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This is to certify that Dr./Mr./Ms. **Rohan Palkar** has presented / participated / contributed for a **Full** length paper with the title **IRIS Identification Exploration An In-Depth Analysis** in the **International Conference on Intelligent Computing and Networking (IC-ICN 2024))** organized during February, 23rd & 24th, 2024 at **Thakur College of Engineering and Technology,** Kandivali (E), Mumbai.

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THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY

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Approved by All India Council for Technical Education(AICTE) and Government of Maharashtra

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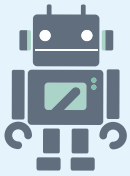

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IRIS IDENTIFICATION EXPLORATION: AN IN-DEPTH ANALYSIS

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Abstract: **- In IRIS recognition Techniques for verifying the uniqueness of human IRISes and testing the performance of biometric authentication. Biometric systems can identify real people based on their specific characteristics. Biometrics are an easy and reliable way to prove your identity. Today, when reliable identification is essential, human facial image recognition is misused. Since IRIS scanning is now the most accurate biometric approach available, it is a popular choice for detecting extremely accurate and almost compatible. The IRIS detection framework is efficient and effective for this purpose. IRIS recognition system has automatic segmentation system and can recognize circular IRIS and pupil region, eyelid and eyelid, specular image IRIS recognition plays an important role in many organizations, such as: government agencies, purposes etc. For authentication and identification purposes, IRIS recognition technology greatly improves the accuracy of personal authentication compared to other biometric authentication technologies. Our method is an easy and efficient technique to address current issues and increase the accuracy of IRIS detection systems that are already in place.**

Keywords: IRIS Recognition, Neural Network, Feature matching, Computer vision, Machine learning, Image processing, CNN.

1. INTRODUCTION

1.1 IRIS recognition

The [20] Recognition system not only achieves better accuracy, but also provides its consumers with a dependable and safe environment. There are two modes of operation for the biometric device: authentication and identification. In addition to a 1:1 fit of the customer's needs, the biometric authentication mode also includes a 1:n evaluation to find the individual in the database. The [02] IRIS picture extracted from the source is processed by using the Gaber filter and then Hamming distance is used as a judgment for identity. The [46] extraction of IRIS statistics does not require an original picture and offer excessive accuracy under one-of-a-kind assaults. The [01] need for accurate identification of people has evolved over time for the purpose of security and identity supervision. Individuals [20] have also been shown to have different IRIS patterns between the left and right eyes. IRIS patterns are very different and unique, making them one of the most accurate biometrics. Separating the genuine IRIS areas inside the digital image is the first step towards IRIS recognition. Compared to other methods, IRIS recognition technology [45] provides the highest accuracy for individual identification.

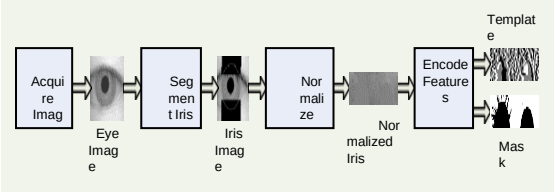


Fig.1: IRIS template generation process [51]

1.2 Use of Eye recognition

A single enrollment can last a lifetime, barring injuries, which makes the stability, or template durability, of IRIS recognition the primary benefit [45]. There are two reasons why the use of biometric technology for beneficiary identification (or identification) is requested [41]. i) Remembering a password is not necessary. ii) The individual always has access to the biological characteristics that are employed. There are two primary sources for claims that an individual's IRIS structure is distinct and remains consistent as they age [53]. Clinical observations are the primary source of evidence, followed by developmental biology. IRIS localization and IRIS image quality assessment are the two primary components of IRIS image pre-processing. Just two traditional IRIS localization algorithms have been put forth thus far, by Daugman [11] and Wildes [52] [11]. One of the most dependable, durable, and unique modalities is IRIS [36]. Because of the IRIS's positive attributes—such as separateness, performance, and time inconsistency—it is regarded as one of the most dependable, accurate, and practical biometric identification systems. The IRIS's geometrical reliability, lack of contact requirement, and stability at the age of two or three are its main selling points [12]. This implies that some people might theoretically join the sin system at the age of three. After fifty years of age, data starts to show patterns.

