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Smart-ID Card

Johnty Simon[1], Kartik Raina[2], Pooja Mudgil[3]
[1,2]*Fourth Year,* [3]*Assistant Professor, Department of Information Technology, Bhagwan Parshuram Institute of Technology (Affiliated to G.G.S.I.P University, Sec-16C, Dwarka, Delhi, 110078)*

Abstract: ***The college lives of students cover a wide range of transactions which he/she has to make in order to fulfil the requirement of the day. Some of the transactions are usually covered by the small denominations of currency carried by students, which allows them to pay for public transport. This leads to division of amount to be carried by the student in e-wallets, cash, payment tokens in some cases. To reduce the hassle created by the variety of modes of payment, we suggest a Smart-ID card which can be used to pay for day-to-day campus needs and allows student or faculty member of the college/university to keep track of the expenses, maintain their attendance and allows the user to pay in the authorised campus area.***
Keywords: Smart-ID, RFID Identification Cards, Digital Payment, Student Interface, Unique Identification.

I. INTRODUCTION

The college life revolves around innumerable transactions ranging from submission of tuition fee, purchasing practical notebooks, stationery and canteen (or mess) charges. Following this an average student has to carry somewhere from 50 to 100 rupees change in their pocket as he/she commutes to college every day, in addition to transportation fare. Moreover, a student needs to carry other things such as ID card, Library Card etc. every day to college too. So, to overcome this we propose a centralized approach for tackling these problems i.e. Smart-ID. Smart-ID is an RFID card which will be issued to all the students and their basic information like Enrolment Number, Library membership number, contact details will be encoded onto it through a web portal. So instead of carrying all these documents everyday a student needs to carry only this card. A student doesn't need to carry cash for minor transactions like mess charges, instead students can deposit a desirable amount in their Smart-ID and use it to pay for their day-to-day expenses. This will allow them to pay easily for their daily charges in the campus, avoiding getting in long queues or setting accounts with popular mobile applications for online transactions. The proposed ID card will require a one-time deposit in the beginning of every semester or year, this amount after reaching a minimum balance can be recharged by adding the amount through online payment via the web portal. A student can be issued with his/her Smart-ID as soon as they register themselves with their enrolment number provided by university.

II. OBJECTIVE

The objective behind making this application is to offer facilities to the students of the college. The Smart-ID card project offers a unique Smart-Identification card to the students enrolled in a college or university. The card performs all the functions as an all-purpose card for the student such as submission of college fees, purchasing stationary, buying food and beverages from the canteen (or mess charges), submitting fines or dues to college etc. These functionalities are accessible to students through a web application. The project involves building a web portal for students, faculty and administration of college to cover the basic functions of the applications such as payment for college utilities. It can also manage attendance of every student present in the database. The faculty can access the attendance records of every student.

III. LITERATURE REVIEW

A. Existing System

A college student has to carry out numerous transactions in the college premises in the form of small denominations like 1 rupee or 5 rupees. This forces a student to carry a small amount of money in the form of change to pay for the utilities. The utilities include xerox/photostat, mess charges, library dues, etc. which creates the hassle of managing the change amount to be kept at hand. To overcome this, many solutions have been proposed such as a receipt of dues/fines/pending amount prepared by the administration department, which is issued to students to allow them to pay by filing the receipt. Such solutions create a further hassle of keeping the receipt book at hand at all times. Smart-ID cards address the concerns by allowing digital payment and easy management of student wallet.

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B. Our System

The Smart-Card System overcomes the problems with the existing system of small transactions by replacing the small denominations with an ID-card. The ID-card gives every student a unique identity which is also used for the transactions done on the college premises. The students can track their payment also. It provides a hassle-free service to the students. It also provides security to a student's identity. The ID-Card can also be used as a library card through which the student can pay dues and fines. Also, we propose to make the system record attendance of students. During transactions at the canteen or other utilities, the student can make payment by just entering the authentication pin which is secured by hashing in the database. This system also generates invoices for the transactions done by every student. The student can get the invoices as per their date range. It can be easily managed by the administration.

