iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** VI **Month of publication:** June 2017

DOI:

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Volume 5 Issue VI, June 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Detection of Grade of Tumor in MRI Images with Hybrid Technique

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Abstract: ***Human brain is a very complex structure and brain image analysis is a very intricate task. Detection and segmentation of tumors from brain is very difficult due to variance and complexity of tumors and dense brain tissues. Manual segmentation of these abnormal tissues may result in misdiagnosis due to human errors. For this automatic medical image segmentation and classification is a key step in computer aided imaging to get accuracy and correct estimation of medical images. The proposed framework comprises of two consolidated grouping strategies, for example, k-mean procedures, fuzzy c-mean techniques, these all are utilized to discover the brain tumor. The hybrid technique is including image upgradation which is finished by contrast improvement and midrange extention. Skull striping is done through twofold thresholding utilizing morphological operations. Division of the picture is done through two grouping methods k-means and fcm.fcm utilizes membership function to distinguish genuine tumor area. The component extraction is performed by utilizing gray level run length matrix. At long last, grade of tumour is calculated.***

Catchwords: ***Tumors, feature extraction, brain, clustering calculations, k-means, fuzzy c-means***

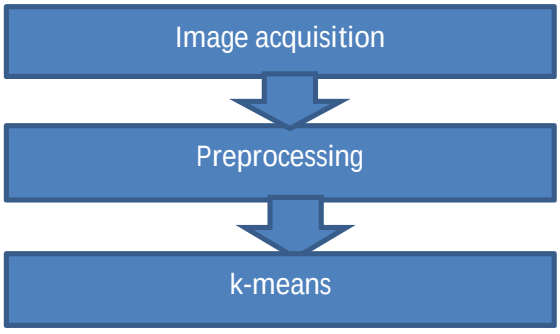
I. INTRODUCTION

Image segmentation is an important topic in the field of digital image processing. The purpose of image segmentation is to partition the image into essential regions with respect to the appropriate locations .Segmentation of biomedical images plays a significant role in image processing as it helps in the extraction of suspicious regions from the medical images. Image segmentation has been an area of active research for the past two decades reulting in several image segmentation techniques that have been proposed and described in the image processing research literature.

Brain tumor is a serious life altering disease condition. Brain tissue segmentation of MR images is very challenging because of the insufficient image quality due to the properties of developing tissues. Brain tumor is strange development of neurons in brain. The development of neurons can fluctuate from individual to individual. Tumors are categorize in to two types according to their as Beningn and Malignant. If the tumor is at its beginning then it is categories as Beningn and if part of tissue develop somewhere else and spreads then it is categorizes as Malignant. Tumors impacts CSF(cerebral spinal fluid)which causes strokes so location of cerebrum tumor is essential viewpoint for diagnosis and further procedures. MRI images are more secure than w other imaging modalities as it doesn't include any radiations and gives 3D view of image with high resolution..The consolidated bunch procedures give more quick and precise outcomes.

II. PROPOSED METHODOLOGY AND PROCEDURE

The proposed system has six steps starting from image acquisition to feature extraction. The component extraction is finished by utilizing GLRLM (grey level run length matrix) to extract features.



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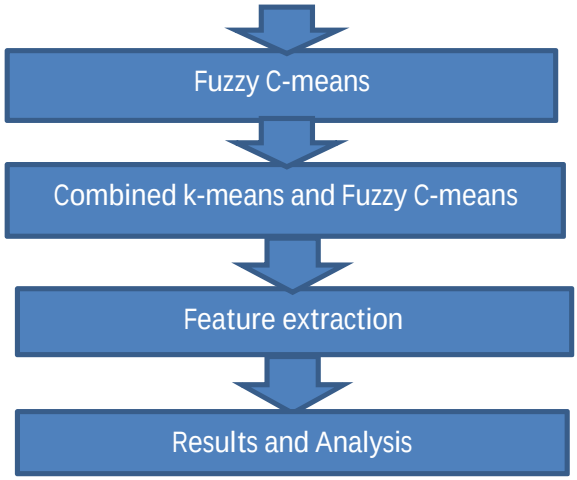

Fig.1. Flow chart for Proposed Method

A. Image Acquisition

MRI images can be taken from various internet resources ,hospitals and medical diagnostic centers.

