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Automated Parking System using Web Application

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Abstract: As we know, now-a-days population has been increased regularly, it also caused to increase vehicle population. So, more spaces are required to park our Vehicle. In this project we are introducing a new parking system called Automated parking system using Web Application. This System gives us efficiency to find vacant slots to park a vehicle in parking area. An application contains the data of all existing vehicles in parking area, available parking slots. In our project we use EM 18 module to sense RFID reader, RFID reader to know the status of our parking system. i.e. which car is on which place in parking slot. In our paper we are implementing whole parking system. We allocate a parking slot to the vehicle at the entrance of parking area within some ms. Whereas while leaving parking area system calculates the cost of parking and automatically deduct money from user's account using e-wallet system. We will get to know all these features in brief in our paper.
Keywords: ***Automated parking, Web application, Multi-level car parking, e-wallet system***

I. INTRODUCTION

In todays developed world man is living a comfortable life. As this development is a boon for humans at the same time, sometime it can create problems. The number of vehicles that has been used in daily life have increased drastically as it provides a great comfort to individuals but at the same time the common problem faced by everyone is the parking issues. Parking is a major problem faced which in turn results in the wastage of a big amount of time. Even after all the development and progress achieved still manual parking management is seen.

The method followed in parking system is that the parking premises simply have sign board which provides the drivers with the basic information like the directions and if there is different parking slot for two wheelers and four wheelers with the increase in the number of vehicles being used nowadays the number of vehicles that enters the parking area have also increased. Due to everything being manual the drivers do not have much idea about the parking availability, like is there any parking space available. The vehicle driver needs to drive through the whole parking area in order to get a place for his vehicle to park and the availability of place is also not sure, there may be time when the drive go through all of the parking area and then come to know that there is no place available to park his/her vehicle. After everything is done while leaving the driver needs to pay the parking fee which is collected manually. This when done during peak hours results in long queue. Such kind of problem is being faced in the existing parking system.

The development of this project can be a problem solver to almost everything mentioned above. The aim of this project is to create a web application using which drivers can get information about the parking place from anywhere. The web application will show all details regarding the parking place such as if slots are available or not. With the help of this project the old manual parking system would be converted to a completely automated parking system. As all details would be available all the time, drivers would not have to travel the whole parking area to find a vacant parking space which would eventually save the time. Also, e-payment method is being implemented using this project so there won't be any long queue as the driver would be able to pay from his/her e-wallet.

For getting everything automated we will be using EMU-18 module, which would be installed at the entry gate. With the help of RFID reader all data shall be maintained for existing users and the vehicles which are not registered shall go under visitor's category. The use of RFID is done as it would be economical for any and every parking area. While leaving parking area too same process occurs. RFID get scanned and allocated parking slot is marked as available. As this project is a web application it is completely platform independent and all it would need is any device which is having active internet connection. It would provide efficient parking slot as the parking place which is available at that particular time and which is closest to the driver shall be allotted to them with the help of the shortest path algorithm.

II. RELATED STUDIES

The proposed system [1] includes the use of LCD to display the available and allotted parking slots on the LCD Screen. It has various Modules for the implementation of the system that includes Interfacing of Microcontroller with LCD, Interfacing of Microcontroller with GSM, Interfacing of Microcontroller with RF Module. The concept of Real Time Viewing Automated Parking System is involved in proposed system of [2]. It has different features like providing a screen of parking slots displayed outside the parking area, checking online (Wi-Fi based) for the list of parking slots and you can decide where you are going to park your car.

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This system gives priority to PWD (Persons with Disability). Car owners with PWD passengers will be more prioritize to park near the entrance mall. So, there will be no problem to PWD people to search for a place to park his/her vehicle. This proposed system [3] includes the use of PIC 16 FXX Microcontroller. It uses the infrared sensor to detect the vacant parking slot at each level of car park, sending signal to microcontroller to process and display total available parking slot on 16x2 LCD displays. It also includes use of LCD, IR Sensors, Bluetooth Module etc.