C. Review of Similar Existing Solutions

Existing systems such as the Barcode Scanner Based Student Attendance System proposed to record attendance of students is yet another application in the real-world scenario where Smart-ID cards can double up as an attendance recording system. This allows more utility in terms of carrying an ID card which can be used to pay as well as record attendance of the students and faculty. The database maintained for the Smart-ID can be used to fetch the details of the user and record the attendance. This also allows the utilization of the central database maintained for Smart-ID to be used for other applications as well. The idea of multipurpose smart-card can also be implemented in the college premises. The multipurpose card plays such an important role in serving different purposes in the college. The card can be used for paying for utilities in college. It can also be used as a library card and also to pay dues in the library. Attendance can also be tracked using the multipurpose smart-card. The Smart-Card is read by Smart-card readers which can also write to the card as well. The Multipurpose cards are tamper-resistant. It can easily store loads of information in them as well. It is convenient to carry one smart-card for different purposes instead of carrying multiple cards. It delivers an improved service and connects the user directly to the web services.

IV. APPROACH

A. Smart Cards

A smart card is a physical electronic authorization device, used to control access to a resource. It is typically a plastic credit card/ Debit card -sized card with an embedded integrated circuit (IC) chip. Many smart cards include a pattern of metal contacts to electrically connect to the internal chip. Others are contactless, and some are both. Smart cards can provide personal identification, authentication, data storage, and application processing in various day-to-day activities. Applications include identification, financial, mobile phones (SIM), public transit, computer security, schools, and healthcare. Smart cards may provide strong security authentication for single sign-on (SSO) within organizations. Numerous nations have deployed smart cards throughout their populations such as Delhi Metro Rail Corporation has deployed Smart card technology for all commuters allowing them to avail of the benefits of fast and hassle-free travel. These cards are based on NFC technology, which is yet another form of contactless technology.

B. Characteristics of Smart-Card

A smart card has the following general characteristics:

1) Smart cards are typically made of plastic, generally polyvinyl chloride, but sometimes polycarbonate is also used.
2) Since April 2009, a Japanese company has manufactured reusable financial smart cards called "KAMICARDS" made from the paper.
3) It communicates with external services through card-reading devices, such as ticket readers, ATMs, DIP readers, etc.
4) These cards do not contain batteries; power is supplied by the card reader. Smart Card Information.

C. Security Concerns

Smart cards have been advertised as suitable for personal identification tasks because they are engineered to be tamper-resistant. The chip usually implements a cryptographic algorithm. There are, however, several methods for recovering some of the algorithm's internal state. Differential power analysis involves measuring the precise time and electric current required for certain encryption or decryption operations. This can deduce the on-chip private key used by public key algorithms such as RSA. Some implementations of symmetric ciphers can be vulnerable to timing or power attacks as well.

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Smart cards can be physically disassembled by using acid, abrasives, solvents, or some other technique to obtain unrestricted access to the on-board microprocessor. Although such techniques may involve a risk of permanent damage to the chip, they permit much more detailed information to be extracted.

