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Design and Fabrication of Mutli Drink Vending Machine

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Abstract: ***The design and construction of a multi-drink vending machine is the primary goal of this little project. This machine's function is to offer people a wide variety of goods, including water, drinks, coffee, tea, etc. A machine that can sell things is a vending machine.Different products are being produced in what is more akin to an automated process without the need for man handling that we typically see in busy cities. These systems are now accessible in some of the best-rated restaurants and hotels in India as well as MNCs. In most systems the operation are carried manually by the operator in which the billing and change making is carried out by the \sowner who running the shop or restaurant. There are strict requirements for interactive gadgets used in public settings, including user-friendly interfaces. This model's vending machine is made using plywood, fevicol gum, a DC motor, and other materials. batteries, etc.***
Keywords: Plywood, Gum, DC Motor, Batteries etc

I. INTRODUCTION

"Design and Construction of Vending Machine" is the suggested topic. Often, this machine offers both hot and cold beverages. In the early 1880s, England produced the first sophisticated vending machines. Many locations have vending machines. Together with the multi-drink vending machine, it takes less time but requires more work. The contribution of robots in our daily life is fast expanding day by day as they are starting to replace humans in every day chores. A vending machine that sells hot coffee and other coffee beverages is known as a coffee vending machine. Earlier models included toppings like cream and sugar along with instant or concentrated liquid coffee and hot or boiling water. one among the most popular the most well-liked products available worldwide in vending machines

II. LITERATURE REVIEW

Kedar Shelar et,al [1] says that sugarcane is a major crop in any countries. Sugarcane is most source of sugar in India and holds a conspicuous position as a cash edit. Sugarcane gives crude fabric for the moment biggest agro-based industry after textile. This project aims to design and fabricate small scale sugarcane harvesting machine for sugarcane harvesting to again duce farmer’s effort and to increase production of agricultural products. Machine consists of petrol engine and different mechanisms are used in this machine.

Shivam Singh et,al [2] was proposed studied to save time by 75% to 83%. The aim of this paper is to design a high- tech vending machine that can dispense a variety of products at the same time using finger print sensors and other high technological features for security and user friendliness. The basic design of a vending machine begins with the cabinet, the steel outer shell that holds all internal components and which determines the machine's overall size and shape. Inside the cabinet is a steel inner lining called the tank.

Manish S. Bisen et,al [3] introduced when a coin is deposited into a vending machine, it sells food, drinks, sanitary pads, and other items; simply put, vending machines demand the correct quantity of money for a specific item. Vending machines are commonly seen at hotels, transportation stations, and restaurants and they mostly provide food. The mechanism that receives and determines the value of entered coins is a crucial part of a vending machine. A set of tests Determines the dimensions, weight, electric characteristics, and magnetic properties of the money when it is inserted.

Dipali Bhoyar et,al [4] was proposed this project is about design and working of operation of coin operated vending machine. Vending machines mainly supply food are found in hotels, transportation terminal, and installation. An important component of vending machine is the mechanism that accepts and determines the value of inserted coin.

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When coins or tokens are inserted a series of test determines the dimensions, weight, electric properties, and magnetic properties of the money, a coin or token that fails any test is rejected. If the coin or token is accepted, its value is determined from the data acquired.

T. B. Rajitha et,al [5] says that these days in this fastly moving world, appliances that are automatic are being preferred. This is the biggest advantage of our project. Automated dispensing machines decentralized medication distribution systems that provide dispensing, and tracking of medicines are recommended together as a potential mechanism to enhance efficiency and patient safety, and they are now widely utilized in many hospitals. There is no doubt that these medicine vending machines can improve the efficiency of medication distribution, but their capacity to decrease medication errors is controversial and it depends on many factors, including how users can design and implement these systems.

M.J Rooshan et,al [6] introduced normally, hygienic problems in humans cause due to the local methods of juice preservation (which uses chemicals) and juice extraction (adding preservatives), time and also energy wastage occurs because of the hand squeezing. The developed extractor consist of frame, connecting screw rod, screwjack, pressing mechanism, feeding pot, interlock, receiving pot and discharge mechanism. The process of fruit juice extractor normally involves the crushing of fruits, squeezing it with maximum force and compressing the whole fruit with a maximum pressure in order to obtain the fresh juice without or with fruit bulb/flesh which conventionally reduces the bulkiness of the fruit to liquid of beverages .