III. SYSTEM BLOCK DIAGRAM

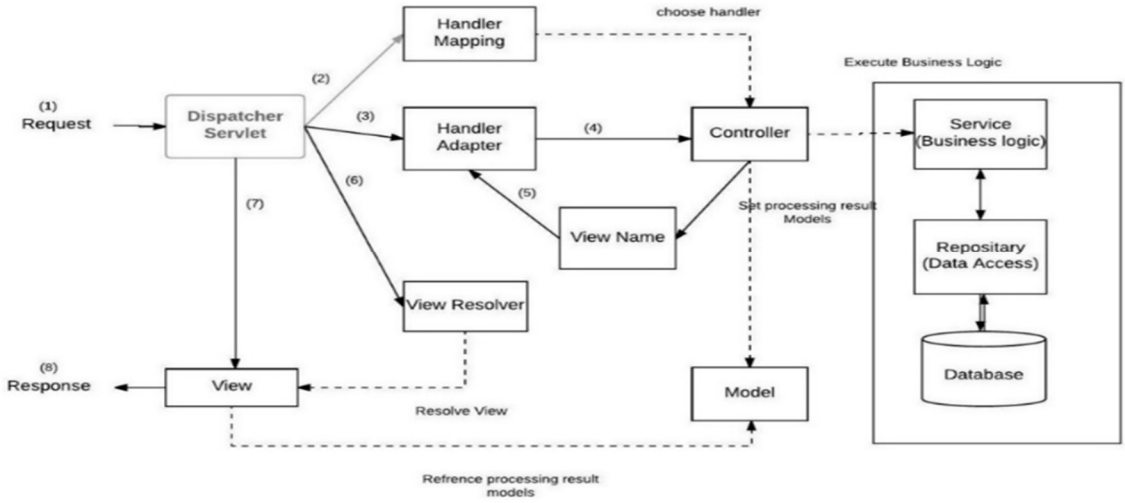


Figure 1: System Block Diagram

A. *Components of system Block Diagram*

The above Figure shows the System block diagram for automated car parking system. Its components are:

1) Dispatcher Servlet: Dispatcher Servlet takes the user request and forwards it to the Handler Mapping and Handler Adapter.
2) Handler Mapping: Handler Mapping decides who will serve the request.
3) Handler adapter: Handler Adapter will decide what action should be taken to serve a request.
4) Controller: Controller acts as an intermediator between various components.
5) View Name: which component to show which search file and loads.
6) View Resolver: find the file from directory which we want to load and sends response back to the user.
7) Service (Business Logic): It contains a Java code. It shows which data to be bring and store where in database.
8) Repository (Data Access): It contains those classes who have access to database.
9) Model: Model converts Table into Object transformed manner.

B. *Working of A System Block Diagram*

User sends the request which comes to the Dispatcher Servlet. Then Dispatcher Servlet forwards that request further to the Handler Mapping and Handler Adapter. Handler mapping decides who will serve the request and Handler Adapter will decide what action should be taken to serve the request.

Then request goes to the controller. It acts as an intermediator between various components. Controller retrieves the information from various repositories according to the user's request. Then request comes to the view name. It will decide which component to show which search file and loads. Then the View Resolver will find that file from the directory and sends response back to the user.

IV. SYSTEM FEATURES

The automated parking system is used by user to see if parking space is available or not in parking area. If yes, he goes and parks his car and Admin updates details in the system. While leaving too Admin again updates information into the system and payment is get deducted using e-wallet system. The system is composed of various modules are as follows- Authenticate module for User/Admin, User Module, Adding new spaces – Admin configuration, Registration Module – For new user, Visitor Module – Need not sign up, Analytics Dashboard.

