iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** III **Month of publication:** March 2022

DOI: https://doi.org/10.22214/ijraset.2022.40806

www.ijraset.com

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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 10 Issue III Mar 2022- Available at www.ijraset.com

MyRoomie: A Roommate Finding App

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Abstract: ***Accommodation in today's world has been soaring at high rates. In addition, to get a shelter that matches one's preference, budget, interest and proximity is a challenge. This problem becomes even more bigger if the person looking for accommodation is a bachelor. For bachelors, factors like affordability, proximity to the university, similar company etc. matters the most. There are number of websites and mobile apps that provide facilities for finding vacant apartment, but as of now, there is no such mobile app that helps to find roommates of choice in a new city. This application is aimed at trying to solve the major accommodation problem for bachelors. This application consists of a variety of features like sending messages, potential match based on user's preferences and shortlisting.***
Index Terms: Data Analysis, Matchmaking algorithm, App Development, Flutter

I. INTRODUCTION

Every day, we observe how technology helps us solve problems and make our lives more productive. However, we did not see this shift in the typical method of locating relevant contacts in order to discover roommates travelling to new places for school or new jobs. People from many walks of life live in cities, making it difficult to find an apartment and roommate who meet your criteria for price, like, and compatibility. Living off-campus while attending university has been shown to increase by 13% in an average university research. There are numerous advantages to living off campus, including lower costs, more privacy, freedom, more space, and the opportunity to live with a more suitable roommate. This application provides a smooth approach for finding a roommate. Sending messages, searching by university name and address, finding a prospective match based on the user's preferences, and shortlisting are just a few of the capabilities. Our project attempts to address this widespread issue by developing an app that displays roommate and apartment listings and uses algorithms to match your profile with the most compatible roommates. Allocating dorms among college students and rooms among tenants are two examples of room allocation problems that arise regularly in practise. The process of creating a collection of pairs among social objects of one kind or two kinds is known as social matching. In our daily lives, we see social matching in a variety of ways, such as dancing couples formed by two groups of boys and girls, room mating of guys for dormitory lodging, job searching in the labour market, and so on. In social matching, social objects are treated as if they have a personality, much like humans, and are afforded the right to privacy against the forcible collection of sensitive personal information. Matching necessitates collaborative activity among social objects, which must be built on a social framework that includes common-goal setting and social guidelines for acceptable behaviour, communication protocols and message exchange systems Model and got an accuracy of 89 percent.

II. LITERATURE SURVEY

A. Literature Related to Existing Systems

1) *Tinder:* Tinder wants to clear the air on how its platform rates and presents possible matches, so it published a blog post on the issue today — but it kept things unclear. According to the blog post, the company's Elo score was a "heated topic" a few years ago, but the ranking tool has since been discontinued. The Elo score was created with the intention of allowing Tinder to rank people based on their beauty. Elo scores are also used to rate chess players, but in the context of Tinder, the higher a person's allocated score went up the more people swiped right (or Liked) their profile. Their card would then be served to other people with comparable scores, ensuring that only the most desirable individuals interacted with one another. People argued that these ratings kept attractive people talking to each other and allowed undesirable people to suffer in a low ranking on Tinder, where profiles are relatively limited in scope and a person's appearance frequently fuel most of the desire to match. Tinder modifies the potential matches a user sees when someone interacts with his or her profile, according to the company. Within 24 hours of taking action, the organisation reorders this user's prospective match profiles. Tinder's blog article isn't very specific, but it sounds like Tinder is using something akin to the Gale-Shapley algorithm, or the algorithm Hinge claims to employ. This programme looks for trends in people's likes. If I like one person and another lady on the platform likes him, we might have similar tastes. Tinder could show me a profile she likes on the platform that I haven't seen yet in the hopes that I will like it as well.

