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Clean City: A Simple Smart City App

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Abstract: Clean City Project will be a system that will provide citizens to directly contact authorities about the waste management in their locality. Our system will assist people and authorities to come together and keep the city clean. The Clean City app is motivated by the need for decreasing the time required to manually complain and take action regarding cleanliness in a particular area.

Keywords: Clean City, Mobile App, Flutter, Dart.

I. INTRODUCTION

Citizens can waste their time manually complaining about cleanliness in their area. The system will be helpful for citizens, local authorities, and waste collectors as it saves time by reducing the manual efforts of citizens and authorities. The purpose of this system is not only to reduce time but also to help maintain cleanliness in the city. The system will also help in reducing the diseases which are caused due to unmanaged waste such as dengue, cholera, etc.

The contributions of this paper are as follows:

1) A system can be used as a tool to maintain cleanliness in a city.
2) Various methods can be used for the maintenance of a clean city.
3) The proposed system uses Flutter for the client-side, Firebase for the server environment, and MongoDB as the database for developing a scalable system.

The rest of the paper is structured as follows: Section 2 gives a short summary of the Literature survey that was done before thinking about the solution of this system. Section 3 explains the different types of users that would be part of the system and also presents the architecture of the system, the technologies that are used, and why they are used. Section 4 gives the details of the implementation of the entire system. Section 5 shows the result achieved. Section 6 concludes the paper.

II. LITERATURE SURVEY

How squandering the executives is a significant piece of the metropolitan framework as it guarantees the security of the climate and human wellbeing. It isn't just a specialized natural issue yet, in addition, an exceptionally political one. The administration of waste is firmly connected to a scope of variables including metropolitan ways of life, examples of utilization of assets, levels of work, and pay levels, among others [1].

How arranging various sorts of trash is a dreary assignment. Despite what is generally expected, it is the best method of disposing of trash. We ought to just sort our dustbins into two groupings, biodegradable and non-biodegradable, and dump the loss depending on the situation. We can help others around to concoct this also. By doing this we can reuse specific non-biodegradable waste or discard it securely to forestall soil contamination [4].

Initiatives in India for Waste Management. The administration of strong waste has as of late drawn in extensive consideration from the Local and State Legislatures just as nearby (city) experts in India. Various partnerships and alliances are found in the region of solid waste management in India. These coalitions are public-private, local area public, and private-private game plans. To distinguish the situation from existing coalitions in the review region, it is first important to recognize the different entertainers working in the field of waste administration [6].

The Green City Concept is one of the most recent reactions to a variety of activities and studies aimed at addressing the challenges produced by the dispersed model of city growth and assisting cities in becoming more sustainable (greener), less dispersed, and liveable [7].

Civic bodies, P ublic and the Government made joint efforts towards the cleanliness of the city .The infrastructure was Prepared with a strategy planning for improvement in sanititation. It is not just an effort of the municipal corporation but also the continuous support from people[8].

Floating cities will be the future as sea level is increasing and less land mass for the citizens. It will be self-sufficient regarding energy and other resources. The future smart cities will have smart citizens who will also improve the quality of living. Major goal of the paper is to discuss the condition of smart cities now and in the future.[9]

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III. PROPOSED ARCHITECTURE

The proposed architecture is developed using two different parts: 1. User view and 2. Admin View. More details about these two parts are follows:

1) *User View:* In this system, new users need to register themselves by signing up using their name, e-mail address, and password. After Registration, they can log in using the registered username/email and password. After Login, they can access the user dashboard and can view/raise complaints about waste management in their area.
2) *Admin View:* In this system, the admin can log in using their username/email and password. After login, they can access the admin dashboard where they will be able to view the complaints raised by users and can resolve them as soon as possible.

