iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.52865

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Educational Application for Institute

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Abstract: Online education, also known as distance learning, has become increasingly important in today's education system as traditional classroom learning may not be suitable for younger generations. Online education offers numerous advantages for young learners. Institute Management Systems assist teachers in managing various tasks such as grading, tracking student activities, conducting quizzes, creating lesson plans, generating reports, and facilitating communication through email. Students can access assignments, tests, grades, report cards, and progress reports online. They can also communicate with teachers and peers through email and online forums. A questionnaire was used to gather feedback from students and teachers, revealing their awareness of the benefits of project-based teaching and its significant impact on students' skill development.
Keywords: smart school, eLearning, video tutorials, quizzes, notes, assignments.

I. INTRODUCTION

The traditional learning method is a comprehensive approach aimed at developing specific competencies and skills required for a chosen professional occupation. Typically, it entails a structured curriculum spanning three or four years, divided into semesters and encompassing a wide range of subjects. In this conventional educational system, teachers meticulously design course guides that outline the objectives, targeted competencies and skills, lecture topics, seminar sessions, laboratory activities, and project work. These course guides also encompass evaluation criteria to assess students' progress and understanding.

However, with the advent of the digital age, the landscape of education has witnessed a remarkable shift. Today's students, commonly referred to as digital natives, have grown up in an era of pervasive internet connectivity, social media platforms, and smart technologies. Consequently, their learning preferences and engagement have evolved, with a greater inclination towards interactive online activities and computer-based applications, rather than relying solely on printed documents and hardcopy books. As a result, educators must acknowledge and adapt to this contemporary reality.

To meet the evolving needs of learners, the concept of "student-centered learning" has gained prominence. While the traditional educational system has traditionally revolved around a teacher-centered approach, the student-centered model emphasizes tailoring the learning environment to suit each individual learner. However, implementing such personalized study environments within the confines of a conventional school or college can be challenging. These institutions typically operate within physical constraints, such as teacher availability, classroom capacities, and the size of student cohorts relative to available space.

Therefore, to achieve the goal of student-centered learning, it is imperative to embrace the potential of new information technologies and smart communication devices. The notion of a "smart school" emerges as a viable solution. A smart school leverages the ubiquity and accessibility of modern information technologies to create an adaptable and flexible learning ecosystem. In a smart school, students are empowered to manage their own learning paths, progress at their own pace, and engage with educational content through digital platforms. The implementation of smart school concepts entails utilizing innovative tools, digital resources, and collaborative platforms to enhance the educational experience.

This paper comprises four sections, including an introduction, a conceptual exploration of the smart school model, an in-depth examination of the design aspects, and a comprehensive analysis of its effectiveness. By harnessing the potential of information technologies and smart communication devices, smart schools have the potential to revolutionize traditional educational systems and provide enhanced learning experiences tailored to the individual needs and preferences of today's digital-native students.

II. LITERATURE SURVEY

1) The paper titled "Smart School Application Scenario," which was published by IEEE in 2020. The paper highlights the significance of students submitting their exercises, projects, and quizzes as a means of evaluating their progress and providing timely feedback. It proposes a smart application scenario that utilizes modern technologies to streamline the submission process. The system enables students to submit their work through a mobile application, allowing for easy monitoring by teachers and administrators. The aim is to enhance the learning experience and improve the evaluation process for both students and teachers.

