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"inᐯRted – Interactive Navigation by Virtual Reality Tour of Electronics Department"

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Abstract: ***The purpose of this study is to design a navigation tool that helps users in exploring a place without actually having to move about. The 3D model of the virtual campus offers a characteristic and genuine visual representation of the campus. Also, keeps great interaction with clients so that gathering of people to see through and encounter the feeling of really being right there inside the campus. We all have the experience of getting lost and missing our way in an unfamiliar region or unknown place. Similarly, the freshers or the visitors who are visiting the university for the first time might encounter the identical issue once they enter the Campus. To make it convenient for them, we offer an easy platform for navigating locations inside the college Campus. According to the final idea of the project, the design should provide a typical location selection input with the corresponding output. Users can properly choose the doorway from our campus or a selected location on a distinct floor, and also the best-suited way is shown on display step by step. The purpose of designing this aspect is to let users remember the destination whether or not they are required to travel in-home or on the way before coming to our campus.***
Campus visits are among the openings for colleges and colleges to point out their resources, amenities, and accomplishments to guests and students. Several universities are utilizing similar technology as a mobile campus touring application like customized maps to create for the visitors at home self-guided campus go through devices. Our project will provide a Virtual 3-Dimensional experience in the navigation of the College Campus.

I. INTRODUCTION

These days it's more inconvenient to visit universities, resorts, and other faraway destinations without any prior knowledge of the layout/architecture of the destination. People are less likely to visit or don't want to visit in person. Virtual tours help solve this challenge by giving users the ability to explore destinations in their comfort of time and place. Also, allowing the destination to show off what makes it so special.

In the past few years, we have seen an exciting race for the miniaturization of computing devices. Tasks that were once performed by instruments that took up large space and were not portable can now be accomplished on a device that fits into a human hand. A handheld device is a small computing device that has a display screen with touch input or a keyboard. These handheld devices can also have Wi-Fi, Bluetooth, and GPS facilities.

There are many navigation applications such as Yahoo Maps, Google Maps, and MapQuest that provides their users with directions from one location to another. However, these applications are not able to provide routes that are as precise as an on-campus path would require. GPS navigation is a commonly used assistant during a trip. By using this navigation system, travellers can quickly arrive at their destination when in an unfamiliar area with complete ease. GPS tracking devices are capable of telling the user his/her approximate latitude, longitude, altitude, time, and several satellites were seen. Therefore, this concept is used to design a navigation system for college campuses, theme parks, etc.

A campus may be a complex infrastructure. Especially new students and folks who are there for the very first time find it very difficult to orientate themselves and find various places. Whether or not there are maps at some points on the campus, users don't have continuous guidance to get to their desired destination. It's human nature to attempt in finding the simplest & shortest way to reach to their destination using these various static maps, but as they begin to steer within the target direction, they have no help.

It's quite hard to find systems that provide pedestrian navigation. Therefore, to help the newcomers familiarize themselves and adapt to the new Campus department and find the various labs, classrooms, etc in the department a virtual 3D navigator is designed. Visuals are more immersive and impactful; the human brain can handle pictures up to 60,000 times quicker than words. The point is with a picture, you'll be able to convey so much more data than you'll be able with words. In reality, it can take a thousand words fair to portray what is in one picture.

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The interactive virtual campus based on different software relies on the real scene of the university to display the interactive virtual campus. Embedding a virtual campus into the college's site can realize the interaction between the webpage and the virtual campus so that the guests/newcomers do not ought to spend as well much time looking for information about the campus, they can visit the site to realize the virtual conditions of the school's buildings, classrooms, lanes, and different campus offices.

