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Parking Management in TCE Campus

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Abstract: Parking challenges have been a part of our society for a long time and traditional parking management strategies have come a long way. The problems associated with parking are common to most of us. This paper attempts identify problems faced in TCE campus. Further, by examining a variety of parking management solutions for the problems. This is done by collecting data using questionnaire and parking survey. The data are analysed to find the most desirable measure to overcome the problems. Various measures are tried and tested by having public opinion on the measures if implemented, by having another questionnaire. After which the measures cost is estimated to see which one will be beneficial. This will greatly benefit the system in the long run.

Keywords: Parking Management, TCE campus

I. INTRODUCTION

Parking is an essential component of the transportation system. Vehicles must park at every destination. Parking convenience affects the ease of reaching destinations and therefore affects overall accessibility. Parking facilities are a major cost to society, and parking conflicts are among the most common problems facing designers, operators, planners and other officials. India is facing a new problem nowadays – lack of sufficient parking space. With families getting smaller and the total number of motor vehicles exceeding the total number of heads per family, the parking scenario is woefully falling short of the current requirements in the country. The situation is such that on any given working day approximately 40% of the roads in urban India are taken up for just parking the cars. Many cities are suffering from lacking of car parking areas with imbalance between parking supply and demand which can be considered the initial reason for metropolis parking problems. This imbalance is partially due to ineffective land use planning and miscalculations of space requirements during first stages of planning. Shortage of parking space, high parking tariffs, and traffic congestion due to visitors in search for a parking place are only a few examples of everyday parking problems.

A. Parking Management

Parking management refers to policies and programs that result in more efficient use of parking resources. Parking management includes several specific strategies. When appropriately applied parking management can significantly reduce the number of parking spaces required in a particular situation, providing a variety of economic, social and environmental benefits. When all impacts are considered, improved management is often the best solution to parking problems.

Management solutions tend to be better than expanding supply because they support more strategic planning objectives:

1) Reduced development costs and increased affordability.
2) More compact, multi-modal community planning (smart growth).
3) Encourage use of alternative modes and reduce motor vehicle use (thereby reducing traffic congestion, accidents and pollution).
4) Improved user options and quality of service, particularly for non-drivers.
5) Improved design flexibility, creating more functional and attractive communities.
6) Ability to accommodate new uses and respond to new demands.

II. STUDY AREA

Fig.1 – TCE CAMPUS

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Thiagarajar College of Engineering is a government-aided autonomous institution located in Madurai, Tamil Nadu, India. It is affiliated to Anna University, Chennai. It is situated at 9.8866° N latitude and 78.0745° E longitude. It is one of several educational and philanthropic institutions founded by philanthropist and industrialist Karumuttu Thiagarajan Chettiar. Since it is such a large college, there are large no. of vehicles entry into college. For these vehicles to be managed, there are six zones where vehicles are parked.

- ZONE 1 – **Near to Auditorium**
- ZONE 2 - **Front parking**
- ZONE 3 - **Architectural Department**
- ZONE 4 - **Opposite to CSE Department**
- ZONE 5 - **Opposite to IT Department**
- ZONE 6 - **1st Year Block**

III. LITERATURE REVIEW

Rafiat Oluwatosin Omisore et.al. (2019) [1] Paper deals with the parking survey being conducted for data collection and using the data to analyse the parking index for the Central Business District in Akure. To emphasise the management of parking facilities in public areas of Pune , **Rajat Boob et.al. (2018)** [2] suggested suitable suggestions for the various problems faced by the common public using parking survey and demand survey. While **Haseeb Ul Hassan et.al. (2017)** [3] implemented Parking Inventory Report so as to let the policymakers, community , developers and others to know the information about the source of conflict , cost, and congestion within center city, to help them to take decisions on this matter.
Abdul Ahad et.al. (2016) [4] idealised “Park Easy” web app for the car parking problems, to allocate available parking space to given driver to park their vehicles. **Nikolay Naydenov (2016)** [5] foused on parking capacity , duration for parking management, while **Troung Thi My Thanh et.al. (2016)** [6] dealt with illegal parking and how it can help by legalizing it and problems what so ever. To avoid the congestion of car parking, **S. B. Baglane et.al. (2014)** [7] derived by implementing the parking management system. The literature study gave a clear over view and knowledge about various factors governing parking, various issues related to parking, and its impact. The study also allowed us to know various methods to identify problems and to assess the data. The study also incorporated various new innovations in the field that are implemented to parking.

