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Iris Recognition by Madla towards Ensure Secure Authentication

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***Abstract-* Nowadays, Iris recognition is a method of biometric verification of the person authentication process based on the human iris unique pattern, which is applied to control system for high level security. It is a popular system for recognizing humans and essential to understanding it. The objective of this method is to assign a unique subject for each iris image for authentication of the person and provide an effective feature representation of the iris recognition with the image analysis.**

In this work proposed a new optimization and recognition process of iris features selection by using proposed Modified ADMMDeep Learning Algorithm (MADLA). For improving the performance of the security with feature extraction the proposed algorithm is designed and used to extract the strong features identification of iris of the person with less time, better accuracy, improving performance in access control and in security level. The evaluations of iris data are demonstrate the improvement of the recognition accuracy. In this proposed methodology the recognition of the iris features has been improved and it incorporates into the iris recognition systems.

Key words-GLCM, Deep Learning, Strong Features extraction, MADMM, Iris recognition

I. INTRODUCTION

Foryears, Recognition of bodily features has been used for the purpose of identification and security such as the face, fingerprint, and iris. As a result of progress in the field of iris recognition, it recognizes the structure to regulate the eye sizes and eye surrounding of the pupil. Recently, several studies are made related to the use of recognition of iris model to support biometric experiments.It illustrate the iris biometrics matching, where different data's are employed for training and testing the enrollment, often lead to reduced performance. It stimulating the data from database that are acquired under getting hold of heavily controlled conditions.

The Unique Identification Authority of India is enrolling the people per day about one million, at 40, 000 stations, and plan to enroll the people within 3 years about 1.2 billion of population. IRIS recognition has materialized as one of the most auspicious technologies to provide reliable identification of human and for noncontact biometric authentication [Yulin Si et al., 2012]. Also it became as research topic driven in wide applications like national ID card, border control, banking, etc. Amazing accuracy of iris recognition has been reported by the existing state-of-the-art iris recognition algorithms from controlled environment.

In human eye, iris is a ring shaped region with biometric patterns. It is stable and provides a reliable approach for individual authentication.Based on automatic preprocessing, features matching and analysis, a unique identity label is assign to each iris image features for extracting and identification of the person [SerestinaViriri et al., 2007].The State-of-the-art of the iris recognition methods has a unique image differentiation by its feature extraction strategies. In preprocessing it eliminated the unwanted parts of the image and controls the pupil function with adjusting the size of the image. The diameter of iris is 12 mm and pupil size of the diameter will be varying from 10% to 80%.

In iris recognition applications, iris images are defined with the same class of different subjects [J. Daugman et al., 2002]. So that the iris images dissimilarity of the subjects is need to be identified for authentication. However, in iris biometrics applications the similarities between various subjects are identified, which categorize iris images into several explicit classes. Moreover, the iris images in the central database into multiple categories may help for speed up the iris identification in large-scale. In existing recognition systems, the iris images within the short distance and under constrained environment are obtained using NIR [E. Mattar., 2013 &da Costa et al., 2012]. It achieves the matching accuracy of the image and preserved it clearly in high quality.

For long period of time the patterns of each person is believed to be unique and remain stable and making them as a biometric signature. Over the past decade, iris patterns have gone through significant transformations of developing a new one and upgrading an existing. Sometimes, the enrollment is time consuming and expensive by having large number of users in the hundreds of

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millions. This makes it infeasible in deploying to re-enroll users every time. In practice, iris images for enrollment are trained and tested.

The work is organized as follows: Section II reviews the most appropriate approaches for the amalgamation of iris data. Section III provides the proposed method description with validates of synthesis and interpreting strategies used along with the observed factors of unpredictability data. Section IV presents an analysis of experimental results of proposed work with its strategies and parameters. Finally, conclusions and future work are given in Section V.

