

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**

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Project Report on

**“FACE RECOGNITION - AN APPLICATION OF DIGITAL IMAGE PROCESSING”**

By

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Face Recognition - An Application Of Digital Image Processing

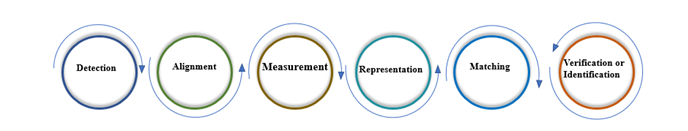
**EXECUTIVE SUMMARY**

This project is about An Application Of Digital Image Processing which is Face Recognition. The Face Recognition (FR) is growing as a major research area because of the broad choice of applications in the fields of commercial and law enforcement. Traditional FR methods based on Visible Spectrum (VS) are facing challenges like object illumination, pose variation, expression changes, and facial disguises. This report give a brief information on the history, application, future scope and the process of Face Recognition.



**INTRODUCTION**

Face recognition requires no physical interaction on behalf of user. It can use your existing hardware infrastructures, existing camera’s and image capturing devices will work with no problem. There are usually three steps exist in a Face Recognition System (FRS); Acquisition is recognition and capturing of facial descriptions from various sight; Normalization is segmentation, arrangement and consistency of facial descriptions; Recognition performs illustration, modeling of unfamiliar facial descriptions and links them with well-known models to offer the identities. FR generally follows the statistical pattern recognition approach. It strengthens security, improves photo organization, facial recognition is low priced and does not store personal data.



**HISTORY**

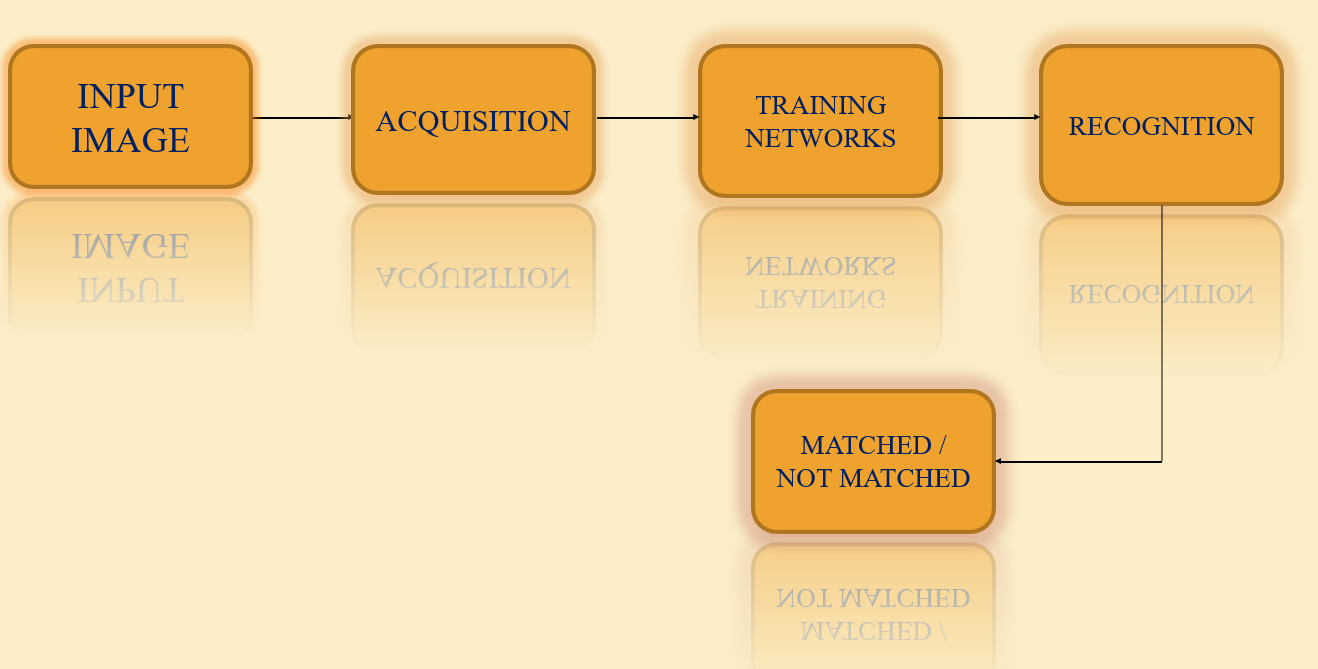
Some key events in the history of facial recognition

1. Manual Measurements By Bledsoe (1960s)
2. Increased Accuracy With 21 Facial Markers (1970s)
3. Eigenfaces (Late 1980s-Early 1990s)
4. Feret Program (1993-2000s)
5. Face Recognition Vendor Tests (2000s)
6. Super Bowl XXXV (2002)
7. Law Enforcement Forensic Database (2009)
8. Social Media (2010-Present)
9. First Major Installation Of Face Recognition In An Airport (2011)
10. Osama Bin Laden Identified (2011)
11. Law Enforcement Agencies Adopt Mobile Face Recognition

(2014)

