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Investigation into Reliable & Efficient Biometrics Techniques

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Abstract: Biometrics allows to check human subjects by analyzing & comparing physical traits. Human body of characteristics might be prints of finger, eye retinas, voice of patterns & irises, facial patterns & hand measurements. Biometric systems consist of application that requires biometric technologies. They would allow automatic identification. It would allow authentication or verification of natural person. Many researches are done on biometrics. But there are several limitations in such technologies such as slow comparison speed, biometric data requires more space & error rate during comparison is too much. Our research would eliminate all above limitation by integrating edge detection mechanism with biometric. Only useful part of biometric data would be saved so that space would be saved & comparison time would be reduced as there would be small data to make comparison. If useless data is eliminated then probability of error rate during comparison also gets reduced. We have discussed several edge detection mechanisms also & we have chosen best from them.

Keyword: Facial recognition, Iris recognition, Edge Detection Mechanism, Matlab, Canny, Robert, Prewitt, Sobel operator

1. Introduction to Biometrics

Biometrics is generally used to verify a person's individuality.

Person could physical grant access to secure area with in a building using scans of finger. He could access to bank account at an ATM by using retinal scan. ^[1]

Biometric in authentication necessary comparison enrollment biometric sample with captured biometric sample.

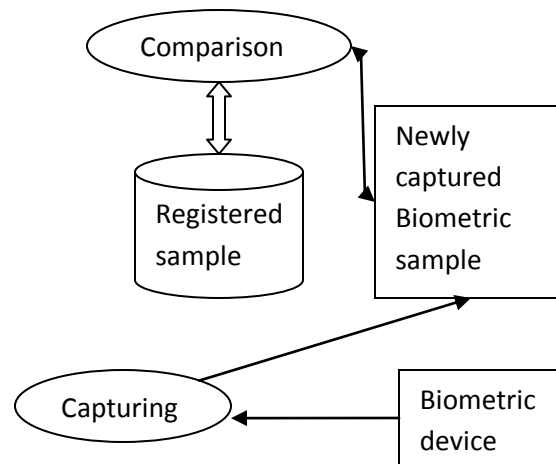


Fig 1 Capturing data from Biometric Device

Application Area

Security purpose Protect Sensitive Data, High degree in individuality belief with transactions & Create databases with a single identities , To **Improve auditing / reporting / keeping record & Time keeping & minimize password related problems and it is used to with in following areas**^[2]:

- a) Secure electronic investing & banking
- b) Financial transactions
- c) Enforcement of Law
- d) Enterprise wide network security infrastructures
- e) Social & Health services
- f) Sales in Retail

Facial Recognition Evolution^[4]

Algorithms of Facial recognition checking facial features by capturing landmarks and features an image of subject's in face.

Three-dimensional recognition^[3]

Lately in emerging trending which has been claimed to achieve better accuracies of three-size face recognition. This technique is use to three dimensional sensors to take information according figer of a face. It could check a face from a variety of seen angles, including a profile also. Sensors acts by projecting organized light in to face.

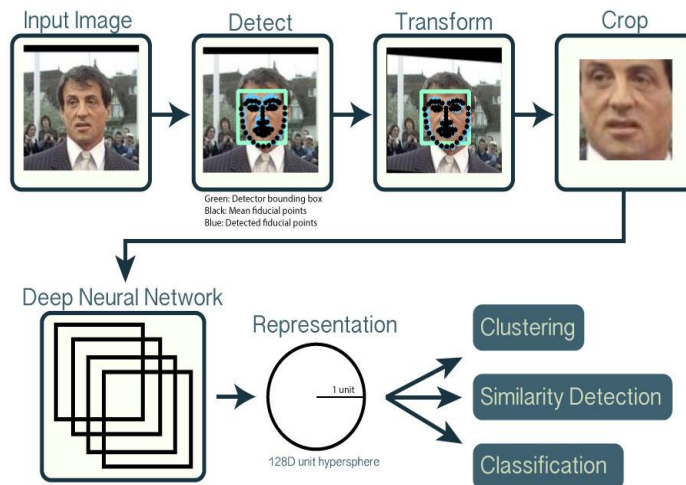
2. Commonly used Significant Software for Face recognition^[6]

Significant software with face recognition capability consists of:

- a) Picasa
- b) Microsoft's Windows Live Photo Gallery
- c) Adobe's Light room
- d) KDE's digital
- e) Sony's Picture Motion Browser
- f) Apple's photo
- g) Open Source's OpenCV
- h) Adobe Systems' Photoshop Elements

3. Benefits & Limitations^[2]

In various biometric techniques facial recognition may not be most reliable & efficient. Correctly designed systems installed within airports, multiplex & another than places of public could identify each person among pack without passers-by even being knowledge of system. Biometrics is like iris scans, and speech recognition can not perform this kinds of mass identification.



