Compressed Palmprint And Facial Image Using Delta-Huffman Source Codes

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Abstract- *Increase of computing has lead to an explosion in the volume of information to be saved on hard disc and send over the internet. This enlargement has lead to a need for data compression which is the ability to reduce the amount of or Internet Bandwidth required managing this information. The study of data compression is the science which attempts to advance toward manners that can be applied to information to make it take up less space. The uses for this are vast and algorithms will need to be improved to sustain the certainly larger files. The Authentication process involves verifying the identity of an individual claim access to one or more resources of a system. My paper provides a review of compression of data techniques. The aim of this Research work is to improve the performance of the system by using the Adaptive Delta & Huffman Codes.*

Keywords- Error detection and correction, Delta code, Huffman Code.

I. INTRODUCTION

Human were confronting with the trouble of authenticate unknown person, previously in ancient Egypt when grain was contracts or delivered were concluded. On the other hand other nations such as France and Germany were also familiar with this individuality. Hence, Assyrian potters distinct their earth vase with their Biometrics [1]. For this reason visible body individuality, such as colour of eyes, height of body or even the complexion of a person were used. A person can know the whole thing such as passwords, Personal Identification Number (PIN) and any specific number, how they are often used commercially to see the difference of associates and enemy [2]. At present a day the job of recognizing person is no longer restricted to human. There exist many ways to recognize oneself acknowledgement [3]. As a member of this procedure of progression we ever more often have to verify our identity to technological systems [4, 5].

II. RELATED WORK

You-Ran Liu and Lih-Jen Kau et al 2017 [1], in this paper we propose a scalable face image compression algorithm based on Principal Component Analysis (PCA) and Entropy Coding.

Fig-1 Hand geometry scanning by Biometric Machine

By using PCA and some training face image patterns, we can extract the most representative Eigen image of human faces. To reduce the coding complexity as well as to achieve a higher compression ratio, only the first term of the extracted Eigen images will be used for the encoding of the human face, i.e., only the Eigen image with maximal energy strength will be selected for the encoding process. After the process of PCA decomposition and arithmetic coding, the generated bit stream has only 45201 bits. They then evaluate the compression ratio (CR) according to the following equation.

$$CR = \frac{X}{X''}$$

Where X and X" corresponding to the size of the image before and after compression respectively. With the definition, we can find the compression ratio is 1.823. Nidhi Dhawale et al 2014 [2], Huffman coding is especially used in the applications where loss of information is not tolerated such as in the compression of text file. Huffman coding is also known as prefix coding or prefix elimination coding. John Daugman and Cathryn Downing et al 2008 [3], They have contemplated the impacts of three plans for picture pressure on iris acknowledgment execution, prompting the astounding end that even pictures packed as extremely as 150:1 from their unique full-measure positions, to only 2000 bytes, stay entirely useful.

III. PROPOSED METHODOLOGY

The proposed method may be divided into two steps. The first step is for Registration or Enrolment. The second step is for Authenticate the user or client. The overall procedure is described by the flow of the processes. To registering an enrolment is the mainly essential procedure of the biometric detection [9].

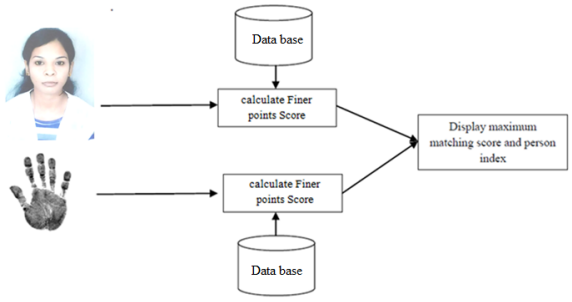

Fig-2 Applied Hand Geometry Impression and Face image of Clint

The biometric individuality must be taken under best conditions, with respect to a good recognition rate, for example according to lighting. Typically these are captured more than 1, because a later recognition should be even possible if the conditions during the respective collection process are much worse. Successive to the initial collection phase the captured traits, so-called reference individuality, are stored on a smartcard. For verification purposes the reference trait may be stored on a smartcard. In case of identification most likely saved means is the database. For verification purposes the reference trait may be stored on a smartcard.

