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Recent Trends in the field of Biometric Security system using Digital Image Processing

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Abstract: ***This paper gives an outline in security with the help of DIP(Digital Image Processing). Digital image processing technology is a heavily used technology in various fields like military, biometric, medical fields etc. Scientists try their best to upgrade this technology which helps in the future from any obstacles. In 1960 DIP was first invented at Bell Laboratory. In of case of Fingerprint, it is the evidence which plays the main role to solve criminal problems. Not only a fingerprint, face recognition and iris recognition also takes a main role to solve any criminal problems or it is also used for privacy purposes. Digital cameras take pictures with clarity and give a satisfied output to the users.***
Keywords: Convolution, Algorithm, Intrinsic, Watermarking, double-dimensional.

I. INTRODUCTION

In the recent days digital images are very much important in our daily life. Digital Images gives us more information and more clarity which helps us to record any kind of data. It has so many advantages; one of its advantages is easy accessibility that has results in security problems. Through the digital images we can fix so many problems in security like fingerprint, face recognition, iris recognition. Not only in the security, are digital images used in various other fields like agriculture, IOT based home security, bio-medical components etc. Digital image is a combination of double-dimensional image which has limited set of digital values called pixels. The process of digitization can be occurred through scanner of video-camera. Firstly images are digitized through different image processing operations then (DIP) Digital Image processing lays forces two important tasks which called amelioration of pictorial information of human explanation and processing of data image to utilize storage.

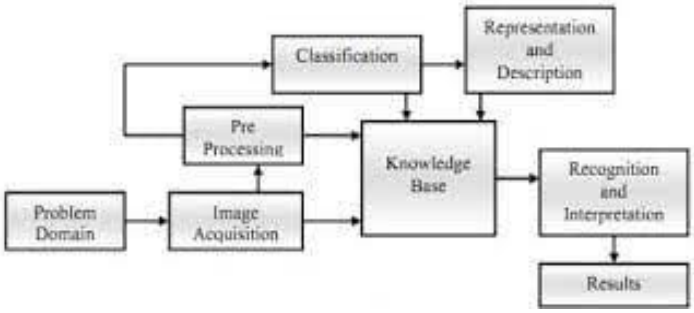

Fig. 1 Fundamental Steps in DIP

In 1960, DIP (Digital Signal Processing) was Invented at Bell Laboratory, Jet Propulsion Laboratory, Massachusetts Institute of Technology. Firstly it was invented for satellite imagery, medical imaging etc but recent times it has various applications in various fields. In the early times image processing quality was not much good but nowadays outputs have better quality. The American Jet Propulsion Laboratory successfully did their first application. They apply image processing in geometric correction, gradation transformation and also in noise removal.

Digital Image processing is mainly digital computer to process digital images from an algorithm. DIP (Digital Image processing) is a sub-domain of DSP (Digital Signal Processing).It mainly works over analog image processing. It takes wider range of algorithms which applied to input data. DIP avoids noises and distortions during the processing. In the DIP process digital filters are used to more clear the images.

It offers complex algorithms and also gives sophisticated output in a task. In DIP filters are used to blur and sharpen digitized images. Filtering of images are done by some methods like convolution.

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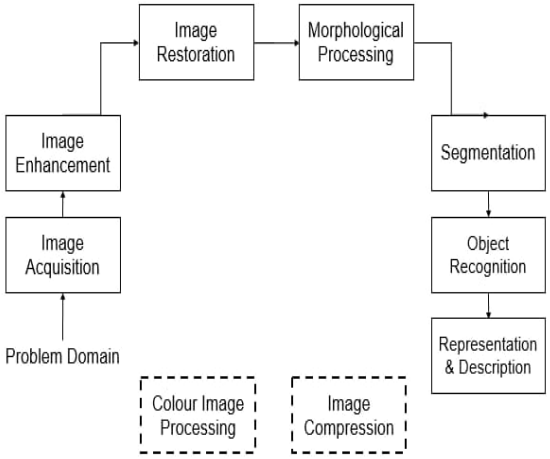

Fig. 2 Block Diagram of DIP Processing

DIP used in security like Fingerprint, Face recognition, Iris recognition. It also helps in the defence of any country.

A. Application

1) Fingerprint Pattern Restoration by Digital Image Processing Techniques

At, 1st September 2003, the paper was published by Wen CY and Yu Cc on the topic of fingerprint pattern restoration by DIP (Digital Image processing). Nowadays fingerprints are the most valuable things to solve any criminal problems but lacking of problems and wrong information fingerprints pattern make process difficult. In the recent decades image processing directly applied on the forensic science. In this paper they try to cover up on the novel digital image restoration techniques which are fully based on AM modulation (Amplitude Modulation) and FM (Frequency Modulation) reaction -diffusion techniques to store defective fingerprint pattern. This method showed us its application to fingerprint pattern increases in the recognition process. This way mainly fingerprint patterns are mainly working by the help of DIP (Digital Image Processing).