The human eye is like a digital camera. Like electronics, the human eye focuses and displays light to shape a picture. Basically, light rays replicated from distant or nearby objects pass through various media like, lenses, liquid humours, crystal lenses, vitreous humours and so forth. Light rays pass thru diverse channels, refraction of mild is executed.

Finally, light is obtained and targeted on the retina. The retina incorporates mild emitting cells known as rods and cones which might be touchy to light depth and frequency. In addition, the resulting photograph is processed by using thousands and thousands of cells that transmit signals or neurotransmitters via nerves to the brain. Most pictures are blurred; however, the brain does this properly. This procedure is similar to convex lenses.

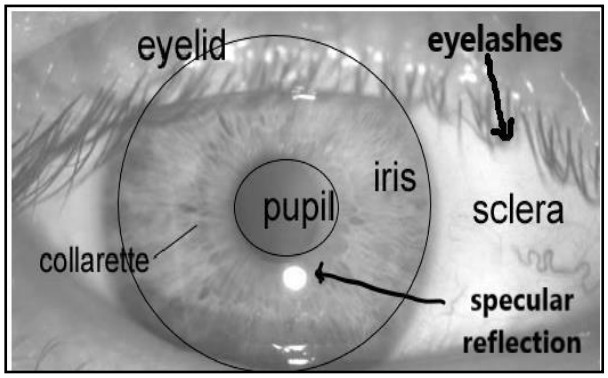


Fig.2: Front view of human eye [44] [50]

1.3 Problem Concepts

The fractal dimension value of the IRIS is obtained using the box-counting method in the characteristics of the IRIS [08]. Upon displaying the IRIS, 92.63% is the true value of the IRIS fractal dimension, as determined by the box-counting method. Twins frequently have similar physical traits, and it is well known that twin identification using facial recognition is exceedingly challenging. As a result, analyzing the connection between the twins' IRIS is fascinating. Here, it was discovered that the participant could identify twins with an accuracy rate of more than 81% utilizing the IRIS by itself, devoid of any associated visual features like eyelashes, eyelids, or tears.

People with diabetes for a long period of time are frequently afflicted with diabetic retinopathy (DR), [31] an eye manifestation of diabetes. It results from injury to the blood vessels in the retina, the tissue located at the rear of the eye. You run a higher risk of getting this illness if you do not control your blood sugar. And lastly, it may result in blindness. On the other hand, the illness can be treated early on if it is discovered and identified in a timely manner. We attempted to tackle this issue by using computer vision modelling, which helped to lower the amount of human labour required to find errors. The dataset contains a variety of sized photos from various sources. Making ensuring that every image is down sampled at the same radius (200 and 500 pixels) is our first responsibility. This image is then the first image to show the neural network connections of the learning transitions

1.4 Types of Fake IRIS Images

- **Artificial Eye**: Glass, Plastic
- **Eye image:** photograph, paper print
- **Natural eye (as a User):** unintended use
- **Natural eye (as a fraudster):** printing contact lens
- **Capture after which replay invasions:** IRIS code template, Eye image

1.5 Development of IRIS Recognition methods

We [25] will briefly introduce the development of various IRIS recognition methods and discuss the Hamming distance and neural network-based IRIS recognition techniques.