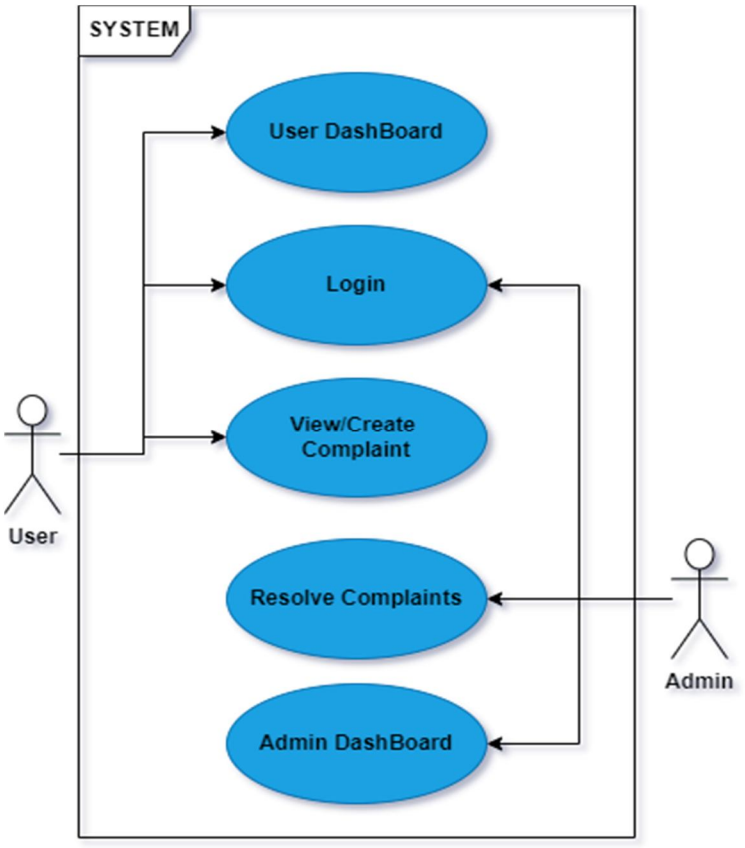

Fig 1.1 Use Case Diagram of the proposed system

A. *System Architecture*

The user firstly signs up him or herself and then every time he or she can just log in as a customer. An admin corporation will be having a fixed username and password as the user cannot enter into the app after the attempts.

The user when he or she logins, the User Dashboard page will be opened. Then the user must capture the image of the issue and fill the complaint form. When the Admin logins into the app, he or she should first go through the issues that are posted. The priority-based problems are solved one by one. Our app has two dashboards that are user and admin, the user can log in to post an issue and the admin is the one who belongs to the government can resolve the issues.

If the user is a new user he/she can register by giving the details, if he/she is already a user then simply can give a username and password, if it is correct then can directly enter into the user dashboard and the by clicking on the camera icon one can move to the image selection page. Here he/she can add the image either by using the camera or by using the gallery. After that he/she has to provide details about the issue and then submit the issue. After this, by going to the complaint page he/she can verify the issue being recorded. Now the issue will be reflected in the firebase database and can be viewed by the admin.

Now when logged in with a fixed username and password provided to the admin the admin Dashboard appears with a list of issues posted by the user. By tapping on the image, the admin will be transferred to google maps with the location where the issue was generated. With the help of the Resolve button, the admin can resolve the issue.

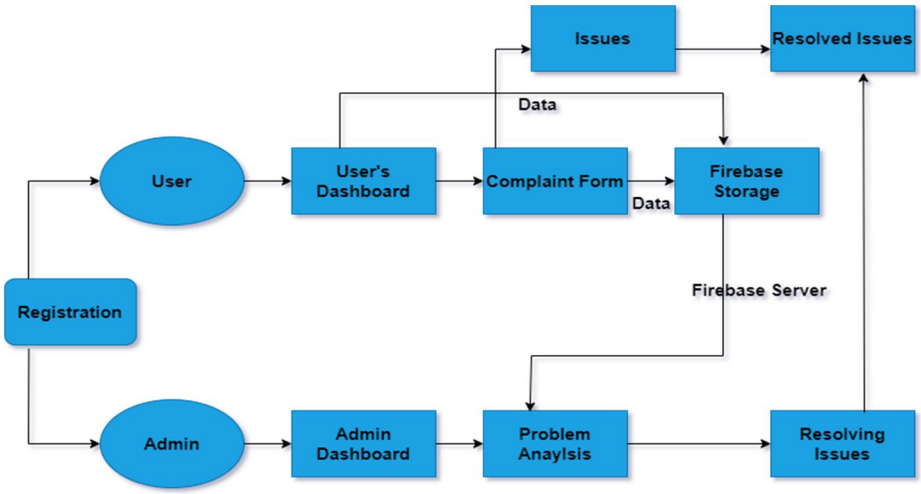

Fig 1.2 Overview of System Architecture

IV. IMPLEMENTATION

A. *Flutter*

Flutter is a go-stage UI tool that is intended to permit code reuse all through working frameworks including iOS and Android, while also allowing projects to the point of interaction right away with fundamental stage contributions. The objective is to allow manufacturers to supply high-in general execution applications that experience natural on select frameworks, accepting varieties in which they exist while sharing as bounty code as suitable.