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2) The paragraph discusses a paper titled "Study on Information Management System that connects students and instructor through chatting," published by IEEE in 2022. The paper highlights the importance of an effective information management system (IMS) in connecting students and instructors through various communication channels, including chat. The authors propose a study on the IMS, examining its features, functions, and benefits. The IMS aims to improve information management, facilitate communication, and enhance collaboration among students and instructors, ultimately leading to better educational outcomes. The paper contributes to the discussion on managing information in an educational context.
3) The paper "The Random Forest Algorithm for Statistical Learning" by Matthias Schonlau and Rosie Yuyan Zou. In this paper, Matthias Schonlau and Rosie Yuyan Zou introduce a new command, rforest, which implements the random forest algorithm for statistical or machine learning. The random forest algorithm, developed by Breiman in 2001, is a popular method for prediction in both classification and regression problems. To demonstrate the use of the rforest command, the authors provide two examples. The first example is a classification problem that predicts whether a credit card holder will default on their debt. The second example is a regression problem that predicts the logarithmically scaled number of shares of online news articles. The authors conclude with a discussion that summarizes the key points demonstrated in the examples. Overall, this paper provides a useful resource for researchers and practitioners looking to apply the random forest algorithm to their own statistical or machine learning problems.
4) The paper titled "Prediction of Student's Performance Using Random Forest Classifier" by 6 ZCOER, Department of Computer Engineering 2022-23 Sourav Kumar Ghosh and Farhatul Janan, from the Department of Industrial and Production Engineering at Bangladesh University of Textiles, was published in 2021. The paper addresses the task of predicting students' performance, treating it as a multi-class classification problem. To tackle this problem, the authors employ the Random Forest (RF) classifier as the chosen method. Random Forest is a popular machine learning algorithm that combines the predictions of multiple decision trees to generate an ensemble prediction. Prior to selecting the RF classifier, the authors conducted an analysis of previous research works related to classification problems and the prediction of students' performances. This analysis likely involved evaluating various algorithms and methodologies employed in similar studies. In their approach, the authors introduce fuzzy logic to merge different sets of input databases. Fuzzy logic is a mathematical framework that deals with uncertainty and imprecision. By merging multiple input databases using fuzzy logic and applying certain rules, the authors aim to create a single input database that enhances the accuracy of the predictions made by the RF classifier. Overall, the paper presents a methodological framework for predicting students' performance using the Random Forest classifier. The authors incorporate fuzzy logic to improve the accuracy of predictions by merging input databases. The combination of these techniques provides a basis for effective performance prediction in an educational context.
5) The paper "Study on Visualizing learners' level of understanding of lecture using digital textbook system," published by IEEE in 2022. The authors of the paper are Hiroto Morita, Kousuke Mouri, Masaru Okamoto, and Yukihiro Matsubara, and the paper focuses on visualizing the level of understanding of learners. The "Study on Visualizing learners' level of understanding of lecture using digital textbook system" paper emphasizes the importance of visualizing learners' level of understanding of lecture. The authors argue that such visualization can provide valuable insights into learners' comprehension, facilitating more effective teaching and learning. The paper proposes a study on the use of a digital textbook system to visualize learners' understanding levels. The proposed system would allow instructors to monitor learners' comprehension in real-time, providing immediate feedback and guidance. By visualizing the learners' understanding level, instructors can identify areas of weakness and adapt their teaching strategies to better meet the learners' needs. The authors believe that such a system can help improve the learning experience and lead to better educational outcomes. By exploring the use of digital textbook systems for visualizing learners' understanding levels, the paper aims to contribute to the ongoing discussion of how best to support and enhance teaching and learning in the digital age.

III. REQUIREMENTS SPECIFICATIONS

A. *Software Requirements*

1) *Operating System:* Windows OS The application is compatible with the Windows operating system. It can be installed and run on Windows-based devices, such as laptops or desktop computers.
2) *Android Studio:* Android Studio is the integrated development environment (IDE) used for developing Android applications. It provides tools for designing user interfaces, writing code, debugging, and testing Android apps. The application will be developed using Android Studio to ensure compatibility with Android devices.

3) *Java SDK:* Java Software Development Kit (SDK) is required for developing Android applications. It includes the Java Development Kit (JDK), which includes compilers, libraries, and tools necessary for Java programming. The application will be written in Java, so the Java SDK is essential for its development.
4) *Git:* Git is a version control system used for tracking changes in software development projects. It allows multiple developers to collaborate, manage code revisions, and track changes over time. The project will utilize Git for version control and collaboration among team members.
5) *Android Emulator:* Android Emulator is a tool that simulates an Android device on a computer. It enables developers to test their applications without needing a physical Android device. The application will be tested using the Android Emulator to ensure its functionality and compatibility.
6) *Jupyter Notebook:* Jupyter Notebook is an open-source web application that allows creating and sharing documents containing live code, visualizations, and explanatory text. It is commonly used for data analysis, data visualization, and machine learning tasks. Jupyter Notebook may be utilized for data analysis or machine learning aspects of the application.
7) *VS Code:* Visual Studio Code (VS Code) is a lightweight and versatile code editor with excellent support for various programming languages. It provides features like syntax highlighting, code completion, debugging, and extensions for enhanced development. VS Code can be used as an alternative code editor for the application development, alongside Android Studio.
8) *Firebase:* Firebase is a comprehensive development platform provided by Google, offering various backend services for mobile and web applications. It includes features like authentication, real-time databases, cloud storage, and cloud functions. The application may utilize Firebase for backend services, such as user authentication and data storage