Losses in these systems are less than effective if facial expressions vary. Even a big smile could render system less efficient. On 18 January 2013 Japanese researchers created privacy visor that use to infrared lights to make face beneath it unrecognizable are facial recognition software For instance: Canada now allowed only for neutral facial expressions with in small size photos. There is also inconsistency within datasets used by researchers. [9] Researchers may use anytime from several subjects to scores of subjects, & out of them a few images to thousands of images. It is very significance for researchers to make available datasets they used to each other, or have at least a standard dataset.

4. Limitation of existing Biometric Techniques^[3]

1. Space Consuming: As Biometric sample are collected & stored in the system. This huge data takes space with in memory. If we capture facial expression using Biometric device. Unnecessary part from facial expression could be removed & facial express could be saved.

2. Time Consuming: Time consumption is more when registered sample is large with in size. If there is little data to compare then it would take less time.

3. Probability of Error: chances of error increases when useless data is kept with in registered sample

5. Detection of Edge Mechanisms^[12]

Edge detection an photo or picture processing technique for find boundary is of an objects within picture or images. It is working by detecting discontinuities with in shininess. Edge/border detection is used for image or picture or picture segmentation & data extraction with in areas such as image or picture or picture processing, computer of vision, & machine vision. Common border detection algorithms include Sober, Canny, Prewitt, Roberts methods.

Edge/border detection is a set of Mathematical technique. Main objective is to find out points with in a digital image or picture or picture at which image or picture glow changes sharply, more formally, may have some discontinuities. Particular Points at which image or picture changes of brightness sharply are called organized in a group of curved line segmentation known as edges or borders. Each problem of finding discontinuities with in 1D signal is known as step detection and problem of checking signal irregularity more time is known as change detection. Edge/border detection is a tool with in image or picture processing, machine vision and computer vision, precise with in part of detection of features & feature extraction. [12]

Operator of Prewitt

Prewitt operator are required for detecting edges upward and downward.

Sober Operator

The sober operator are same to Prewitt operator. It has been also calculates edges with in both horizontal & vertical direction. It is also a derivate mask and is used for edge detection.

Robinson Compass Masks

Worker is identified as range mask. In case of operator they would take one mask and rotate it with in all 8 compass major directions to find edges of each direction.

Kirsch Compass Masks

Kirsch Compass Mask are a derived mask that is used to finding edges. Kirsch mask is used for finding edges with in all directions.

Palladian Operator: Palladian are a second order derived mask. It could be further divided into positive Laplacian and negative Palladian. Laplacian Operator is also a derivative operator which is used to found edges with in an image.^[10]

Sharpening: Sharpening are another side to blurring. Within blurring, we reduce edge content & in Sharpening they would swell edge content. So in order to raise edge content with in an image, we have to find edges first.

Canny edge detector have been benefit algorithm derived from previous work of Marr & Hildreth. It is an optimal edge detection technique which provide better detection, clear response & better localization.^[10]

6. PROPOSED WORK

1. Before comparison we crop biometric features.



Fig 2 Facial Expression After Cropping

2. After cropping edge are detected using Edge detection mechanisms.

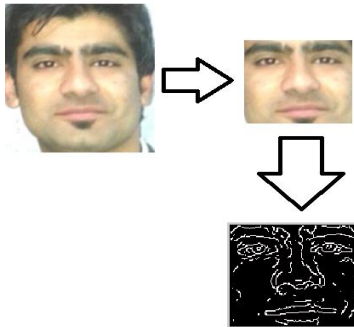


Fig 3 Facial Expression After Edge Extraction

3. These Register sample would be stored with in Biometric database

4. Next Time matrix of stored sample would be compared with matrix recently captured biometric data's edges.

7. Scope & Conclusion

In this research we have reduced space consumption & time consumption occurring during Biometric tests. This System would also reduce error rates. In this research we would study & evaluate different edge/border detection methods with in Biometrics. We had been seen that canny edge detector would give best result with in Biometric comparisons as a compared to another with some positive points.

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