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Map Function: Image Processing System using Handover Technique on cloud Environment

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Abstract: ***Cloud computing is the one of the emerging techniques to process the big data. Cloud computing is known as service on demand. Large set or large volume of data is known as big data. Processing big data (MRI images and DICOM images) normally takes more time. Hard tasks such as handling big data can be solved by using the concepts of hadoop. Enhancing the hadoop concept will help the user to process the large set of images. The Hadoop Distributed File System (HDFS) and Map Reduce are the two default main functions which are used to enhance hadoop. HDFS is a hadoop file storing system, which is used for storing and retrieving the data. Map Reduce is the combination of two functions namely maps and reduces. Map is the process of splitting the inputs and reduce is the process of integrating the output of map's input. Recently, medical experts experienced problems like machine failure and fault tolerance while processing the result for the scanned data. A unique optimized time scheduling algorithm, called Dynamic Handover Reduce Function (DHRF) algorithm is introduced in the reduce function. Enhancement of hadoop and cloud and introduction of DHRF helps to overcome the processing risks, to get optimized result with less waiting time and reduction in error percentage of the output image.***
Keywords: Cloud computing, big data, HDFS, map reduce, DHRF algorithm.

I. INTRODUCTION

Cloud Computing is a well known concept also known as, IT on Demand. Cloud computing is the concept, which is run by most of the IT companies like e.g. Amazon's EC2, Intel's Intel Manager. Cloud computing package has a set of clients and servers. The packages are powered with high storage capacity, high flexibility and high computing performances. Cloud computing has the several concepts in it like, cloud storage and cloud security; cloud storage reaches to the users a lot. Euca2ool is a Cloud tool, proposed in this work is to enhance the uses of this tool; where the user has to create an account in the Eucalyptus Partner Cloud (EPC). Since this tool can easily interact with Amazon's EC2 on any operating system, this Ecu2ool has been selected in this work. Java Advanced Imaging (JAI) is regularly used for encoding and decoding the image that is saved in the HDFS. JAI is introduced mainly for the betterment of imaging processing process. The job of the JAI is to translate or to transform the image format. The concepts of Big Data, JAI, Hadoop and Map Reduce functions are proposed in this work. This work is executed with the private cum hybrid cloud tool called Euca2ool. The Fig. 1 shows the full Architecture of the proposed work. Two set of processing techniques are applied over the input and Fast corner_9 corner detection is also used in the system. Presently, this regular set of work is made with the other corner detection method and scheduling algorithm for 2D to 3D data processing [1]. In the proposed work, it has been proved that, there is another better corner method, improved SAD matching and Scheduling DHRF Algorithm, which could benefit the client in the useful manner. DHRF algorithm has proved that, it works better than the existing algorithm while processing the Reduce function. One of the main concepts in the proposed work is introduction of JAI used for image transformation. If the images are in the improper format, JAI changes the image to the right format

