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Smart ATVM Application

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Abstract: ***The demand of transport system has increased due to large amount of growth in India's population. It has become essential to consider effective technologies in the areas of public transport that will ease the system of transport. This paper presents the design of android application system that harnesses the functionality of the existing electronic smart cards. The idea is to develop an android application that incorporates its simplicity and usability. We employ this ticket friendly solution that replaces the conventional paper ticketing by paperless-ticketing. Moreover, it will overcome the drawback present in the ATVM, where the passengers do not get any alert message about expiry date of the card. The touch sensors on the vending machine are unresponsive. Many-a-times, the vending machines are not in the working state. Due to changes in the weather, the card may get spoilt and torn away. And if it gets stolen, any unauthorized user can use the card until the balance becomes absolute. This application will provide the notification about the balance amount left. It will also help the user to renew the card through the application. The user can also purchase the ticket and get an e-ticket for the same. Since the user is going to log in with his/her password, the unauthorized user can't have an access to it. In the current system the user needs to get the smart card manually, and pay an initial amount of Rs.100/- (Rs.50/- for the card and Rs.50/- for as balance). The user also needs to print the ticket from the vending machine (which, at many places the machines are not working properly).Also if the user needs to renew the card, he/she needs to do manually. Moreover the user interface is not user friendly, which leads to many problems while purchasing the ticket.***

Keywords: Android, QR codes, ATVM online ticketing, UTS, Automated fare collection machine, scanner.

I. INTRODUCTION

Human-Computer Interaction (HCI) is the design and implementation of interactive computing systems that users can interact with. Also referred to as MMI (Man Machine Interaction), HCI allows us to gain a fresh perspective of joint interaction between man and machine. The most important concepts in HCI are functionality and usability. [1] A system is said to successful if there is a balance between both functionality and usability. The research findings aim to develop such a balanced application of HCI in the arena of public transport ticketing. The idea is to develop an android application that incorporates its simplicity and usability. The use of the smart cards ensures the union of existing functionalities of the Automatic Ticket Vending Machine (ATVM) ticketing. Presently the commuters of metropolitan cities either wait in the long waiting queues to avail the railway tickets or utilize the ATVM machines by means of electronic smart cards. The proposed system provides an efficient, easy-to-use and a convenient alternative to the current means. There are special counters for these smart cards and travel coupons. However one needs to stand in the queue. Other drawback is if the card expires, the balance amount is non-refundable and no such notification is given for the same. Moreover, in some areas, vending machines are itself not accessible. This project is based on the android application, where the user will be notified of the remaining amount left. Here, if the user wish to renew his/her card they can do the same.

II. EXISTING SYSTEM

A. ATVM

Automatic ticket vending machines are accessible on all stations and passengers can purchase First or Second Class single, return or renew season tickets & Platform tickets for adult or child. To purchase tickets through ATVM smart card is used. We can obtain smart card from booking offices at railway stations and recharge as per our requirements. On every recharge commuters get 5% extra value. [4][6]

Drawbacks:

1) Many-a-times ATVM machines are not working properly.
2) Expiry date of the card is unknown to the user.
3) E-ticket facility is not provided.
4) Due to weather conditions, cards may get torn away.
5) Vending Machines are not user friendly.
6) Currently there are no online recharge facilities available for smart card.

B. Mobile Ticketing

After downloading UTS mobile app and registering, an R-Wallet with zero balance will be created. The Unreserved Railway journey tickets, Platform tickets and Season tickets can be booked by signing in with the mobile number and password. There is no need to print the ticket. The ticket is generated on mobile. One needs to recharge R-Wallet with a minimum amount of Rs.100/- from any booking windows or through www.utsonmobile.indianrail.gov.in. [2][5]

Drawbacks:

1) UTS app is not available for iOS users.
2) Tickets need to be booked from a distance of 2km away from the station. Thus if the user stays near the station (in the radius of 2km) he/she needs to walk away from his/her locality until he/she is out of the radius. This simply means user can't book the ticket from the station.
3) The application is not user-friendly, as the user needs to do a top-up in the R-Wallet which requires a recharge in multiple of hundreds with initial amount as 100/-
4) UTS app account is attached to both the mobile number and the phone. This means that if one change the handset, then one's needs to submit a headset change request to be able to use the same account. Moreover, the handset can only be changed in 3 months.

III. PROPOSED SYSTEM

The proposed system deals with an objective of implementing a mobile application wherein the user needs to register him/her. The user will be provided with a unique ATVM number. After that the user can login to the system and can purchase a ticket.

