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Sanitary Napkin Vending and Disposal Machine

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Abstract: ***Educating and creating awareness for the use of Sanitary Napkins is of prime need. The proposed system combines both dispensing and disposal machines for sanitary napkins. This system can meet the menstrual emergence conditions. The main purpose of this system is to design a cost-effective vending and disposal machine using Arduino. The dispense machine consists of four parts, they are, Coin Acceptor-Coin Sensing unit, the motor unit, the coin rejection unit and the pad dispensing unit. The disposal machine consists of relay, furnace, filter and ash tray. The whole operation works on Arduino module. The automatic fault detection and intimation mechanism identifies the nature of fault occurred in the system and automatically intimates the service personnel about the fault.***

Keywords: Arduino, Coin accepter and coin Sensing unit, Dispensing and Disposal machine.

I. INTRODUCTION

Human actions create waste, and it is the way these wastes are collected and disposed off, which can cause fatal effects on the environment and public health. Every month, 1000 of women's and adolescent girls dispose off the menstrual waste which results in accumulation of the same. For e.g., consider40 female employees work in a private organization, the menstrual waste generated every month or perhaps even every week is to be collected by the trash pickers which results in affecting their health due to the persistent foul smell and improper disposal methods used. Hence, the management of the generated waste while maintaining a proper hygiene is of prime importance in our country. In order to overcome this problem, sanitary napkin incinerators are used. Incinerators are used at a certain temperature level ranging from 800-900 degree Celsius. Along with, the persisting problems of the sanitary napkin vending machines is resolved in proposed system. In the sanitary napkin vending machine, the issue of the jittery behavior of the coin acceptor is provided with an alternative option by implementing cashless transactions using UPI payment. The system aims at combining both the sanitary napkin vending and disposal machines for the convenience of the users. The proposed system is flexible enough to be installed at school, institutions, private organizations and even at community libraries. The problems arising due to improper disposal of sanitary napkins are as follows:
Lead to transmission of infections like hepatitis B and hepatitis C.

A. Motive

To teach and create alertness of use of sanitary napkins and suggest easy access to sanitary napkins by installing Simple Vending Machines with replenishment program in Rural Schools and Colleges so that Girls/Women get familiar to use this Sanitary Napkins for their better health care. Secondly, to solve the problem of sanitary napkin disposal by mounting incinerators which shall decrease spread of infection, reduce environmental pollution due to non biodegradable sanitary napkins and reduce clogging of public drainage system due to spongy nature of napkins**.**

II. LITERATURE SURVEY

The health hazards associated with unsafe disposal of napkin have been presented. Almost 90% of a sanitary napkin is plastic. The thin uppermost layer on napkins, known as the dry-weave top sheet, is made of polypropylene (a plastic polymer). The padding is wood pulp merged with super penetrable polymers and the leak-proof sheet is made from an impenetrable polyethylene. The plastic used in sanitary napkins, which is non-biodegradable, is not only injurious for health, but also has negative consequence on the environment. Since it is non- biodegradable, the soiled napkins remain in the landfills for about 800 years. The informal practice of burning soiled napkins in the open emit toxic gases like dioxins and furans. Hence safe disposal of napkins is very important. *
The previously proposed system of sanitary napkin disposal aims at reducing both air and soil pollution. Solar power is utilized for working of this system. When the sanitary disposal system is turned ON, a voice system prompts the user to place the napkin in the tray provided for the purpose. When the napkin is sited in the tray, the IR sensor detects the napkin and sends a signal to raspberrypi. The raspberrypi in turn gives command to turn ON spider coil. The spider coil burns the sanitary napkin into ashes. The collected ash can be flushed out via the drain of the toilet. The carbon dioxide emitted from this system is absorbed by a CO2 filter. The entire process is controlled by the Arduino [1].