II. RELATED WORK

University campuses can be considered miniature cities, which consist of buildings within a large area. A study focusing on constructing a 3D campus, which can be extended to meet future applications for campus management using aerial photos and site verifications to produce 3D models adhering to CityGML standards. The CityGML models were built using feature manipulation engine (FME) software that allows manipulation, conversion, and transformation of data. This paper presents the methods used to construct a virtual 3D Campus for Universiti Teknologi Malaysia (UTM) at the level of detail 2 (LoD2) of CityGML based on aerial photos and site visits and verifications. [1]

The present work focuses on the design, development and prototype of a joystick for use in the navigational control system for a self-balancing vehicle for specific u The design of the joystick has been fabricated using conventional manufacturing methods to keep costs down. The ultimate goal is to provide an easier experience for navigational controlling. [2]

Having identified a scarcity of evidence-based design principles and practices for patient-centered healthcare environments, researchers at the Purdue University Regenstrief Center for Healthcare Engineering have developed a Virtual reality (VR) mock-up of a hospital patient room. This paper explores the efficacy for identifying how physical environment and design elements impact behaviour, processes and safety.

The VR patient room mock-up is designed to have a high degree of interactivity to facilitate evaluation of the designed space as a "healing environment." Positive feedback from healthcare practitioners. [3]

Based on comparison and induction, combined with the application of unity 3D technology and its technical points, determining the model classification of the Virtual Campus roaming system. At the same time, investigating the successful cases of unity 3D technology in other fields, especially in-game applications, and enhancing the technical feasibility of virtual roaming systems. After analyzing the layout of the real campus environment, design and plan the development process of 3DS Max and Unity 3D technology combination.

The development of a virtual campus environment first needs to build the model, including the model of terrain, buildings, campus scenic spots, and other accessories. The virtual campus scene is built through 3dsmax, and then imported into unity 3D software for interactive design.

III. SCOPE

To bring the campus to prospect and highlight the unique landmarks, buildings, and history. Sharing the college experience with family. Highlighting the campus life to promote activities. To provide vital information and navigation on the campus to visitors.

The latest cutting-edge technology of virtual reality is immersive. It permits your gathering of people to plunge profoundly into your campus life, making it feel nearly as if they've become a part of it. It's a ceaseless involvement, from the minute they dive in all the way until the end.

Designing a custom outline of your area so exact it'll seem as though you're strolling through it. Changing structural drawings or photographs into 3D buildings, virtual models like strolling around a real-life area. Incorporate virtual reality and pictures that are dazzling, but visually designed.

Making it possible for your audience to be immersed in any existing or imagined space. This platform lets your audience fully understands what they need to know and where they need to go.

Navigating a major architecture can be strenuous without any knowledge of its layout. This project will help you navigate the architecture allowing a real-life experience through virtual reality, Guiding you through the architecture to your destination. In massive hospitals and Universities where the layout is like a maze, getting lost could be easy. In companies where there are various offices, a modern worker must explore for the first time a division he's been assigned to without being late. This virtual 3D navigation makes it simpler to keep in mind the route to the destination.

This venture is particularly accommodating to the hearing and speech impaired. Pictures can depict unique and complex concepts such as facial expressions. Pictures can immediately alter your disposition and take off impressions much quicker and much more precisely than words can. Pictures can conjure sentiments of bliss, pity, and others. Visuals invoke a positive feeling!