Given below are the steps to use the applications:

1) User needs to register into the system.
2) User will receive an OTP on his/her number for verification purpose.
3) If user is valid he/she will receive the ATVM number from the application.
4) The user can now login into the system with mobile number and password.
5) The balance amount of the ATVM number will be displayed.
6) The user can now purchase the ticket.
7) User will receive details about the ticket.

A. Features

The proposed project on an automatic vending ticket machine for receiving notifications about ATVM smart card details and purchasing ticket through the smart ATVM application. This system is completely dependent on the application since there is no need to manually buy the ATVM smart card through the ticket window.

User need to register to get ATVM number through application. The initial balance and issue date is also stored in the database at the time of registration. User will get the notification about the remaining balance each time the user purchase a ticket from the application.

Whenever user wishes to purchase a ticket, he/she needs to select the necessary options. A message will be sent to the user about the purchased ticket details.

Following are the features of the system:

1) User can purchase the e-ticket.
2) User can recharge their ATVM number.
3) Notifications about balance amount left.
4) Provide high level of authenticity satisfactorily.
5) Incorporates simplicity and usability.

B. Advantages

1) Registration requires only mobile number.
2) Tickets can be booked from anywhere and at any time.
3) E-tickets can be cancelled.
4) Application can be used on any platform.
5) Printing of E-Ticket is not required.
6) Payment process is easy-to-use.

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C. QR codes

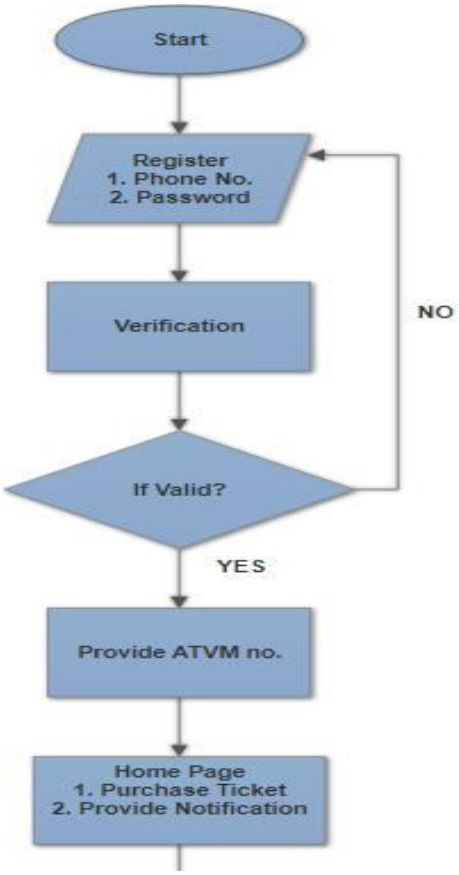
In the proposed system E-Ticket will be generated in the form of QR codes so let's understand QR Code. Quick Response Code (QR Code) is the trademark for a type of matrix barcode or two-dimensional barcode which was first designed for the automotive industry in Japan. A barcode is a machine-readable optical label that holds information about the item to which it is attached. [3] A QR code contains black squares arranged in the form of square grid on a white background that can be read by an imaging device such as a camera and processed using Reed–Solomon error correction till the image is appropriately interpreted. The data is then extracted from patterns that are present in both vertical and horizontal components of the image. [3]Once the account is created, user can purchase a ticket by specifying the source and the destination, class, single/return and the number of tickets. The amount will be deducted from ATVM number and the application will generate a QR code of purchased ticket which will be scanned through the scanner present at the station. The information for each user is stored in a database for security purpose. Also the ticket checker is provided with an application to validate the user by checking it's entry in the database.

IV. WORKING

A. Algorithm

1) Start
2) For Registration, Enter Mobile number and Password
3) Verify mobile number, if valid go to step 4, else go to step 2
4) System will Generate ATVM number for a user
5) To enter the system, enter the Mobile number and password, if valid go to step 6 else step 5
6) For purchasing a ticket select appropriate options according to the requirements.
7) Generate ticket in the form of QR code with a unique code
8) User scans the QR code from the scanner present at the source station.
9) Stop