To create an edge map, one uses canny edge detection [45]. The Canny Edge detecting method is used to install the IRIS border. The Canny [08] edge detection algorithm is intended to minimize photo detail while identifying object edges. Hough transformation [44] is a computer vision imaginative and prescient algorithm for figuring out circles in an picture, edge detection the usage of Canny edge detection strategies, To detect edges of objects in an image [08] The device not best extracts features of the photo, however additionally use it to find its obstacles on the outdoor of the product It is viable

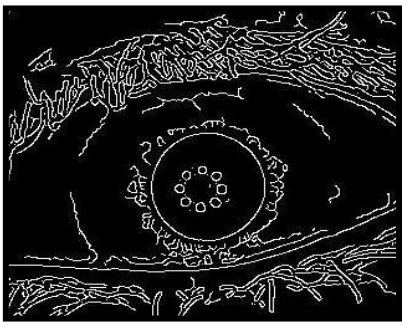


Fig.3: Canny Edge Detection [08]

1.8 Parts of IRIS Recognition:

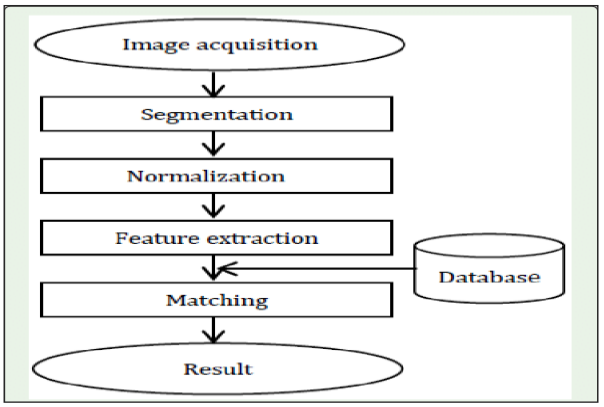


Fig.4: Flowchart of Methodology [39][49]

Image Acquisition

Capturing the IRIS image for further processing [39]. In order to obtain optical pictures Certain IRIS detection systems employ high-resolution cameras, including LG, OKI, SARNOFF, and PANASONIC, to obtain optical images at up to 3 m distances. By optimizing image acquisition systems, the quality of captured images can be enhanced.

Segmentation

[39] During the segmentation method, undesirable facts are eliminated and the outer and internal borders of the IRIS are marked. [22] The segmentation benefit is used to discover the annular area across the pupil-IRIS boundary in the captured photograph.

Normalization

[07] In the normalization step, the location across the IRIS is converted right into a rectangle. For this we are able to use the Hough transformation. This technique is used to extract functions of a selected resolution from a picture.

Because it must specify the preferred feature in a parameterized shape. The normalization of the IRIS discipline [44] is based totally on the Dougman rubber sheet model. The Hough [07] remodel is generally used to locate ordinary traces such as instantly traces, circles, and curves. Because of the complexity of the overall Hogg algorithm, we restrict the primary discussion to classical Hogg transformation. The main gain of the pig conversion characteristic is that the precise region can tolerate the difference inside the color and the photograph is nicely preserved.

Feature Extraction

In order to provide a best-matched biometric template, the feature extraction procedure takes advantage of texture analysis techniques to extract distinct properties from a typical IRIS image, such as smooth, bumpy, silky, or rough regions.

Matching

IRIS recognition by way of sample matching is the process of identifying someone by means of analysing the sample of the IRIS. IRIS is a skinny, shallow, cone formed structure surrounding the pupillary aperture with root positioned posteriorly in comparison to unfastened margin.