Nilani Ratnasri et,al [7] was proposed the Automatic machine operates based on electronics engineering, mechanical engineering, and electrical engineering, which is a collectivity termed Mechatronics. People spend more time buying things in supermarkets as the market is crowded. Hence, it disappoints the customers and it leads to losing income to the vendors. Normally people touch the things (mostly vegetables) to identify their quality. At that time, they can be affected by infectious diseases. Low hygiene and quality of most of the things are finally needed more workers to maintain the quality. Therefore, higher salary which needs to be paid to workers, and there is security issue as most of the customers use the cash payment method. As a result, design of the vending machine is the best solution to avoid these problems. The vending machine is one of these automated machines which supply needed things to the customer.

Eriyeti Murena et,al [8] says that vending machines are available in many public places for vending items like snacks, beverages, newspapers, tickets and smoking cigarettes Recently developed vending machine requires a control system to offer a variety of products to the general public. The machine can also monitor the product availability status and general machine status and alarm the owner and users. Vending machines are not an exception to the need for innovation, high definition, touch enabledscreens, non-cash payment methods, Internet of Things and cloud-based services.

M. Oktaviandri et,al [9] introduced the contribution of machines in our daily lives is swiftly growing day by day as they are starting to replace humans in everyday tasks. Machines can do tasks that might either be impossible for an individual to do or it might take a longer time for them to complete it. Accordingly, machines make human's work easier and more effective. The Ais Kacang vending machine was succesfully fabricated using ranking method selection. This customized Ais Kacang vending machine dispenses the ingredients into a prepared plate. The vending machine consists of dual modes, the automatic and manual mode. Based on this project, this vending machine was designed and developed to introduce a new electrical appliance to this modern world which will help to reduce manpower in producing Ais Kacang.

Ayan Banik et,al [10] was proposed as per the recent report published by WHO, the number of COVID-19 cases surpassed 300,000 globally on 23rd March 2020. ICMR has confirmed more than 500 cases of COVID-19 in India. The vending machines are used to serve or dispense the beverages like drinks etc. The vending machines are used to serve the beverages easily and effective. 11 Due to the passage of time it is proving itself as a slow poison for the whole world. Global agencies should actively come forward in order to exchange their views against this Pandemic. Virologist and scientist are in continues effort in order to introduce the most effective Vaccine to common people, these tasks get more complex due to unwanted mutation of this special species of Virus. It has also been estimated that more than 18 months could have been required to completely get rid of this Pandemic. In this work we have tried to bring forward an all new Portable Integrated Hand Sterilizer and Dispenser to ensure Hand Hygiene and Subsidized Facial Mask which may prove beneficial and may save precious lives.

Vennan Sibanda et,al [11] says that a vending Machine is a customer service machine that operates without the aid of human intervention. It provides different consumer products even diamonds and platinum jewellery to customers, after the vendee inserts currency or credit into the machine using extremely simple steps. It is controlled through a control system which provides a main module, a payment system, a user interface system, a product extraction system and a communication system.

Vaibhav Bisht et,al [12] introduced green buildings form a milestone technology for a sustainable and eco-friendly atmosphere.

A sophisticated process management and control with advanced warning systems and sustainable user-friendly buildings is their existing norm, as per the Indian Green Building Council. With efficient resource utilization and waste management along with different user friendly working systems, these optimized building spaces reduce various utilization costs, parallelly increasing the safety, hygiene, and comfort standards. Their norms for the future eye at a sustainable development scheme using different renewable energy technologies with solar energy having developed as a fast-growing alternative due to its usability in various rural and urban dwellings

A Brolin et,al [13] was proposed an automatic medicine vending machine with a self contained on- site pill dispensing mechanism and a storage facility for the plurality of pills that can be dispensed based on the user requirement. Major components of the machine are, a scanner to take the input from user, a system that includes servo motors for dispensing the medication, large storage space to store the pills, sensors to detect the motion of pills, an inventory monitoring system to keep track of the storage, an industrial standard vertical foam fill machine to pack the medication separately and a non-contact laser inkjet printer to print the description which includes the time at which the medicine must be taken.