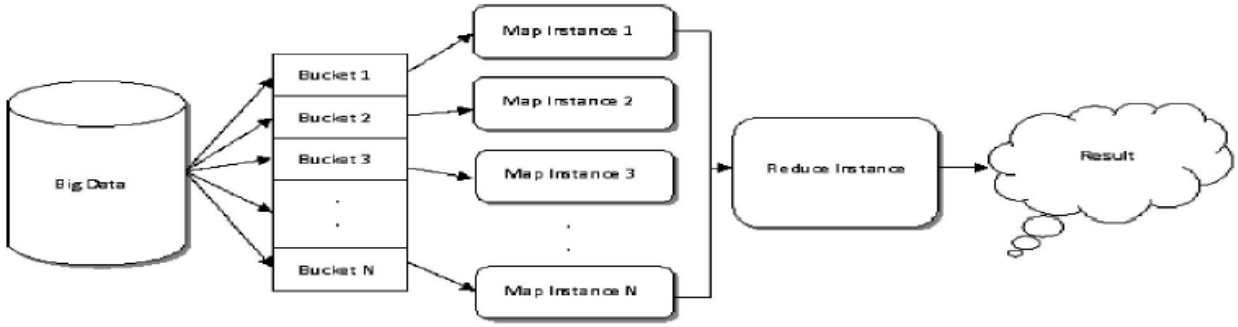


Fig. 1: Architecture of Hadoop for Map Reduce Function

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One of the main concepts in the proposed work is introduction of JAI used for image transformation. If the images are in the improper format, JAI changes the image to the right format. The raw data formats input are converted to the fixed frame size and then the data compression is done. The compressed data is scaled to a fixed frame size. The received output will be a better one with high flexibility, less time estimation and less error percentage. Mostly the medical data will be in the DICOM format and rarely in the JPEG format and the output received will be in the .jpeg format. According to the literature, the best way to process the large volume of data is enhancing Hadoop. Hadoop basically has HDFS (Hadoop Distributed File System) and Map Reduce function. The enhancement of Hadoop over Cloud Computing will obtain additional improvement in result and also in the waiting time. Hadoop can solve the problems like failure of Machines, fault tolerance, which occur during the processing of large set of data. These minor problems may result in the failure of the work. So, in order to overcome these problems, Hadoop is used. When the speed of the machine di not match with the Map Reduce function the tasks will be delayed. To rectify this problem, the Ecu2ool is used to manage the works of the Map Reduce function. To reduce the waiting time during the operation, a Dynamic Handover Reduce function (DHRF) algorithm is implemented in the Reduce function.

The proposed algorithm will work on the reduce function to reduce the waiting time during the operation. If there are a few small files, then Map task processes only a little amount of input data, and as a result, there are many unscheduled Map tasks [4]. The concept of unscheduled Map task is common. In the proposed work, the Map task are unscheduled, the process of intermediate data to the Reduce function will be a little hard task. So, according Tin-Yu Wu et al, a switch algorithm was proposed. But, since there may occur some technical fault while processing the Reduce function, Handover technique is implemented. So that, the process will wait, until each process gets over completely. The HDFS system is utilized in this process. The cases may be either the small pieces of data or the large volume of data; the HDFS storing system supports all the formats for storing the data. This paper reports the experimental work on big data problem and its optimal solution using Hadoop cluster, Hadoop Distributed File System (HDFS) for storage and using parallel processing to process large data sets using Map Reduce programming framework. Big data chunks with different size and sequence will be computed in each node, so that transfer of a chunk is overlapped with the computation of the previous chunk in the node, as much as possible.

The data transfer delay can be comparable or even higher than the time required for computing the data. Use of Dynamic Switch of Reduce Function (DSRF) algorithm, a scheduling scheme on the Reduce functions for users who compute simultaneously to acquire Reduce resources to finish the tasks efficiently [8]. In the proposed work, Dynamic Handover Reduce function (DHRF) algorithm is implemented in the Reduce function where the system waits until the process get over. The proposed module converts the size and format of the image using the following options: max Width, max Height, Image Format. JAI is introduced with small change in the coding. If max Width, max Height, is the case, it would take more space in HDFS. This may result in occupation of more space. The Reduce function will wait for the Map function to generate intermediate data; the Reduce function can switch to another task to combine the image data first. The case of incompletion may occur while processing the Reduce function in the existing work, when the machine get faults like virus attacks, corruption of Operating System and others.

Those inputs or the data gets stored in HDFS to process the MapReduce Function. HDFS handles both the structured and unstructured data. The Hadoop's job is to split the data and distribute to the hosts to compute. This work will be done simultaneously in the parallel manner. This is called as distributed and parallel computing. The host depends upon the strength and the storage of the computing capacity.

II. RELATED WORK

With the vast growth of images produce by 2D/3D graphical hardware technology .the task of image retrieval analysis framework identify and it provide data as well as map reduce phase to big no of medical data. Hadoop is an open source framework which is handle big data and it provide scalability fault, tolerance, high availability and parallelism. It can handle vast amount of data it manage such as master node it can handle map reduce task, salve node and prototype task it find query image, map reduce task given tired retrieval system. It is stored in Hadoop distributed file system. Job trackers are capable to handle smallest task which is come first.