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2) *Bumble:* Bumble, like other dating apps, hasn't explained how its algorithm works. What factors does Bumble consider when deciding who to show you? First and foremost, they advise that you set up your filters. This informs the system on how to best provide you with potential matches. The more detailed your filters, the more likely you are to find someone you desire. If you can't go 40 miles to meet someone for coffee, then restrict your search radius. The best profiles are displayed first while swiping away. On any given day, these are usually the profiles with the most interaction. This theory has sparked a lot of controversy. These tactics will quickly double your everyday matches. Aside from the risk of someone swiping right, photographs that are blurry, grainy, or low quality might penalise your profile and cause it to be viewed less. Bumble uses a variety of methods to estimate how popular a profile is, including presenting it to a huge number of users. It then gives it a starting score. To do this with a new profile, it is displayed to a huge number of other profiles while it is still fresh. This will provide them with all of the data they require to rank it. It's possible that resetting your profile will result in matches. If you are not matching after a few weeks, it may be worth deleting your profile, making a new profile, adding some new photographs, and editing your bio to "test" what works and what doesn't. The girl who has already swiped you on the right will be revealed first. In addition to the most popular profiles, those who have swiped right will appear at the top of the profile deck. That's why you'll usually receive matches at the start of a swiping session, and afterwards they won't happen as frequently, if at all.

a) *Synchronise The Queue:* Checking your discussion page and the Match Queue will let you know if you've been swiped ahead of time. Check out our in-depth post on how the Bumble Match Queue works for more information. You'll need to start a discussion once you've found a match.

b) *Methods/Procedures used by Dating Websites:* Scholarly sources, academic journals, and recent media pieces were used to compile the information for this research review. I used the ProQuest and Google Scholar databases in particular when looking for scholarly literature. Because they offered this research with tests relevant to online dating applications as well as insights from users on online dating applications, I felt it was vital to use articles recently published online and in magazines. Uses and Gratifications Theory, online dating programmes, Tinder, Bumble, and representation were among the topics and phrases entered into the search enginesAs described in the methodology section of this chapter, several of the searches yielded sufficient results for my research. However, certain searches yielded insufficient results in terms of representation, the Uses and Gratifications Theory, and specific dating applications, so I narrowed my search terms and phrases. When I was looking for materials for this study, I made a point of looking for information that was not biassed toward my own opinions so that I could get a variety of perspectives. For example, I looked for articles about online dating apps written by guys, so my study wasn't limited to female-oriented literature. Finding a variety of articles on different sorts of mobile dating apps, such as Tinder and Bumble, was crucial to this study because it displayed many different perspectives on online dating and demonstrated how an individual's depiction might alter depending on the programme.

3) *Splitwise:* Splitwise is a free programme that allows users to share bills with their friends. If a group has to split the cost of a bill, Splitwise ensures that everyone who pays is refunded for the proper amount and with the fewest transactions possible. When a bill is due, Splitwise users can receive an email reminder, and the app also allows them to submit an IOU to someone else in the group. The software is touted as a means to keep track of unsecured debts such as rent, food and travel expenses, bills, and other expenses. Splitwise users keep track of who they owe, who owes them, and why on the appBecause a user may input any spending to the app as soon as the cost is incurred, this service eliminates the need to keep receipts. Splitwise can track each expense and the amount each individual in the group owes when splitting bills with friends and relatives. Splitwise then allows users to add up all of their expenses and have the entire amount automatically transferred to the rest of the group.

4) *Real Estate Websites (99acres):* It is an online forum where buyers, sellers, and brokers/agents can rapidly, effectively, and affordably exchange information about real estate properties. You may advertise a property, search for a property, browse through properties, create your own property microsite, and stay up to speed with the latest real estate news and trends at 99acres.com. This app, created by the popular property search engine 99acres.com, provides the same user experience on the move as the website. The software, which is available for Android users for free, allows you to search for rental houses and view high-resolution photos, videos, and maps. It is most renowned for the wide range of alternatives it offers, with over 10 lakh properties listed across the country. It also guarantees landlords and interested tenants immediate contact via phone calls, texts, or e-mail.

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B. Literature Related to Algorithms