Flutter applications run in a Virtual Machine that maintains a hot reload of changes without hoping to recompile the entire code. When conveyed, Flutter applications are gathered clearly to machine-level-code, either Intel x64 or ARM headings or JavaScript if zeroing in on the web. The framework is open-sourced, with an open-minded BSD grant, and has a thriving climate of third-party packages that supplement the middle library's convenience.

This outline is separated into various segments:

1) *The Layer Model:* The pieces from which Flutter is fabricated.
2) *Reactive UIs:* A center idea for Flutter UI advancement.
3) *A Prolog to Gadgets:* The crucial structure squares of Flutter UIs.
4) *The Delivering System:* Flutter transforms UI code into pixels.
5) *An Outline of the Stage Embedders:* The code that lets portable and work area OSes execute Flutter applications.
6) *Incorporating Flutter With other Code:* Data about various methods accessible to Ripple applications.
7) *Support for the Web:* Concluding comments about the attributes of Flutter in a program climate.

B. *Dart*

Dart is a programming language developed for consumer improvement, together with the net and cell apps. it's far developed by way of Google and also can be used to build server and laptop applications.

it's miles an article situated, tastefulness essentially based, a waste accumulated language with C-style grammar. it might gather either neighborhood code or JavaScript. It upholds interfaces, mixins, dynamic classes, reified generics, and type surmising.

1) *Stand-Alone:* The Dart SDK comes with a free Dart Virtual Machine, allowing Dart code to be executed in a request line interface environment. As the gadgets associated with the Dart SDK are created commonly in Dart, this autonomous Dart VM is a huge piece of the SDK. Dart ships with a standard library that permits originators to make functional structure applications, for instance, custom web servers, using the dart2js compiler and the bar bundle director.
2) *Ahead-Of-Time:* Dart code can be Ahead of time gathered into machine-level code (neighborhood direction sets). Applications worked with Shudder, an adaptable application SDK worked with Dart, are shipped off application stores as AOT-gathered Dart code.
3) *Native:* Dart 2.6 comes with dart2native compiler to assemble autonomous, neighborhood executables code. Earlier this component just revealed this limit on iOS and Android mobile phones through Flutter.

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C. Android Studio

Android Studio is the official integrated development environment (IDE) for Google's Android **working machine**, in light of JetBrains' IntelliJ program and arranged basically for Android developers. It is to be accessible for download on Windows, macOS, and Linux-based thoroughly working constructions or as a membership-based in 2020. It's a substitute for the E-ADT as an essential IDE for Android application development.

Android Studio was announced on may additionally sixteen, 2013, at the Google I/O convention. It turned within the early get entry to preview degree beginning from version zero.1 in May 2013, then entered the beta stage starting from model zero. eight which turned into launches in June 2014. The primary solid build was launched in December 2014, starting from version 1. Zero.

On May 7, 2019, **Kotlin** supplanted Java as Google's inclined toward language for Android application advancement. Java keeps on being upheld, as is C++.

Features

1) Gradle-based form support
2) Android-explicit refactoring and handy solutions
3) Build up instruments to get execution, ease of use, adaptation similarity, and different issues
4) ProGuard coordination and application marking capacities
5) Format based wizards to make normal Android plans and parts
6) A rich plan editor that grants customers to migrate UI parts, decision to survey designs on various screen courses of action
7) Support for building Android Wear applications
8) Innate assistance for Google Cloud Stage, engaging joining with Firebase Cloud Illuminating (Earlier 'Google Cloud Illuminating') and Google Application Engine

Android Virtual Gadget (Emulator) to run and investigate applications in the Android studio.

D. Firebase

Firebase is a stage progressed via Google for developing portable and web programs. It became, toward the start, an unprejudiced organisation established in 2011. In 2014, Google got the stage and its miles are currently their lead introducing for application improvement.

It is utilized for cloud utility improvement and makes it less hard to introduce and scale the utility.

Firebase's first item turned into the Firebase Realtime Information base, a Programming interface that synchronises programming realities all through iOS, Android, and web devices, and stores it on Firebase's cloud. Programming software engineers can utilize the item to assemble ongoing, cooperative applications. Firebase brought $1.1 million up in seed financing in May 2012 from Flybridge Capital Accomplices, Greylock Accomplices, Originator Aggregate, and New Undertaking Associates.

In June 2013, Firebase brought $5.6 million up in Series A sponsoring from Affiliation Square Undertakings and Flybridge Capital Assistants.