B. Flowchart



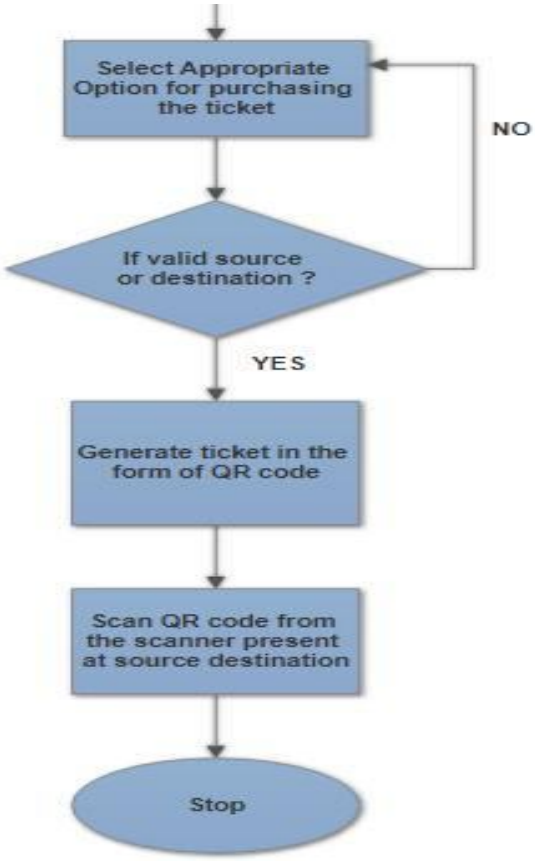


Fig. 1. Flowchart for Smart ATVM Application

V. IMPLEMENTATION

A. Register Page:

User needs to first register, by proving details like name, adhar number, email id, mobile number and password. After filling the details, an OTP will be send to verify the mobile number. Once the mobile number is validate, the user can now Login.

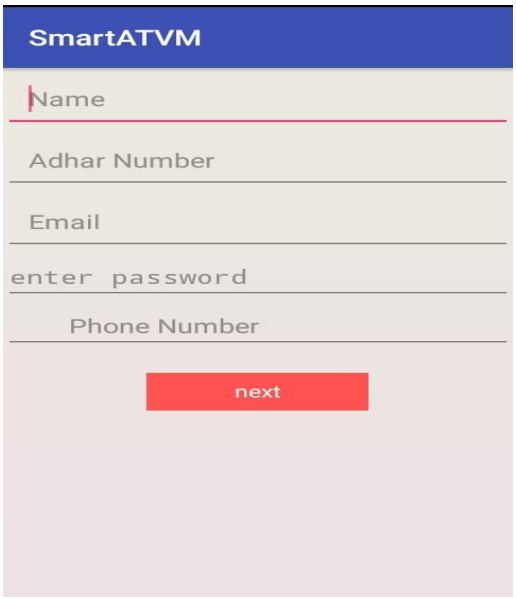


Fig 2(a). Register

Fig 2(b). Register

Fig 2(c). Register

B. Login Page

For login, user needs to enter email id and password.

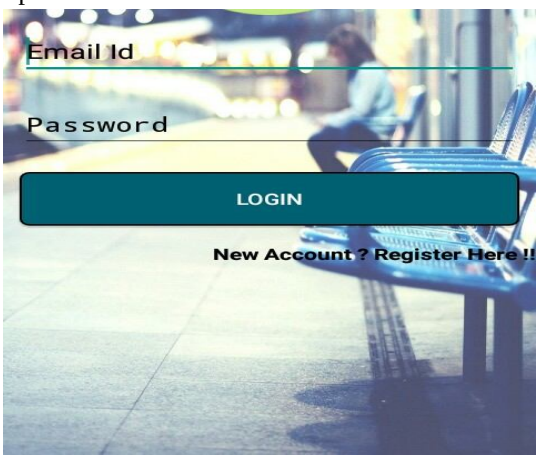


Fig 3. Login

C. Booking Details

The user needs to enter source, destination, return or single, number of adults and child if any.

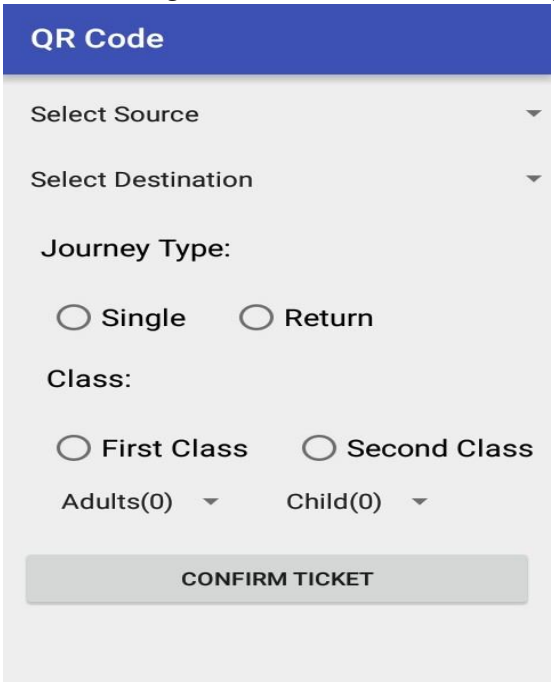


Fig 4. Booking Ticket

D. Ticket details

After successful payment, the ticket summary will be generated which will contain the details of the ticket such as source, destination, number of adults and children. Along with this a QR code will be generated which will contain a unique number. This unique number will be used for authentication and security purpose.