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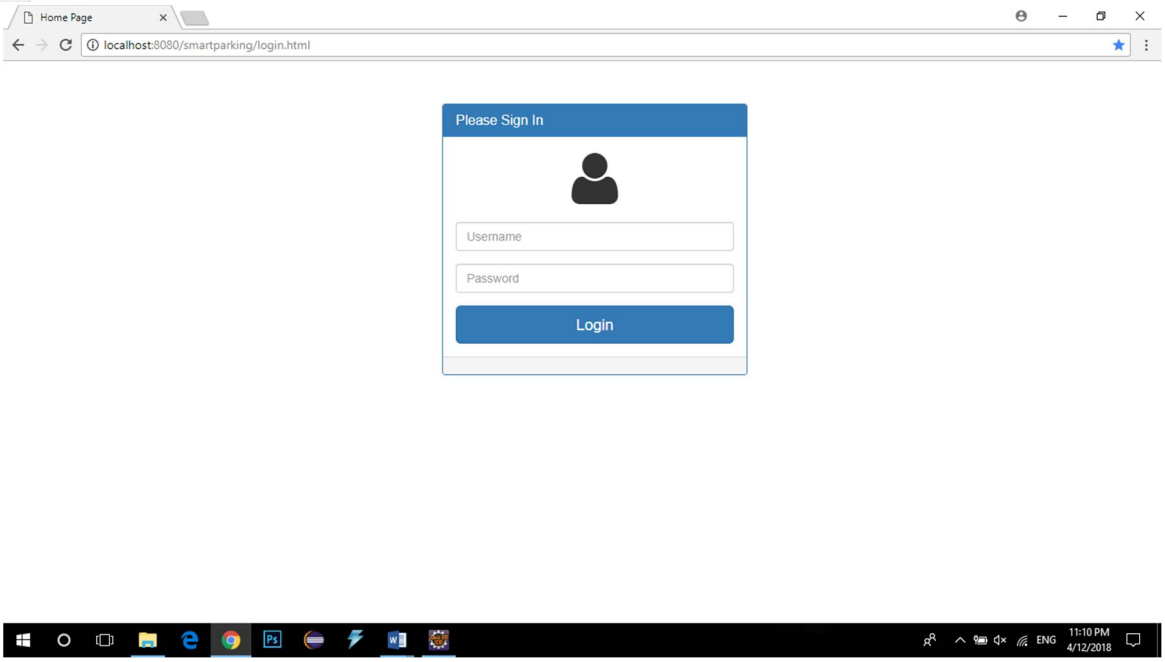


Figure 2: Login Module of Web Application

Starting from the Web Application, Figure 2 shows the Login Page of the application where only authorised user and admin can access. Following figure shows the pages after logged in by the admin and by the user.