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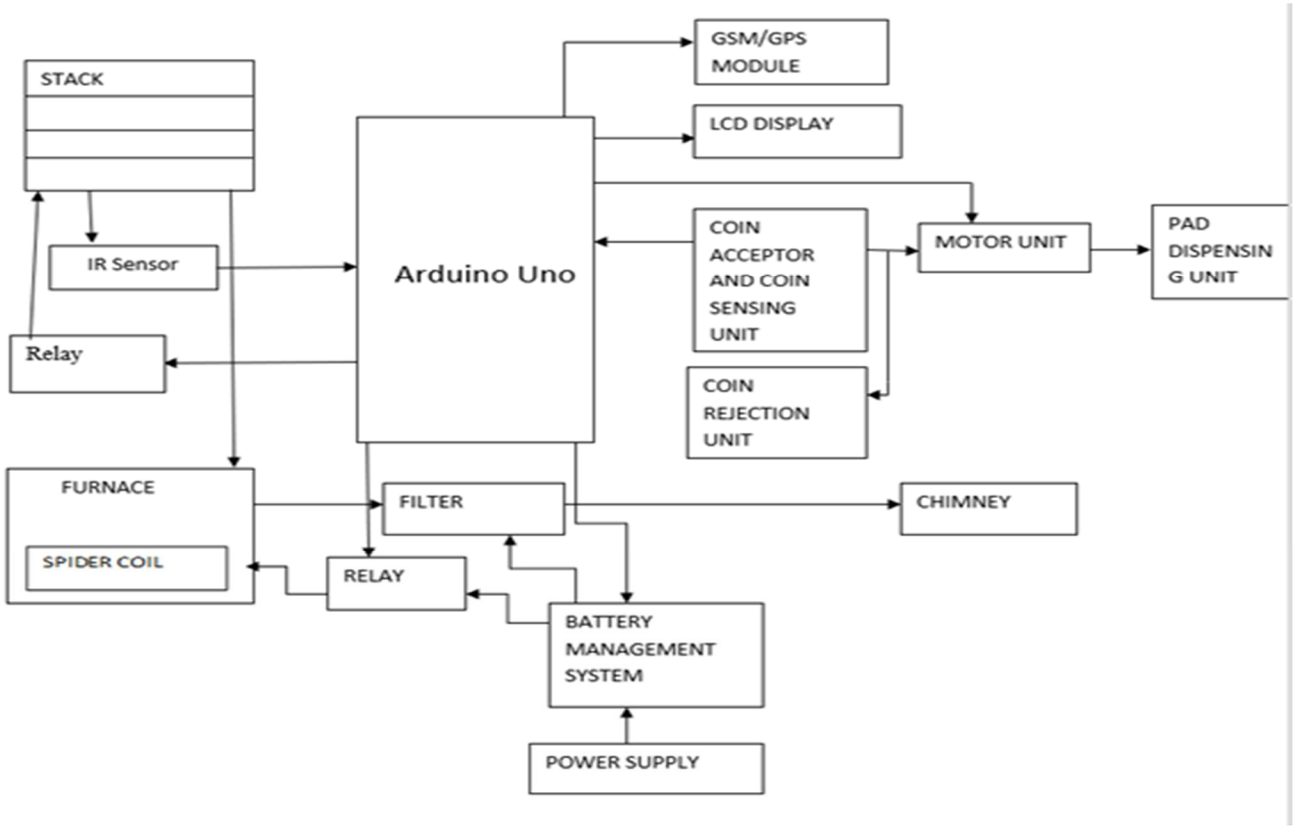
The existing system of sanitary napkin disposal is named as 'Ashuddhi-Nashak'. This system contains two openings /lids. The napkin to be disposed is thrown from the top opening. News paper is put into the system and from the bottom opening, fire is lit. As the news paper burns, the napkin too gets burnt. The ash is collected at the bottom, which can be thrown away manually. This system over comes the problem of soil pollution but air pollution is an unaddressed issue here. The Carbon dioxide gas that gets emitted from this system causes air pollution [2].