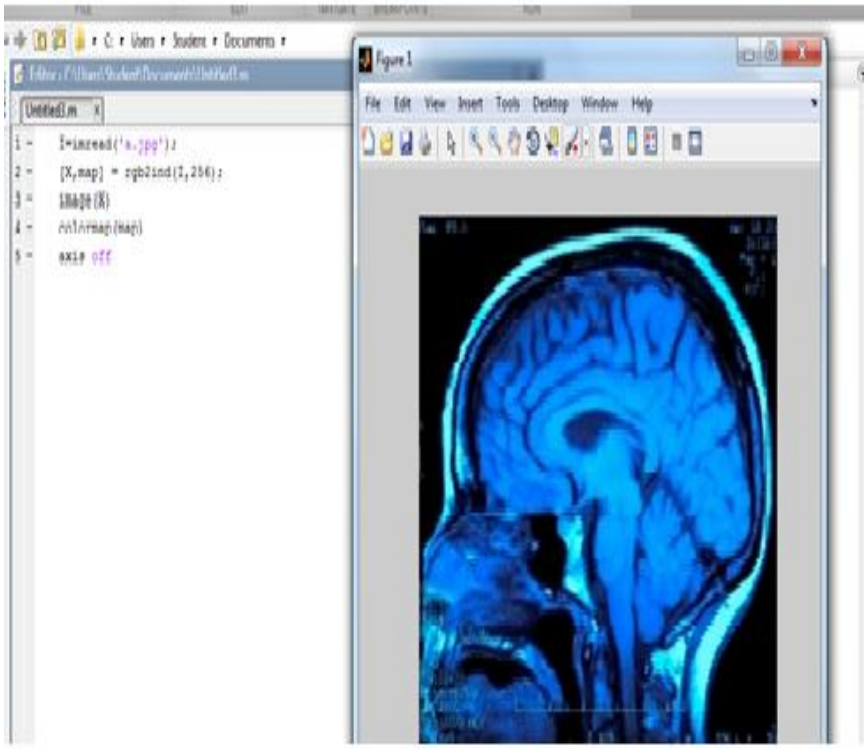

Fig.2 Image Acquisition

B. Preprocessing

Preprocessing the lowest level abstraction. This is done to suppress the undesirable distortion and boost the significant feature. This step channels the redundant data in the image and refines the points of confinement. Pre-handling includes improvement of MRI images and skull striping.

1) *Enhancement of MRI Images:* This step enhances the nature of picture. At first brilliance is expanded by changing picture from RGB to dark scale intensity pictures. Modified Matlab capacity is utilized to guide low and high force values. In the mid extend step picture power qualities are extended.
2) *Skull Stripping:* Skull stripping implies evacuation of non-brain tissues as scalp,skull and many others from MRI images. Skull striping is finished by twofold thresholding disintegration steps.

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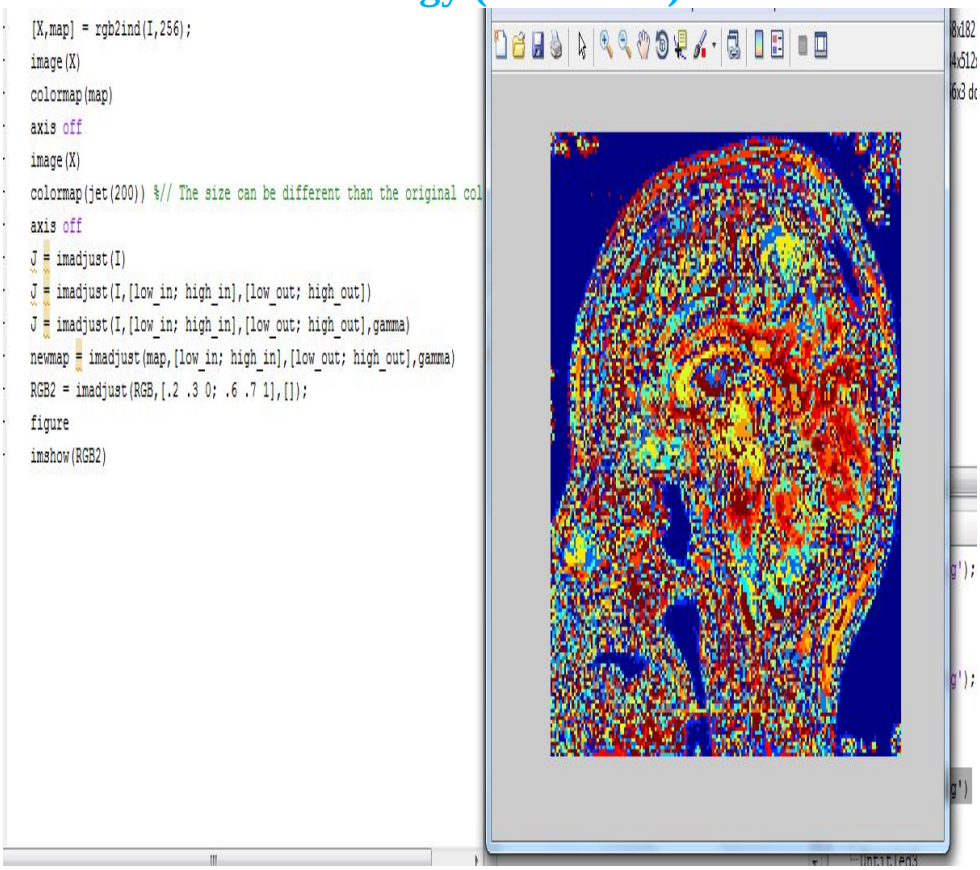