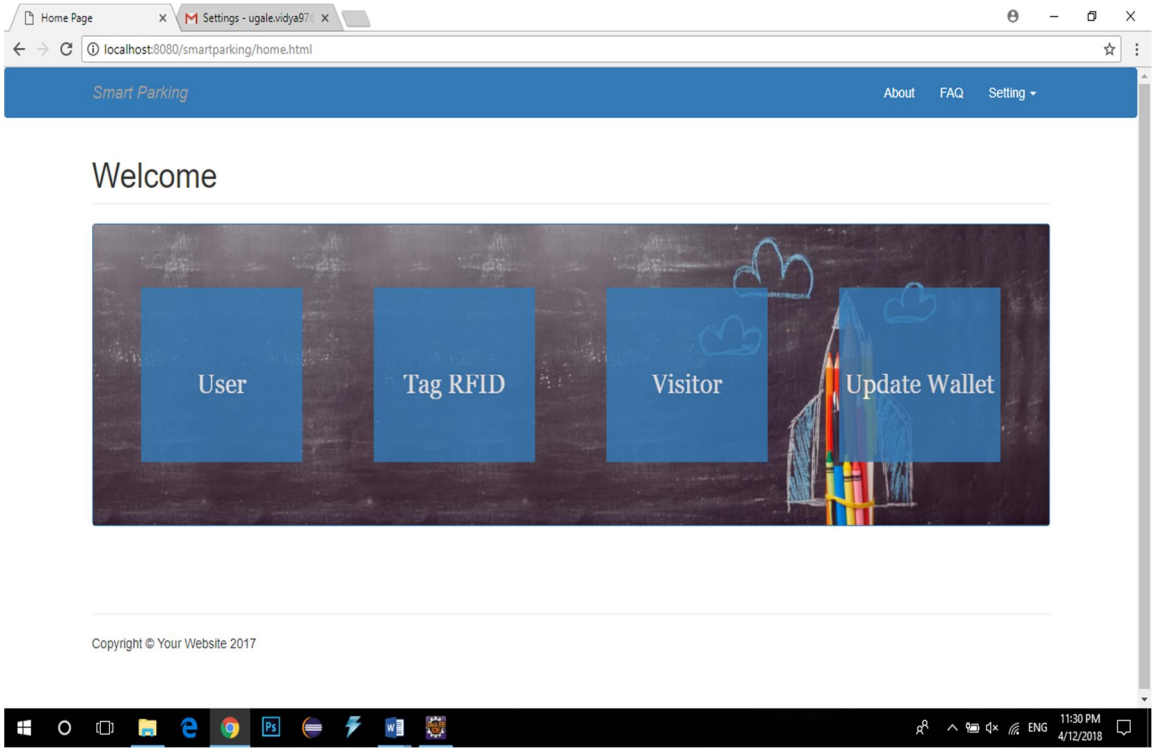


Figure 3: Admin side module after logging in an application

Figure 3 shows the Admin side page after logging in an application. It further contains four options. In User, admin can create user name and password for user. Using which a user can get log in access in a web application. Second Tag RFID, in this admin can assign a unique RFID reader to user's every vehicle. Third is Visitor, in this if any visitor enters into the parking area admin can update his data in his records/database. And Fourth is Update balance, in this if any user having want to update his wallet, admin has authority to do that.

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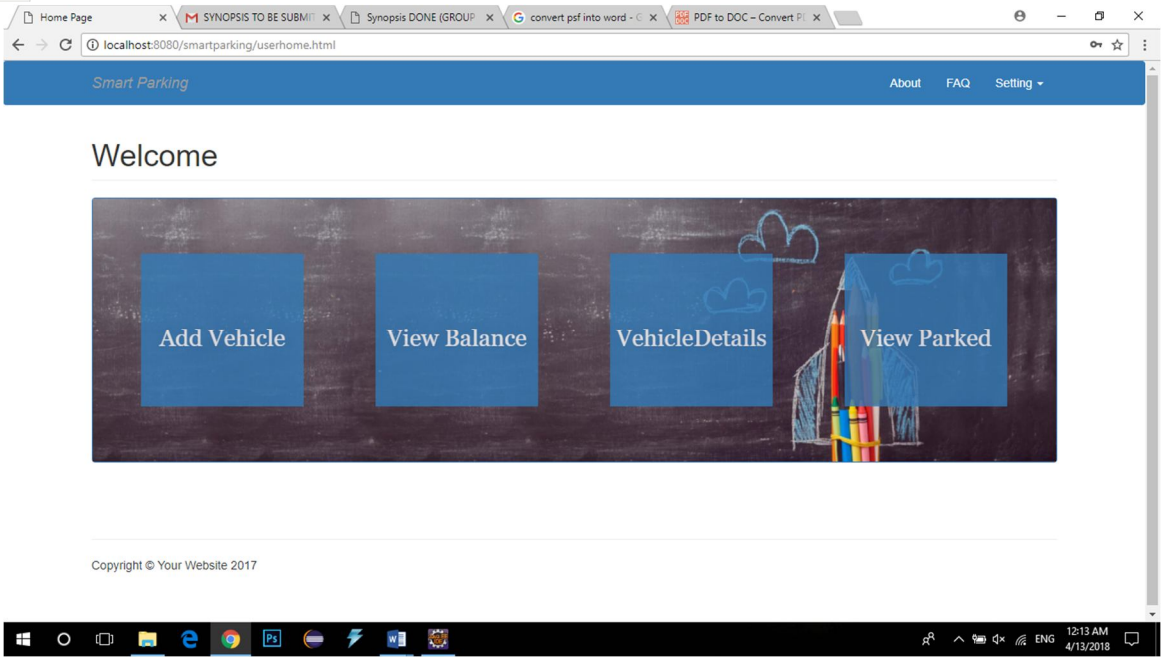


Figure 4: User side module after logged in successfully into the web application

Above Figure 4, shows the user side page after logged in successfully into the web application. This page further contains four features. First is Add vehicle, here user can add his all vehicle details. Second is View balance, here user can see the amount available in his wallet. Third is Vehicle details, here user can see if parking space is available or not. For his/her vehicle and Fourth is view parked, here user can see his previous parking history.