In 2014, Firebase shipped off two things. Firebase Hosting and Firebase Authentications. This arranged the association as a flexible backend as a help.

In October 2014, Firebase was acquired by Google. Following a year, in October 2015, Google acquired Divshot, an HTML5 web-hosting, to combine it with the Firebase.

In May moreover 2016, at Google I/O, the partnership's yearly engineer meeting, Firebase presented Firebase Analytics and declared that it was growing its administrations to turn into a backend-as-a-administration (BaaS) for developers. Firebase fuses different Google services, including Google Cloud, AdMob, and GoogleAuth, to offer architects a more broad extent of things and scale.

Google Cloud Illuminating, the Google organization to send message pop-ups to Android, changed into outdated through Firebase, Firebase Cloud, which added the ability to supply spring-up messages to each io and web device.

In July 2016, Google declared that it was securing the versatile designer stage LaunchKit, which worked in application engineering publicizing, and would be collapsing it into the Firebase development. In January 2017, Google obtained texture and Crashlytics from Twitter to include the contributions to Firebase.

In October 2017, Firebase sent off Cloud Firestore, a real-time document data set as the replacement item to the exceptional Firebase Realtime.

V. RESULT

Our application is better than others in the market as it is easy to use,takes care of privacy of the user,reduces spam complaints by using location and images.

A. Login Page

Login with valid email id and password which was generated by users while signup can be done as shown in figure 1.1

B. SignUp Page

Signup the App to register by providing the user's details like Email id and Password and clicking on the signup button can be done as shown in figure 1.2

Fig 1.1 Signup Page

Fig 1.2 Login Page

C. Forget Password Page

If the user forgets his/her he can reset it using the forgot password option and he will receive the link on his registered email as shown in figure 1.3.

D. Maps

After Login the app will open the home page. In our Home Page maps will open and it will automatically detect the location wherever you are as shown in figure 1.4.

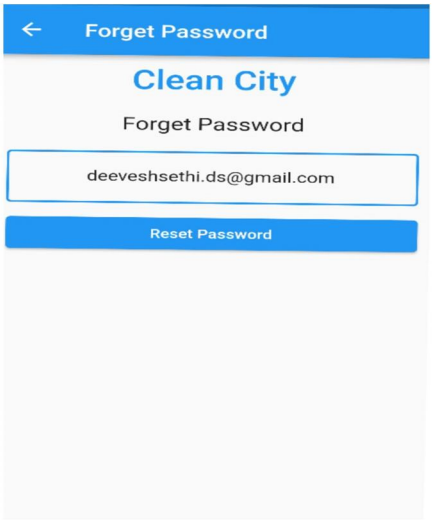

Fig 1.3 Forget Password Page

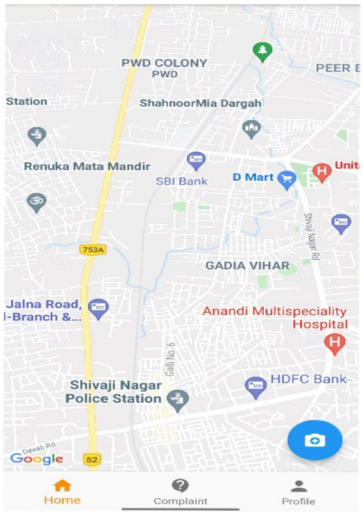

Fig 1.4 Maps

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E. Camera

After clicking on camera you will have 2 options:-

1) Choose from Gallery

2) Take photos by using a Camera.

As shown in figure 1.5.

F. Complaint Form

After Choosing a photo a complaint form will open and you want to enter the title and description after that you can submit it as shown in figure 1.6

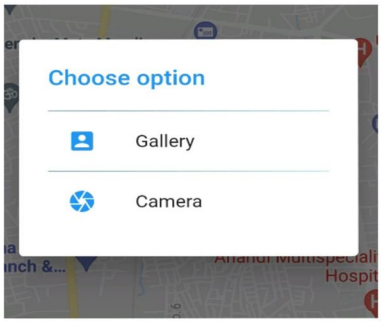

Fig 1.5 Photo Picker

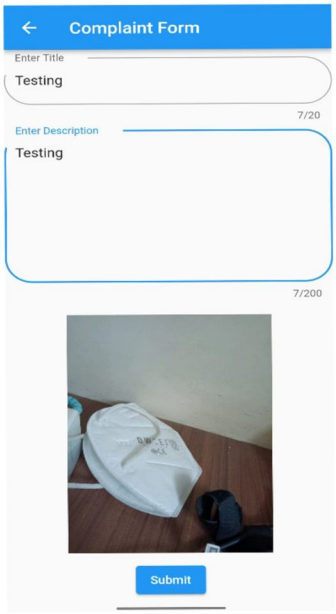

Fig 1.6 Complaint Form

G. SignOut Page

You can go to your profile and sign out from there as shown in figure 1.7.