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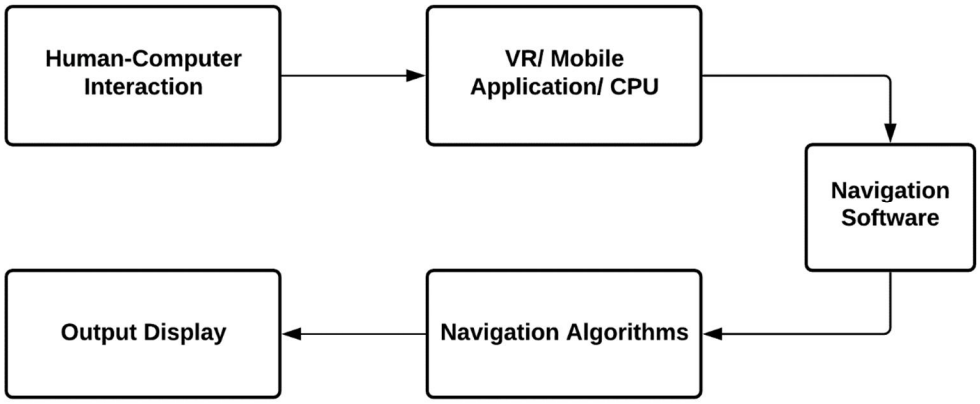
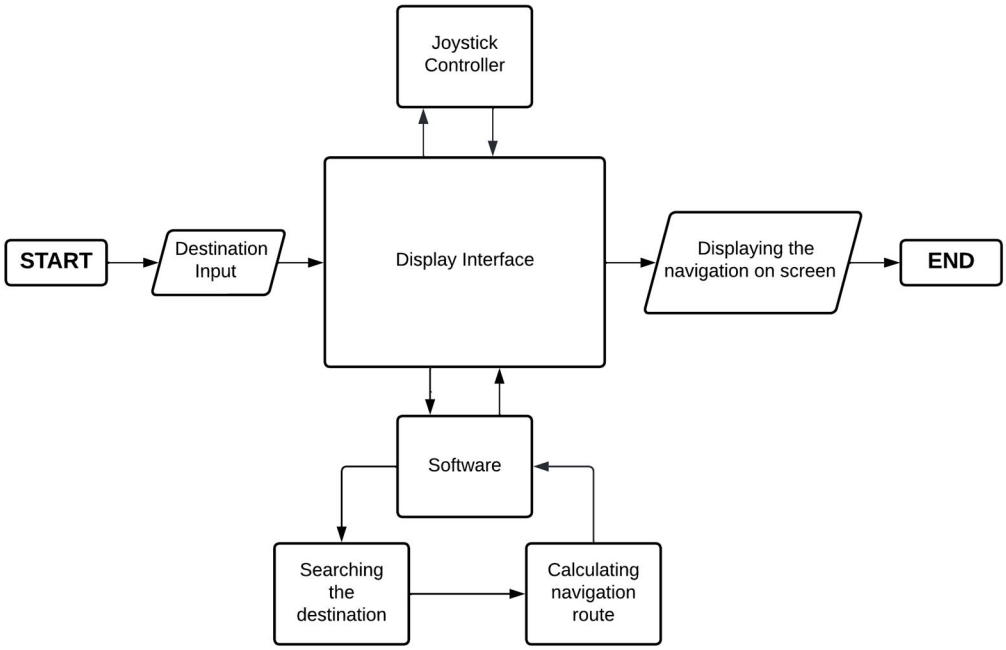
IV. PROPOSED METHOD



We have planned to use the methodology stated above in the block diagram to achieve the objectives of this mega project. We will be making the software with a gaming engine called Unreal Engine. It is a free and powerful engine provided by Epic Games.

V. EXPERIMENT DESIGN



VI. IMPLEMENTATION

Unreal Engine is a game engine that is used to create applications. There will be buttons on the software's interface for entering the source, destination, and leaving the application. Additional buttons show on the screen when the user picks a source or destination. The client has the option of selecting his or her own supplier (by default the beginning point will be the entrance). Similarly, once the source has been chosen, the client can enter the objective by selecting one of the many buttons. These inputs will be kept in a variable, and those factors will be used to find the shortest path from the source to the destination.

For the design layout, the software builds a network mesh, in which each location is traced by calculating the nodes that add up from source to destination. This enables the shortest path with the fewest number of nodes to be calculated.

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The navigation interface will be in real time 3D to make it as reliable as possible. A lifelike interface will help the navigation be more immersive and impactful.

There are multiple display methods that can be used :

Smart mirror – A stand-alone model can be used at the entrance of the building. The smart mirror is a dual display screen that acts as a mirror as well as a display screen. This can be implemented to make it more presentable.