Fig.1. Ashuddhi-Nashak

[3] Have provided a method that discards a germ, cryptomeria chips and ALGA for waste reduction that a fresh disposal method continues to be present which disposes diapers. Microorganisms active using the cryptomeria processors have effect on the decomposition of these disposable diapers, an eco-friendly disposal method which uses microorganisms in the forests to eradicate the used diapers is suggested to reduce waste. Microorganisms including cryptomeria chips have the effect upon the decomposition of the pulp. Roughly, 85.46 percent of those pulps per sheet is decomposed by bacteria. By utilizing nutrition, source decomposition rate of diapers may enhance.

III. SYSTEM DESIGN

Fig.2. Block



Diagram

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IV. HARDWARE DESIGN

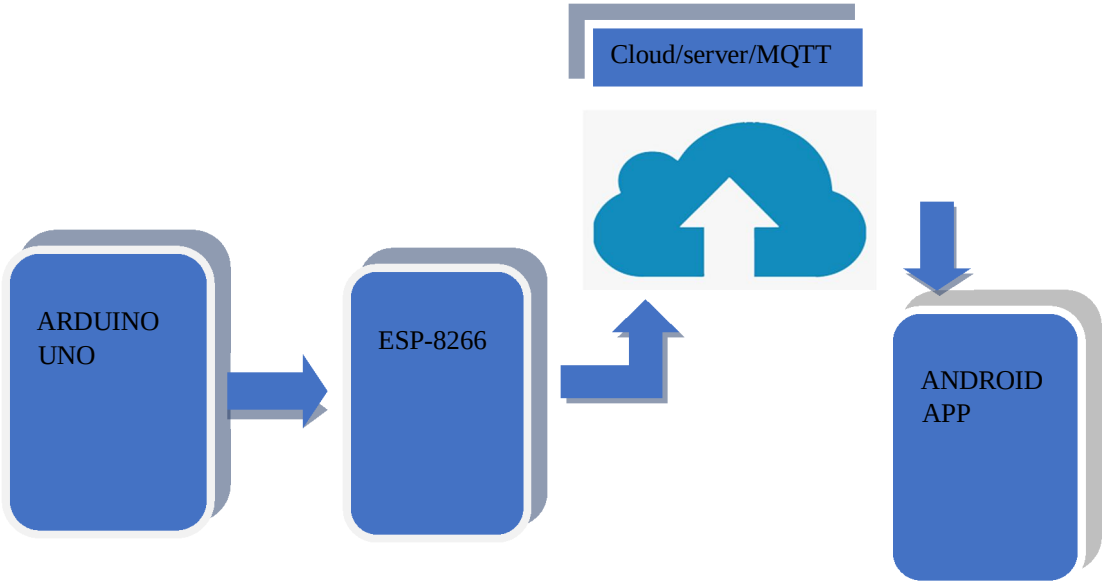
A. In the dispense machine the front panel displays the product price on the LCD.
B. The multi coin acceptor accepts different combinations of the coins.
C. The coin acceptor and sensing unit notifies Arduino UNO by sending the signal.
D. And the further process takes place.
E. Along with the coin acceptor, an alternative option of cashless transactions is also included in order to counteract the jittery behaviour of coin acceptor.
F. The sanitary napkin disposal machine consists of Arduino UNO, Furnace, Filter, Power Supply and Battery.
G. The disposal machine works on the power given to it through the battery management system.
H. The disposal machine, comprises of a stack in order to store the sanitary napkins.
I. Initially, only one sanitary napkin is allowed to enter the furnace.
J. The Arduino UNO sends a signal to relay to turn on the heating process of the furnace.
K. Ash generated while burning the sanitary napkin is collected in the ash tray.
L. The gases liberated during burning are filtered out using a filter.

