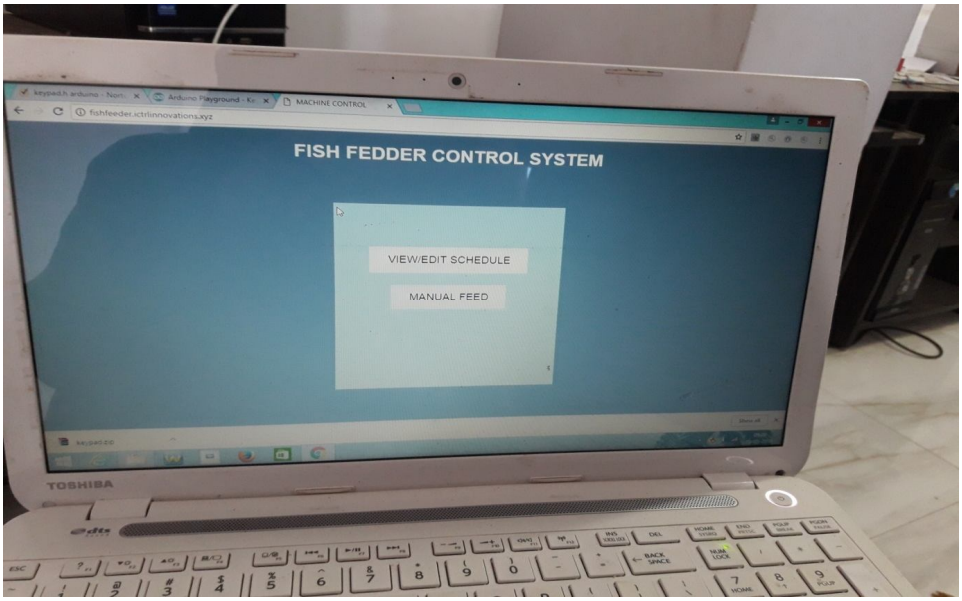

Fig. 3 Feeding control system

The view/edit schedule is used to schedule the time for feeding the fish which is shown below