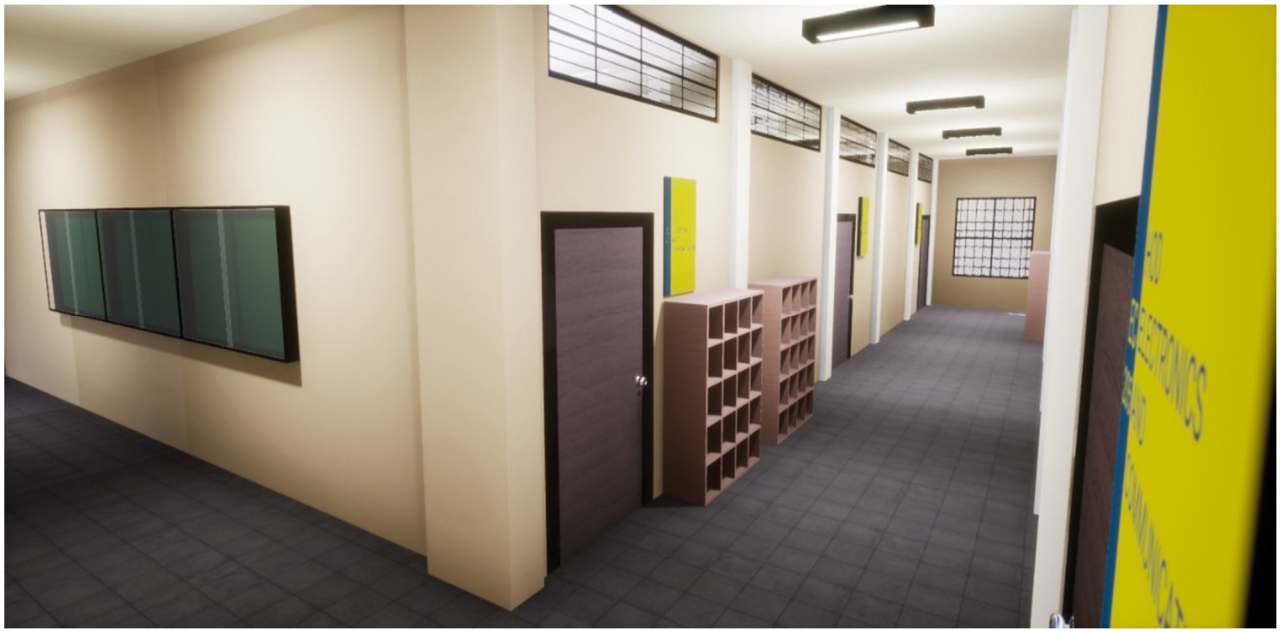
Mobile Application – Using Unreal Engine we can create an application compatible with mobile(iOS & Android), this makes it very practical for all kinds of users. Since everyone possesses a smartphone these days it becomes very easy for users to check out the architecture. This allows real-time exploration at any place and anytime. A convenient method for everyone.

VR headset – This is also a mobile application but the application is created to integrate Virtual Reality into the created design. This is the core objective of the project to provide a real-time, lifelike user experience. The VR version can also be developed using Unreal Engine. VR provides a vibrant experience for users hence making it interactive and attractive to viewers.

Laptop – The design can also be streamed on a laptop; it can be downloaded as an application on the laptop as well.

Finally, a joystick has also been implemented for free control. This joystick can be connected to mobile/laptop via Bluetooth model[2].