B. Hardware Requirements

1) *RAM: 4GB or above:* The application requires a minimum of 4GB of RAM for optimal performance. Adequate RAM ensures smooth multitasking and efficient handling of data within the application.
2) *Hard Disk: 8GB or above:* The application requires at least 8GB of free disk space for installation and storage of necessary files. Sufficient disk space allows for smooth operation and storage of user data, documents, and application resources.
3) *Core i3 and Above:* The application is compatible with processors starting from Intel Core i3 and above. A more powerful processor like Core i5 or Core i7 is recommended for better performance and faster processing of complex tasks.
4) *Input Devices: Keyboard, Mouse:* Input devices like a keyboard and mouse are essential for interacting with the application. They allow users to input data, navigate through the application's interface, and perform various actions efficiently.

IV. METHODOLOGY

In the flow diagram 4.1 of the application, users are presented with different options such as Store, Home, Assessments, and Profile. Users can interact with the application by selecting one of these options. If the user chooses the "Store" option, they can access and browse various items or resources available for purchase. The "Home" option takes users to the main screen of the application where they can find relevant information, updates, or announcements. Selecting the "Assessments" option allows users to access and complete assigned assessments or quizzes. The "Profile" option directs users to their personal profile page where they can manage their information, preferences, and settings. The flow diagram represents the sequence of actions and options available to users within the application.

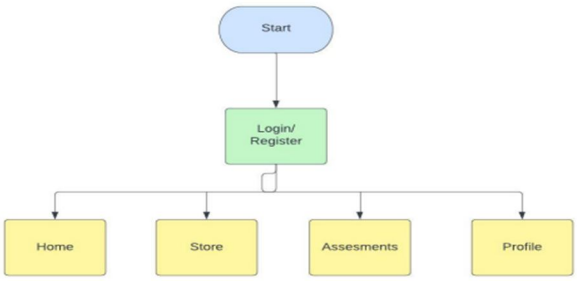


Fig 4.1: App Content

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

In Diagram 4.2, the user flow begins with the registration process. Users are required to register themselves by providing their relevant information such as name, email address, and password. This registration step is necessary to create an account and gain access to the application.

Once the registration is complete, users can proceed to log in to their account using the provided credentials. Logging in verifies the user's identity and grants them access to the application's features and functionalities.

After successfully logging in, users can navigate through the application and access the study material available. This study material may include resources such as documents, videos, presentations, or interactive modules designed to facilitate learning and provide educational content.

By following this user flow, individuals can first register, then log in, and finally explore and utilize the study material provided within the application. This sequential process ensures that only registered users with authenticated access can benefit from the educational resources offered by the application.