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The evolution of digital technology and stored device it is fast development of digital image library, and all kinds digital tools produce number of image every day. It becomes a warm research in recent years. The content-based medical image retrieval (CBMIR) speed, and high precision. It has been extensively applied in the fields such as medical, aided medical diagnosing, and medical information management . Cloud computing can distributed task to every node in parallel processing it provide research idea for medical image retrieval. There are two main aspects of development of parallel image processing system; one is algorithms. It is searching the efficient parallel algorithm and development of high-performance parallel computer to achieve specific purposes, but such system is limited to the scope of application. The other is developed for general-purpose parallel image processing system, which is the main stream of the parallel image processing system. It is cannot be described the word, it only understanding different image from person to person it applied in such as medical technique medical diagnosing, medical information management with the support next generation like big data analytics, one can find and improve the medical image processing.

Hadoop framework is one of the finding based on map reduce distributed computing model. It most widely used in parallel computing is designed to scale from one to multiple machines, each are stored in computing that is divided into based method. We used to map reduce computing model to extract feature files into Hadoop based open source distributed, and column oriented store model in big data. Split the digital image using image segmentation for detection of object and its boundaries. Every pixel value can be extract with the label and it will give the visual characteristics. The Name Node is responsible for managing the name space of the file system and the access of the clients to the files, while Data Node manages the storage of the data of its node, handles the client's reading and writing requests of the file system, as well as carries on the creation, deletion and copy of the data block under the unified scheduling Name Node.

III. ARCHITECTURE

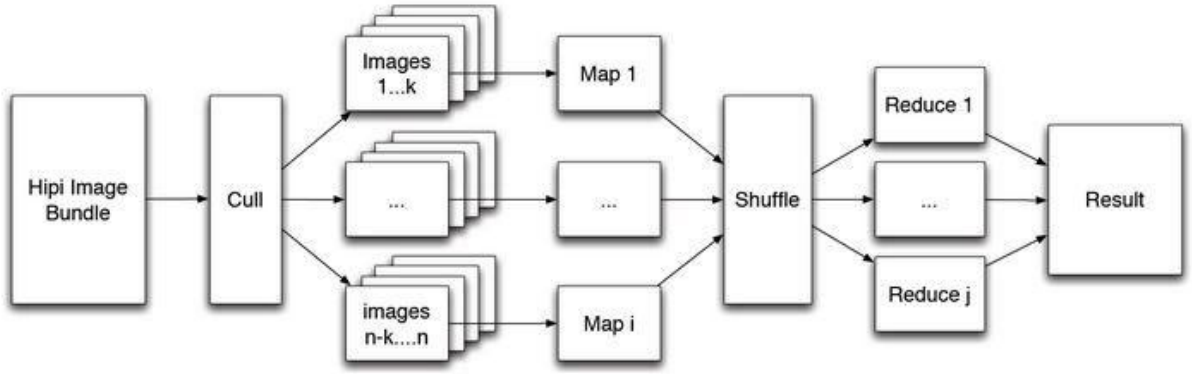


Fig: Hadoop image processing interface

IV. IMPLEMENTATION

A. Fast Corner_9

In the presence of various corner detection methods include harris corner method, Susan, Zheng and Harr. Among these methods, fast corner_9 is used due to higher clarity when compared with other corner detection method. This fast corner detection has come from moravec Sum of Squared Differences (SSD) and the harris corner detection (second derivative of SSD). By using the non minimal suppression it is determined. This is calculated by subtracting the original value, by comparing *p* value and with *t* value. This has been implemented on client machine with the configuration Intel (R) Core 2duo, 4GB RAM and 2.93GHz processor and the Server with the configuration of IBM X 3400 M3 Server, Intel Xeon E 5507 (Quad Core), 2.26GHz Processor, 146GB DDR3-1333MHz ECC RAM, 146GB 10K SAS hard disk drive.

V= min {

$$\sum(p - pixelvalue)n, if\ \frac{1}{n}(value - p)$$

Where *v* is the co reshold value and *n* denotes to the nonmaximum suppression.

$$\sum(pixelvalue - p)n, if\ \frac{1}{n}(p - value)$$

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V. SUM OF ABSOLUTE DIFFERENCES

SAD is a mathematical term that has been enhanced here to find between differences the two *P* blocks of the processed data.