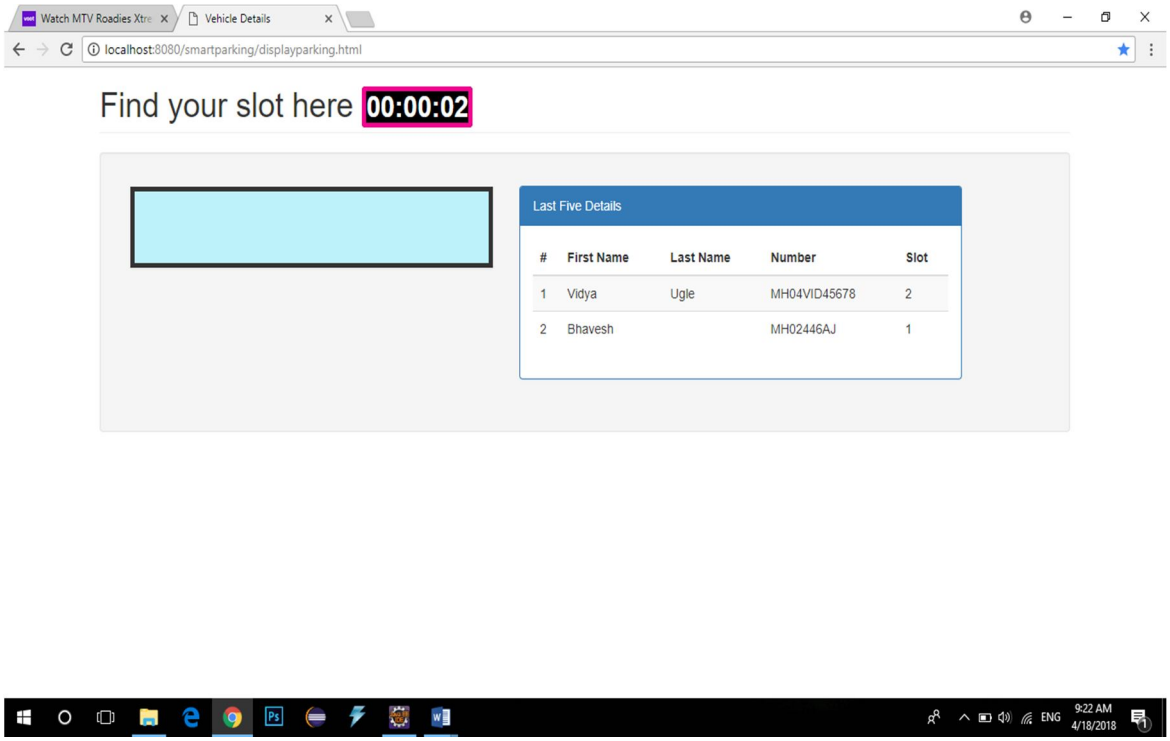


Figure 5: Display Screen

Above Figure 5 shows the Display Screen shows the details of last five vehicle with their parking slot. And as a new RFID reader gets read it will show the vehicle number and parking slot assigned for that vehicle. A display screen will get updated in every 4ms. While leaving Parking Area Display screen will show the leaving vehicle number and amount to be deducted or bill.

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A. Advantages

1) Time Consuming Process.

2) Less Human Intervention.

B. Disadvantages

1) EMU-18 module can use over 10 m only. (i.e. for education purpose only)

V. CONCLUSION

Thus, we propose to develop a web application that would provide a advanced and developed platform to users regarding everything related to parking of vehicles. The proposed parking management system takes into account all possible attributes that is expected from it.

The vacant car parking slots are given by as per priority based. The main contribution of study is to introduce the most significant parking problem that is finding vacant space & smallest path to reach that vacant space. It helps to give the proper management of parking. It reduces instances of single car improperly parking across two spaces. Parking detection system would decrease searching time for vacant slots. It is important to have an effective vacant parking slot tracking system to display vacant parking available at each row of parking slot and guide car driver to there. And therefore, it reduces the effort of the driver to find vacant slot and also time to reach that vacant parking slot. We ensure that the database updates are carried at regular interval of time.