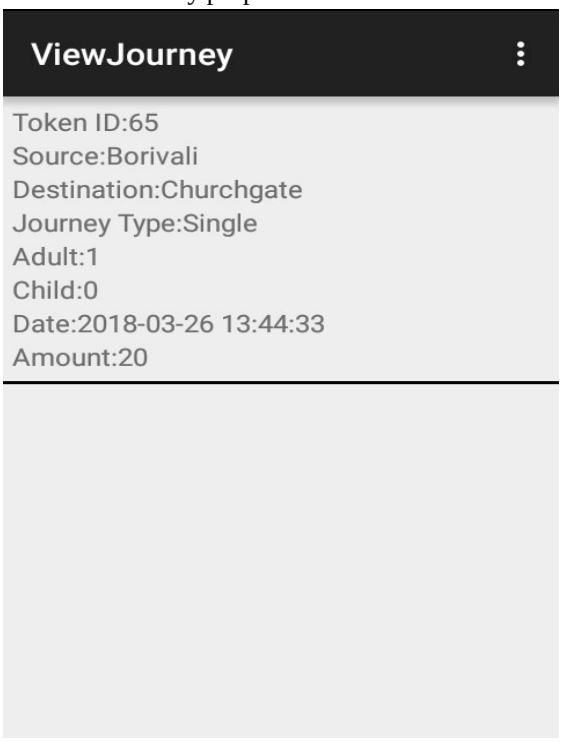


Fig 5. Ticket Details

E. Recharge wallet and View Recharge

The user can recharge wallet with Credit card or Debit card and can view the same.

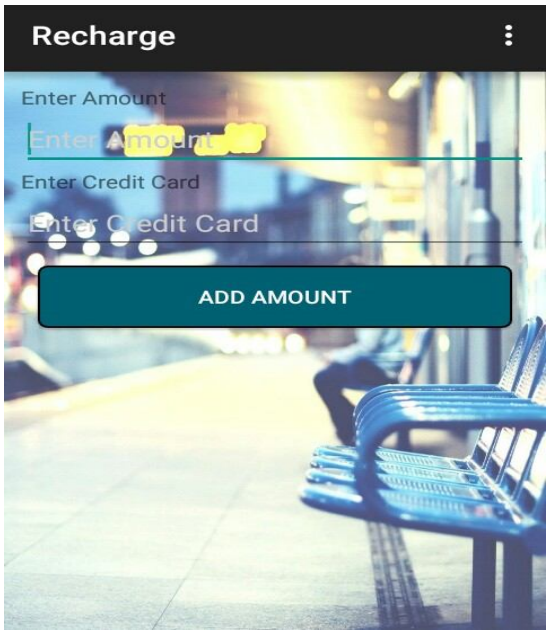


Fig 6.Recharge Wallet

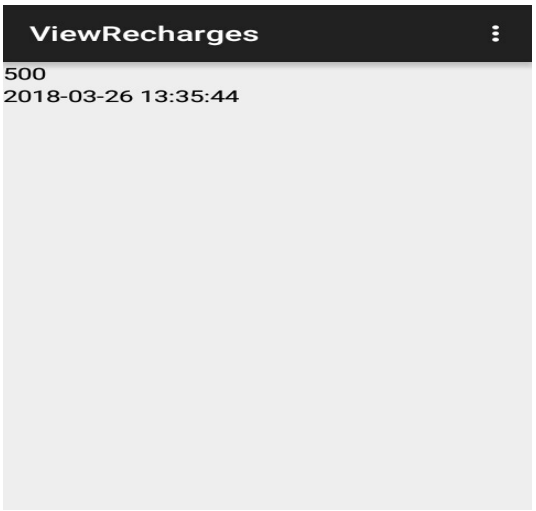


Fig 7.View Recharge

VI. FUTURE SCOPE

In the current system user require internet to purchase ticket. This can be improved by allowing user to purchase offline.

1) The application can be improvise more by supporting user to book express ticket.