A. Krishna Kumar et,al [14] says that the paper describes the modeling of a Finite State based vending machine using the mealy machine model. The proposed machine has been implemented on Spartan3 FPGA development board. The whole design has been functionally verified using Xilinux 9.2i and Modelsim 6.2a simulator. A vending machine is a machine which disapears items such as snacks, beverages, lottery tickets, consumer products to customers automatically after the customer inserts currency or credit into the machine. This paper compares different aspects as timing and device utilization of the proposed machine with the previously proposed machine3. Also the paper indicates a future possibility of a betterment over existing vending machines

Shivaji V et,al [15] introduced during this industrialization vending machines play an important role for fulfilling the process immediate needs of the society. In a challenge to competitive industrial world, a system must be flexible, and cost effective so automation in machines is very much essential. . 13 Juices are like Fanta and Maaza and milk shake and combustion of juice and milk shake in a new approach by implementing automation using PLC. The project also involves the two different mode that are, first mode is normal mode in which it accepts the 5rs coin and gives half filled glass of juice or milk shake or it accept the 10rs coin and give completely filled glass of juice or milk shake. And second mode is Party mode in this mode it just sense the glass & gives completely filled glass of juice or milk shake. The main and most important part is PLC because if we required any change then just by changing the PLC programming whole problem is solveno need to purchasing a new machine.

Susmita Jadhav et,al [16] was proposed the main motive of this project is to design a low cost, effective vending machine. The vending machine can produce different small products like a chocolates, candy, snacks, and cold drinks like soda water, juices, hot drink such as coffee, tea newspapers & stationary. It operates automatically and dispenses different small product so it is called as automatic dispense machine. This machine can implement by using microprocessor, microcontroller, FPGA etc. It has many benefits. Previous microprocessor based vending machines were inefficient as compared to Microcontroller based vending machine. So it is necessary to make it more reliable with efficient algorithm that will be fully commanded .microcontroller based solution. The main purpose of writing this paper was to create a vending machine which could provide Cadbury chocolate to the people using extremely simple steps. We have made an attempt to vend chocolates i.e. Cadbury.

Chandani B. Barad et,al [17] says that coffee is apart of daily routine of people around the world. Everyone want to cup of coffee with their preference. Some people depend on a road side stall to fulfill their requirements. The quality of coffee from these road side stalls is questionable. The cleanliness of utensils used in making coffee cannot be trusted. There is one thing that is virtually impossible to consider are the individual preferences. It is difficult from the road side stalls to fulfill different preferences of different customer. Some would like with sugarand some would like sugar free coffee of the beverages of the vending machines.

Aswathy B et,al [18] introduced the public distribution system (PDS), established by the Government of India under Ministry of Consumer Affairs, Food, and Public Distribution to distribute grocery items to poor people at fair price is facing significant threats to its very existence. These threats starts from the basic issues of renewing the ration card every year which has to be done manually by the employees to the malpractices done by the ration store dealers like diverting food grains to open market to make profits. There is another problem of irregularity in opening shops and false announcements of deficit in food grains. Hence through this paper the idea is to completely automate the rationing system. For simplicity, it is better to implement an embedded system for the same. In the proposed system, the advanced ARM8 (Advanced RISC Machine) processor is used and it is the heart of the system that controls all sub systems like sensor modules, database systems, connected across it.

Rahul Jadhv et,al [19] was proposed the vending machine which provides the beverage like snacks, cold drink, it is also used for ticketing. These systems are operated on either coin or note or manually switch operated.

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This paper presents system which operates not on coin or note, it operates on RFID system. This system gives the access through only RFID which avoid the misuse of machine. A small RFID reader is fitted on the machine. The identity card which contains RFID tag is given to each employee. According to estimation the numbers of cups per day as per client's requirement are programmed. Then an employee goes to vending machine show his card to the reader then the drink is dispensed. But when employee wants more coffees than fixed number, that person is allow for that but that employee has to pay for extra cups and amount is cut from the salary account. Radio Frequency Identification is an electronic device which consists of a small chip and an antenna.

B Jyothi et,al [20] says that vending Machines are used to dispense various products like Coffee, Snacks, and Cold Drink etc. when money is inserted into it. Vending Machines have been in existence since 1880s to serve beverages of the vending machine easily. 15 The first commercial coin operated machine was introduced in London and England used for selling post cards. The vending machines are more accessible and practical than the convention purchasing method. Nowadays, these can be found everywhere like at railway stations selling train tickets, in schools and offices vending drinks and snacks , in banks as ATM machine and provides even diamonds and platinum jewelers to customers. Previous CMOS and SED based machines are more time consuming than the FPGA based machines. The FPGA based machine is also more flexible, programmable and can be reprogrammed. But in microcontroller based machine, if one wants to enhance the design, he has to change the whole architecture again but in FPGA user can easily increase the number of products.

III. METHODOLOGY

The Each item in a vending machine has a unique selection number or button. Clients select the button or item number that corresponds to their selection, then they wait for the product to be dispensed. There are several different types of vending machines in use today. Vending equipment resembles an automated store. Products are placed into a machine and often offered for sale around-the-clock.

