JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125 VOL 7, ISSUE 04, 2020

# LOCAL AND GLOBAL HISTOGRAM MATCHING FOR ENHANCING IMAGE QUALITY USING SPATIAL REPRESENTATION

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**ABSTRACT:** Image enhancement is the important method to improve the quality of the images. Image quality is the important factor for processing images and making effective decision. The traditional image enhancement method has handling multiple images. We propose novel local and global histrogram method for enhancing image quality. The spatial representation is used to select each image regions and find the histogram values. Matlab is used to setting the experiments. The proposed model, we use biometric finger input as one model evaluating the system. Here, image pre-processing steps is applied for improve image contrast and enhance image quality. The stereo plane is created for handling local and global histogram. The experimental setup can obtained good quality images in spatial plane.

**KEYWORDS**: Histogram matching, Local and Global values, Image quality, Spatial representation, Image enhancement.

## I. INTRODUCTION

Bio metric finger print is a good method to monitor the attendance and monitoring systems. The effective system has good validation factor and provide quality results. Different finger print pattern processing systems is available in real time. Capturing fingerprint and analyze the pattern is easiest to way record their presence [1]. The fingerprint is unique coordinating and marking systems. The problem is analysing pattern and making effective decision is one the major problem. We are working in the domain for exactness, reducing mistake rate and computation time. To improve the above characteristics we propose a novel local and global histogram matching method for analyzing pattern using spatial representation plane [2].

The histogram matching is important method to analyze the image pattern and bit wise comparison. This method we can easily find inactive fingerprints. The correct and matched finger are easily found and make the decisions. The problem is low quality images, network coverage, connectivity issues and computing devices. This strategy we upgrade the existing mode with image enhancement techniques. The outcome of this method score is as 0.2% comparatively increased and utilization rate also tremendously changed [3][4].

For example, the shading coroners, edges, unique lighting effect, senor life time and machine dependency are to be considered for measuring lifetime. We present a novel image enhancement with spatial representation using local and global histogram matching [5]. The proposed image improvement calculation comprises of three stages: (I) changing the image by differentiate restricted versatile histogram matching technique, (ii) picking the reference image, and (iii) shading coordinating. In this paper, classified as follows, section 2 describes related works, section 3 explains proposed model, section 4 gives implementations and section 5 explains results and conclusion.

## II. RELATED WORKS

Mukvinder et al, minutiae extraction method is for unique pattern verification. This methid has two stages first step find the each histogram pattern values and mark the pattern. Stage tow has matching each coordinate position with existing stored procedures. Fast Fourier transform is used for converting pattern into query for matching pattern [6]. Garud et al, segmentation and restoration methods are applied for reducing noises, hidden surface elimination and morphological

ISSN- 2394-5125 VOL 7, ISSUE 04, 2020

process. Minutia method has bifurcation process and it can be affected by neighbourhood highlights points. So Deboot et al, suggested that ongoing image assessment procedures can lead the histogram matching [9].

Sachin et al, the enhancement process is classified into histogram matching point and granular object mode functions. The performance is utilized by set of pattern and their information. The different image acquisition model is available for image pre-processing and pixel matching is leads computation cost [10]. In this work, the multi model fingerprints are indentified and inactive fingers are removed. The image qualities are taken into account and discover comparison between each coordinate position of matching accuracy [11]. The unique mark, dormant factor and primary point focusing are considered for evaluation. This is more helpful for quality assessment and coordinating each pattern.

## III. PROPOSED HISTOGRAM MATCHING

The histogram matching is programmed model and each calculations are depends with biometric finger pattern. Our proposed method has performed unique finger impression enhancement and particular extraction. The vision of input images and edges are converted to unique mark images. Details are extracted by using pre-processing, extraction and matching methods. Image enhancement has clear and simple method to mark unique images. This method has cutting of images and acquire the detecting patterns. The scanners are considered for assessing quality factor and verify the precision rate.

**Figure 1: Bio metric finger input and output histogram**

For image enhancement method has to two major process, histogram equalization and Fourier transforms. Spatial representation is used for differentiate the input patterns and upgrade the images. In this stage, we use pre-processing, image enhancing and local & global histogram matching are done. The up-gradation of images by using edge detection method is used. The local and global histogram matching is converting gray scale images to two dimensional folded images. The pixel values are picked and find the delegate for identification.

The unique finger print is obtained from Fourier transform. The images are divided by two separate part, one part for preparing histogram and another part reinverse operationsFourier Transform is given by,

$$F(U,V) = \sum_{x=0}^{m} \sum_{y=0}^{n} f(x,y) + e^{-(j2\pi n)}$$

After applying image enhancement the histogram values are calculated by using

$$G(x,y) = F^{-1} |(F(U,V) + F(U^{'},V^{'})|^{k}$$

For this case x,y,u,v = 0,1,2,3,...,n-1

## IV. LOCAL AND GLOBAL HISTOGRAM MATCHING

Local and global histogram is has twofold images such as valleys and ridges. The propogation of gray scale images are taken into account for edge selection and extraction. The matching of each pattern is represented as 0 and 1. The 256 level images has 2 levels one half for estimation of 1 and another part is foundation of 0. This two cases are changing agent of whole system. We utilize binarize unique matching pixel and find the incentives of each square of images (16 x 16). The each square of values are stored in estimation matrix and provide prominent results. The square of point is taken into account for matching and verifying next pixel.