IV. METHODOLOGY

The process beings with collection of qualitative and quantitative data from the study area. According to the existing problem in the study area that is chosen, infrastructure factors related to parking is identified. The collected data are further analysed and parking survey is performed to know the current parking capacity. Implementation of measures and their public reaction is also considered.

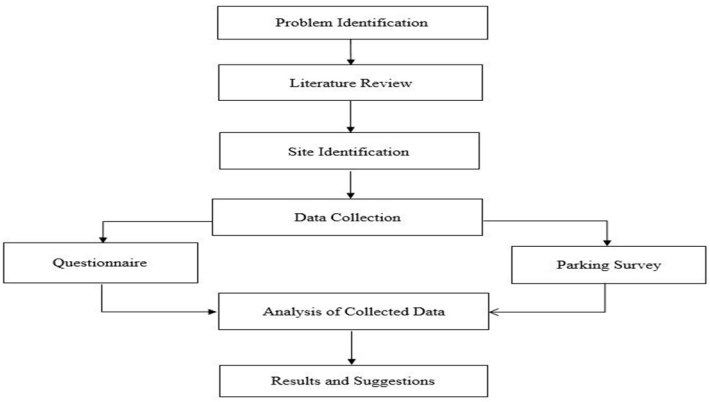

Fig 2 Methodology

The data was collected in the form of questionnaires and parking survey. These 2 methods helps to find both quantitative and qualitative data for the project. About 67 responses were recorded, out of which 3 were valid. Based on these results , conclusion were drawn.

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The result for the questionnaire survey is as follows