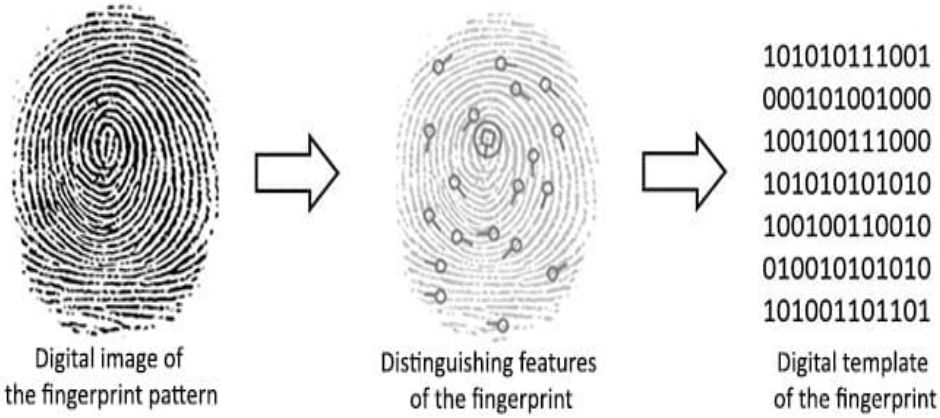

Fig. 3 Working Of Fingerprint Scanner

2) Face Detection and Recognition System using Digital Image Processing

At 2020, in the 2nd International conference on innovative mechanisms for Industry application (ICIMIA) this paper was published. Nowadays face recognition through DIP (Digital Image Processing) plays important role. In case of individual important sign is face. It makes everyone different therefore face recognition helps us in the identification of any person's identity using face. The whole face recognition process completed into two parts. Firstly face detection the detection of face is done except those case where the object placed far. In the second part recognition of face is done. After that the whole method repeated helping in face recognition model which is known as biometric technology. In the face recognition process two types of methods are done which is Eigen face and Fisher faces method. In the Eigen face method, PCA(Principal Component Analysis) is used to reduce face dimensional space.

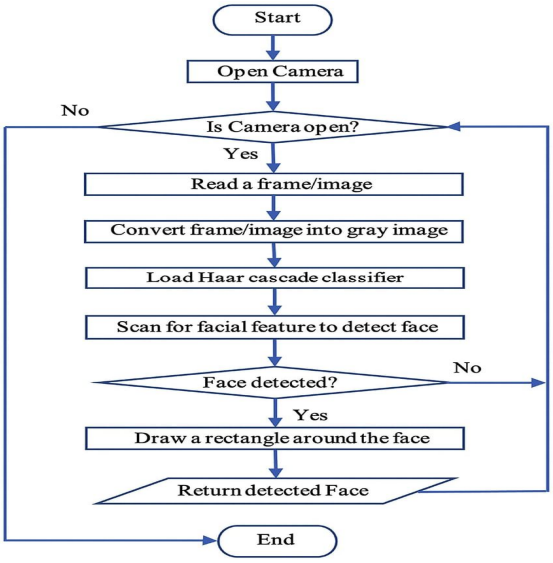

Fig. 3 Flowchart of Face Detection process

3) Iris Detection using Digital Image Processing

Iris recognition is very essential in the security, because it gives authenticity. Lots of scientists suggested new techniques for iris recognition which gives better performance of the system. This system is still not widely used due many issues like it's production cost is very high and it take more processing time and recognition rate is less but the production cost and processing time issue will be solved by using integrated circuit technology. Iris recognition needs hardware and software design. It can proceed by some steps. Firstly the system understands the inner and outer boundaries of iris, next it detects subroutines and exclude eyelids, eyelashes.

It has so many applications in various fields like in the Bank United Texas became the first bank who introduced the iris recognition system in the ATM. In India the government introduced iris pattern for the Aadhar Scheme.

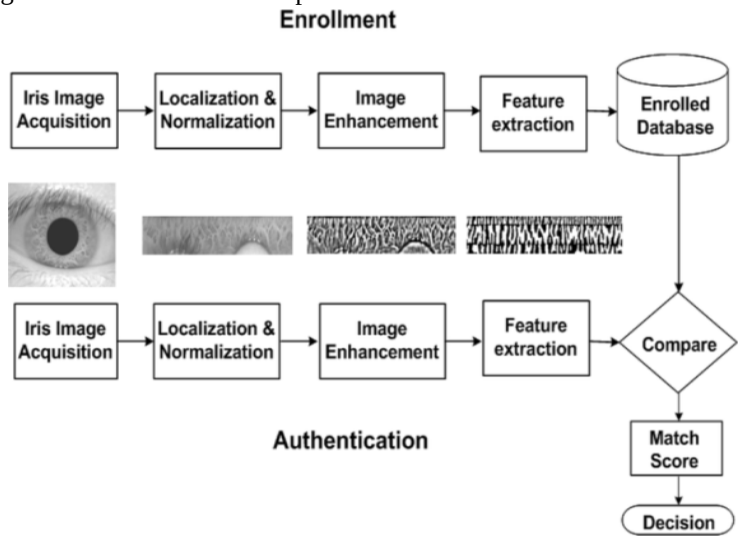

Fig. 4 Block diagram of Iris Recognition

II. FUTURE SCOPE

In future DIP (Digital Image Processing) uses new techniques, digital automated robots which are developed by many scientists in various nations. For the advancement the processing time and production cost will be less and it helps the entire process. In the future digital image processing and artificial intelligence will introduce voice commands, translating languages, tracking people etc. DIP technology will also help in medical fields like surgery, reprogramming problems in human DNA. It also helps in the transportation system like for the advancement of DIP automated driving cars will be introduced. Fingerprint, iris recognition, face recognition will be faster than in recent times. Scientists will work in this topic to improve the system.