V. HARDWARE REQUIREMENTS

1) *Arduino:* Arduino is an IOT platform for creating innovative and interactive projects.
2) *DC Motor:* A DC motor is a revolving electrical motor that changes direct current electrical energy into mechanical energy.
3) *Coin Acceptor:* The sensors in the coin acceptor use the thickness, diameter and fall time of the coins to identify them and is fully programmable
4) *LCD:* An LCD is an electronic display module
5) *Keypad:* A keypad is a set of buttons organized in a block or "pad" which bear numerals, signs or alphabetic letters. Pads containing numbers are called a numeric keypad.
6) *Spiral spring for vending machines.*
7) *Activated Carbon Filter:* Carbon filtering is a method of filtering that uses a bed of activated carbon to remove pollutants and impurities, using chemical captivation.
8) *GSM/GPS Module (SIM808):* SIM808 module is a GSM and GPS two-in-one function module.
9) *Relay:* The key operation of this device is to make or break contact with the support of a signal without any human participation in order to switch it ON or OFF.

VI. SOFTWARE IMPLEMENTATION

Unified Payments Interface (UPI) is a real time payment system to permit hassle-free, secure and reliable cashless transactions through mobile phones. In the existing system, the android application identifies the installed UPI applications on the device and when the user chooses to pay with a specific app, it connects with an app via deep learning and completes the payment procedure and returns back to the app with transaction details.



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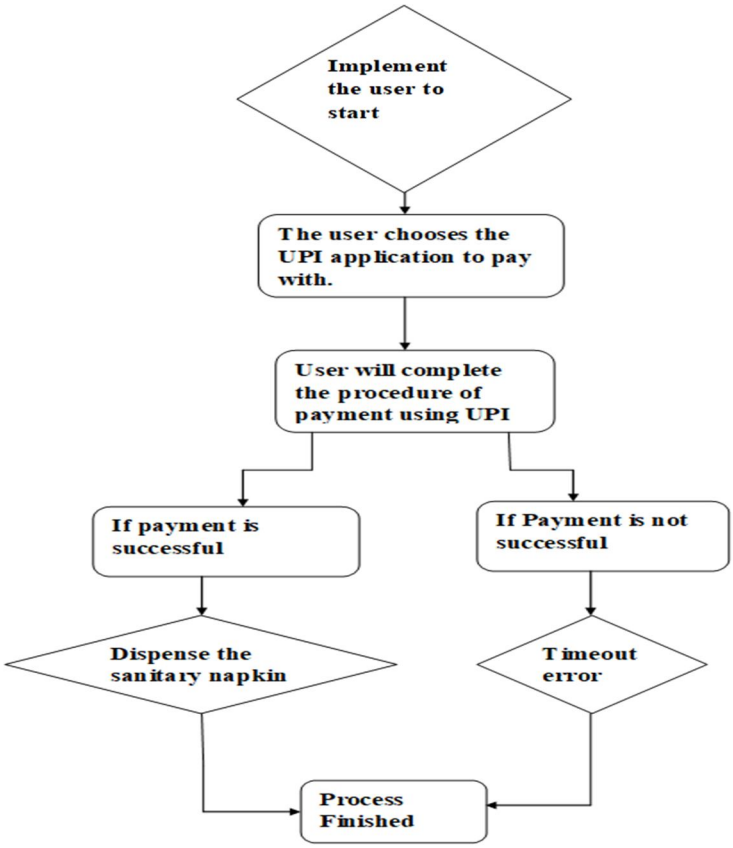