2. LITERATURE REVIEW

Dr. Frank Burch, an ophthalmologist, first created the idea of IRIS recognition in 1936 by utilizing IRIS patterns for personal identification. In 1989, John Daugman created the first true IRIS recognition algorithms, patented them, wrote the first paper about them, and gave the first demonstration in person. Oyebode et.al. [01] Two hundred and forty (240) IRIS photos had been skilled and Sixty (60) photographs have been used to check each of the three strategies at distinctive threshold cost. The final result showed that, in terms of recognition computation time, particularity FPR, and accuracy of recognition, CPNN outperformed SOFM and BPNN. An IRIS recognition system based on CPNN could result in a safer security monitoring device than SOFM and BPNN. High recognition accuracy and computing performance must never longer be compromised in the IRIS reputation system. According to Cheng-Shun Hsiao et.al., [02] the two efficient deep-learning-based schemes under investigation for IRIS biometric authentication are U-Net and Efficient Net. Using a U-Net based detector, the device first extracts and segments the ROI of the IRIS. Next, the optional normalization method envisions the segmented IRIS zone, or the IRIS middle. The suggested deep-studying based IRIS recognition technique, tested on the CASIA-v1 database, achieves up to 98% recognition charge. Following the experiment, cropped IRIS photos retain higher IRIS statistics to correspond with IRIS features without any additional treatment. Many of the precise IRIS functions at the real eye photograph may be lost if the IRIS photograph is function-greater. As a result, the reputation algorithm has a very strong impact on popularity. According to Tan Chen et al. [03], MATLAB accurately simulates the pre-processing program in the IRIS popularity algorithm. Twenty examination samples provided by Guilin IRIS Information Era Co., Ltd. were used to test the algorithm, and the accuracy rate was 100%. The blood vessels in the white eye can be discovered using infrared organic detection technology. An very accurate prediction of up to 20 people's IRIS may be found by a CNN-based IRIS popularity device, which makes it ideal for usage in their project by Yuan Zhung et. al. [04]. The version is a black box, meaning that the fundamental working principle of the system isn't always understood, and the computational complexity results in a long training period. Nashwan Jasim Hussein [05] in their implementation adopted along the GVF active contour to improve and adopt robust IRIS segmentation by allowing counter for boosting shrink. For this technique, two models were examined: IRIS and pupil segmentation. Two ideas were put forth to identify the approximate parameters of a pupil under IRIS images that were examined under NIR and transfer lights. In the future, it is suggested that the algorithm's speed be increased by creating heterogeneous models that combine the power of CNN with the speed of modern computer vision techniques. N. Krishnaveni et al. [06] used distance measurement in assessment to set up arrangements that weight the bits according to their reliability at registration, either treating each bit equally or ignoring unreliable bits completely. Ideal for several enrollment-time scans to obtain more accurate styles than current models. Boost the effectiveness of any biometric authentication technique by using it to analyze the design advent algorithm as a black box and devour the binary templates relation. Pratiksha Shetiya et. al. [07] built a Security System for ATMs by using IRIS Recognition, the authorized and real person can have access to the ATM device. When compared to other gifts, this item is remarkably stable. The images were obtained through a database and transferred to the computer system for processing using several MATLAB functionalities. The user is then granted access to the account if the output iris image and the database iris image closely match; if not, the request is denied. In the end, we were handed a machine that uses PNN and has a reputation fee of 94.6%. According to DWI JUNIATI et. al. [08] Twins' irises are quite similar to one another and courtful. It seems possible that the increased iris dating of twins affects the identification of iris. According to the observation's findings, the number of twins in the statistics has a negative correlation with the accuracy of iris reputation; that is, the more twins there are in the iris recognition records, the lower the accuracy. The iris popularity acquired altered to 90.33% accuracy. Iris recognition that requires extraordinarily large numbers of twins in order to get an extremely high degree of accuracy. 1215 images from each dataset were trained by Jannatul Ferdous et. al. [09], and 80% of the subset was set aside for education, with the remaining 20% reserved for experimentation. The experiments' locations are displayed in the confusion matrix and in the accuracy vs time comparison. The confusion matrix can be used to calculate the precision and consider value, which are useful metrics for understanding the overall performance of any classification method. Compared to the results of an ANOVA test, the suggested methodology's use of linear SVM yields a 4.22% increase in accuracy and a 46.75% reduction in time needed. Meenakshi et. al. [10] used the terms that were used in PAD and the processes used to create PAI are defined. It provides an overview of the available benchmark open-