III.CONCLUSIONS

In this paper we have discussed the application of DIP in security like Face recognition, fingerprint, Iris recognition. Not only in the security it is also used in various fields like biometric, image transformation, visual content analysis, virtual reality. This paper will help scientists to improve the DIP process in Security. More research is needed to improve issues with regard to digital imaging. In recent times DIP helps users to use electronics goods easily. This technology can help the military or police to find any criminal .

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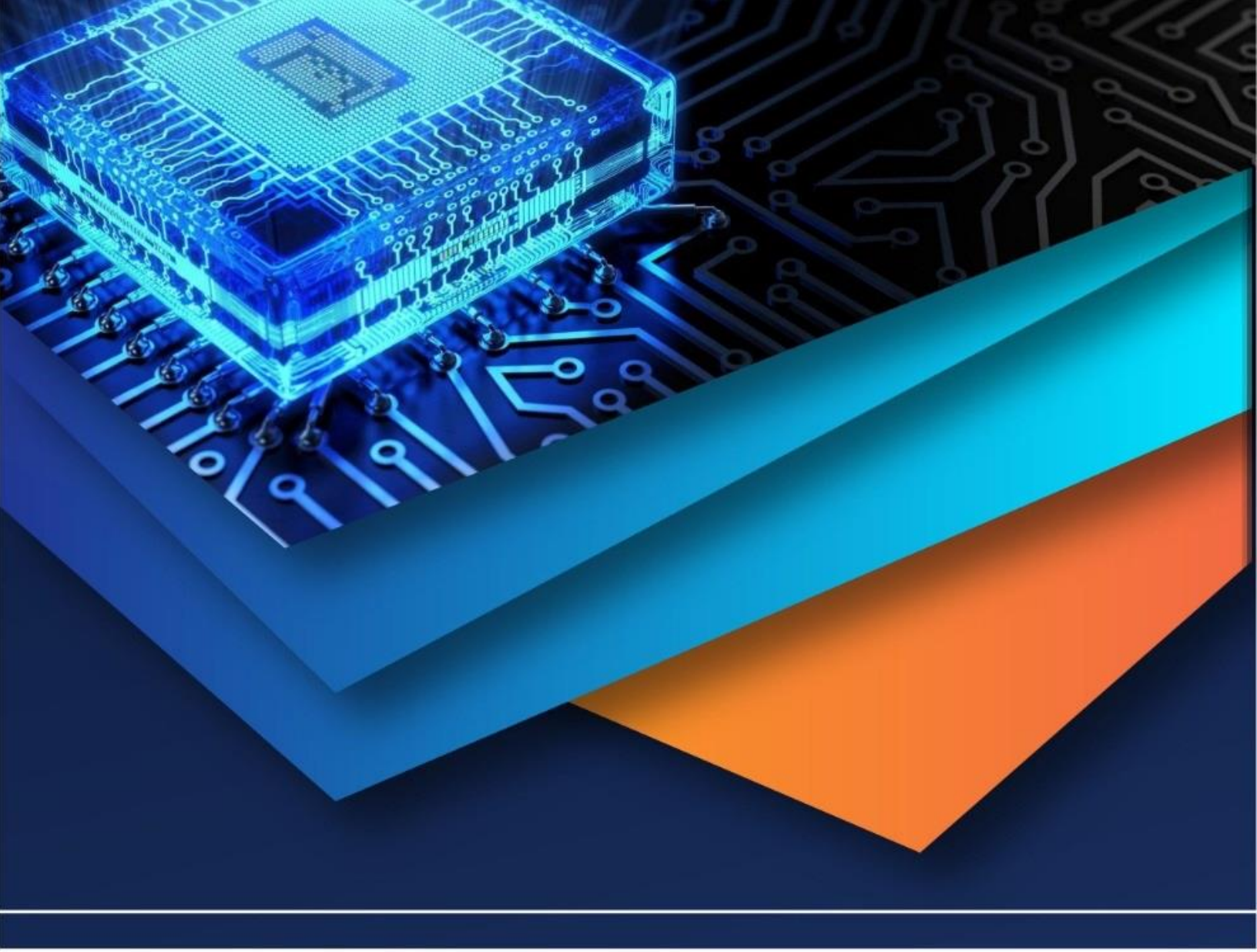

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