Fig.3 Enhancement of MRI images

3) *Double Thresholding:* In this step the transformation is done from dim scale picture to twofold picture. Here concealing is done to every pixel with scope of 0.1*256-0.88*255 to 1 where 1 belongs to white and remaining pixels to 0 for dark. With this procedure the disintegrated tissues pixels are disposed of. Here we consider two limits (upper and lower) hence called twofold thresholding.
4) *Erosion:* It is the operation in morphological image processing where the undesirable pixels are expelled from the MRI picture skull segments are removed.

C. K-MEANS

K-Means follows unsupervised learning approach and used to classify the given data set. In this approach least-squares partitioning method is used to splits the group of objects into K groups. First image is converted into binary form and K values are assigned. Then center is selected randomly. Distance between all pixels of cluster is find out. Comparison is done with all cluster using distance formula and the shortest distance the pixel moves to cluster and then the centroid is re-estimated.

Steps

1) Let K is number of clusters.
2) Choose cluster center.
3) Pick randomly all pixels from cluster.
4) Distance between each pixel and each cluster center is found
5) Examination is done to the closest groups and focus moves to it.
6) Else it is moved to next bunch.
7) Re-estimation.
8) Repeat until focus finalize.

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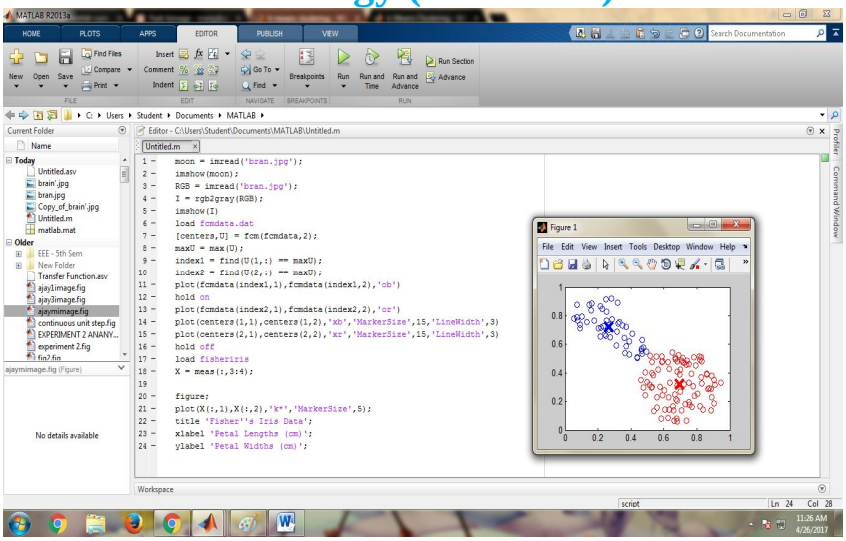

Fig.4 k-Means Estimation

D. Fuzzy c mean

FCM logic is a root of handling the data This technique generate partitions where each pattern belongs to one, and only one, cluster. So clusters with firm partition are disjoints. Fuzzy clustering use membership function to associate each pattern to every cluster. The member ship values are 0 to 1. The membership functions states fuzziness of a pixel image and also states the information presented in the images.