II. LITERTURE REVIEW

In this section the survey related to the iris recognition system is discussed. In iris image the function of obtaining accuracy which is based on the method of segmentation. The parameters are iris inner and outer borders [H. Proenc et al., 2006 & Liam et al., 2002]. The pupil detection of the iris image is identified with the transformation and filtering [Du et al., 2004]. The outer border is defined by sobel filtering and the method provides a better performance analysis in dark background iris image by non-concentric iris and pupil.

For extracting the features and solving of optimization the Alternating Direction Method of Multiplexer (ADMM) is used [Sarikaya et al., 2014]. It is easy to handle and solve the issues by breaking them in to smaller pieces. Through this ADMM algorithm, the iris images is divided into several pieces among the whole pixel values and selecting only few regions of images using this optimization algorithm for strong feature extraction.

In order to reduces the complexity and eliminate the insignificant features a new optimization process is designed and implemented. After this GLCM (Gray Level Co-occurrence matrix) algorithm is used to get all the image statistical features so that DBN (Deep Belief network) is train and it is comes under the deep learning family [Yushi Chen etal., 2014]. It is an Advanced Artificial neural network, will learn the input features and respond according to the situation. The extracted features of iris are used in the training process unsupervisingly and then the trained data is ready to recognize the query of iris image given.

A novel optimization framework is proposed for learning iris biometrics transformations with its desired properties and represented concisely using kernel functions [Pillai, J.K et al., 2014]. The proposed work is utilized for high adaptation by performing it in a similar way with limiting the samples from various data's set. Furthermore, the classes will be large between various samples and these constraints make sure that alleviated the mismatch problem when matching is performed. For obtaining the solution the test samples is need to be perform every time if the optimization problem has a global optimum and convex. This involves in adaptation parameter estimation during the training stage. During testing, the samples are transformed and done matching which leads to significant improvements in accuracy. The components in iris recognition system are strong features extraction, identification, matching and ensure secure recognition for security. In order to overcome the limitation of the existing work, the Modified ADMM and Deep Learning algorithm are proposed for optimizing the extraction of the features for strong features with better performance and accuracy.

III. MODIFIED ADMM AND DEEP LEARNING ALGORITHM - MADLA

The proposed work analysis and algorithm are discussed in this section. In this work, the analysis and design of the training phase and testing phase is proposed with the strong features extraction of optimization and preprocessing technique. Modified ADMM and Deep Learning Algorithm are proposed with high level abstraction for ensuring the identification of the person.