D. Flowchart for the Application

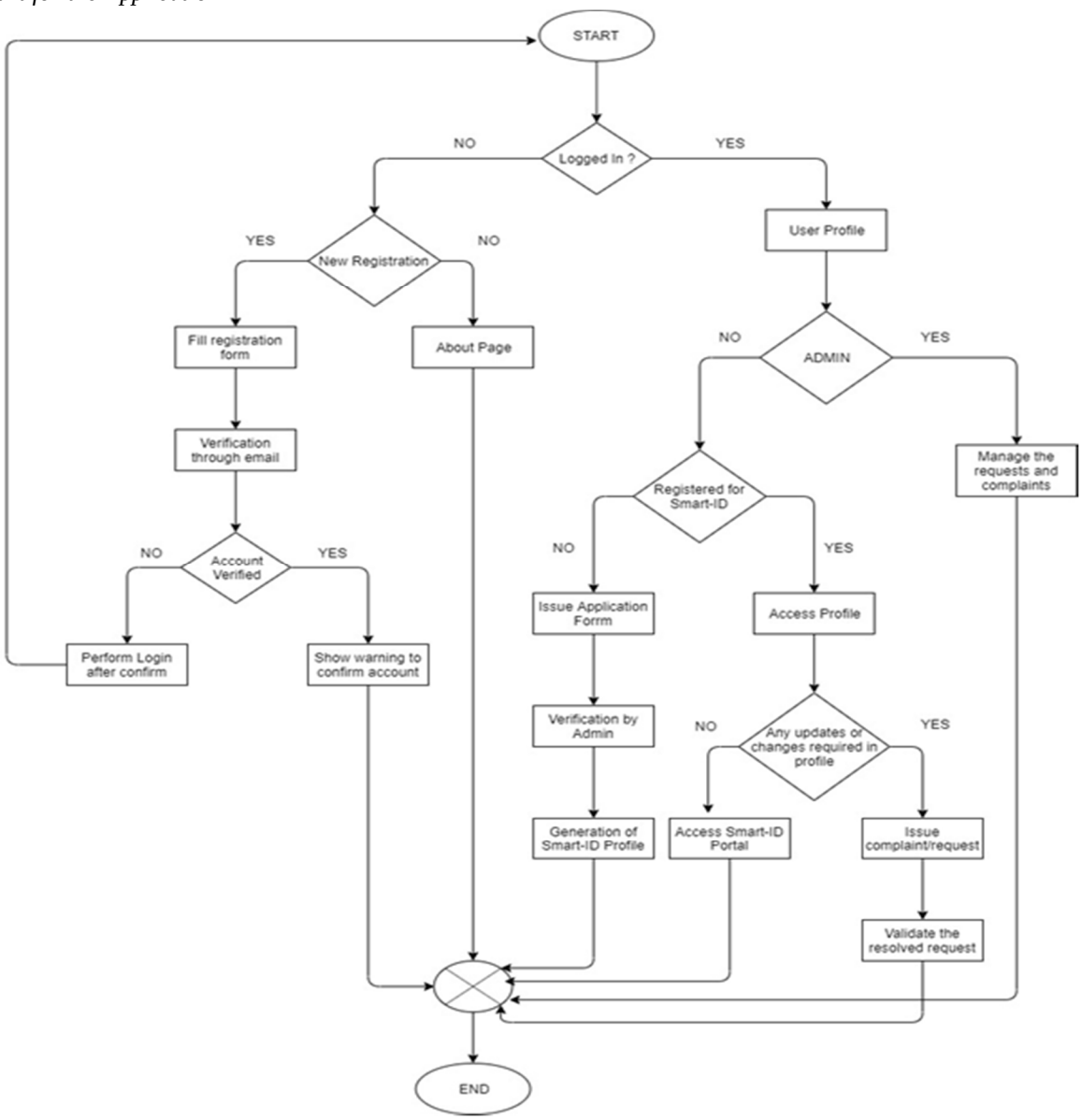

Fig. 1 Flowchart for the application

V. STUDENT MODULE

A. Information about student module

We've designed an interactive web portal for the Smart-ID Project where all the information can be collectively stored in the database for a student. A student can create an account on the web portal of Smart-ID by providing his/her basic information such as enrolment number, module, batch, contact number, email and setting up a password. After setting up the account with basic details mentioned, students have to confirm their account through the confirmation link sent to their registered email address. Students can login to their account to view their information and submit a request for the issuing of Smart-ID. Once issued and registered onto the Smart-ID Portal, students can view and add money to the Smart-ID Wallet, view balance and transaction history. Students can also upload their profile picture and edit their profile details via the portal.

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B. Request Process for Smart-ID

The request process for smart-ID cards is divided into three different sub-processes. First, the student applies for the smart card by clicking the "Request for Smart-ID" button on their profile. The request goes to the admin panel. Then, the admin can approve or reject the request as per the verification of the details. A confirmation notification is sent to the student about the acceptance or rejection if the request is rejected by the admin. After the acceptance, the students can access their smart-ID profiles after an initial payment completion via the web application.

C. Payment Process for Smart-ID

A student/faculty after successful completion of the request process is allowed to proceed with payment for registration/recharge of his/her Smart-ID card. The user is advised to follow the instructions displayed on the screen and proceed to fill details for payment on the form displayed. The form is submitted and a charge for the specified amount is generated by the server and sent for processing the payment. The user is requested to fill the required OTP/Passcode to allow the charges to be deducted by the application from the user's bank account/e-wallet/payments bank etc. Upon successful payment, the user is displayed his payment reference number and payment receipt which can be easily downloaded in PDF format. The reference number is to be kept safe, in case of unsuccessful payment.