supply datasets and their purposes. It can provide modern PAD methodology, such as deep learning-based processes, hybrid techniques, and traditional laptop vision-based ways. Joshua et.al. [11] found that the IRIS undergoes morphogenesis during gestation, resulting in styles and colors that are both exact and random for every individual. The focus was explicitly divided into four key areas: matching, segmentation of the IRIS, normalization, and feature extraction. The majority of the works supporting IRIS's popularity are more or less equivalent. Vahid et. al. [12] in their work said that the Techniques and plans must be in place to identify specific individuals for security purposes, and technology must be in place to alert ports, airports, and ferries. Financial transactions also involve the use of applied spoofing prevention measures and secure authentication techniques, which help to resolve organizational difficulties involving people, technology, and systems. Wang et. al. [13] in their IRIS identification technique uses monochromatic imaging generation, which makes it difficult to distinguish certain images from the pupil photo. The 20% alternate in the IRIS code generated by the equal IRIS appears to be the weak point of the IRIS recognition process; nevertheless, in the popularity procedure, this IRIS code only modifies 10% of the total IRIS code, which is a very small percentage of the code. It is evident that calculus is still a highly preferred tool in the IRIS reputation set of rules. Alfi et.al. [14] reveals that a proper evaluation of IRIS reputation should take into account both the time computation required for the popularity process and the feature extraction method that is chosen. The suggested set of rules is considered accurate if it computes quickly and can be applied not only to one database but also to multiple databases with excellent overall performance. The final outcome is undoubtedly mostly based on a number of studies that were part of our analysis. Sheida et. al. [15] Compared to other biometric developments such as fingerprint or facial recognition, the accuracy of IRIS identification for personal authentication is significantly higher. However, this type of authentication device is also susceptible to fraudulent activities such as the use of counterfeit IRISs. When it comes to spoofing in the form of phony copies of video playbacks, artificial eyeballs, patterned touch lenses, published IRIS images, and other commonly utilized artifacts, IRIS detection systems are comparatively helpless. Regarding upcoming research, the author will assess the appropriate selection criteria for Liveness identification in extreme genuine and externally fabricated scenarios. Jayapriya et. al. [16] has worked on a lot of characteristics that are system-based are divided for IRIS and accurate finger affect. Once minutia extracted features and the dimensionality of the extracted capabilities have been lowered with the help of KPCA, feature extraction degree fusion is applied in a multimodal framework. With a database including 25 photos, the multimodal framework's accuracy is 97.33%. Nisha et. al. [17] describes the entire process of IRIS recognition and related issues. IRIS Dilation is seen in a fearful scenario. Eye blink rate will decrease below fear, pupil dilation (extra visibility) is another amazing phenomena, and the area of IRIS visibility (AIV) will grow. We designed and developed a set of rules to identify such circumstances, protecting users from fraudsters when someone is made to be physically present in front of an IRIS scanner in order to access their account. Muhanned [18] in their work, IRIS images that had already been scanned had been entered and automatically segmented. Localization of the IRIS and student regions were part of this system. The computer vision and prescient algorithm were utilized to locate the circles in the image, and the clever facet detection technique was employed to find the edges. YUYANG et. al. [19] says that while the cooperative transmission is being carried out, wearable devices must be utilized for the relay transmission because of the implantable device's limited transmission power. The relay points the records to the receiver while pointing to a head. Richa et. al. [20] In this experiment Casia-IRIS -c program language period DB v3. Future paintings will encompass testing the technique on greater databases. We also intend to use the proposed technique on different attacks on IRIS reputation system. The guy-in-the-middle attack, possible on interception of all three messages. In addition to reducing recognition time, Puja S. et al.'s [21] suggested device outperforms in completing a Rank-1 identification charge that is equivalent to 99.8% on all similar databases. Lamiaa A. and others [22] The accuracy achieved in this project, which uses the Haar Cascade Classifier, is 86%. Pre-processing the IRIS image is done at the segmentation step in order to reduce distinguishing sounds. Next, the Circular Hough transform is used to segment the student and IRIS obstructions. This stage's average accuracy is 78.25%. The Rubber Sheet model's use is standardized by the IRIS image. Zhenan and others [23] public access to the CASIA-IRIS-Mobile-V1.0 database, which includes 11,000 images from 630 Asians. Zhenan et. al. As far as they are aware, it is the largest NIR mobile IRIS database, and it is invaluable for selling IRIS popularity research on mobile devices. According to J. Jenkin et al. [24], researchers work to improve hybrid procedures so that the IRIS recognition machine performs better overall in terms of increasing accuracy and using less processing. The main challenge with this biometric device is the rise in false rejections caused by aging, pupil dilation, occlusion from drooping eyelids in changing positions, environments that are particularly reflecting, and wearing beauty lenses. Kien et. al. [25] found that even while off-the-shelf pre-trained CNNs were originally developed for object recognition tasks, they might be applied to the IRIS recognition task. Using state-of-the-art CNNs from the ILSVRC project, we are able to achieve the most recent reputation accuracy in two sizable IRIS datasets: CASIA-IRIS-Thousand and ND-CrossSensor-2013. Xiulai and associates [26] Malicious key sharing and repudiation are too strong for the traditional image encryption technique. Should the key length be excessively long, it will be effortless to misplace and challenging to remember. The development of biometric encryption arose in response to the need to address the problem of inadequate key. The biological processes that are amenable to encryption must satisfy certain requirements, such as stability, non-aggression, and uniqueness. In addition to meeting the aforementioned requirements, the IRIS boasts rich feature set, strong defense against intrusions, and remarkable encryption power. Thomas and et.al [27] Photograph recognition is the source of the Perceptual Image Hashing Algorithms utilized in this paper for IRIS Image Recognition. Because