A. How many users felt that they genuinely have parking difficulties

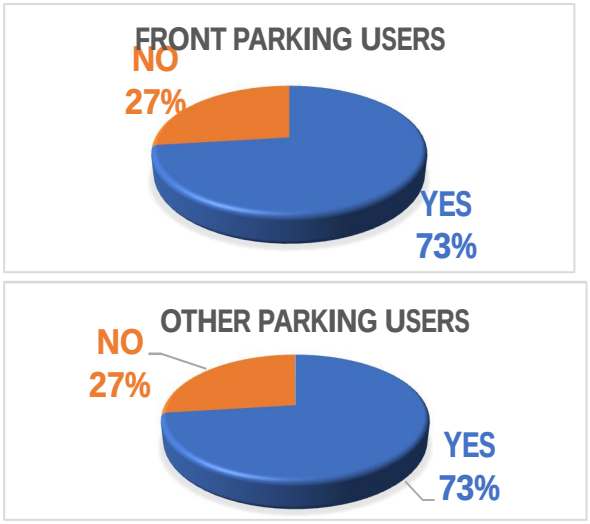

Fig. 3

B. What was the major aspect on which the users feel like most important among quality, convenience and security.

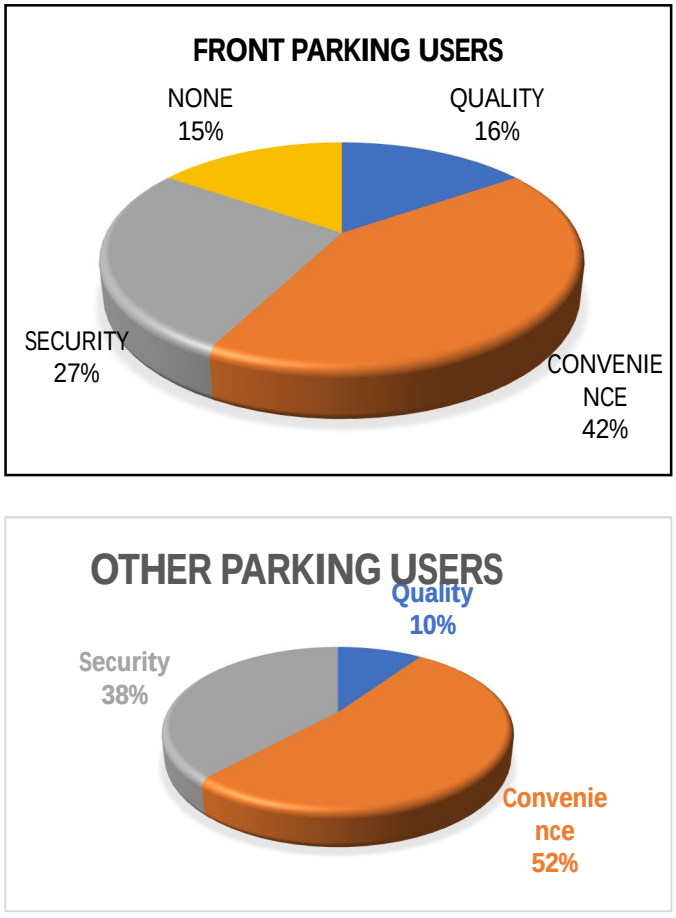

Fig. 4

C. Whether users feel their vehicles to easy to access while they depart from college.

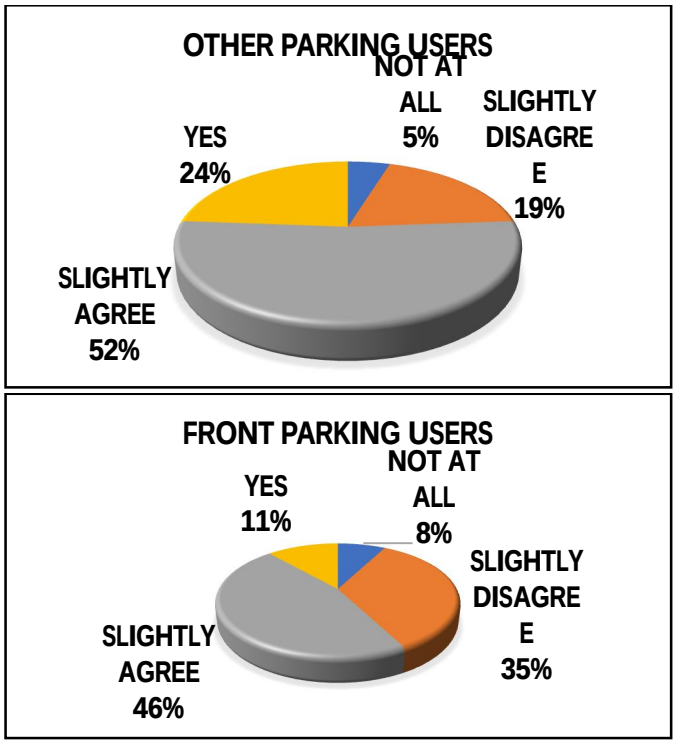

Fig. 5

D. Whether the various commuters have been late to class, which has been a factor due to their distance of vehicle from their sites