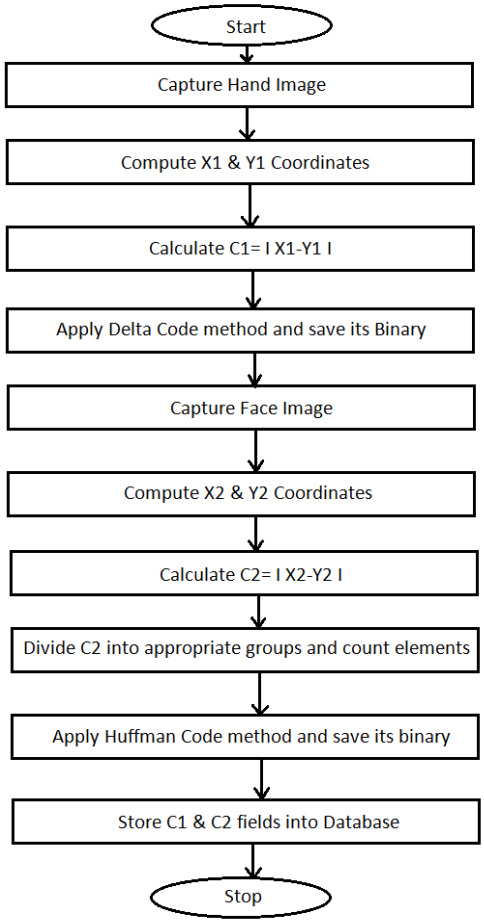

Fig-3 Flow chart for Enrolment into system

The result of matching process finally indicates whether a person could be successfully identified or verified, respectively. The process itself depends on the recognition function. This work is extension of that algorithm to provide the more security and privacy. There is limited memory space to save the biometric information. Hence compression techniques will be added in future. Generally 29 finer points are extracted by the Hand Geometry & Face separately.

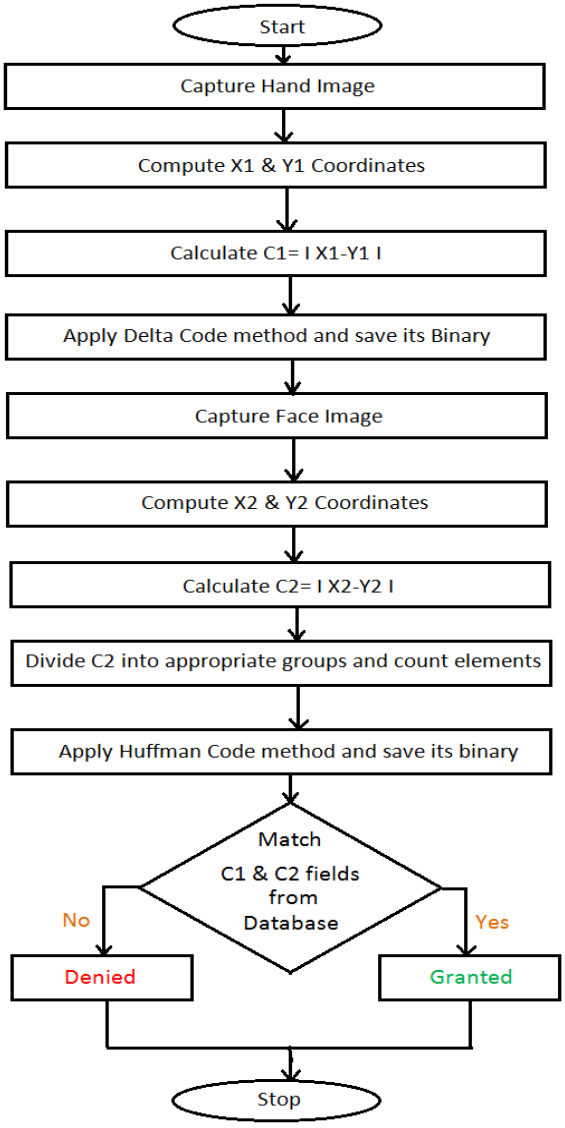

Fig-4 Flow chart for Authentication in system

For the remaining column, we can't use delta compression, because numbers are not in ascending order but in the random manner. If arrange in ascending order then the difference is very large. Hence we use here Huffman code for compression. Hence for that we have created the group of 20 numbers and find the values present in this group.

Table-1 Periods of finer Points & their respective frequency for the Group of C2-Field

S. No.	Periods	Values	Frequency
1	0-20	13, 19, 7, 2, 17, 15, 13, 7, 4	9
2	20-40	28, 23, 25, 29, 32, 30, 34, 34, 32	9
3	40-60	47, 41, 57, 41, 45	5
4	60-80	80, 73, 61, 77, 70	5
5	80-100	100	1

Let calculate the Huffman codes.