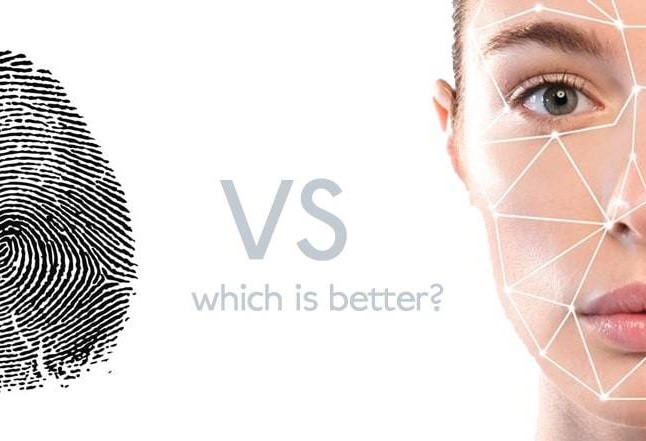
1. Face Recognition “Inevitable” For Retail (2017)
2. iPhone X (2017)
3. Watchlist As A Service (2017)

**BLOCK DIAGRAM**

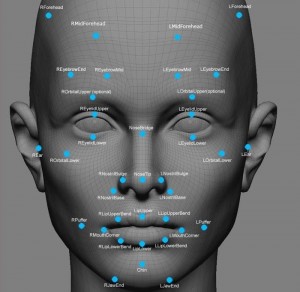
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**WHY FACE RECOGNITION OVER BIOMETRICS**

* A biometric is a unique, measurable characteristics of human being that can be used to automatically recognize an individual or verify an individual’s identity.
* They can be used to identify someone in a biometric database or to verify the authenticity of a claimed identity.
* One of the method problems is the issue of privacy concerning non-revocable biometrics, especially in the case of identity theft.
* Moreover, when biometric templates get stolen, an attacker can attack other authentication systems using the compromised biometric templates.

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**HOW FACE RECOGNITION SYSTEM WORKS?**

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In facial recognition there are two major processes -

* Image Acquisition

Is the creation of a representation of the visual characteristics of an object, such as a physical scene or the interior structure of an object. The term is often assumed to imply or include the processing, compression, storage, printing, and display of such images.

* Identification

The system compare the given individual to all other individual’s databased stored and give result of match or not matched.

“There are 80 nodal points on face” on a human face.

Few nodal points are:

1. Distance between the eyes
2. Width of nose
3. Depth of eye socket
4. Cheek bones
5. Jaw line
6. Chin

**SOFTWARE USED**

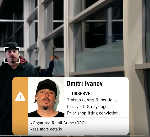
**CODE**

**SCREENSHOTS OF THE OUTPUT**

**APPLICATION**

* SECURITY/COUNTERTERRORISM

Access control, comparing surveillance images to known terrorist



* PREVENT RETAIL CRIME

Identify when known shoplifters, organized retail criminals or people with a history of fraud enter retail establishments



* UNLOCK PHONES

iPhone uses face recognition to unlock phones, powerful way to ensure that if a phone is stolen sensitive data remains inaccessible by the perpetrator

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* VOTER VERIFIACTION

Identify during a voting process this is intended to stop voting twice or where the vote may not go as excepted



* FIND MISSING PERSONS

3000 missing children were discovered in just four days using face recognition in India



* BANKING USING ATM

Software is able to quickly verify a customer’s face and enable secure transactions



* PROTECT LAW ENFORCEMENT

Helps police officers by instantly identify individuals in the field from a safe distance



* IDENTIFY PEOPLE ON SOCIAL MEDIA PLATFORMS

Helps Facebook to automatically recognize when its members appear in photos



* DIAGNOSE DISEASES(DiGeorge Syndrome)

National Human Genome Research Institute, uses face recognition to detect rare disease called DiGeorge syndrome (portion of 22nd chromosome missing)



* TRACK SCHOOL ATTENDANCE

Tablets are being used to scan students’ faces and match their photos against a database to validate their identities

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**CONCLUSION**

* Factors such as environmental changes and mild changes in appearance impact the technology to a greater degree than many expect
* For implementations where the biometric system must verify and identify users reliably over time, facial scan can be a very difficult, but not impossible, technology to implement successfully
* It has the potential for privacy abuse due to noncooperative enrolment and identification capabilities
* Recent research has proven that Multispectral/Hyperspectral Imaging System would be the future of human FR
* Forecasters opine that this technology is expected to grow at a formidable rate and will generate huge revenues in the coming years. Security and surveillances are the major segments which will be deeply influenced. It is estimated that it will also be adopted by retailers and banking systems in coming years to keep fraud in debit/credit card purchases and payment especially the ones that are online. This technology would fill in the loopholes of largely prevalent inadequate password system. In the long run, robots using facial recognition technology may also come to foray. They can be helpful in completing the tasks that are impractical or difficult for human beings to complete

**REFERENCES**

1. <https://www.facefirst.com/blog/amazing-uses-for-face-recognition-facial-recognition-use-cases/>
2. <https://www.slideshare.net/mobile/gsantosh031/face-recognition-ppt>
3. Digital Image Processing, 3rd edition, WILLAM.K.PRATT
4. Fundamentals of Digital Image Processing, ANIL.K.JAIN