Fig.3.Flowchart of UPI payments

VII. RESULTS

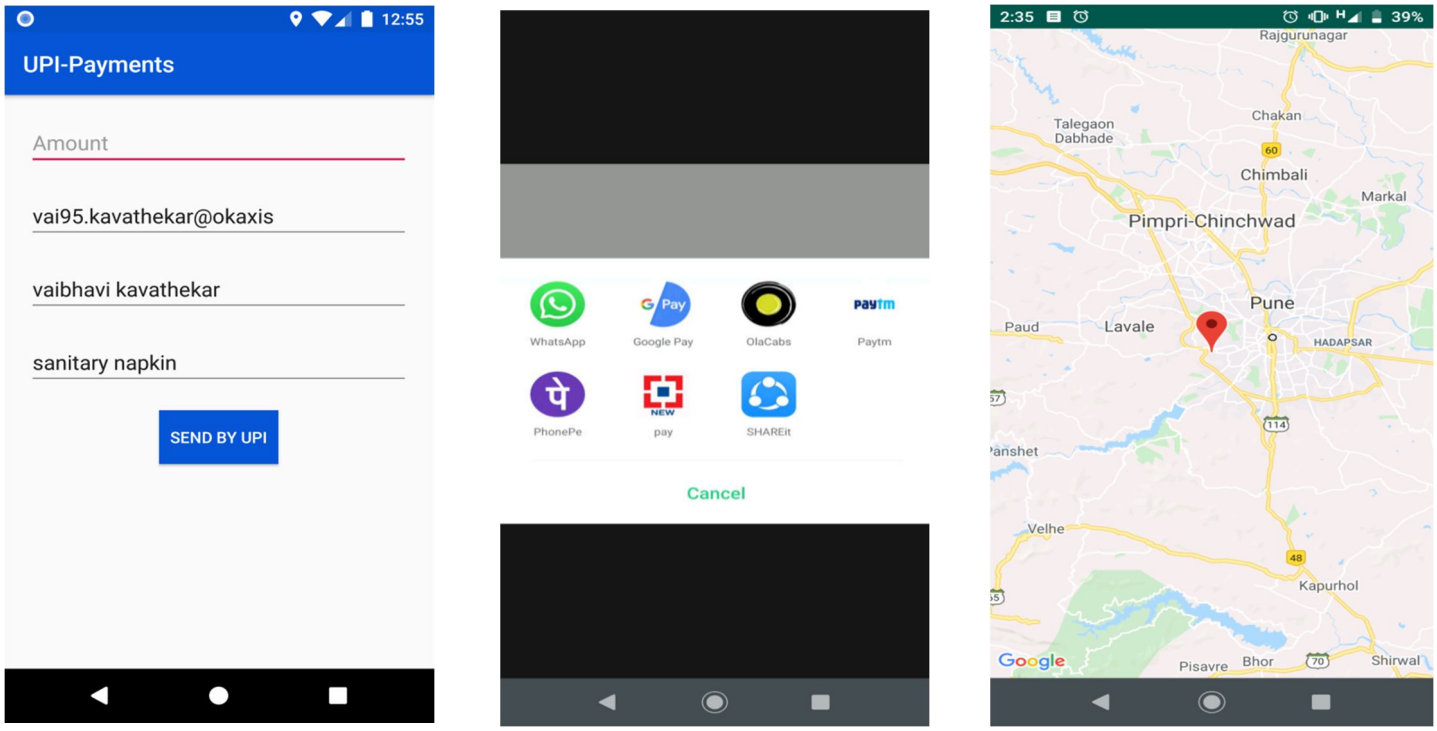

Fig.4.Results

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VIII. KEY FEATURES

A. Provides the precise location of the machine with the help of GSM/GPS module.
B. Hassle free transactions as the user can make UPI payments in the vending machine.
C. User friendly.

IX. CONCLUSION

In order to control the menstrual waste, operation of modern techniques like incineration is used. Napkin disposer is combined with the vending machine, so that dispensing and disposing is achieved in a single unit.

X. FUTURE SCOPE

A. The temperature required to dispose off the sanitary napkin can be reduced.
B. The sanitary napkins can be incinerated electrically.
C. In the vending machine, the cashless transaction can be implemented by scanning the Quick Response (QR) code instead of using the UPI Id of the user.