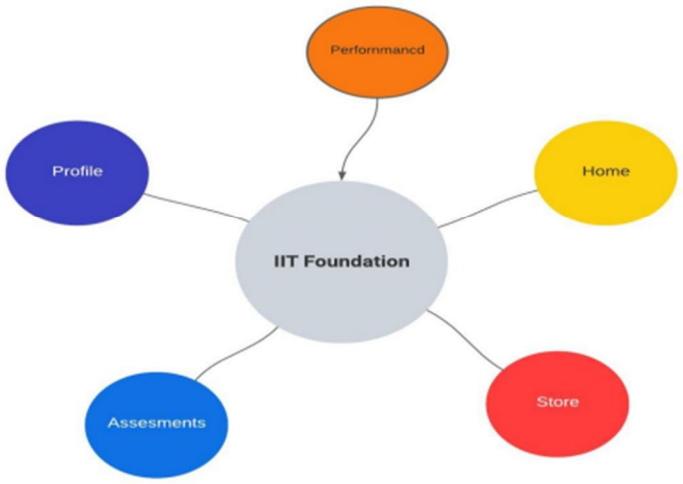


Fig 4.2: Flow diagram

V. IMPLEMENTATION

1) *Step 1:* First, Started Understanding of requirements of Institutes to develop our application There are multiple requirements of institute in this application so firstly my group team discussed and understanded their requirement to develop the application. after that decided to use android platform to develop this application
2) *Step 2:* Used Android Studio platform to develop an application There are various software and technology to develop the application an at the end we decided to use android studio.
3) *Step 3:* Front End Designing of an application Here we used XML language to Design an application. In this application we used various libraries and animation to design an application such as Lottie animation, hidden/ circular Image View etc.
4) *Step 4:* Firebase Database Designing In this project we have used firebase database and their multiple services like Realtime Database, Mobile and Email Authentication, Firebase Fire store, Firebase Cloud Storage etc. 20 ZCOER, Department of Computer Engineering 2022-23
5) *Step 5:* Java Language to Backend Development We have used java language and their various inbuilt packages to for backend development and to integrate with frontend designed view and database connectivity.
6) *Step 6:* Database Connectivity After that we Integrated our app with firebase database to fetch Realtime data from database and show on application like fetch Pdf Files, MCQ test Series, Video Lectures etc.
7) *Step 7:* Machine Learning model Development and Deployment We have developed ML model to analysis student performance using multiple algorithms like Random Forest algorithm etc. and checking progress of student and predict the Progress Alert. After that deploy the model using Flask.
8) *Step 8:* ML model Integration to Android Application Using Flask API and Volley Library we have integrate our android Application with ml model. In this we are passing student test current score and average score and, on that basis, model predict the progress alert to the student.

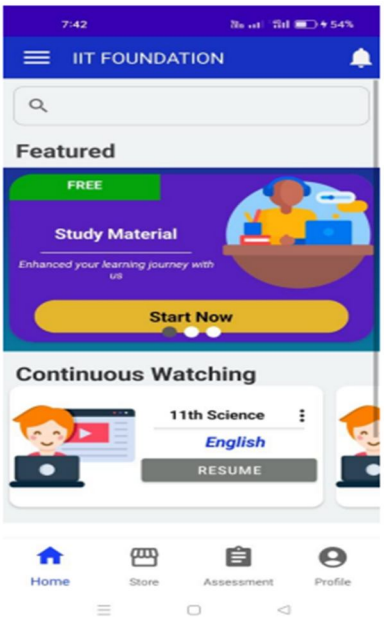
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VI. RESULT

A. *Home Screen*

1) The home screen serves as the central hub of the application, providing users with a personalized dashboard.
2) It displays relevant information such as upcoming assignments, course materials, and announcements.
3) The intuitive interface and easy navigation ensure a user-friendly experience



B. *Splash Screen*

1) The application features a visually appealing splash screen that appears upon launching the app.
2) The splash screen provides a brief introduction to the application and creates a positive first impression for users