D. Screenshots

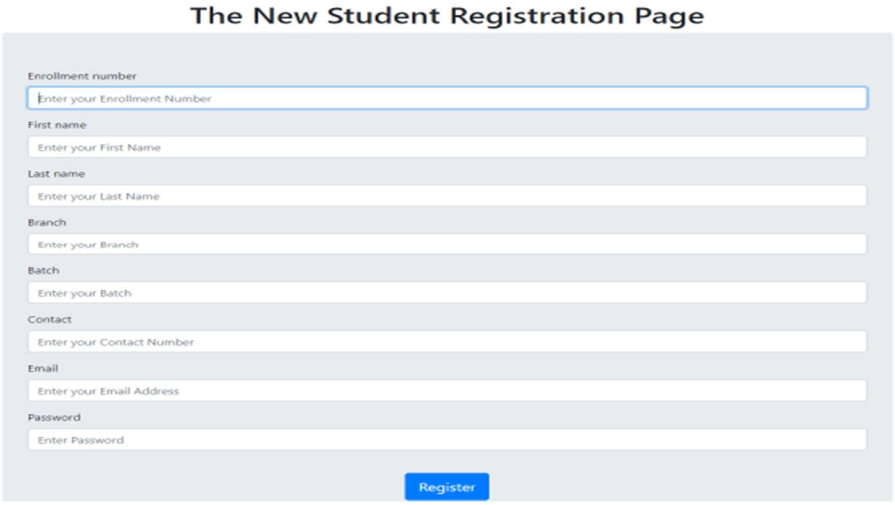

Fig.2 Registration portal for students

Fig.3 Smart-ID Profile for students

E. Approval of Smart-ID by Admin

After the completion of initial payment, the student is given a smart-ID card for the purpose of small transactions. The Smart-Card is mapped to the corresponding student in the Smart-ID DB. The student can also access a Smart-ID profile through which they can see their transactions and track their card balance. The profile can also be used to register grievances and feedback to the admin about the Smart-ID.

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VI. FACULTY MODULE

A. *Information about faculty module*

Faculty module of web application is provided to be used by the faculty members of the college/university. It allows the faculty members to create a custom profile and update their status or manage their daily schedule. The proposed module is similar to the student module as it allows the faculty member to avail the Smart-ID card, similar to that of student id card, but allows them to have special privileges over students such as daily attendance tracking along with fingerprint/eye print, restricted access to faculty areas etc. The faculty members can access their profile online using the Smart-ID web portal. The faculty members have full access to the student's database except their personal details, or they have access to only students' academic details. This allows them to prepare the complete year report of students and remove the hassle of collecting data from students on every annual assessment/examination, feedback for the courses attended in the semester etc.

B. *Special privilege for faculty module*

The faculty members have a special privilege over the students that they can access the profiles of students belonging to the same batch / year. This allows the faculty members to access the student records when required to generate the exam/assessment report and track the performance of each student as they proceed further in the course. The details can also be used to analyse the attendance of each student

VII. ADMIN MODULE

A. *Approval for smart-card for users*

The admin is authorised to provide a smart-card to the users registered in the Smart-ID database. The administrator approves the application for Smart-ID and makes the student eligible for payment. Administrator approves the application for Smart-ID and makes the student eligible for payment

B. *Payment Approval*

The initial payment for the Smart-Card is approved only after the details of the user is verified by the admin. The initial payment can be done via the web application using the payment gateway.

C. *Special privileges for admin module*

The admin has several special privileges over the users of the smart-ID that they can access profiles of any user present in the database. The admins can update or delete the profile of any user in the database. Users can recharge their smart-card by requesting the admin also.