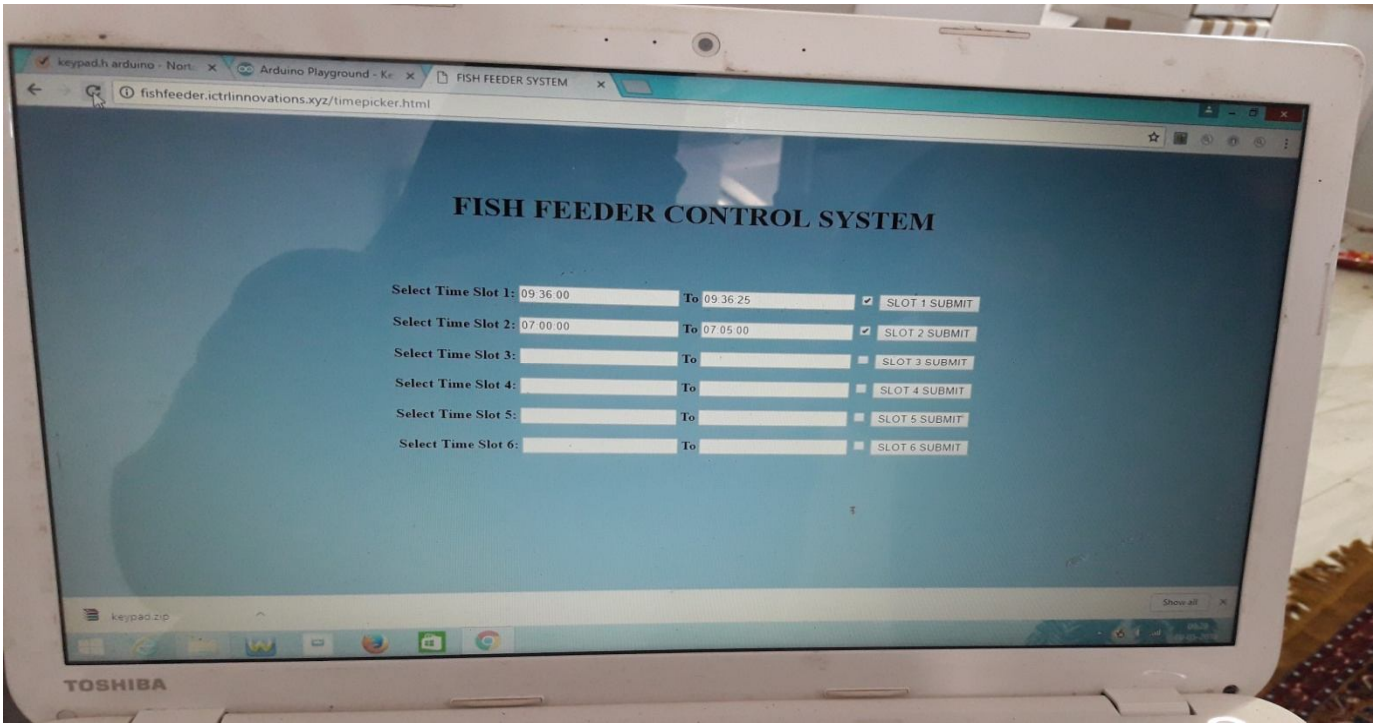

Fig. 4 View/Edit schedule

The manual feeding is done by clicking the motor on and motor off button which is shown in below figure