SAD=$\sum_{(u,v)\epsilon w}[A_1\ (u,v) - A_2(x+u, y+v)]$

Where A1 and A2 are the two images. Like the harris corner method, here also, (u, v) denotes the image patch area and while processing (x, y) gets shifted from (u, v). Where, w refers to the fraction of image points. Before the implementation of SAD there is an existence of SSD to find the difference. As SSD is an old, it isn't able to produce a clear result like SAD. The Relationship between the intersection points detected by harris corner detection method and labels the corresponding points for computers to judge the corresponding locations of intersection. In relationship between the corners, the interpolations are used to judge the location of the corner while being photographed to simulate the data.

VI. ALGORITHM

Here shows the Illustration of DHRF algorithm. After the installation of Intel Manager is over, next the hadoop set up has to be done in the system. Now, the system can work on the map reduce functions and use the facility of the HDFS. After the successful installation of the Intel Manager and hadoop and its content, the proposed DHRF algorithm has to be inserted in the reduce function. Since, the map reduce is an open source, it can be edited and modified according to the user's need. When a task is applied to the nodes on the cluster, the map function starts its job of splitting the data. The task node assigns the job for the each node, and also it supervises the job node and its functions. When the job assigned by the task node gets over, the output of the map function is ready with the intermediate data. In the proposed work DHRF algorithm receives the map result and finally, recognizes the labeling for the output.

In this map, as defined earlier the four methods of processing have been involved. The master node monitors all the functions of the map function. The task of the map function is the hardest task, which manages the server and client machines.

A. Algorithm 1: DHRF

```
BufferedImage res= new BufferedImage(width,height,BufferedImage.TYPE_BYTE_GRAY);
// Initialize the image process
byte[] bytesCompressed= compressor.compress(imagetoCompress);
Deflater deflater= new Deflater();
deflater.setInput(bytesToCompress);
// Produce the data compression
BufferedImage resizedImage= new BufferedImage(IMG_WIDTH, IMG_HEIGHT, type);
Graphics2D g= resizedImage.createGraphics();
g.drawImage(originalImage, 0, 0, IMG_WIDTH, IMG_HEIGHT, null);
g.dispose();
// put the data into scaling
static{
URL.setURLStreamHandlerFactory(new FsUrlStreamHandlerFactory());
}
// write the map reduce structure
in= new URL(PATHTOBEMAPPED).openStream();
IOUtils.copyBytes(in, System.out, 2, false);
// set the server to handle mapper
FSDataOutputStream out= fileSystem.create(path);
InputStream in= new BufferedInputStream(new FileInputStream(new File(source)));
// mark data into HDFS of hadoop Process the image until completing the grayscale,sobel, guassian, fast corner, SAD matching of the image.
// operate the data process until the data processed map(in_key,
in_val) -> list(out_key, intermediate_val)
reduce(out_key, list(intermediate_val)) -> list(out_value)
// Set the map reduce Operation
FileSystem fs= file.getFileSystem(context.getConfiguration());
```