D. *Screenshots*

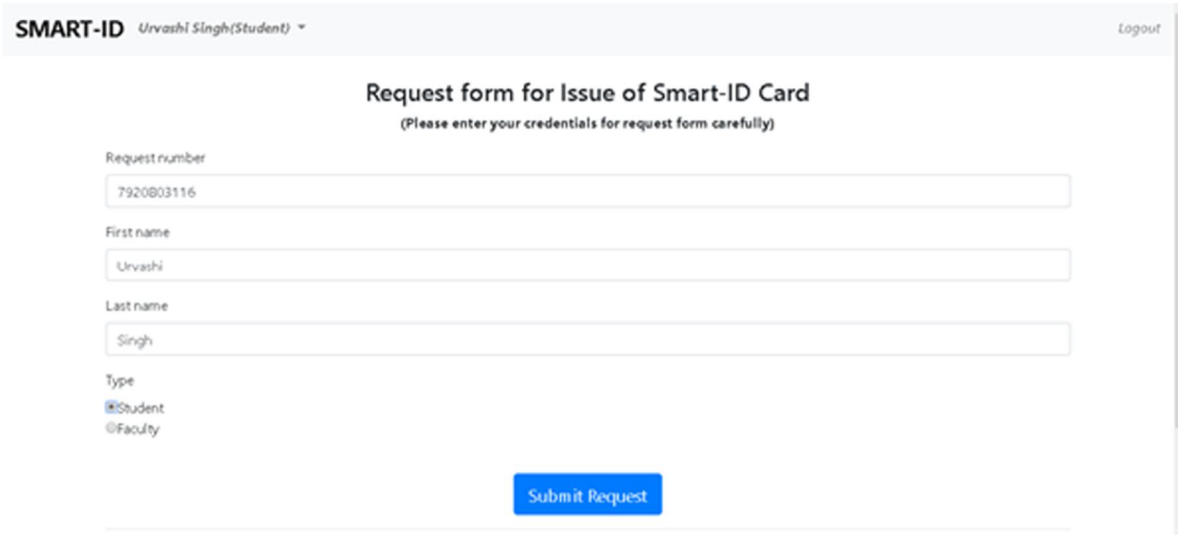

Fig. 4 Request Form for Smart-ID Portal

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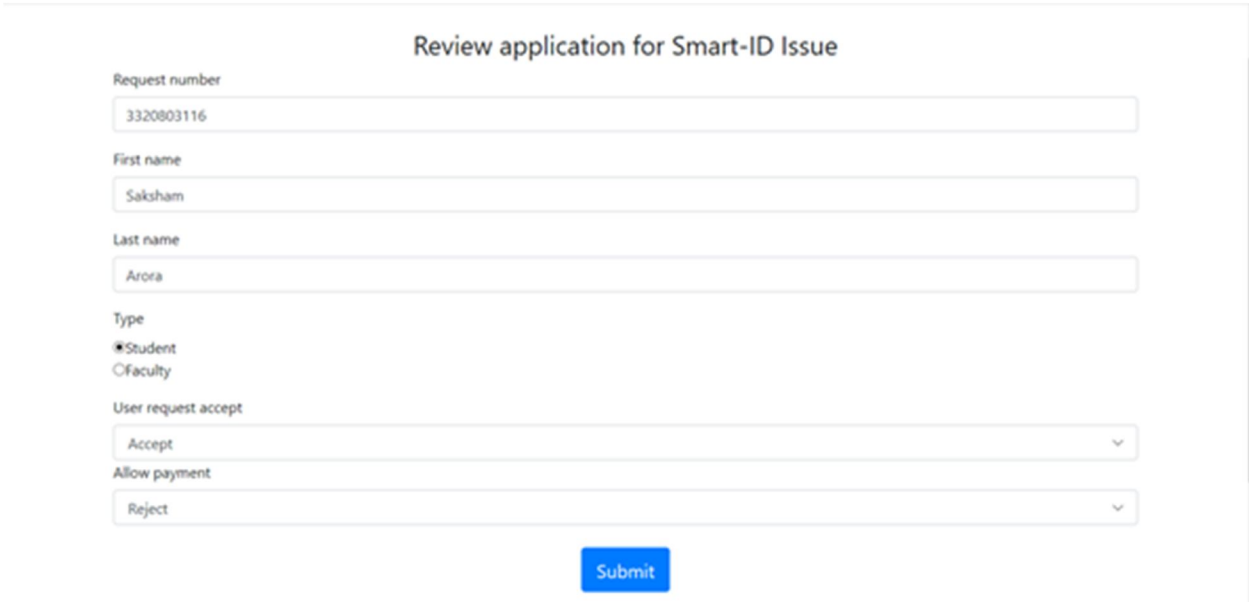