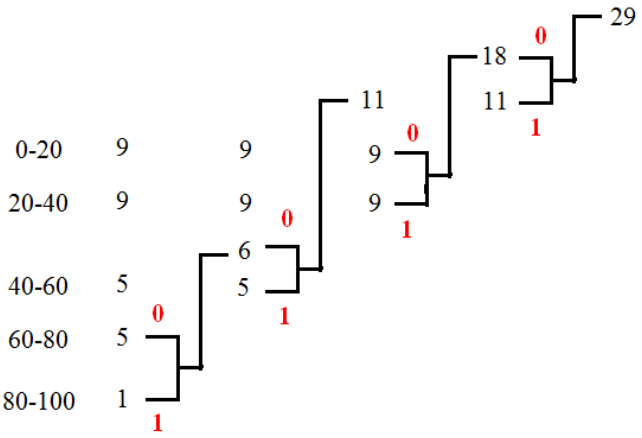

Fig-5 Huffman codes to reduce applied Samples of C2- Finer Points

Then we have created Huffman codes for those groups according to frequencies of the group. This code is assigned to first value of group. Then the C2 - field value is break according to the first value of the group. For example 65 is a member of 60 – 80 groups. Therefore it can be break as (60+5). And then we will represent the 60 by its Huffman code and for 5 we will use its binary equivalent.

Table-2 Calculated Huffman codes & Additional Binary for C2 Field

S. No.	C2– field	BRAKING C2 - field		Binary	
1	80	80	0	00	0
2	28	20	8	01	1000
3	13	0	13	00	1101
4	47	40	7	11	111
5	73	60	13	100	1101
6	19	0	19	00	10011
7	23	20	3	01	11
8	61	60	1	100	1
9	100	80	20	101	10100
10	25	20	5	01	101
11	7	0	7	00	111
12	2	0	2	00	10
13	17	0	17	00	10001
14	41	40	1	11	1
15	77	60	17	100	10001
16	70	60	10	100	1010
17	57	40	17	11	10001
18	29	20	9	01	1001
19	32	20	12	01	1100
20	15	0	15	00	1111
21	30	20	10	01	1010
22	13	0	13	00	1101
23	34	20	14	01	1110
24	7	0	7	00	111
25	41	40	1	11	1
26	45	40	5	11	101
27	34	20	14	01	1110
28	4	0	4	00	100
29	32	20	12	01	1100
TOTAL BITS				162	

According to this table it is clear that here we required about 162 bits only to store the Finer Points of single Hand Geometry and Face image.

IV. COMPARATIVE ANALYSIS

Storing of finer points data without compression

Total bits required for storing a single Template of Palm Print image without coding = 493 bits

Total bits required for storing a single Template of Face image without coding = 464 bits

Total bits required for storing a single Template of Palm Print image and Face image without coding

=Bits required for storing X-fields + Bits required for storing Y-fields = 957 bits

Storing of finer points data with compression

Compression of c1- field by delta code

Total bits required for storing C1 Field with Delta code= 78 bits

Total bits required for storing C2 Field with Huffman code= 162 bits

Total bits required for storing C1 Field & C2 Field with Delta & Huffman code= 240 bits

The Compression Ratio of data is:

$$= \frac{\text{Size of image before Compression}}{\text{Size of image after Compression}}$$

$$= \frac{957}{240}$$

$$= 3.99$$

V. CONCLUSION AND FUTURE WORKS

As given in IEEE Transactions 2017 on the topic "Scalable Face Image Compression Based on Principal Component Analysis and Arithmetic Coding" sir You-Ran Liu and Lih-Jen Kau (1) obtained Compression Ratio about 1.823. From equation (7) it is clear that with the technique of Compression by Delta and Huffman codes approximately 3.99 Compression Ratio (CR) can be achieved. It means my dissertation gives more Compression ratio with less complexity. The CR is utilized to assess the minimization of the picture, while PSNR (1) is used to assess the visual nature of the Recreated Picture. MSE is the mean square value between the reproduced picture and the first picture. In the proposed work there is no need to recreate or reproduce the picture, So that we have calculated CR only.

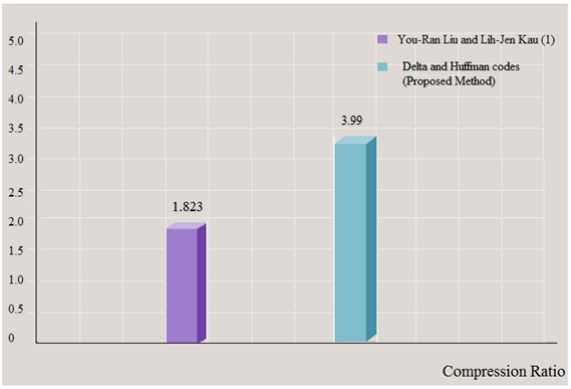

Fig-6 Comparison between the methods

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