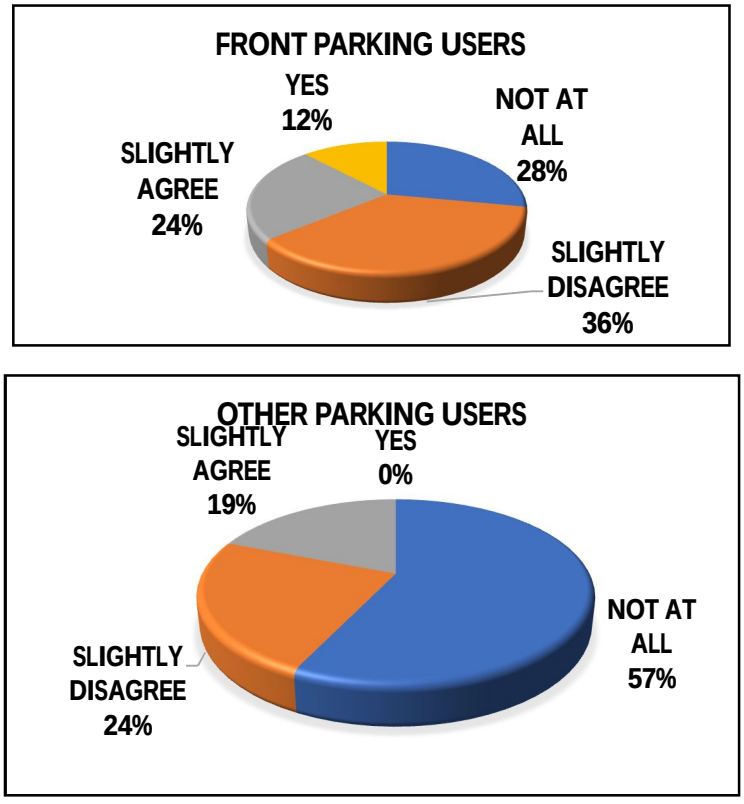

Fig. 6

E. Whether users find it easy to find space to park their vehicle.

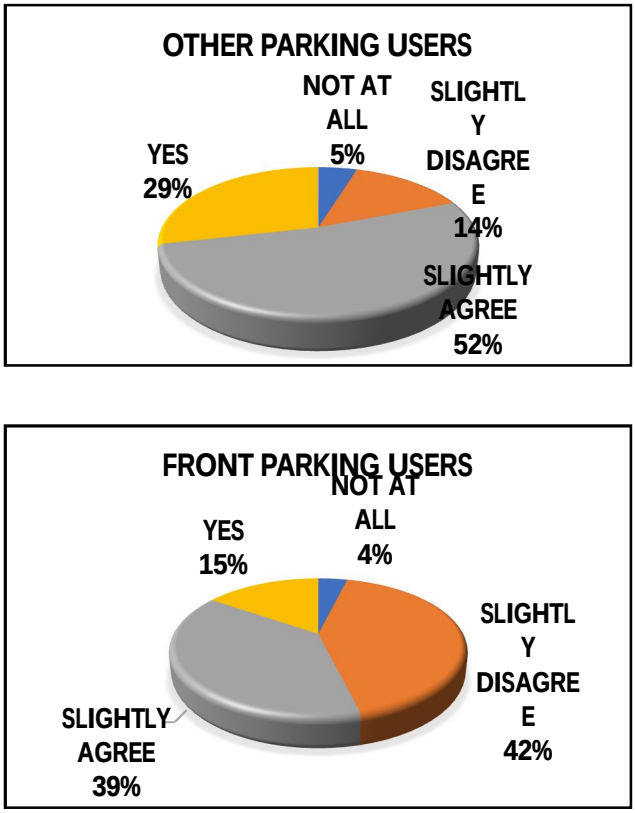

Fig. 7

F. People's opinion on to find whether they feel our campus has enough capacity to park all vehicles considering future.

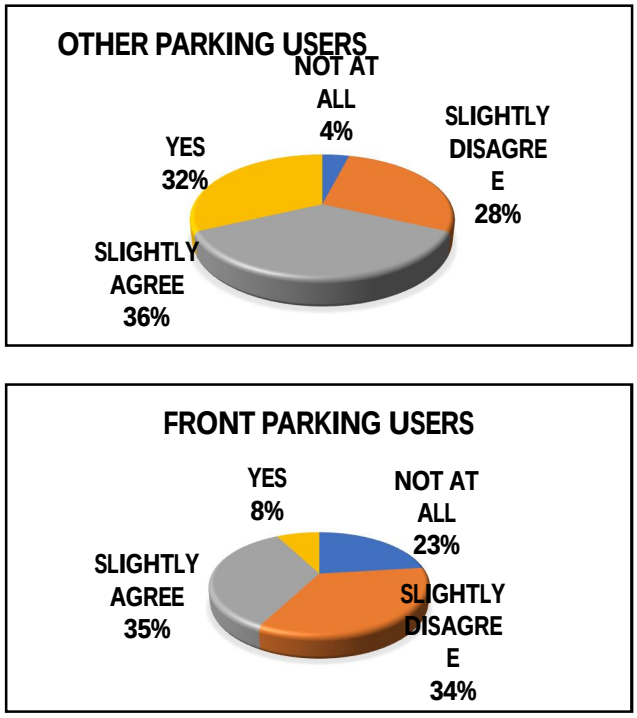

Fig 8

The questionnaire survey was completed successfully and all the answers were recorded and these data were analysed. The outcome of the questionnaire is