1) *Stable Marriage Problem:* The stable friend drawback includes grouping n persons into n/2 disjoint pairs in such the way that no 2 people that aren't matched along like one another to their partners. enable two males (m1 and M2) and two females (w1 and w2) to require part. Let' decision money supply' preferences list w1, w2. Let' call m2' preferences list w1, w2. We'll sit down with w1' selections as m1, m2. We'll refer to w2' choices as m1, m2. The pairing m1, w2, w1, m2 is unstable as a result of m1 and w1 would choose each other over their allotted companions. The matching m1, w1 and m2, w2 is stable since no 2 individuals of female would choose one another over their allotted spouses. Lists of preferences may be accustomed type sturdy marriages at any time (See references for proof). For getting a stable match, the Gale–Shapley rule is as follows: the concept is to travel through all of the free males whereas there are still any accessible. each free man pays a visit to every of the ladies on his preference list within the order within which they appear. He inquires concerning the supply of every lady he meets, and if she is, they become engaged. If the girl isn't available, she has the choice of declining his provide or cancelling her current engagement, whichever she prefers. As a result, if a girl encompasses a higher option, an engagement could also be referred to as off. The Gale-Shapley rule has an O time complexness (n2). Set all men and ladies free whereas there's a free man. m who still has a woman w to propose to w = m' highest ranking such lady to whom he has not nonetheless planned if w is free (m, w) to become engaged else some combine (m', w) already exists if w prefers m to m' (m, w) already exists if w prefers m to m' The technique employed by air current and astronomer to spot a stable match uses a basic delayed acceptance strategy that includes proposals and rejections. counting on who makes the proposals, the man-oriented rule and therefore the woman-oriented algorithm are 2 totally different approaches. Figure 2.2-1: SMP normally The input may be a two-dimensional (2*N)*N matrix, wherever N is that the variety of girls or men. Rows zero to N-1 represent men' preference lists, whereas rows N to 2*N – one represent women' alternative lists. The numbers for men vary from zero to N-1, whereas the numbers for girls vary from N to 2*N – 1. an inventory of married couples emerges as a result.

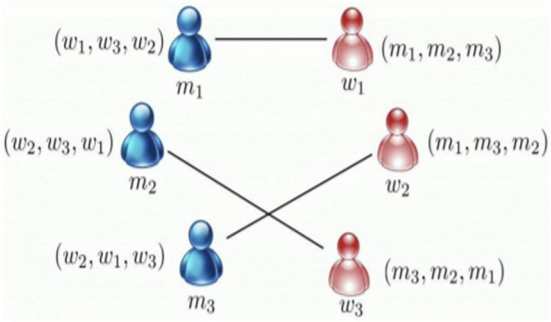


Figure1. General view of SMP. [4]

Figure 2.2-1 general SMP

2) *Extended Gale-Shapely Algorithm:* The technique employed by Gale and astronomer to spot a stable match uses a basic delayed acceptance strategy that includes proposals and rejections. Counting on who makes the proposals, the man-oriented algorithm and therefore the girl-oriented algorithm are 2 totally different approaches.

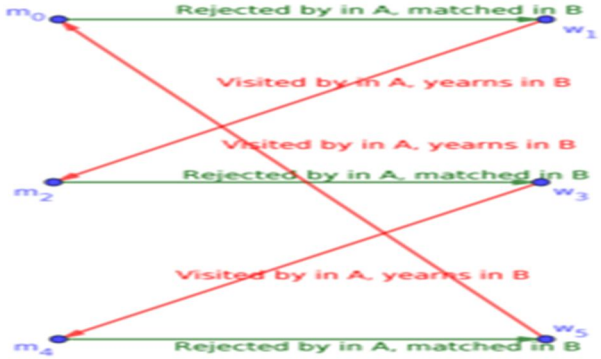


Figure 2.2-2 matching of A and B

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Within the men-oriented method, every guy m proposes to the primary woman w on his list whom he has not already planned to. If w becomes available, she's going to marry m. If w prefers m to her current betrothed m, she will reject m, who will become available, and w will marry m. Otherwise, w prefers her current betrothed to m, thus w rejects m, exploit m single. This method is continual whereas some men stay free. The approach is a dead ringer for the woman-oriented algorithm, with the exception that girls create the proposals. The man-oriented and woman-oriented algorithms, respectively, come back stable pairings that are man- and woman-optimal. The man-optimal stable matching has the property that every guy receives his best potential partner in any stable matching. whereas every male has his very best companion in any stable pairing, any woman could have her worst possible mate at identical time. On the opposite hand, the woman-oriented rule suffers the same problem.

Algorithm 1 Extended Gale-Shapley algorithm [2]

```
1: assign each person to be free
2: while some man m is free do
3: begin
4: w:= first woman on m's list;
5: if some man p is engaged to w then
6: assign p to be free;
7: assign m and w to be engaged to each other;
8: for each successor m' of m on w' list do
9: delete the pair(m',w)
10: end;
```

The Gale–Shapley algorithm has several "rounds" (or "iterations"): every unengaged man proposes to the woman he likes best within the initial round, and so b) each woman responds "maybe" to her favorite wooer and "no" to the remainder of the suitors in the second round. She is then "engaged" provisionally to the person she has so far preferred, and he's conjointly conditionally engaged to her. In every future round, each unengaged man proposes to the most-preferred woman he has not antecedently planned to (regardless of whether or not the woman is already engaged), and so b) if she isn't presently engaged or if she chooses this man over her existing provisional partner, each woman replies "maybe" (in this case, she rejects her current provisional partner who becomes unengaged). AN already-engaged woman' right to "trade up" is protected by the transient nature of engagements (and, within the process, to "jilt" her until-then partner). this system is continued till everyone seems to be actively participating.