VII. RESULTS AND DISCUSSION



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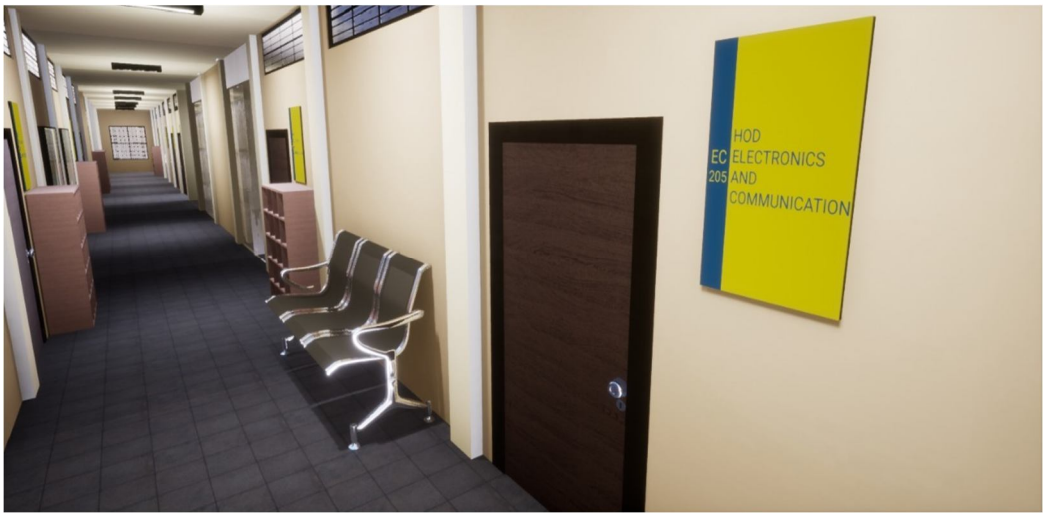

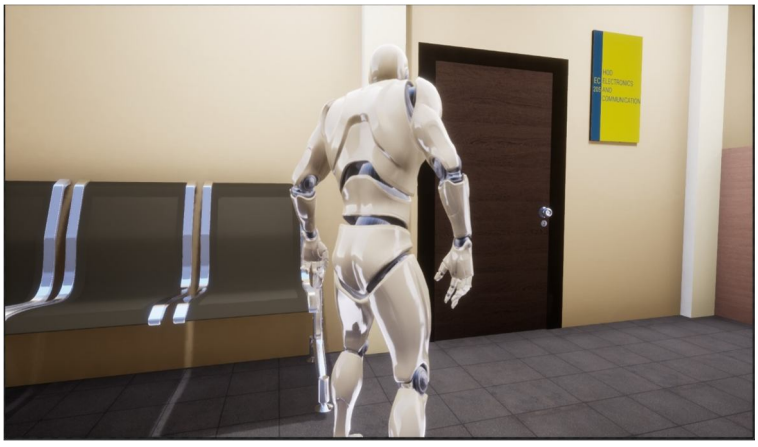

The software will be displaying a 3D model of our department which replicates the architecture. We have also programmed a 3D human that can move around freely.

The navigation interface will be in real-time 3D to make it as realistic as possible. A lifelike interface will help the navigation be more immersive and impactful as a human brain processes images incredibly faster than words.

- The software will be displaying a 3D model of our department which replicates the architecture.
- We have also programmed a 3D human that can move around freely using the controls, this represents the navigation.
- We have implemented navigation algorithms that will guide you to the destination in just one click.
- We also have modelled a Joystick that can be used to control the mannequin to navigate & explore freely.

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VIII. CONCLUSION

This project involves designing a layout of the Electronics and Communication department using Unreal Engine. The 3D architecture enables a real-life experience through Virtual Reality. This project allows one to navigate the architecture allowing him/her to explore the building without having to actually wander restlessly to reach a destination. Hence, providing a navigation aid for multi-floor buildings by comparing different navigation algorithms and choosing the best one which proposes the quickest and shortest route to the destination.

The interactive virtual campus based on different software relies on the real scene of the university to display the interactive virtual campus. A virtual tour is an independent experience so you can be away from the crowd, and noise and take your sweet time exploring the architecture. Thus, creating an experience that stimulates their senses, and imagination leading to a state of awe.

The advantage of the 3D college lies in its intuitiveness and very high interactivity. Inserting a virtual campus into the college's website can realize the interaction between the webpage and the virtual campus so that the visitor does not need to spend too much time searching for information about the campus, they can visit the website to understand the virtual conditions of the school's buildings, streets, and various campus facilities.