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```
FSDataOutputStream fileOut = fs.create(new Path("your_hdfs_filename"));
// write the data mapper
reduce(WritableComparable, Iterator, OutputCollector, Reporter)
continue until reducer task is complete
// send mapper output data to reducer
JobConf.setNumReduceTasks(int)
// set small unit value to the task and reducer wait queue
interrupt.task
store the result(image).
```

VII. PERFORMANCE ANALYSIS

Previously, an analysis was done u sing a different algorithm with four servers. Analysis shows, the time consistency by designing an optimized scheduling algorithm. The proposed DHRF algorithm reduces the time and error percentage using the reduce function. The DHRF algorithm has to be coded with java and the input has to be given in jar file format. When the start option is selected, the operation gets started. The same operation can be paused and stopped. There will be a screen with two segmentations. First, segment shows the given input which is to be processed. Second, one shows the output. Once the operatio n gets over, it automatically shows the output. Figure 6 explains the process.

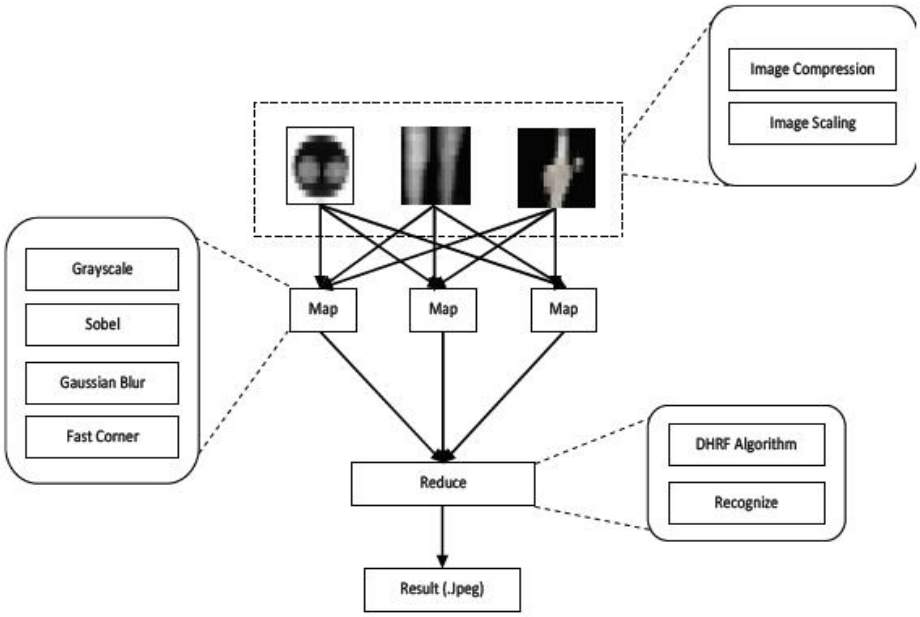


Fig: Work flow and sequence of DHRF algorithm.

The task node, automatically selects the server to do the map function. Then, the output of the map function will be taken as the input for reduce r function. The reducer function is to integrate the input of map before the map function. The implementation of DHRF algorithm will work on the reduce function and will perform the scheduling process. That is to reduce the waiting time by comparing DHRF algorithm and existing DSRF algorithm. The DHRF algorithm is designed mainly to reduce the time and to decrease the waiting time.

VIII. RESULTS AND ANALYSYS

The DHRF algorithm has proved that, it reduces the time complexity while processing the reduce function. The proposed method produces the better result, when the result of proposed SAD matching is compared with the existing SAD matching.