of its precision, the P-hash method has been widely used in photo recognition. There are numerous advantages to the IRIS Image popularity A-hash domain, and all four methods can and should be applied for accurate and efficient IRIS Image popularity and identification. Haiqing et. al. [28] attempted to improve IRIS recognition's overall performance on mobile devices from unique perspectives. We used two-pixel stage single picture extraordinary-resolution methods at the image level. We can use multi-frame fantastic-resolution techniques in our future work to incorporate richer recordings. To immediately increase the recognition accuracy, the notable-decision technique might be used at both the characteristic and code degrees. Parul and et.al [29] IRIS scanning is renowned for its accuracy and speed, and because it is contactless, it is more hygienic than other biometric modalities. To validate a person's identity, all that is needed is a quick glance at them. The picture of the IRIS is obtained then pre-processing of the photographs is carried out using thresholding and one-of-a-kind morphological operations. Yang et. al. [30] also investigated additional target terms: one takes advantage of the spatial dating of the bits within an IRIS code, while the other reduces the effects of substantially less reliable bits within IRIS codes. constructing the more effective objective phrases in order to supply the IRIS code. A computerized creative and predictive model developed by Sarfaraz et al. [31] is able to identify diabetic retinopathy issues in ocular fluorescein angiography images more accurately than human evaluation measures. By using this model to transfer learning, the overfitting issue was addressed and the accuracy was increased from 37.6% to 48.2%. The results include boosting each magnificence's image size from 500 to 800 pixels and expanding the radius of the photos from 200 to 500 pixels. According to Sandeep et al. [32], IRIS popularity complies with the following: matching, feature extraction, normalization, picture segmentation, and eye localization. The benefits of adopting IRIS popularity technology are its uniqueness and the low likelihood of false rejection or attractiveness. Using public datasets (ICE2005 and CASIA-IRIS-Interval), Jianxu et al. [33] developed an IRIS function matching approach that provides an instantaneous assessment with traditional methods, including Daugman's framework. Caiyong et. al. [34] suggested a method which showed a good performance on multiple benchmarks and is compared with contemporary IRIS segmentation techniques at the recently annotated IRIS datasets. Gene and associates [35] Due to the binary end outcomes of the matching, access to the sources had to be controlled by a corresponding authorization mechanism that granted access primarily based on the matching result. In contrast to the FNMR identification metric, the traditional FMR does not optimize well for the authentication task. Amena et. al. [36] system's overall performance satisfies the requirements of daily attendance management in a variety of businesses and locations. Through the effective utilisation of advanced data analysis techniques, the value of the basic hardware unit was successfully reduced. Kamal and associates [37] The IRIS popularity system's overall performance is influenced by both restricted and noisy imaging environments. noted that current approaches to managing noisy environments may still have room for improvement. The discriminating features are extracted by M. Gopikrishnan et. al. [38] using the 1D log Gabor filters. Neural community tools were used to improve the matching accuracy. The enhanced approach's experimental results show promising results in terms of accuracy, especially when it comes to the CASIA fact set. The 1D log Gabor filters are used to extract the discriminating features. Neural community tools were used to improve the matching accuracy. The enhanced approach's experimental results show promising results in terms of accuracy, especially when it comes to the CASIA fact set. Ahmad and et.al [39] Similar to other vision-based systems, IRIS popularity structures are very susceptible to noise. Numerous studies and innovations have been made to strengthen the IRIS identification system's resistance to noise, including the use of NIR images, pre-processing algorithms, and expanding techniques to reduce the impact of noise on IRIS segmentation, IRIS characteristic extraction, and IRIS template matching. Khalid et. al. [40] used CASIA model 1.0 for datasets. The dataset's subset of 693 images that were comparable to 99 training images was used. The accuracy charge, according to the IRIS reputation gadget results, was 98.5356%. The device's overall performance is increased and the quantity of memory needed is reduced when the influence of light intensity is eliminated from the images acquired for IRIS recognition, producing a minimal characteristic vector. Yogesh et. al. [41] found that the IRIS recognition device can distinguish between real and fake Hamming distance distributions. The determination of the real and imposter distribution, the genuine receive charge, the equal error charge, and the decideability index are used to assess the overall performance of the applicable system. With 65.021, the implemented device yields 96% GAR at 0.01% FMR and 0.0277 EER. In Akanksha et al.'s study [42], periocular characteristics were extracted from IRIS using wavelets and Local Binary Patterns. DLDA was then applied to provide low dimensional characteristic vectors that were discriminative. We used the fifth level vertical coefficients and the second one stage approximate during wavelet feature extraction since they provided the most relevant records needed for recognition. S.S. Chowhan [43] used the CASIA database to analyze and scrutinize FMN's performance, and it is also contrasted with alternative approaches. Therefore, there are far less hyper boxes formed in FMN. As a result, training and memory time are significantly lower than FNN. Nuriza et. al. [44] proposed approach's average recognition price of 67% was proven by simulation on the CASIA IRIS photo database. This is greater than the results obtained from using the half (56%) and full (53%) IRIS factors. The Nithyanandam and et.al[45] The segment correlation technique is used in the IRIS popularity system, and a comparison of two virtual eye photos has also been completed. These methods have been individually investigated for many exceptional packages, leading to a large body of work. When the test is over, the results indicate that the set of rules performs admirably. Wang et. al. [46] used a novel steganographic scheme is put forth with the intention of enhancing the IRIS characteristic's safety. The results of the experiment show that while transmitting over the conversation channel, it significantly enhances the security of IRIS records while barely impairing recognition ability. M.