- Both front and other parking users, a majority of them face parking difficulties to be exact 73%.
- Both front and other parking users feels convenience is the major aspect for parking their vehicle.
- Front parking users find it trouble to access vehicle when departure than other parking sites.
- Front parking users tend to have more trouble being late to class due to not able to find parking space.
- Other parking site users tend to find it easy to find parking space than front parking users.
- Other parking site users of 68% feel that there is adequate space for parking space than about 43% front parking users only feel they have adequate parking space.

At the same time parking survey was conducted the data collected is in terms of percentage.

Table 1- Vehicle count bike

DATE	27/3/2019	28/3/2019	29/3/2019	1/4/2019	3/4/2019	4/4/2019
Front of CSE Dept.	5.88	3.85	3.23	5.38	5.33	2.11
Front of IT dept.	22.35	16.66	11.83	12.90	20	15.79
1st year block	14.12	12.82	11.96	12.90	9.33	9.48
Architectural Dept	15.29	19.23	27.96	13.97	16	15.79
Near to Auditorium	10.60	15.39	17.20	18.28	17.33	23.16
Front Parking	31.76	32.005	27.96	36.56	32	33.68

Table 2 – Vehicle count car

DATE	27/3/2019	28/3/2019	29/3/2019	1/4/2019	3/4/2019	4/4/2019
Front of CSE Dept.	1.44	2.35	1.24	1.60	1.27	1.75
Front of IT dept.	11.54	12.58	12.63	12.37	11.16	10.83
1st year block	6.09	5.54	4.81	4.65	4.60	5.573
Architectural Dept.	22.12	27.35	32.83	23.94	24.87	31.37
Near to Auditorium	10.10	10.40	8.80	8.24	9.77	5.41
Front Parking	48.71	41.78	39.70	49.20	48.35	45.06

As per IRC standards for parking areas for development 1988, It dictates us to consider 1 car is equivalent to 1 PCU while 1 bike is equivalent to 0.25 PCU.

The car space requirements is 2.5m x 5m. By equivalent car space by type of vehicle we can calculate the are required for bike.

There are few measures which can be implemented in our campus :-

Providing marking signage

Having a strict enforcement of rules so that we can punish the rule breakers, as placing new ideas won't just make sure it is the proper usage of the facilities that will enable it.

We can provide guidance system for parking

- We can use manual workers for it

- We can provide this service through means of mobile software applications.

Provide sheds for the vehicle which has been major worry by the users

Next another questionnaire is prepared to know about user's opinion on various features that can be deployed and the need of hour for them.

Whether they would like any new location and planning for car parking

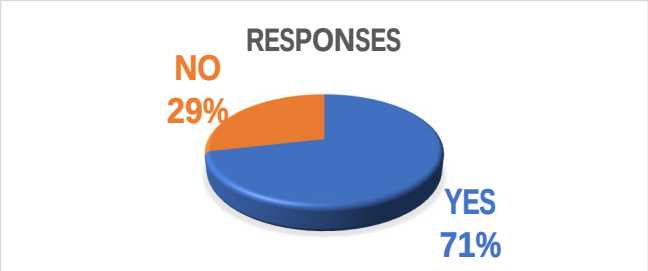

Fig. 9

Which feature has to be given more priority such as mobile software, digital sensor, marking signage, shed.