3) *An Efficient Algorithm for Solving SRP:* The stable roommates drawback has been a nontrivial open problem until Irving created the primary polynomial time algorithm that determines whether or not a specific instance of the stable roommates problem admits a stable matching and, if so, discovers one. In his paper, Irving proves that the planned algorithm has O(n2) complexity.

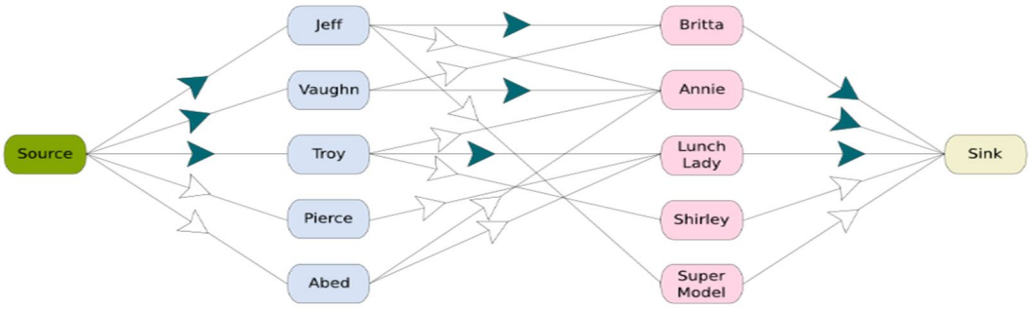


Figure 2.2-3 soucre to sink

They name the algorithm here as *alg*-IRVING consisting of two phases:
The Initial innovate turn, every player makes a suggestion to his teammates. because the sequence of bids progresses, each participant employs the following strategies: 1) If I receive a suggestion from j, he either a) rejects it as a result of he already has1 a superior bid from somebody higher on his preference list than j, or b) reserves it for thought whereas rejecting his current bid because it's inferior to j. 2) If someone on his priority list rejects me, he continues to propose till I realize a mate. This rule section can finish with either I each participant having a bid or (ii) one person being rejected by everyone. If (ii) occurs, the procedure will conclude with no matches, indicating that the issue isn't resolved. If everybody encompasses a bid at the tip of the primary section of the algorithm, the preference list of potential mates for j, who holds a bid from I, may be "reduced" by removing from it.

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4) *Reductions:* Everyone for whom j has a soft spot for I • everyone who has had a bid from somebody they like to j. Reductions is that the approach through that these procedures are carried out. Players I and j are aforementioned to be matched if their reduced preference lists solely comprise j and I, respectively, and that they are therefore ignored within the second section of the procedure. S stands for ordered pairings of the kind (x,y), wherever y holds a bid from x. y is expressed to be x' current favorite and therefore the initial item on his pared-down list of preferences. succeeding Stage. The second phase of alg-IRVING is to search out a rotation in S. within the case of a rotation, the set S is endlessly reworked by the applying of rotations. once applying rotation, if 2 players are matched, they're eliminated from S. (S) = (x1,y1),(x2,y2),...,(xk,yk),(x1,y1), where (xl,yl) (S) is xl' current second favourite in his reduced preference list, and yl+1 is xl' current second favorite in his reduced preference list. once a good length rotation is obtained, xl+1 = yl for all l, this is often referred to as the even party case. this is often conjointly a symbol of no semipermanent compatibility. within the absence of an even party, rotation is performed by substitution the pairs (xl,yl) in S with the pairs (xl,yl+1) in S and so continuation the Reductions operation on the corresponding players' preference lists. The second section continues till no rotation is visible, signifying the invention of a stable match.

III. PROPOSED SYSTEM

This application streamlines the process of looking for a roommate. Sending messages, searching based on certain preferences, prospective matches based on user choices, and shortlisting are just a few of the features.