The two types of vending machines are free vend and pay vend. These days, cashless transactions are becoming more and more common. Typically, customers can pay with a card, cash, or mobile payments. Freshly brewed hot beverages, cold cans of snacks, fresh filtered water, fresh food, hot cuisine, and even non-edible goods can be included. A 24-hour/day, stand-alone vending machine needs a conventional power source.

IV. FABRICATION SETUP

A. Components required

1) Battery

An apparatus that stores chemical energy and transforms it into electrical energy is a battery. In order for a battery's chemical reactions to occur, electrons must move from one substance (electrode) to another through an external circuit, as depicted in figure 1. An electrical current that can be utilised to do work is produced by the flow of electrons.



Fig 1. Battery

2) Switches

As depicted in figure 2, a switch is an electrical component that can interrupt or reconnect the conducting channel in an electrical circuit, divert the electric current, or both. An electromechanical switch, which has one or more sets of moveable electrical contacts coupled to external circuits, is the most popular type of switch. Current can flow between two contacts when they are touching, but it cannot when the contacts are apart.

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Fig 2. Switches

3) Motor

According to figure 3, an electric motor is an electrical device that transforms electrical energy into mechanical energy. The majority of electric motors work by creating force in the form of magnetic field interaction with electric current in a wire winding applied torque on the motor shaft.



Fig 3. Motor

4) Plywood

As seen in figure 4, plywood is made of wood veneers that have been joined together to form a flat sheet. An incredibly versatile commodity, plywood issued for a wide range of structural, interior and external applications - from formwork up to internal panelling.



Fig 4. Plywood

5) Bottles

According to figure 5, a bottle is a narrow-necked, impermeable container that may store and carry liquids. It can be made of glass, plastic, or aluminium and comes in a variety of sizes and designs.



Fig 5. Bottles

6) Wires and Tubes

Metals are used to create wires. According to figure 6, some of the metals used are steel, copper, aluminium, and silver. Because of these qualities, we employ these materials to produce wires. Metals typically exist as solids at normal temperature and have a high melting point.

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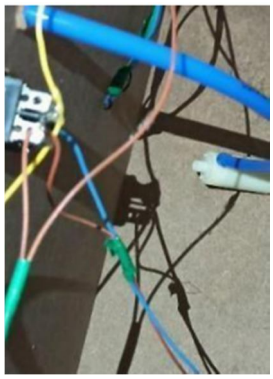


Fig 6. Wires and tubes

7) Cold and Hot Drinks

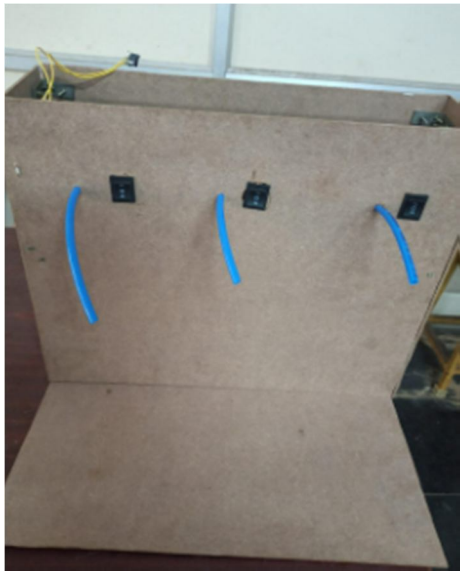
No of the weather, hot drinks are preferred over cold drinks for their quality and health benefits, as illustrated in figure 7. Warm beverages typically calm the body and enhance digestion, even on a hot day. Warm drinks, like warm water, stimulate your digestive system. In order to prevent stomachaches, you can stimulate your circulatory system.



Fig 7. Cold and Hot drinks

B. Construction

Firstly we taken as DC 6V mini air pump motor and batteries. We assumed that there were wires, motors, batteries, etc. The battery is connected by the three wires that are connected to one another. Three buttons are used to join the three wires. Moreover, the three motors are linked to those three buttons. The three motors are connected to the battery. All three motors will receive power from the battery. The attached motor will start operating after the button has been pressed. We used some cold drink caps as a starting point, drilled holes in them, inserted pipes, and then glued everything shut. And using plywood, we created an outside frame or shell. Maintain some holes on the with the help of drilling machine. The tubes are put into the tools, and we then put inside the plywood coffee and cold drink bottles.