Fig. 5 Request Approval by Admin

VIII. CONCLUSION

The web application of the Smart-ID project has been successfully developed and tested to work in a college campus. The application is currently operating under the three main feature modules which allows the student, faculty and administrator to access the application through their respective portals by logging in to the application. Currently the project emphasizes the use of application by students keeping them the main user of the application. The personal profile maintenance, Smart-ID portal and transaction requests are all fully functioning and can be easily deployed on the online platform as suggested by authorities. The production deployment of the application is yet to be tested in the live environment as it requires the integration of hardware modules of the application which will allow the students to use the Smart-ID portal in campus. The Project is set to work in a campus region only so it currently supports payment and registration of students of college. The Smart-ID can be issued to work at a university level with proper scalability measure

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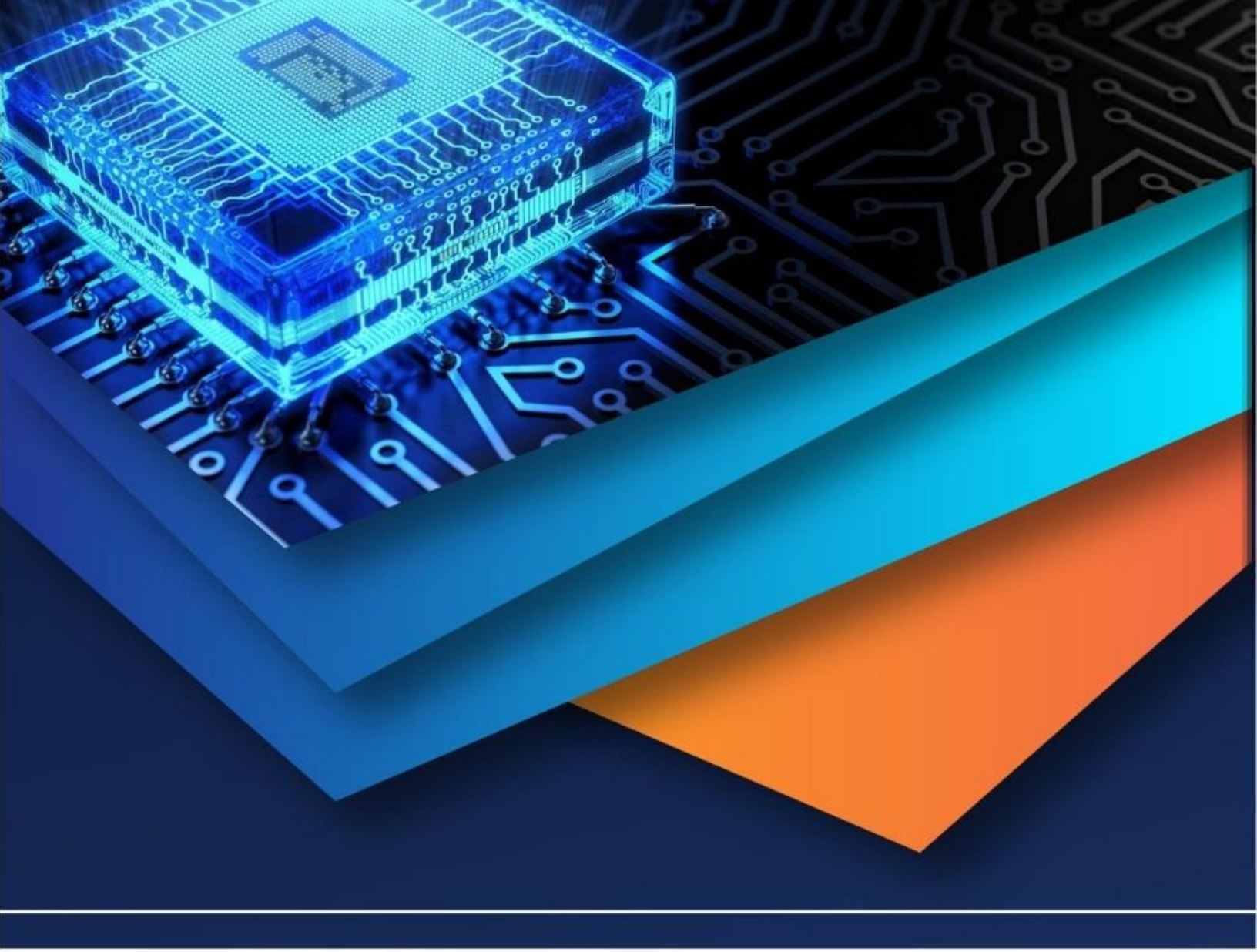

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