Fig 1.7 Sign-Out Page

VI. CONCLUSIONS

These Clean City applications would help citizens and authorities to keep the city clean by making the communication between both parties quicker and also help resolve cleanliness-related issues in the city.

It will also improve the hygiene of citizens as overflowing garbage bins are the main cause of many harmful diseases.

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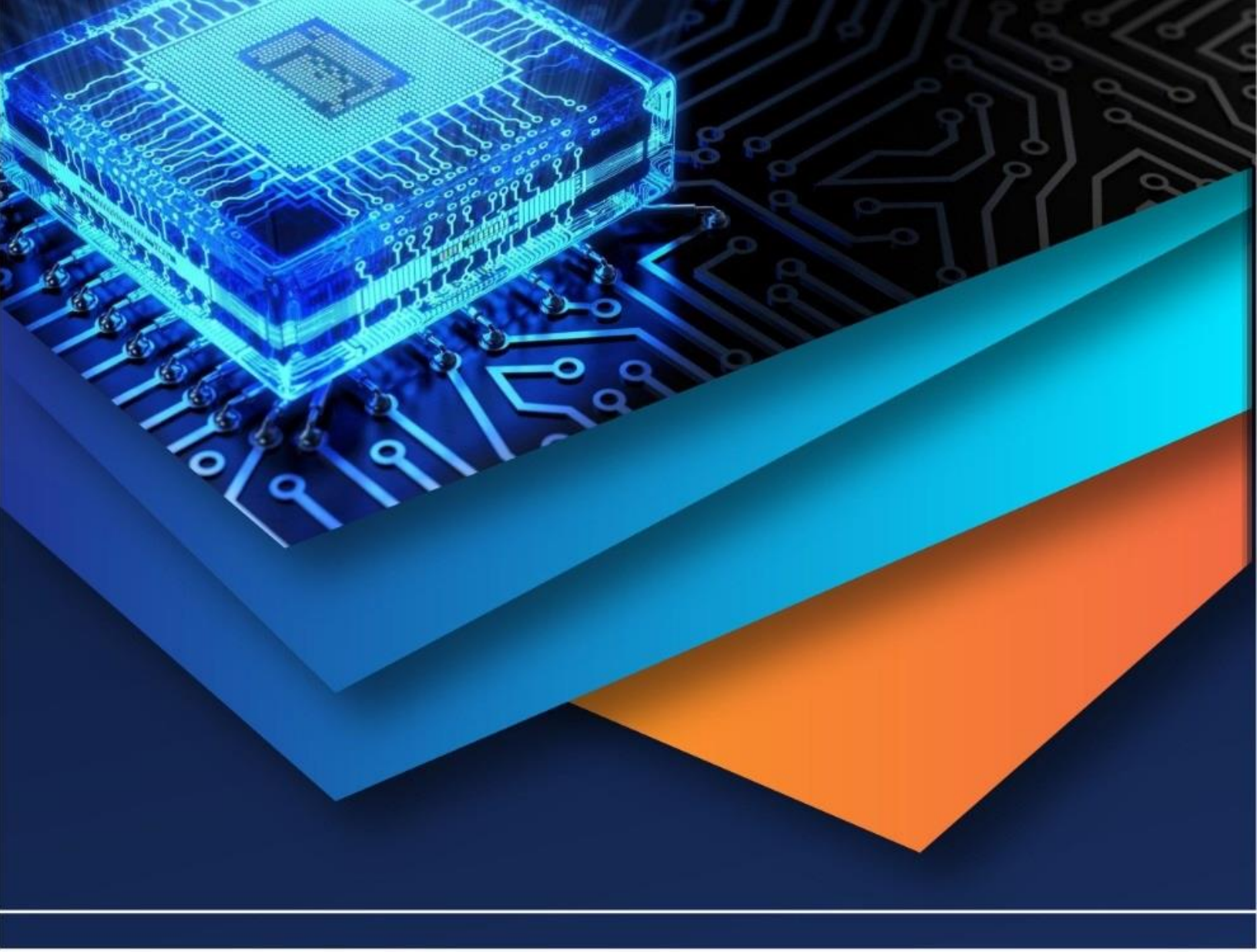

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