Android Material Design is used to create a visually appealing and interactive user experience. For people seeking for a roommate or an apartment, the proposed application will give a time-saving mobile and tablet Android software. Users who already have an apartment but are looking for a compatible roommate, as well as others who are new to town, will utilise the suggested system to find roommates before committing to an apartment.

Users can only use this app after registering. There are a few phases to the registration procedure. The user will receive login access to the app after finishing the registration process. The app allows the user to view and alter their profile and preferences when they have successfully logged in. Potential match will recommend matches depending on the preferences and interests of the user. The app has a function that allows you to shortlist people who are seeking for a roommate or who own an apartment.

This is an Android app that allows users to find roommates depending on their hobbies. Finding a roommate who is agreeable and like-minded to oneself is often tough. This software assists students and professionals in creating profiles and then searching for roommates using a variety of filters. It also allows you to view other users' profiles based on your search parameters.

A. *Features*

1) *User Options:* The following functionalities are available to the user in this app:

a) The user's kind is determined once he or she logs into the programme. The current user may be seeking for a roommate or an apartment.

b) The user can create an account for the app and fill out their preferences and information.

c) The user can see his or her profile and preferences.

d) The user can update their information by editing their profile.

e) Based on their preferences, hobbies, and streams, the user can see potential matches with a percentage of compatibility.

f) Other users can be added to a user's shortlist.

g) Contact potential users via email.

2) *Login:* After you open the app, a login window will appear. Users can access specific app features based on their role by inputting a valid username and password. Users will see an error notice if they input the wrong username or password.

3) *Registration:* The user can register for the app after it has been opened. In order to do so, the user must specify the reason for registering. The second step would be to fill in basic information such as name, contact information, date of birth, gender, and so on. The third phase is gathering information on their schooling, occupation, tastes, and so on. The fourth stage for a user looking for an apartment is to enter apartment choices such as budget, room and apartment sharing preferences, type of home desired, and ready to move in date. The fourth stage for a person seeking for a roommate is to provide information about the apartment, such as the rent, the number of roommates, the address, the apartment website, the property photos, and the availability date. The fifth stage is to include hobbies and activities. The sixth step is for general preferences such as gender, eating habits, smoking habits, and additional notes.

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4) *View Profile:* This page shows all of the information that a user provided throughout the registration process. Basic information, university-related information, housing preferences for users seeking for an apartment and apartment details for users looking for a roommate, interests and activities, and general preferences are all available to users.
5) *Edit Profile:* After logging in to the app, the user can access the profile page and make changes to existing entries by clicking on the edit button icon.
6) *Potential Match for user Seeking for Roommate:* After logging in to the app and selecting Potential Match from the menu, the user will be shown with all of their chosen matches, along with their percentage. Selecting any of these will bring up a detailed information page. When a user selects the "Add to Shortlist" button, their profile will be added to the list of shortlisted profiles. When a user selects the "Send Message" icon, a dialogue box appears, and the user can write a message and then send it to another user by clicking the "Send" icon.

B. Additional Features

1) *Expense Tracker:* Track all of your expenses, create a budget, and receive notifications based on your spending. It might be difficult to keep track of all of your expenses and keep a regular bill when you live with roommates. Our software will allow users to make notes on who they owe money to, who owes them money, and why. Finally, they will be able to pay their bills with only one click and one transaction.
2) *Connect with People:* It might be tough to meet new individuals with similar interests when you relocate to a new town or community. It can be intimidating to be young and fresh to a city. As a result, we've decided to establish a community platform for everyone who has successfully registered on MyRoomie. This will provide people a sense of social comfort while they are so far away from home.

IV. CONCLUSION AND FUTURE SCOPE

This software comes in handy while looking for a roommate or a vacant apartment in a city. Uploading an apartment listing, roommate listing, locating a roommate, and finding roommate matches are just a few of the services. This software can be utilised by a wide spectrum of people who are visiting cities. It also offers a variety of communication options to link two users, such as app-to-app conversations, text messages to another user's phone, and direct email to other users. Additional features include an expense tracker that will track one's expenses, send warnings when spending exceeds the budget, and assist keep track of shared roommate costs and split them automatically. The app will contain a reach out to community forum where verified MyRoomie users can communicate with one another.