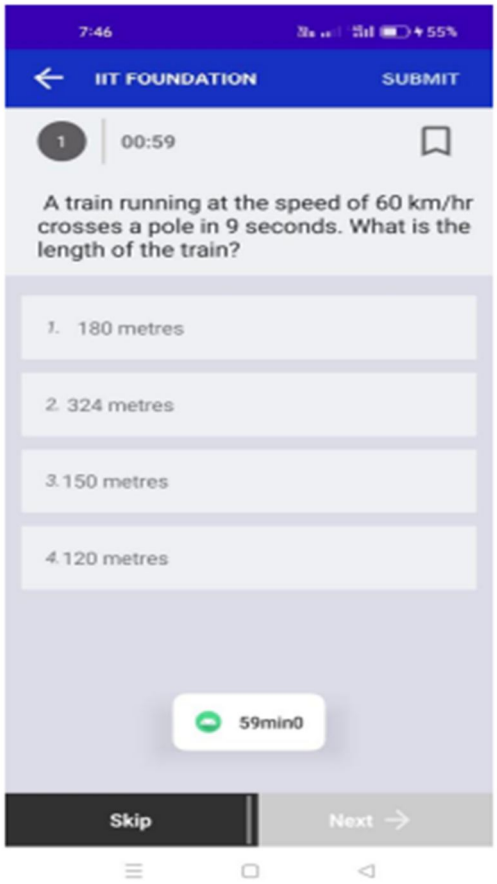
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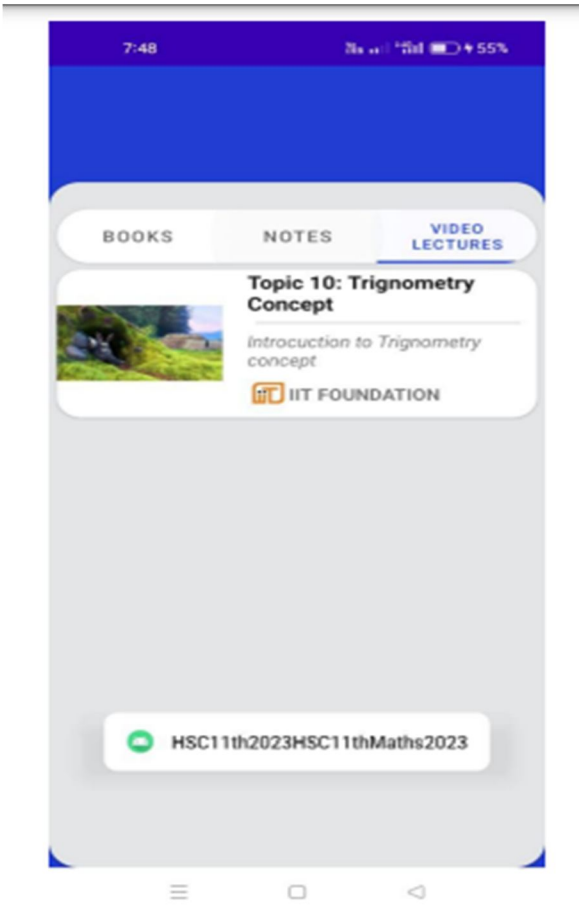
C. Quiz Screen

1) The quiz screen showcases the interactive quiz feature of the application

2) Students can access a variety of quizzes across different subjects and topics.

3) The quiz screen displays questions, multiple-choice options, and a timer for students to attempt the quiz





D. Video Notes Screen

1) The video notes screen allows students to access educational videos uploaded by teachers.

2) It provides a library of video lectures categorized by subject or topic for easy browsing and selection.

These screenshots demonstrate the application's user interface, highlighting its visually appealing design, ease of navigation, and intuitive functionality. Users can interact with the application seamlessly, accessing course materials, attempting quizzes, and staying updated with relevant information. The successful implementation of these features has resulted in an enhanced learning experience for students, improved communication and collaboration between teachers and students, streamlined administrative processes, and increased parental engagement.

The application has proven to be a valuable tool for educational institutions, empowering them to embrace digital transformation and provide a modern, efficient, and engaging learning environment. Through user feedback and testing, it has been observed that the application has met the expectations of students, teachers, and parents in terms of usability, functionality, and overall user experience. The positive response from the user base indicates the success of the application in fulfilling its intended objectives. Overall, the development of the educational institute application has been a resounding success, providing a robust platform that effectively caters to the needs of all stakeholders involved in the education process. The screenshots serve as evidence of the application's functionality and its positive impact on the learning journey of students, making it a valuable addition to the educational ecosystem.