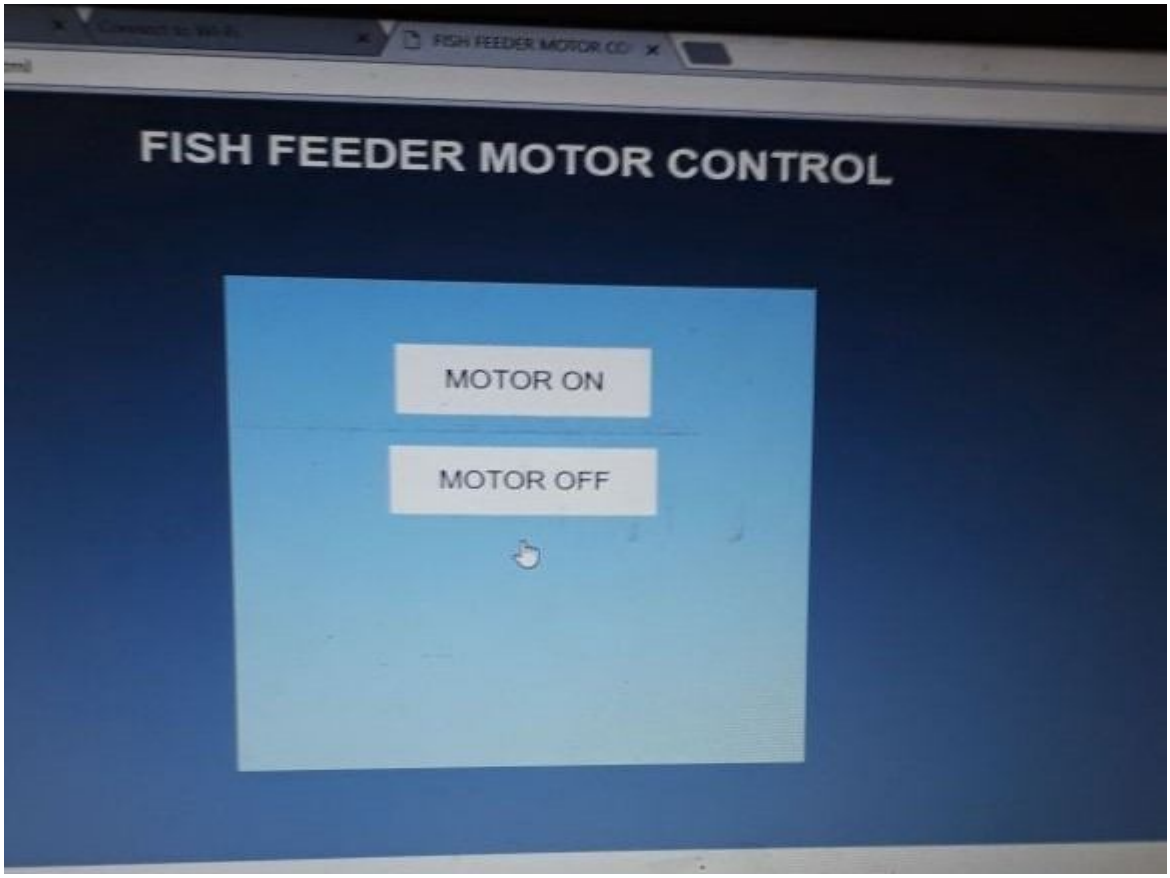

Fig. 5Manual feed

The user can view the status of the fish which is shown in below figure

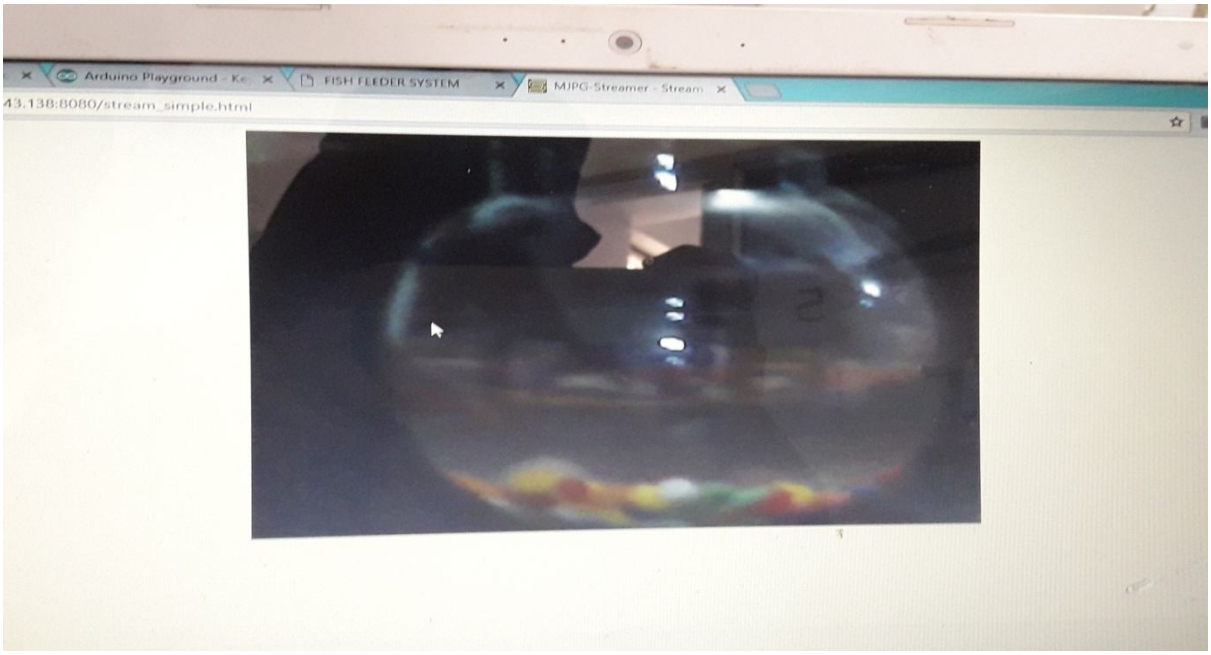

Fig. 6View the fish

VI. CONCLUSION

The automatic fish feeding system using raspberry pi is used to control and view the feeding of the fish. The camera is connected to the raspberry pi to view the status of the fish . This project aims to reduce the overfeeding and starvation problem ,thus reduces the

chances of dying the fish. If the fish is provide with excess food ,the fish tank may get polluted and can cause harm and health issues to the fish. Web page is created to feed the fish. The user schedule time for feeding at regular interval of time and at that particular time the motor starts rotating to feed the fish.