This web application would help in achieving the idea of completely automated car parking system with least human intervention and would help us finding the slot for parking with almost no problem.

VI. ACKNOWLEDGEMENT

It gives us great pleasure in presenting this project synopsis report titled: “Automated Parking System Using Web Application”.

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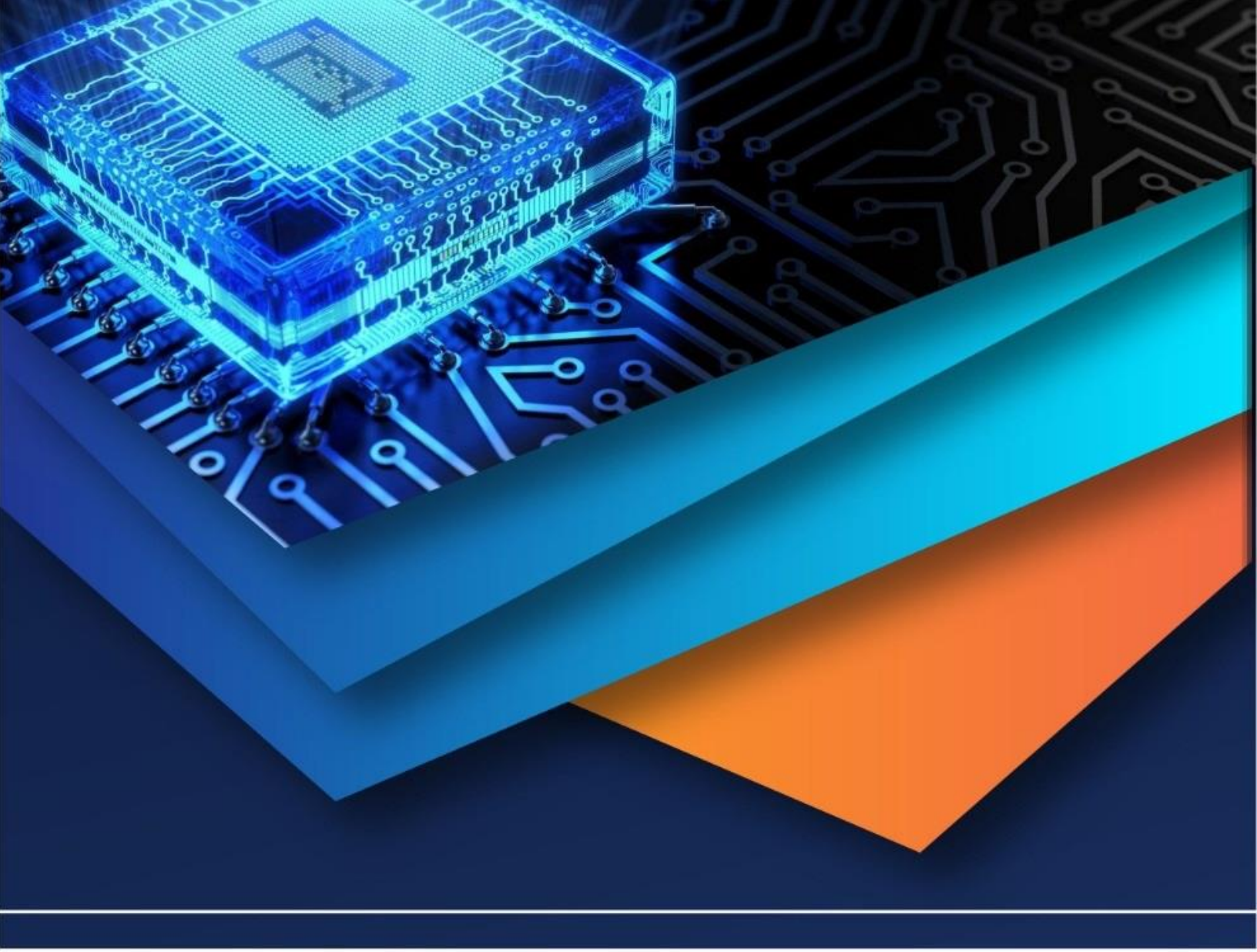
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