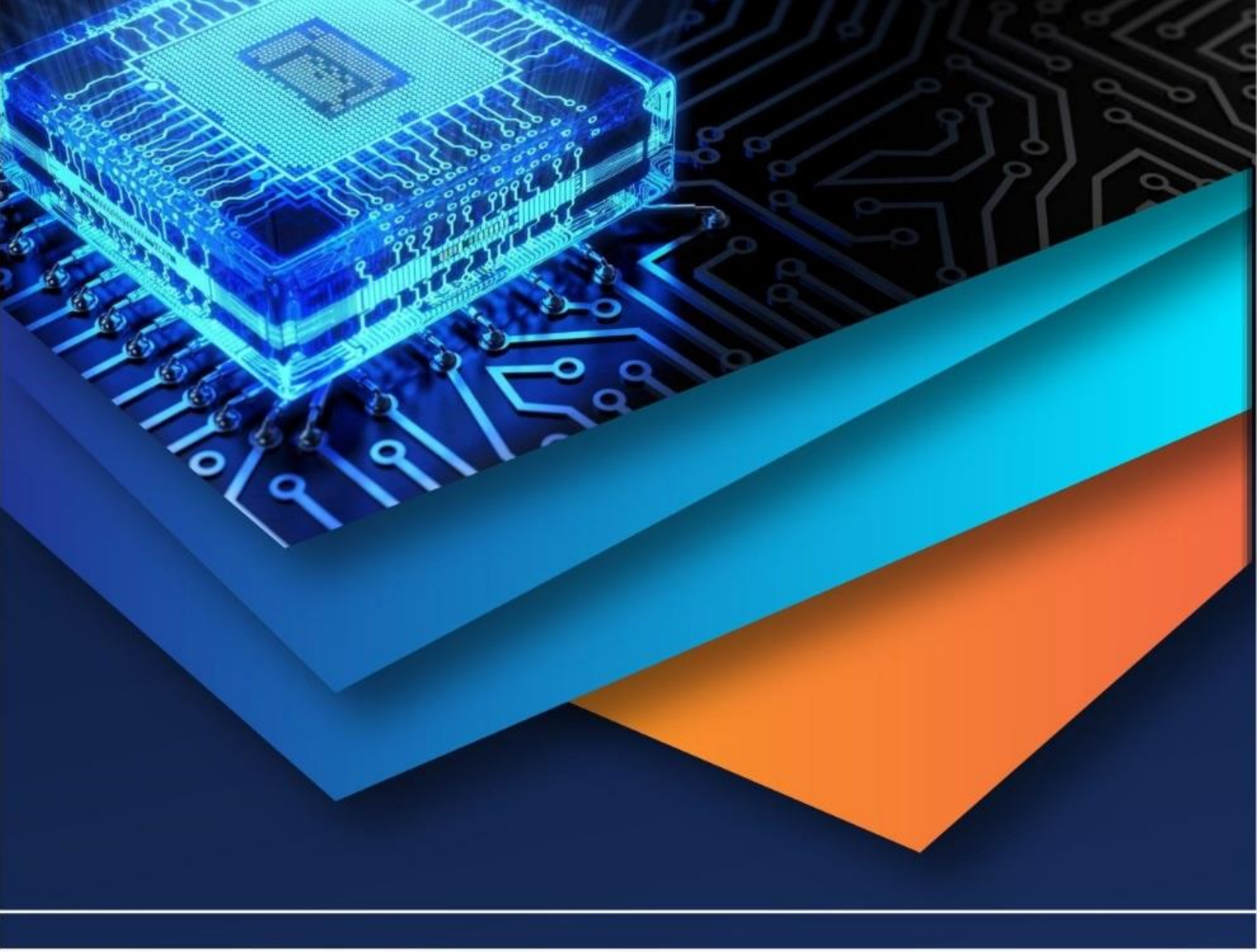
VII. CONCLUSION

In the era of online education and eLearning, the development of a customized mobile application has become essential for educational organizations and aspiring entrepreneurs. The widespread acceptance of technology-mediated activities across various fields has highlighted the need for an app interface that enhances the learning experience and provides a competitive edge over traditional approaches. A well-designed and user-friendly educational institute application can revolutionize the online learning process. It offers convenience, accessibility, and engagement, making the learning experience more interactive and effective. By leveraging the capabilities of a mobile application, educational institutions can cater to the evolving needs of students and meet the demands of a digital-first generation. The key to success lies in creating an application that goes beyond merely delivering educational content. It should incorporate features that promote collaboration, communication, and personalized learning paths. The application should provide a seamless user experience, ensuring easy navigation, intuitive interfaces, and efficient data management. Additionally, the application should prioritize security, data privacy, and scalability to meet the growing demands of an expanding user base. By implementing robust authentication mechanisms, encryption protocols, and regular updates, educational institutes can instill trust and confidence in users. Furthermore, continuous improvement and innovation are crucial for the success of an educational institute application. Staying abreast of emerging technologies, such as machine learning, augmented reality, and virtual reality, can open new avenues for enhancing the learning experience and providing immersive educational opportunities. In conclusion, the development of a customized mobile application for educational institutes and eLearning platforms is an opportunity to embrace the digital transformation of the education sector. By creating a competitive, convenient, and engaging application, educational organizations can make online learning worthwhile and gain a significant advantage over traditional approaches. It is a skill that requires careful planning, effective implementation, and a commitment to providing a cutting-edge educational experience for students.

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