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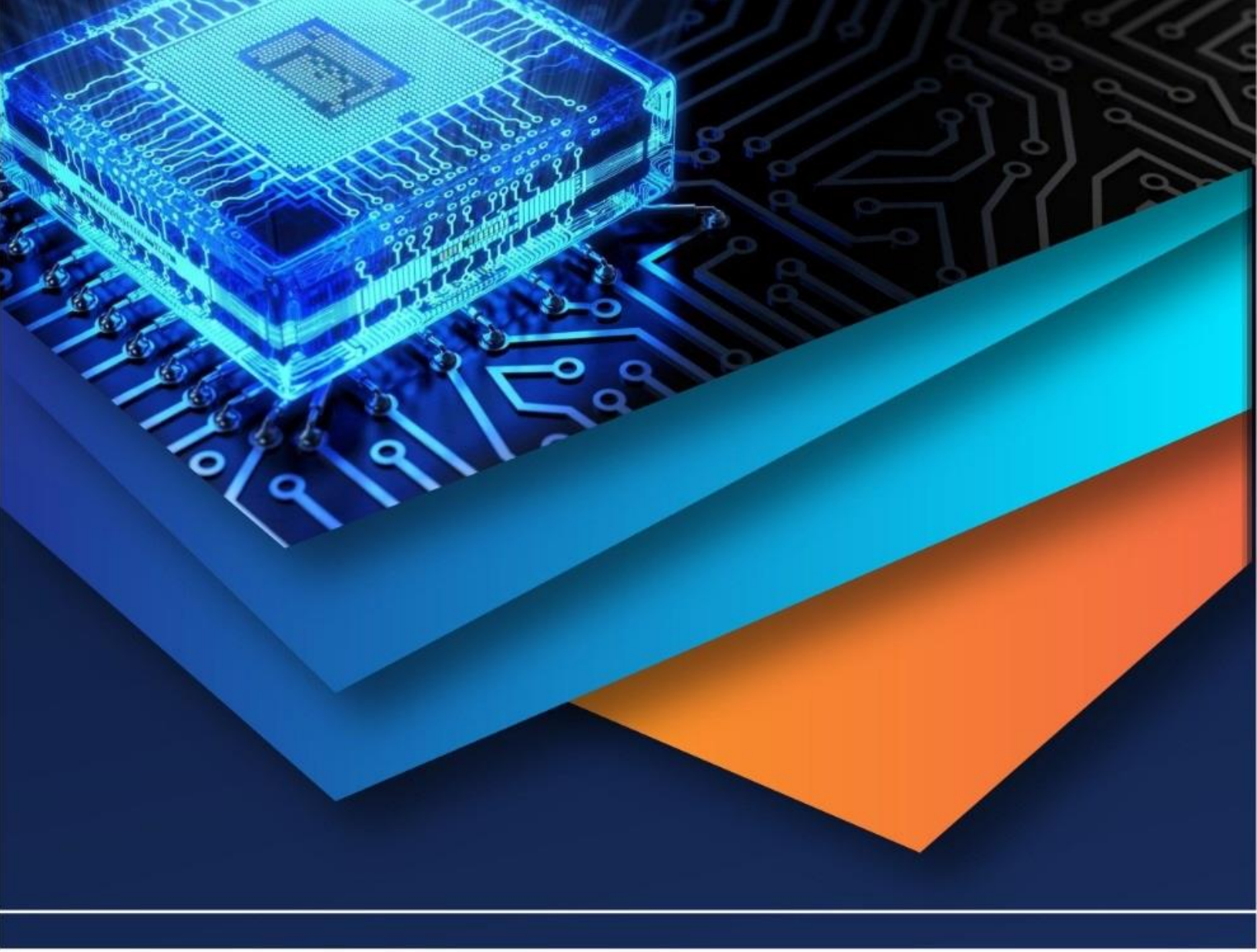

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