2) Like in metro, automated fare collection machines will be use and instead of collecting coin, scanner machines will be use which will scan the QR code at entry/exit point (i.e. station) for providing the authenticity (i.e. the user has ticket or not).

3) Users can send booked tickets to their family and friends. This can be done by sending an SMS or e-mail.

VII. CONCLUSION

This project aims to give a smooth experience to both the passengers and railway staff. Moreover, it will also contribute to a cashless economy and will be safer for the passengers to carry the e-ticket and payment details in their phones rather than carrying cash, credit/debit cards etc. With the growing popularity of smart phones, this will be the right time to introduce the system as people are already familiar with technology and it will be easier for them to adapt it.

VIII. ACKNOWLEDGMENT

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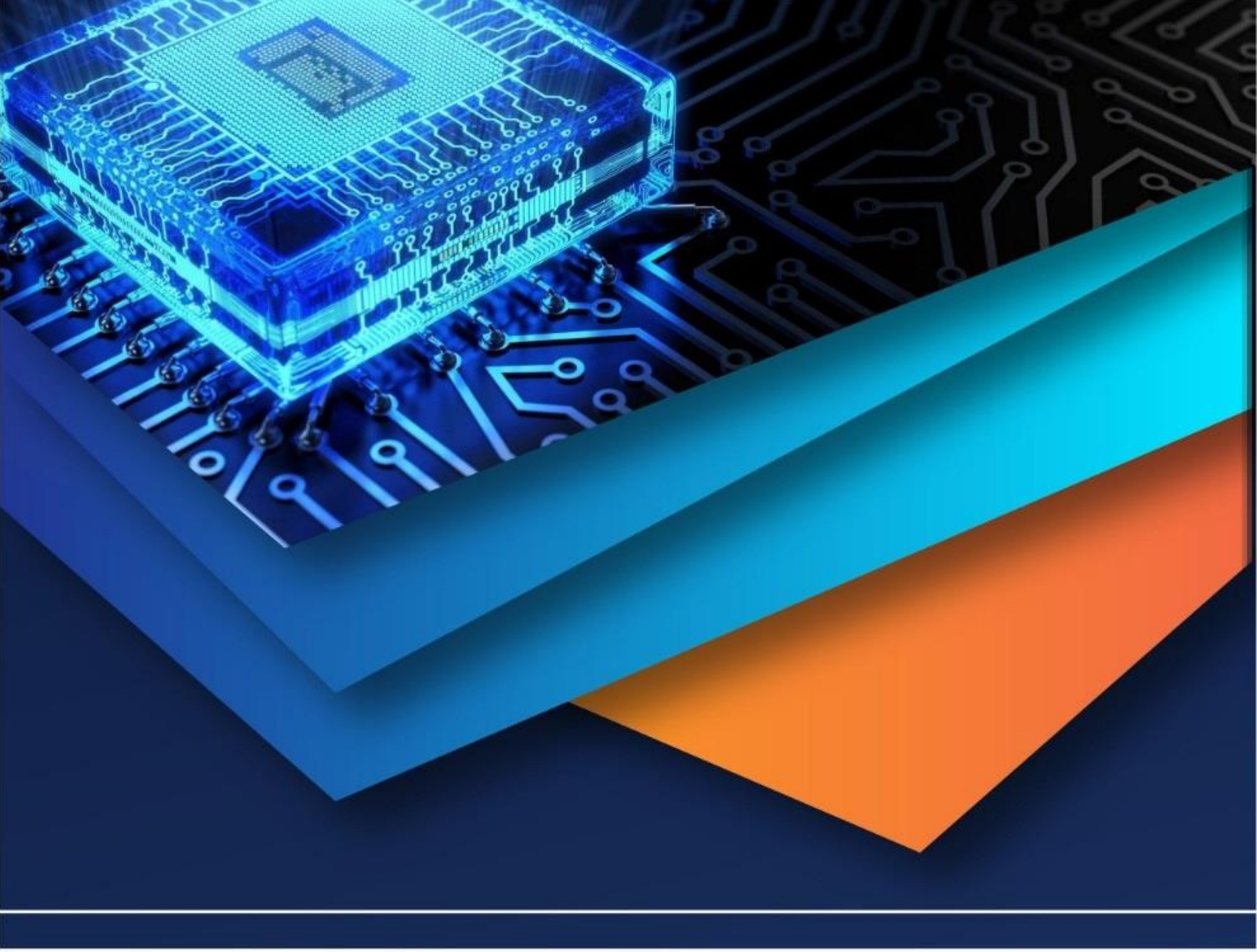

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