The main advantage of the fast corner_9 method during the execution was, the output of the data is marked with better quality to detect the corners of the image. The output of fast corner_9 method. While comparing with existing, the proposed fast corner_9 method shows the corner more clearly. During the comparison, it is proved that, the method applied in the proposed algorithm works better than the existing system. Whatever the size or format of images may be, the result will be produced in the pre defined format. The result occupies less memory space when compared with the size of the input for storage.

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Fig: Fast corner_9 method.

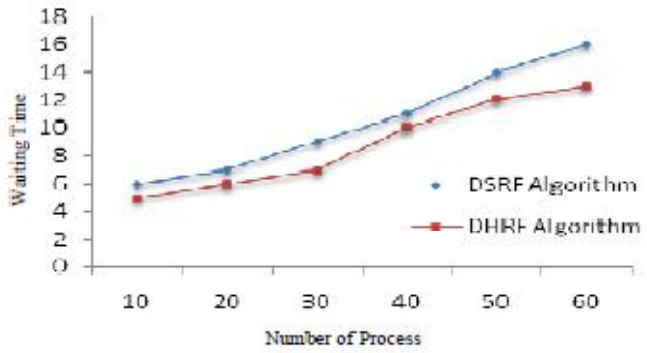


Fig: Waiting time of DSRF versus DHRF algorithm.

Above Fig shows the graphical representation between the proposed DHRF algorithm and existing DSRF algorithm, which clearly shows the number of users attempting the process and the time (waiting time) taken for the process to complete. From the graph we can clearly understand the proposed method is far better than the existing algorithm. The line for proposed DHRF algorithm falls below the line of DSRF algorithm in the Figure 10 shows the reduction in waiting time which is the main objective in the proposed work.

Figure 10 shows the graphical representation between the percentage of repeatability and corner of frames. When harris corner method is compared with the fast corner method, the proposed fast corner method has high deviation point. This comparison is executed with standard system configuration for both the proposed works and existing methods. This graph is made to show the number of attempts repeated to match the Corners of the frame

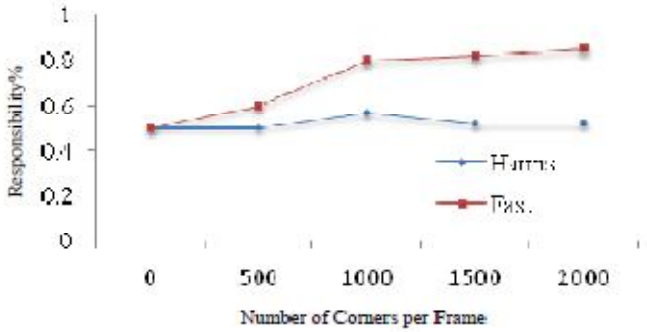


Fig: Number of Frames for harris versus fast method.