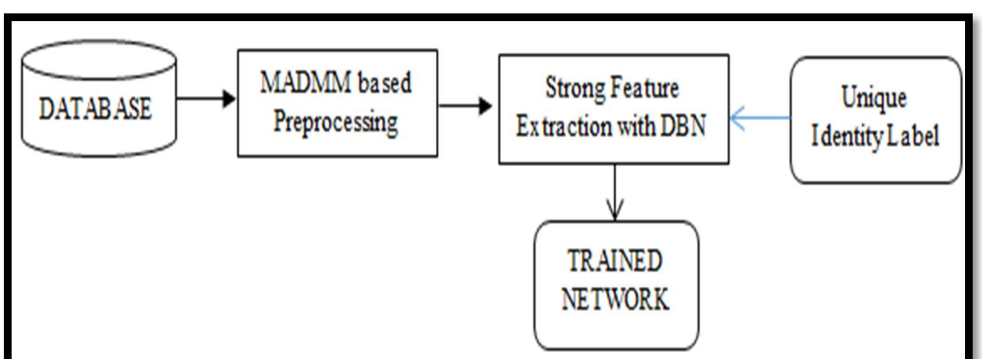

Fig. 1: Training Phase of MADLA

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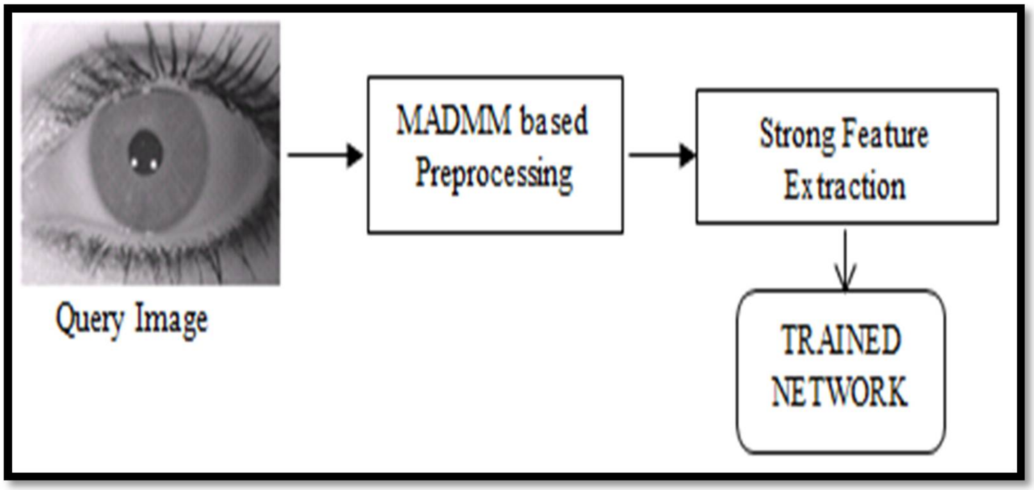

Fig.2: Testing Phase of MADLA

A. *Training Phase*

In training phase,the process of extracting the iris image is consists from the dataset with large number of iris sample which belongs to different persons. It consist the data set with significant and insignificant information. When processing it required more time consumption for data acquires and also it may lead to confusion during the matching stage. In order to overcome the limitation, a new algorithm (MADMM) is proposed with the optimization and preprocessing.

The proposed MADMM algorithm used to optimize the issues and solved it by dividing large problems in to smaller pieces. It will reduce the image information by eliminating the insignificant features. The extracted features are let to matching stage to find strong features in iris image by using the proposed algorithm (MDLA) of GLCM with DBN algorithm, as shown in Fig [1]. High abstractions features are defined by using the proposed MDLA. For easy identification process, a unique identity label is assigning to each iris image features. This algorithm is capable of learning the features for the purpose of classification.As a solution a trained model is generated with all information of the classifier model.

Training Phase

```
Img= Fetch Image Database ();
N=Measure_No_of_Images ();
For Loop i= 1 to N
    ORE= Optimal_Region_Extraction(Img(i));
    SFE= Strong_Feature_Extraction(ORE);
    SF ( i )= Stack_Feature_Storage(SFE);
End Loop
Initializing DBN ();
Trained_Model= DBN (SF);
 Save Trained_Model;
```

B. *Testing Phase*

Testing phase is similar to the training methodology, but instead ofdatabase input a query image is given as input. The input query image will undergo the process of proposed MADMM algorithm which is discussed in training phase and the required portion of image data is preserved in it. In tested phase the extracted features is processed with GLCM and analyzed the matches with the identity label to find a closest match, as shown in Fig [2].

Testing Phase

```
Img= Fetch Image Database ( );
```

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Q=Selecting_Query_from_Database( );

ORE= Optimal_Region_Extraction(Q);

SFE= Strong_Feature_Extraction (ORE);

Load Trained_Model;

Classification = Trained_Model (SFE);

IV. EXPERIMENTAL RESULTS

The analyses of experimental results are discussed and compared the MADLA results with the various existing work. The results of extracting strong features take place with the unique identity label. When extracting the query it obtains the iris recognition with identity label which provide secure identification or authentication of a person. When comparing the work, MADLA provides better accuracy with less time, less error rate, better decidability index and high recognition rate. The data set is taken from IRIS database of Multimedia University (MMU). As shown in Fig [3] the features extraction results are obtained with identity label. The parameters comparison between the existing methods and proposed method is shown in Fig [4], Fig [5] and Fig [6]. Table [I] shows the comparison of the proposed and existing algorithm with the parameter results.