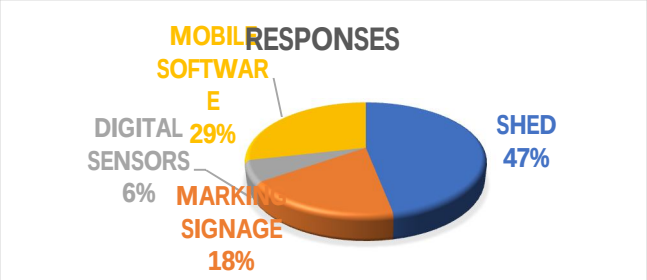

Fig. 10

Whether they need parking nearby department

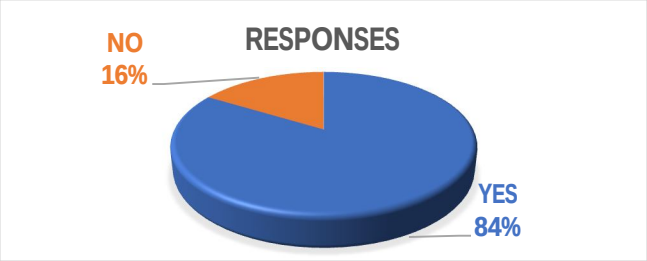

Fig. 11

Separate parking for visitors and regular users is preferable or not.

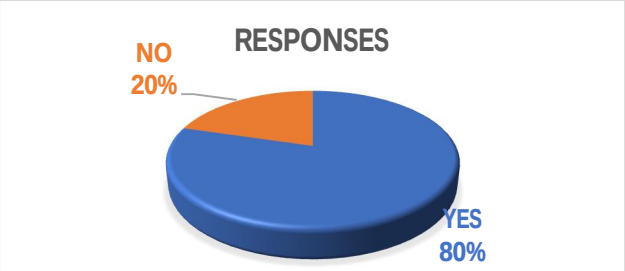

Fig. 12

Whether the users need regular parking spot for them.

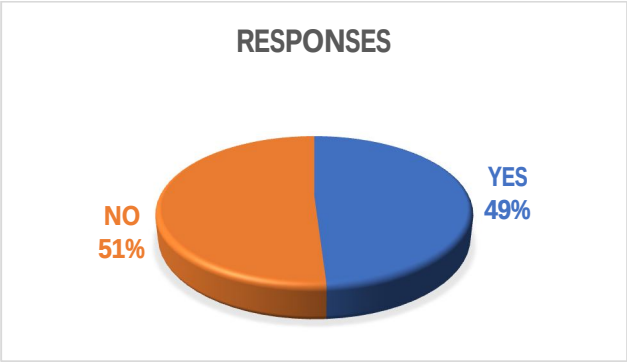

Fig. 13

Whether the people will be convenient if only the bicycle is permitted in the campus and it is also readily available for students and teachers to use for moving place to place inside the college.

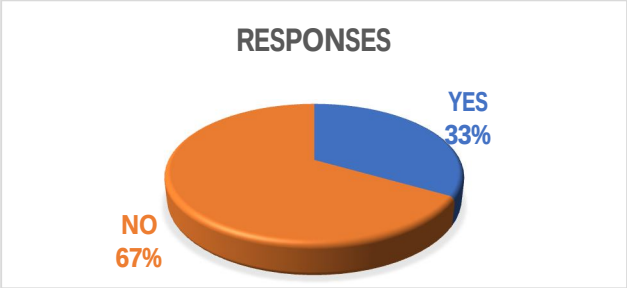

Fig. 14

V. SUMMARY

Since the most major requirement of people was to get sheds, a shed construction for single car will take about Rs2500. While in our campus a total vehicle count of bikes to be around 600 to 700 and car count of 90 to 120 based on the survey conducted. Since on some special events, there is a possibility of increased parking in the parking slots. Hence an extra 10 % capacity is considered for safe planning. With all this calculation the cost for building shed around the campus for vehicle comes around to be about Rs800000. While for parking software various companies in and around Madurai are available where they ask about 45000 to 80000 per time instalment. But in this type the annual rent what has to be paid may be greater than 800000. It would a great investment for future considering Madurai is also one of the smart cities to be developed into.

Fig 15- Before Implementation of suggestions

Fig 16 – After Implementation of suggestions

VI. CONCLUSION

The main objective of the project was to find the various problems faced by the users and to give measures to correct them. After all this process, we would like to conclude that on the main basis of providing sheds for parking as one of the major requirements right now and the cost of it is about 8 lakhs which in investment might be large but considering future plans it is best to ensure that sheds is basic requirements for the users. We can provide marking signage and have strict rules enforced, as measures can be given many a times but to safeguard it we need strict enforcements. With all this factors we can see that users problem solved and have a better parking management.