Gopikrishnan et. al. [47] extracted the features using the 1D log-Gabor filters. To increase the matching accuracy, community tools for neural matching were implemented. When it comes to accuracy, experimental effects show promise, especially when looking at the CASIA statistics collection. To improve the accuracy of the universal matching IRIS recognition system, behavior tests can be conducted using the Counter propagation and SVM tool Xiaofu et. al. [48] in their method, paper-printed IRIS may be accurately identified. In a similar vein, it may strengthen the IRIS popularity gadget. Sudarshan and et.al [49] The effectiveness of the IRIS popularity device is examined by comparing eye pixels and finding singularities using higher level lifting wavelet approximations to extract functions. The final result shows that the method presented here is comparable to a few algorithms' evaluation, and the paper's outputs are of high quality.. Padma et. al. [50] Automatic segmentation set of rules was presented, which could localize the IRIS region from an eye picture and isolate eyelid, eyelash and reflection areas. Segmented IRIS area became normalized to do away with dimensional inconsistencies among IRIS areas. Sheikh et. al. [51] in their method views the templa generation technique as a black field, it may be applied enhance the overall performance of any biometric verification device that uses binary template bitwise evaluation. Lili and others [52] proposed a new set of guidelines for the IRIS area that are more accurate and efficient. Provide a tool for assessing IRIS image quality this is an essential and useful component of the automated IRIS popularity machine. RICHARD and others [53] Additional support for such assertions comes from empirical testing of documented IRIS recognition systems, albeit the extent of those evaluations has been constrained. The popularity of IRIS can provide the foundation for genuinely non-invasive biometric assessment.