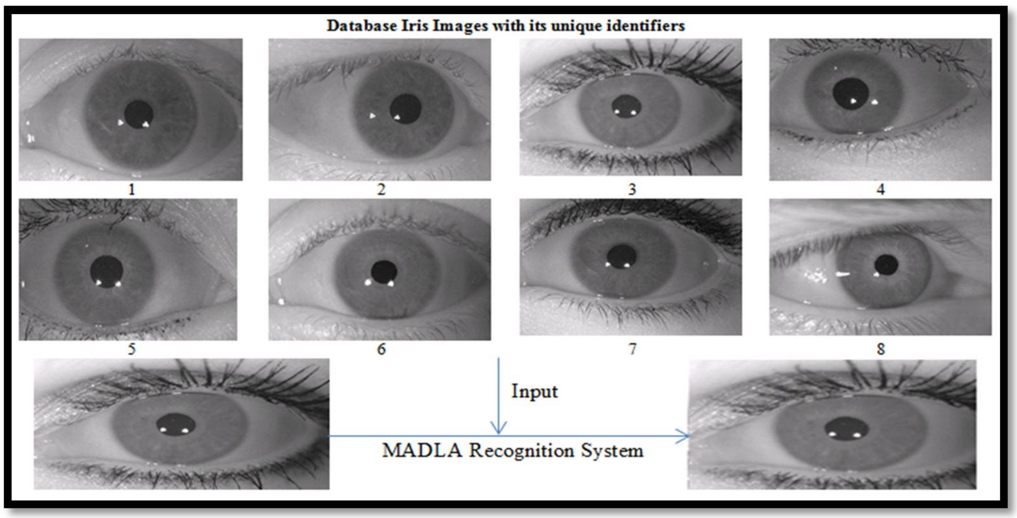

Fig.3The results of MADLA Recognition System

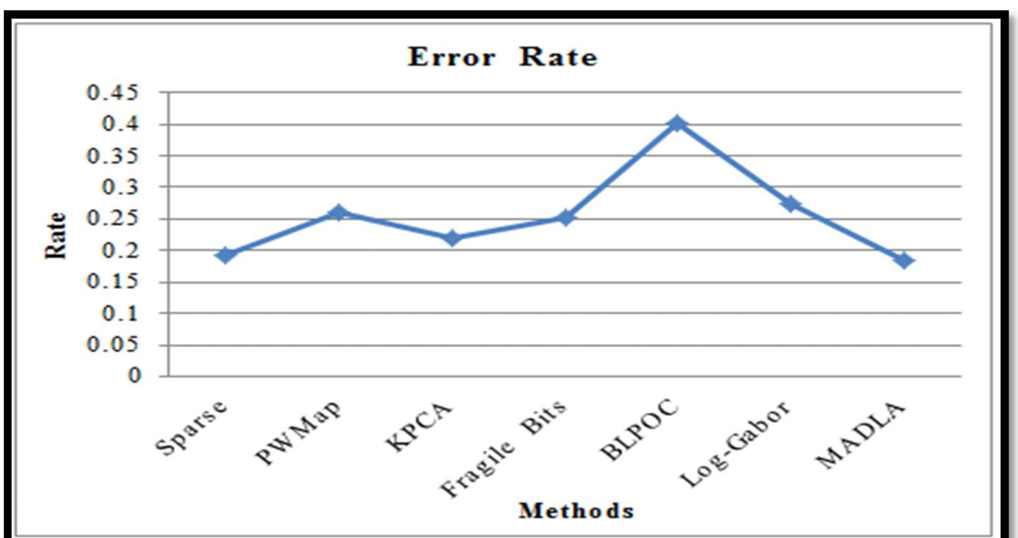

Fig. 4: Error Rate Comparison

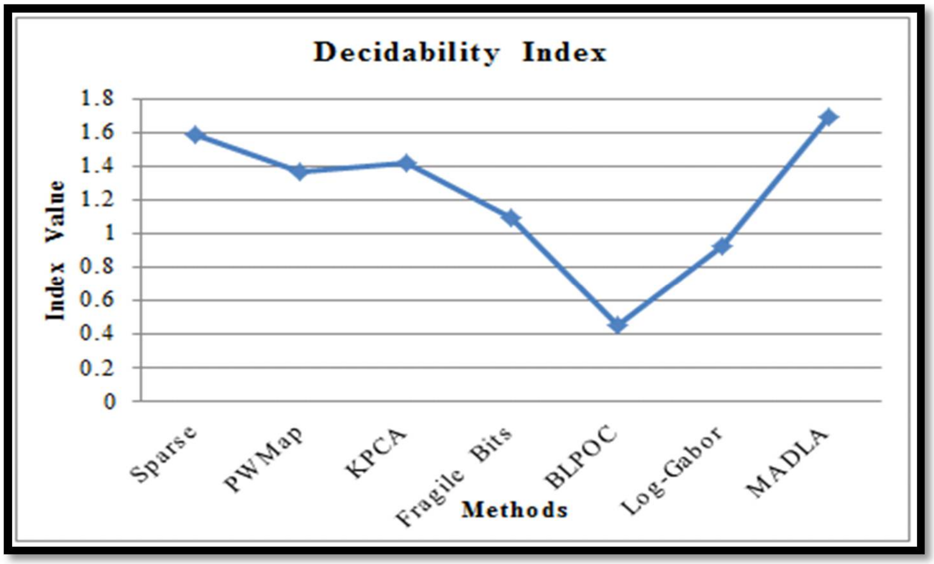

Fig.5 Decidability Index Comparison

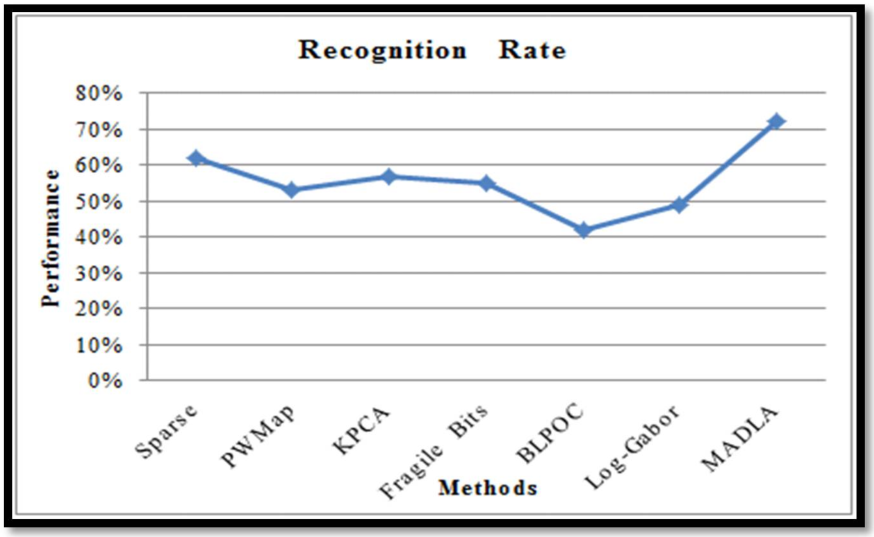

Fig.6 Recognition rate Comparison

Table I: Comparison of Algorithm

Methods	Error Rate	Decidability Index	Recognition Rate
Sparse	0.1922	1.5842	62 %
PWMap	0.2608	1.3700	53 %
KPCA	0.2193	1.4176	57 %
Fragile	0.2534	1.0923	55 %
BLPOC	0.4022	0.4528	42 %
Log-	0.2745	0.9266	49 %
MADLA		1.6892	72

V. CONCLUSION AND FUTURE WORK

In proposed iris recognition system, we analyzed the results of the MADLA algorithm that to prove the efficiency of the system with less time, better performance and secure authentication, obtaining high level abstraction and better recognition accuracy when compare to existing system. For evaluation of the system, the sample data's are enrolled and tested by using the efficient algorithm of MADLA. The main contributions of this work are to provide a solution for mismatch problem in iris biometrics for improve the matching process feature extraction with better accuracy and less time computation. Future works, extending the proposed system with encode of iris image and to develop a system for ensure security and cost consumption.