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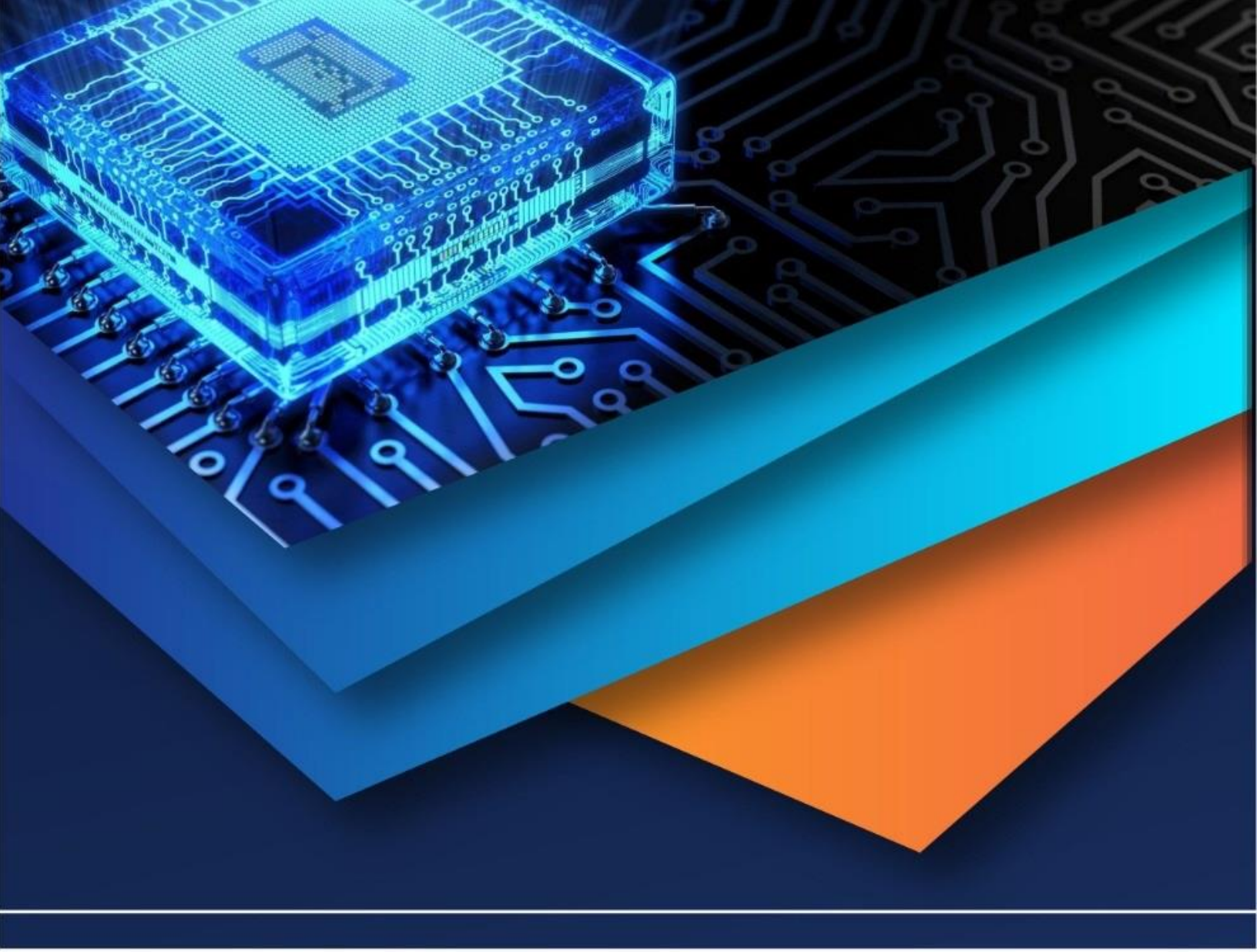

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