V. ACKNOWLEDGEMENT

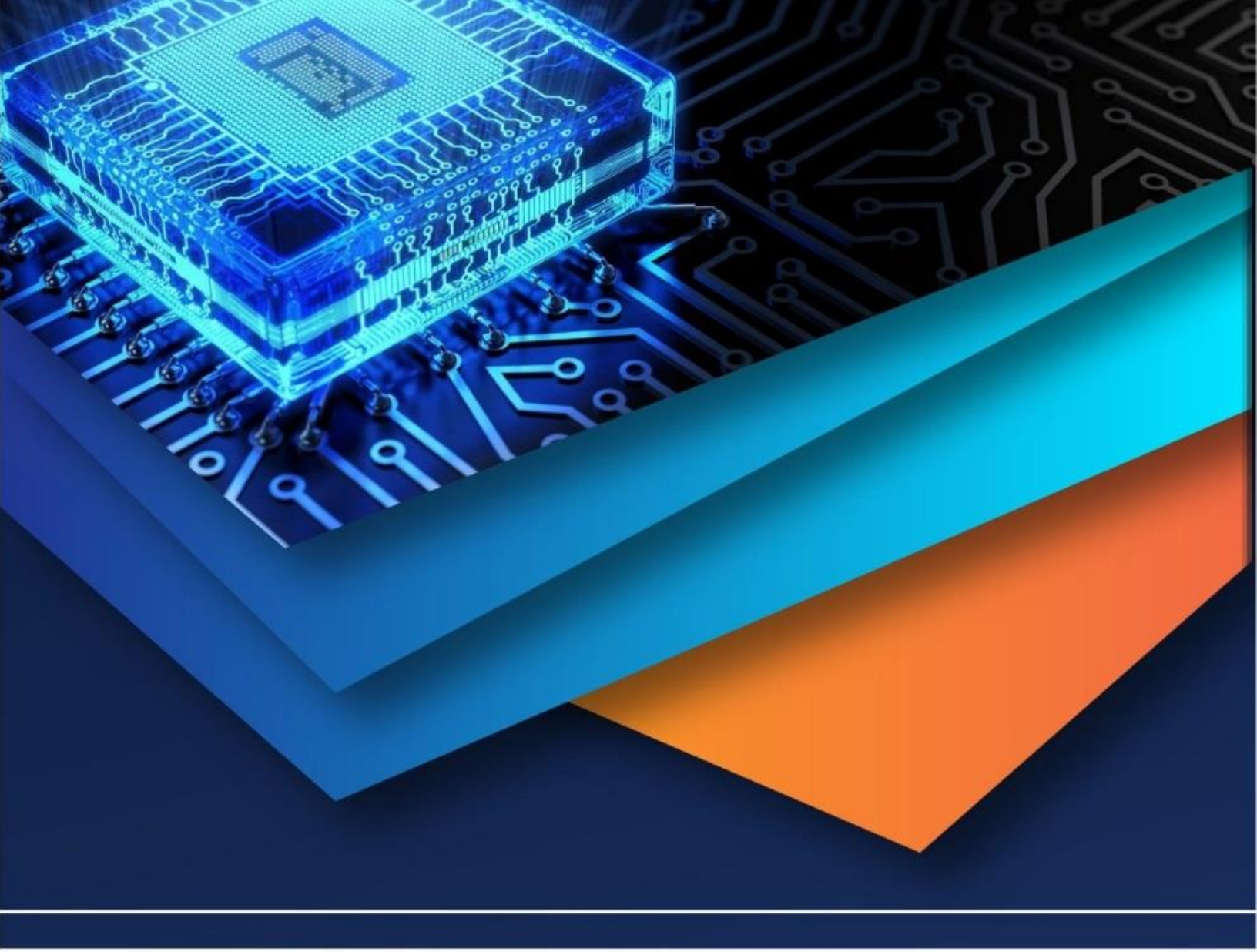
The successful completion of this project would not have been possible without the help and guidance of many respected individuals. It gives us great pleasure to express our sincere
thanks, and gratitude to all of them. We are also thankful to our head of department
Dr Vinaya Sawant and our respected principal sir Dr Hari Vasudevan for their constant guidance. We are extremely grateful to our project in-charge Prof. Harshal Dalvi for his constant support and encouragement throughout the course of this project.
Our thanks and appreciation go to the college and staff for providing us with the necessary
resources and valuable suggestions. Our classmates and team members have given valuable inputs to this proposal which further gave us an inspiration to improve our project. We thank them all for their help to complete our project.
We express our sincere heartfelt gratitude to each of the individuals who helped us in successfully developing our project within the prescribed time.

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