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BIOGRAPHIES

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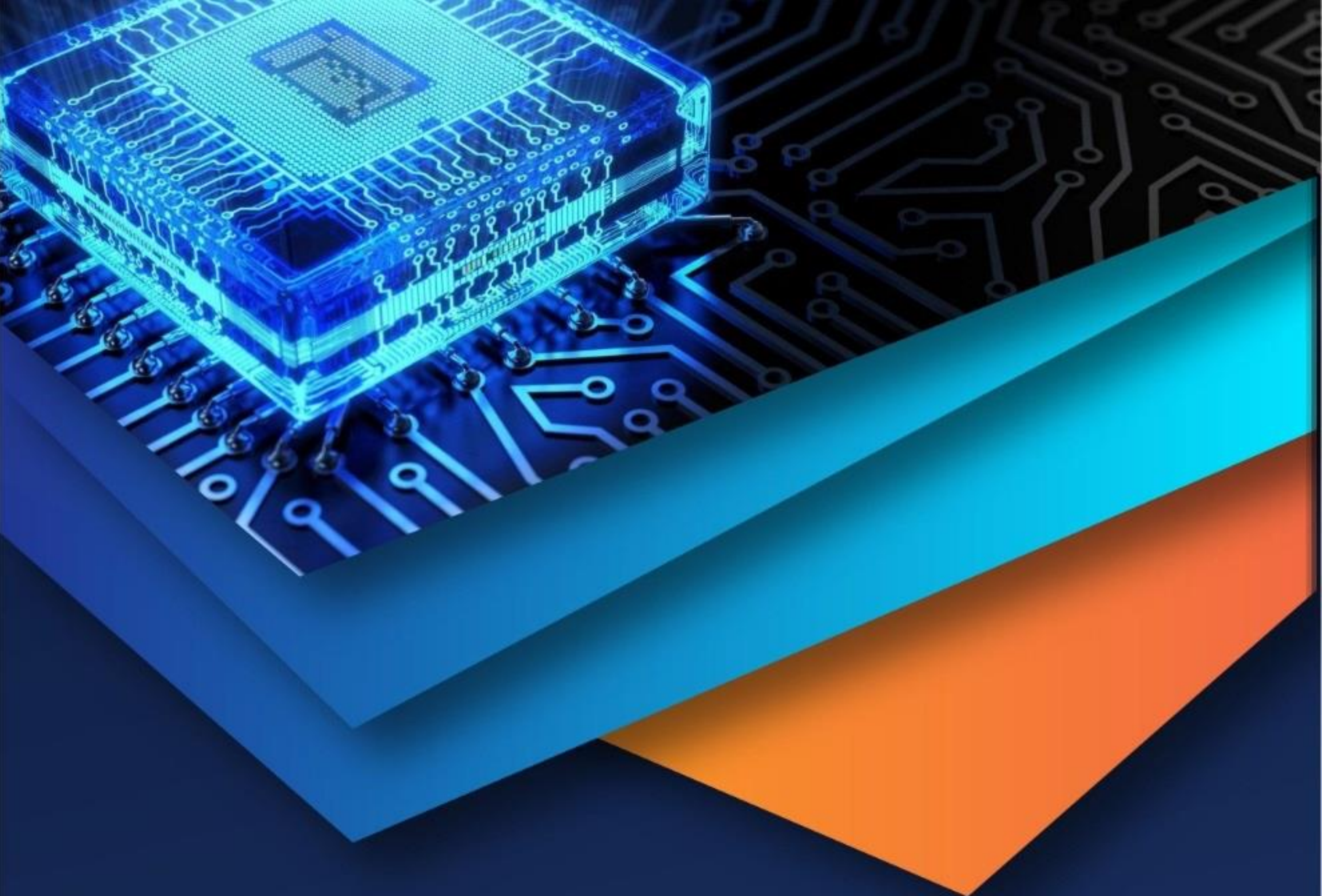

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