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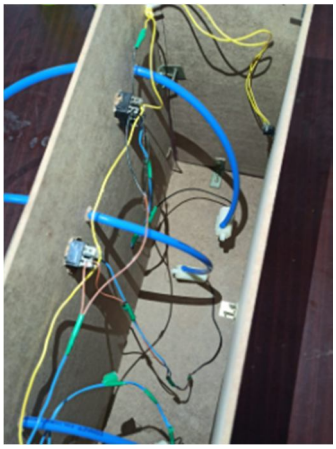


Fig B. Construction

V. CONCLUSION

The design and fabrication of a multi-drink vending machine, which includes batteries, switches, wires, DC 6V motors, bottles, and pipes, among other components. It may provide both hot and cold beverages. We created a device that provides when we push the buttons, drinks are served. The Multidrink vending machine is constructed according to specifications. In the end, we can say that the project accurately poured the beverages. It saves time and makes working in workplaces easier to advance. Our project's primary goal is to decrease beverage waste.

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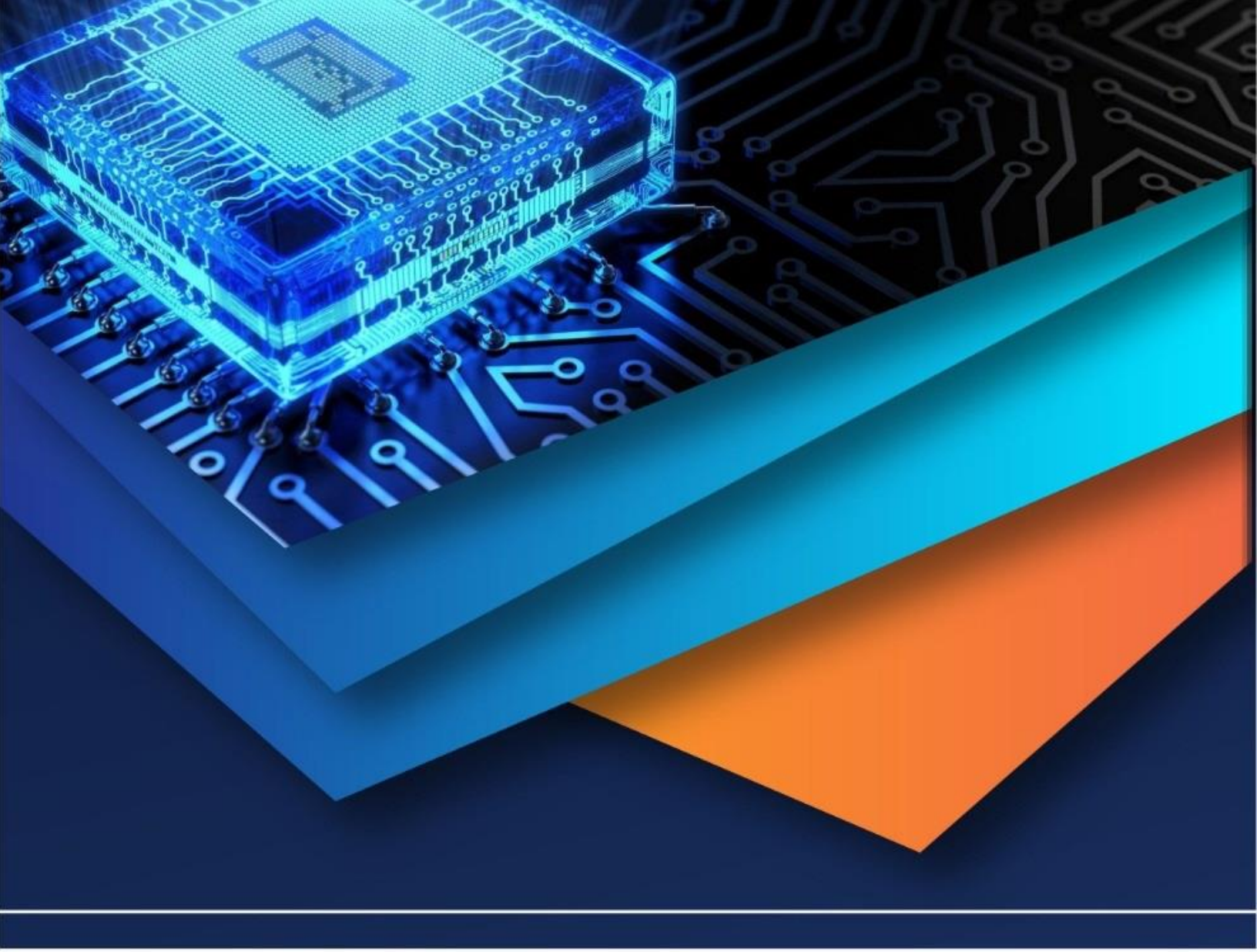
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