3. OBSERVATION

This section shows the observation of the survey performed. The dataset used in many of the papers are:

Table 1 : Data sets

Datas	URL Links
CASIA	http://biometrics.idealtest.org/#/datasetDetail/1
UBIRIS	https://paperswithcode.com/dataset/ubIRIS-v2

Table 2 : Highly used techniques for different operations o Images

Fearure Extrac Techniques	Classificatio Techniques	Segmentatio Techniques
Convolutional N Network (CN	K-Nearest Neigh (KNN)	Edge Detectic
Deep Learnin	Neural Netwo	Region growi
Gabor Filterin	Support Vecto Machine (SVM)	
Daugman Algori		
Box-counting Me		

With 93.23% and 98.54% accuracy, respectively, Canny Edge detection for segmentation and Gabor Filtering for feature extraction are the most often used techniques. Canny edge detection computes the edge strength and direction of each pixel in the smoothed image after using linear filtering with a Gaussian kernel to smooth the noise.

Fig.5. Usage of Techniques for Classification

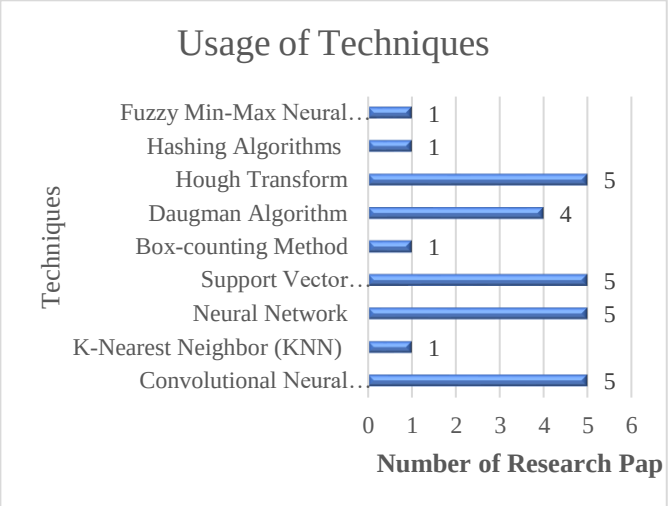
From Fig.5, it is evident that three major techniques like Hough transform, SVM, Neural Network and CNN are highly used for classification of Images. But this is only based on the number of papers using these techniques.

4. CONCLUSION

In observation, Gabor Filtering and Daugman Algorithm techniques are most frequently employed for feature extraction from Convolutional Neural Networks, and Gabor filter has proven to be more accurate than the other two. The most common methods for categorization are neural networks and support vector machines (SVM), yet SVM has a higher accuracy rate than ANN. The most often used and highly accurate technique in segmentation is Canny Edge Detection. IRIS recognition has various uses in other industries where security is required, and it is widely utilized in the transportation and government sectors for the common identification of individuals. The outcome demonstrates that IRIS recognition technology has advanced, almost reaching 90–95% accuracy.

5. FUTURE RESEARCH WORK

IRIS code matching has coordinated placement issues that make the matching process inaccurate and result in low match scores. On the other hand, future IRIS recognition



systems require self-learning and bio-inspired computer-based algorithms to enable better extraction during the registration and mapping (validation) stages.

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