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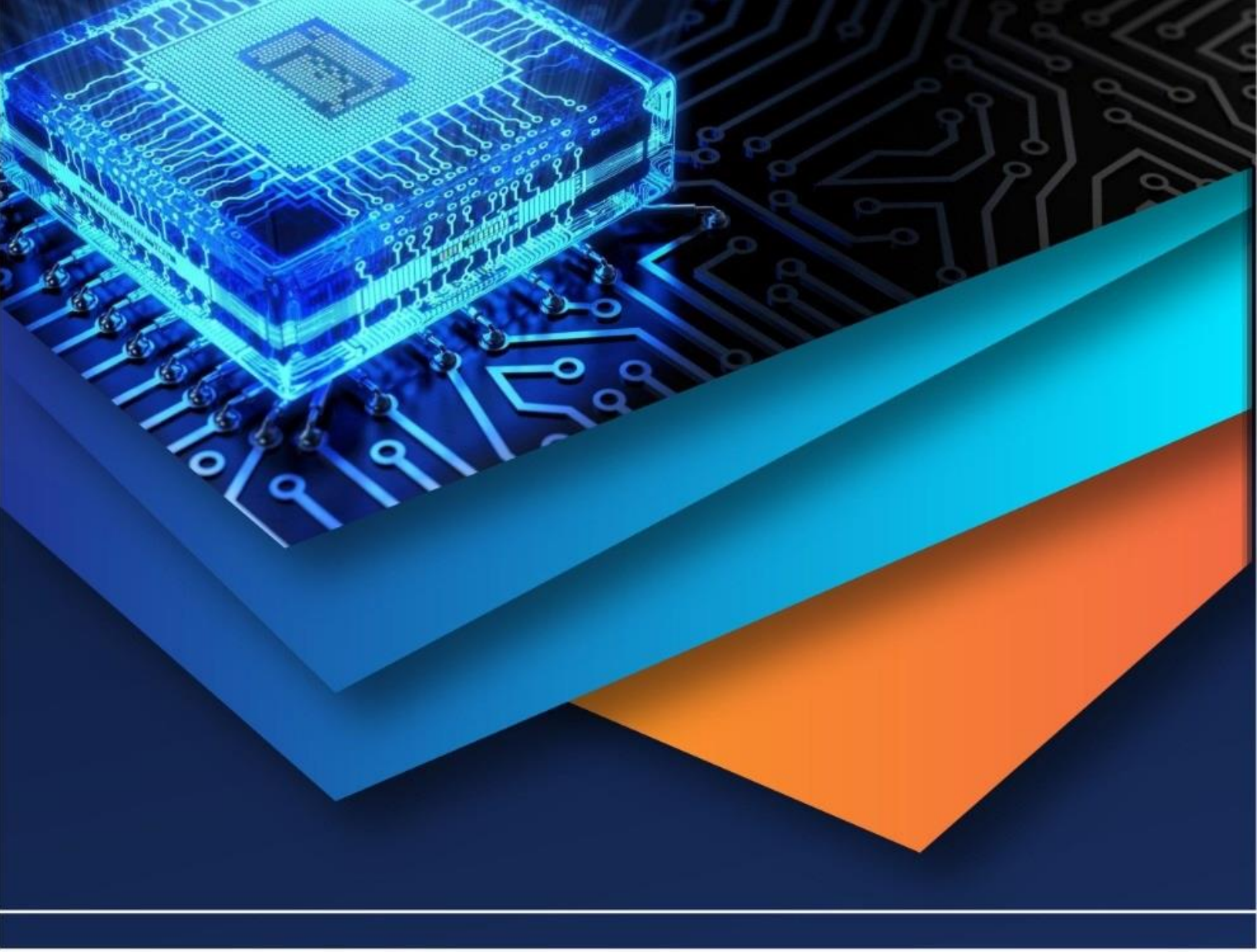

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