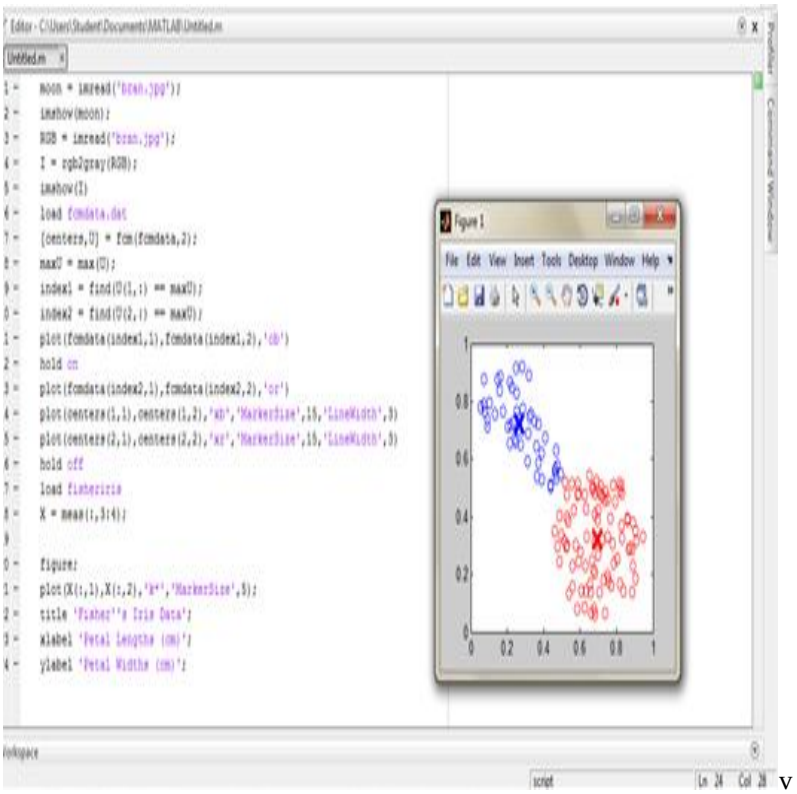

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Fig.5 Fuzzy C-Mean Estimation

E. Combined k-means and fuzzy c-means

This technique combines K-means and FCM. The tumor effected region is shown by colored dots and rest image is shown by white space. The combined technique gives us better performance.

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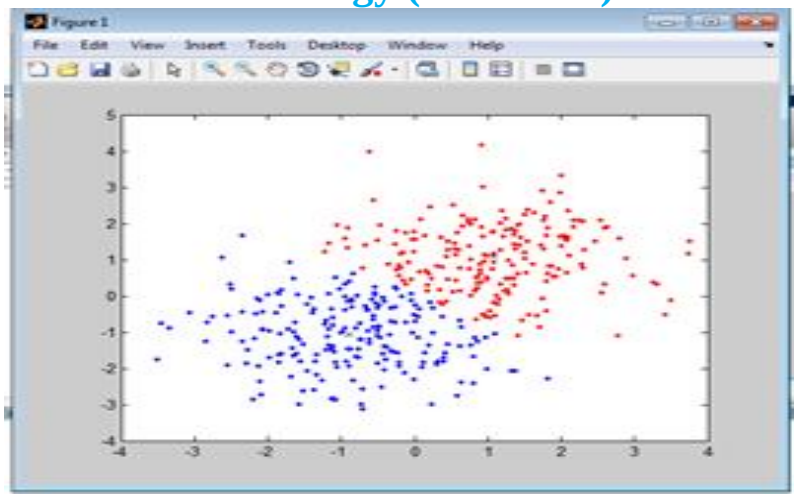

Fig.6 Hybrid Technique

E. Feature extraction (glrlm)

Capturing the actual tumor at FCM output is called image extraction. The analysis of image is done quickly after clustering techniques using GLRLM.

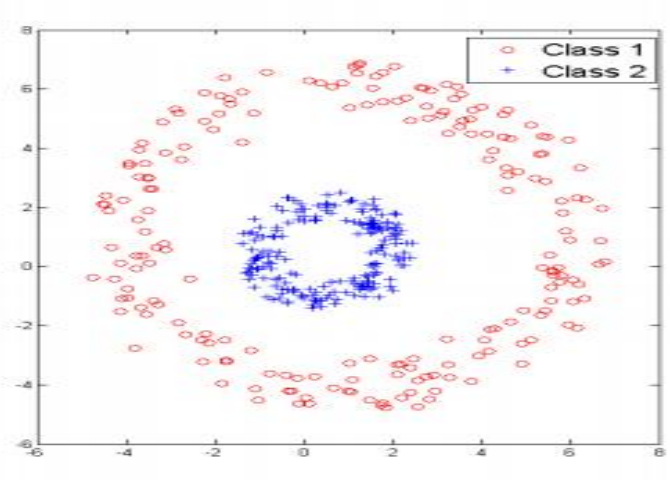

Fig7.Grade of Tumor Detected

III. CONCLUSION

The paper compositions a technique for categorization of tumor in a brain MRI image. The primary goal of this study is to separate the diverse unusual brain MRI image in light of the ideal list of capabilities. This grouping is performed on proton Magnetic Resonance Spectroscopy pictures. In any case, the arrangement exactness results are diverse for various datasets which is one of the disadvantages of this approach. The outcomes inferred that the proposed calculation yield great outcomes when contrasted and alternate classifiers. The outcomes uncovered that the proposed half and half approach is precise, quick and strong.