Figure shows the graphical representation between the percentage repeatability and the Noise standard deviation between the existing harris corner detection method and proposed faster corner edge detection method. Since, the deviations in the Graphs positively shows that, the proposed method is far better and improved when compared with the existing work. As defined the input

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images are compressed and scaled. Figure 12 shows the graphical representation of SAD difference existing SAD with proposed SAD. This shows the proposed SAD matching is proved to be better than existing system.

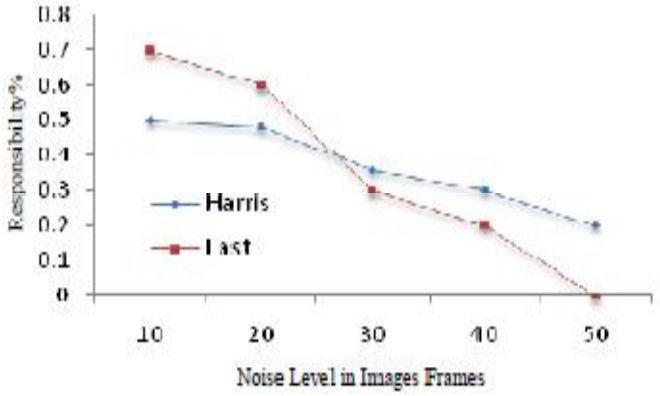


Fig: Noise level observed from harris versus fast method.

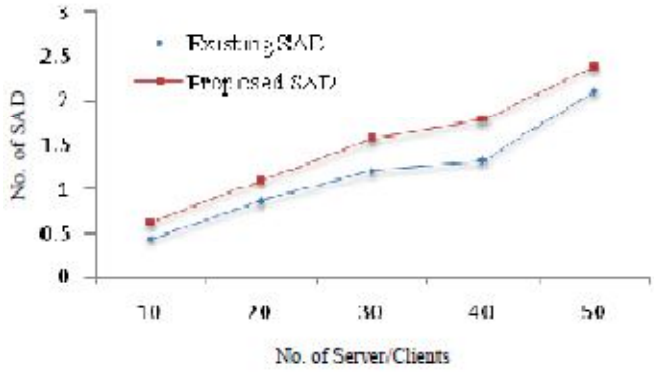


Fig: SAD difference between existing versus proposed method.

All the four graphs, shows the newly implemented algorithm and the enhanced techniques are better when compared with the existing technique. The minute variations in the graph matters and proved to be much better when compared with existing. The servers and the clients are shown in the graph by incorporating the readings according to the process, techniques and algorithm respectively. The proposed harris corner method and the SAD matching play a major role for the enhancement of the output image in this work. The graphs are valued in percentage, so that the results are obtained much accurately.

IX. CONCLUSION

In this System, we have made a Map Reduce based image conversion module in a cloud computing environment to solve the problem of computing infrastructure overhead. In our experiment we conclude that for the larger image data processing Hadoop based system works more effectively than the normal systems. As we know image data processing is time consuming and requires large computing resources so using Hadoop based image conversion we can solve both issues. We implemented an image conversing module that exploits the advantages of cloud computing.

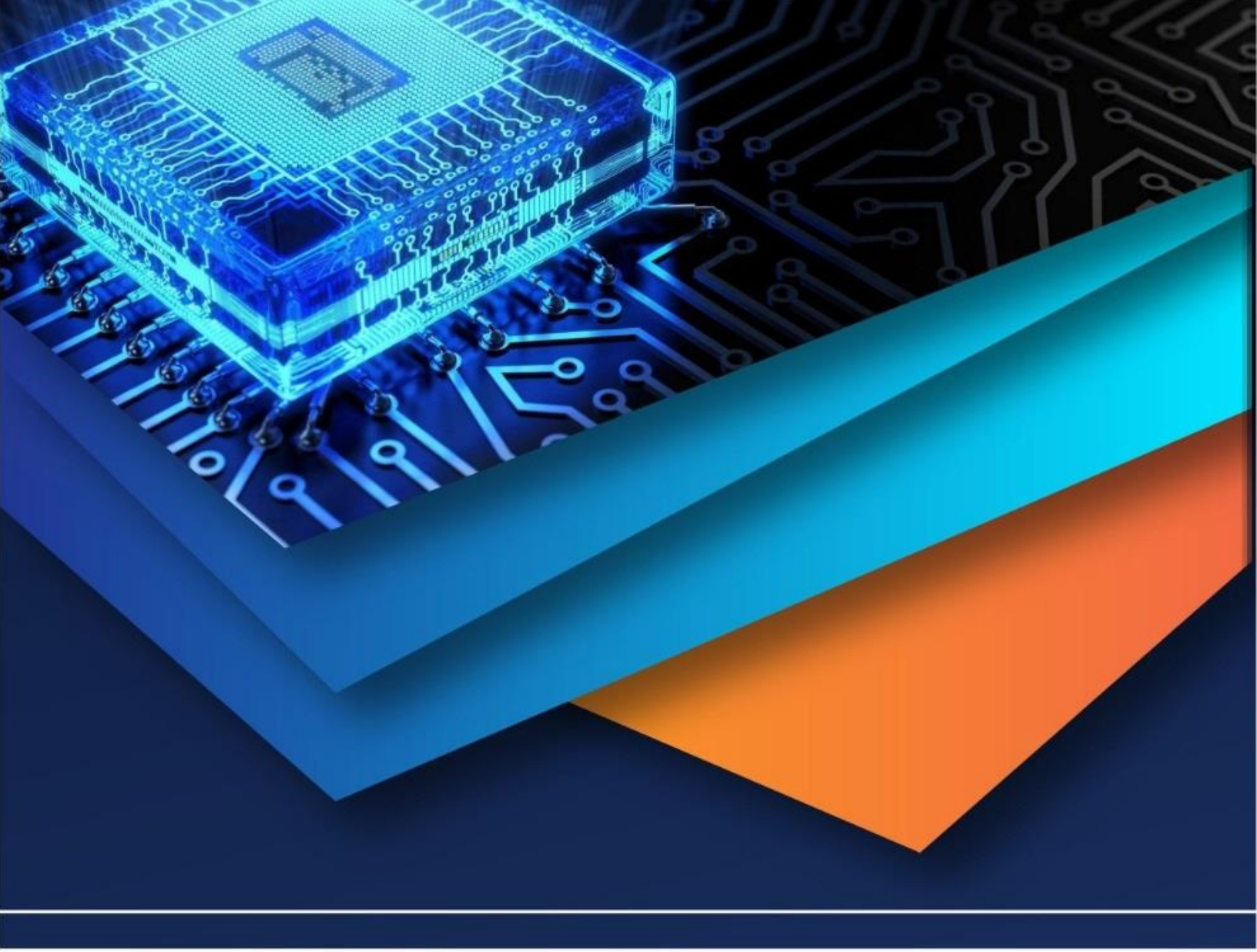
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