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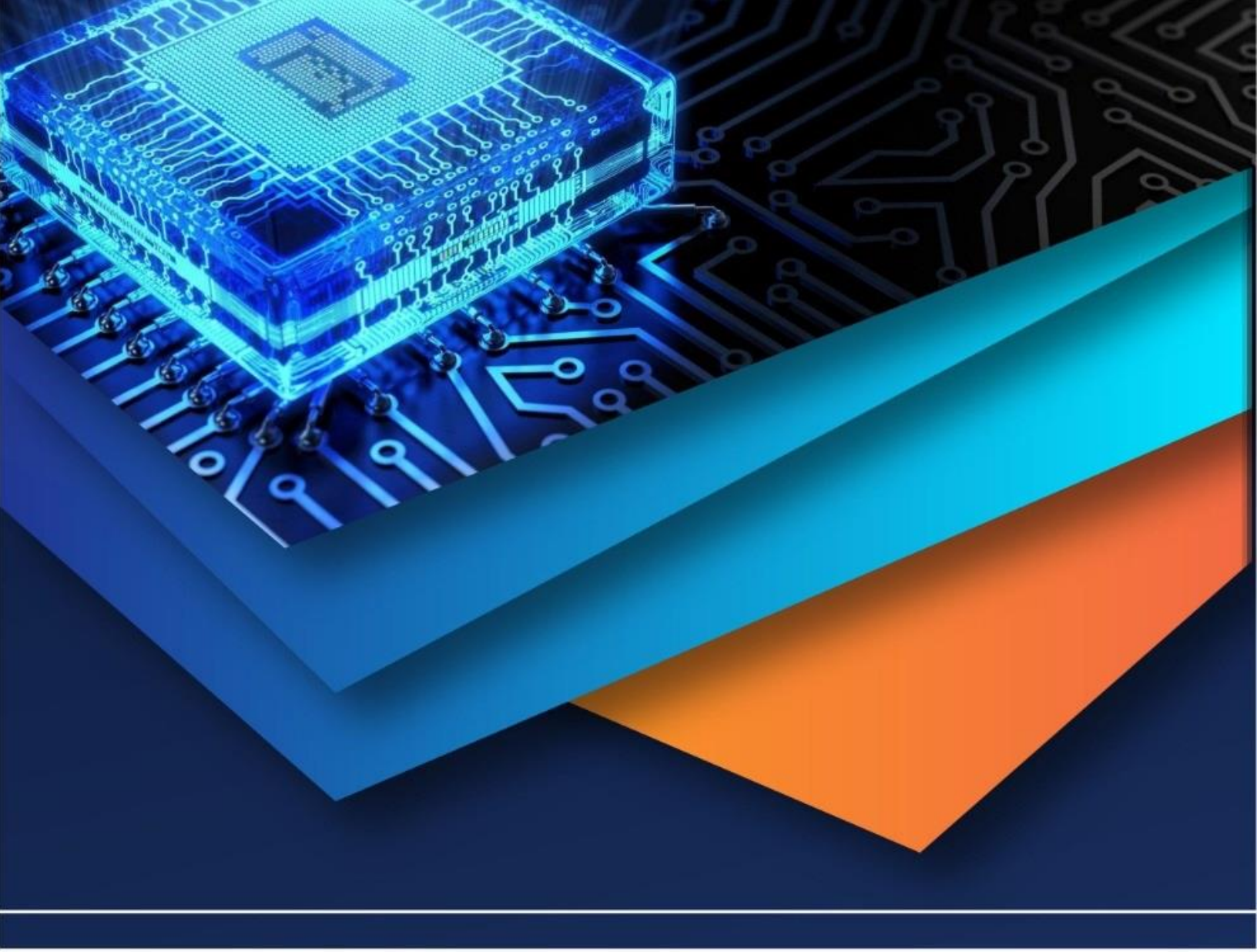

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