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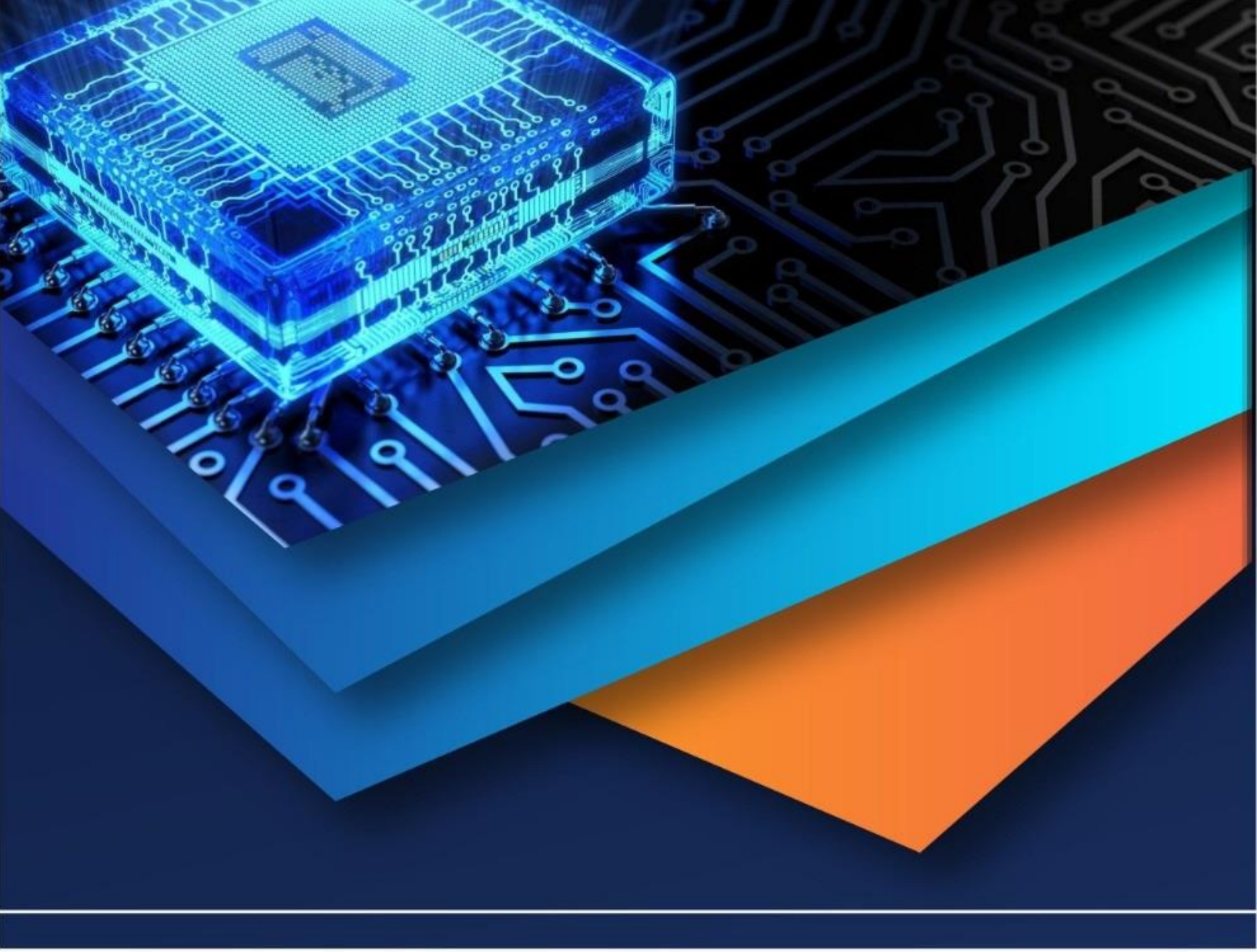

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