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**Figure 2: Original image after applying local and global histogram matching**

## V. IMPLEMENTATION

Unique mark images are mostly identified in pre-processing stage but another stage we used for connecting edges and curves. Spatial representation plane is used to preparing calmer points, which is used for setting coordinating focal values. The framework is prepared for matching pixel and finding minutia points.

The following points are considered for implementing histogram matching in spatial coordinates. i). The separation between one end and one bifurcation ought to be more noteworthy than D, if separation is not as much as D and both particulars' are on a similar edge at that point dispose of them two. Where D is the normal separation among two neighbouring edges. 2). If two bifurcations are on a similar edge and the separation between them is not as much as D at that point dispose of them two. 3). If there are two terminations on a similar edge and separation and the length of the edge is not as much as D at that point disposes of the two terminations.

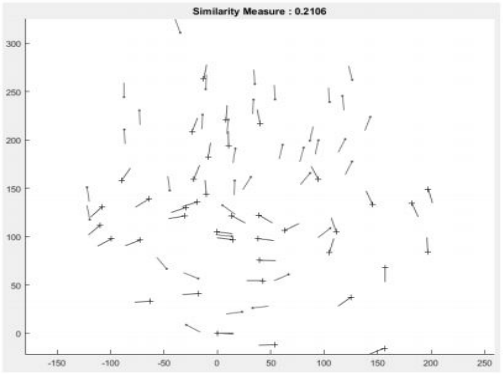


**Figure 3: Histogram matching with spatial plane representation**

The figure 3 shows the matched histogram values in spatial plane. In this case the same finger or matching finger is not considered in account for reducing computation cost. This is flexible matching results and 100X100 coordinate values is selected for evaluation. The heading position is start with pre-matched points and finds unique finger impression. The coordination point score is measure and compare the finger print values. The set of image pair are considered for image quality assessment and enhancement.

Our proposed method has verifying inactive finger patterns by using histogram equalization. The proposed method is evaluated by using MATAB simulations 2014 and NIST SD30 model. The image dataset is selected from TVS industry attendance model TVSFC2015. Apply local and global histogram matching in spatial plane, the low quality images are classified and taken into pre-processing module. The matched pixel are compared and verified. Our proposed method probability score is obtained as 0.2% and it compare with other model the rate is good. The below table 1 shows that similarity index table with comparison.

In this structure, the probability proportion of the inactive fingerprints is checked utilizing Brightness Preserving Fluffy Histogram Equalization approach. The proposed work actualized in MATLAB 2014a and confirmed on FVC2002 DB1-B and NIST SD27 low quality unique mark dataset. In the underneath table portrays the examination of low-quality

ISSN- 2394-5125 VOL 7, ISSUE 04, 2020

fingerprints on the base of likeness. The normal probability score of proposed brilliance saving powerful fluffy is 0.2% more than piece approach. The below table 1 shows that similarity index for histogram matching in spatial plane.

| S.No | Proposed method | | | | Existing methods | | |
|---|---|---|---|---|---|---|---|
| | Histogram Matching | No. of Spatial Coordinates kernel | Level | % of increase | Granular Kernel | Random Pair | Support vector |
| 1 | 0.654 | 2 | 0.005 | 0 | 0.15 | 0.25 | 0.18 |
| 2 | 0.678 | 2 | 0.065 | 0.5 | 0.65 | 0.58 | 0.72 |
| 3 | 0.465 | 2 | 0.071 | 0.75 | 0.92 | 0.94 | 0.87 |
| 4 | 0.341 | 3 | 0.018 | 0.45 | 0.56 | 0.65 | 0.76 |
| 5 | 0.481 | 3 | 0.024 | 0.78 | 0.87 | 0.86 | 0.92 |
| 6 | 0.891 | 3 | 0.045 | 0.54 | 0.59 | 0.67 | 0.78 |
| 7 | 0.234 | 3 | 0.021 | 0.34 | 0.54 | 0.72 | 0.64 |

**Table 1: Histogram matching of spatial coordinates and levels**

## VI. CONCLUSION

In this work, we used histogram matching method for assessing biometric finger inputs. The input patterns are classified and simulation score is calculated for each coordinating pixels. The local and global histogram matching is applied for simulating input finger patterns. This method has upgraded the images and increases the image quality. The spatial representation is used for measuring pixel and histogram points. This method compared with exiting model and probability score is 0.2%. The image dataset is taken from source and test the results using Matlab simulator. The future work should be possible on the patent fingerprints and on live images.

## VII. REFERENCES


1) Navneet Kaur Sandhu and Rupinder Kaur, "To Enhance the Quality of Biometric Identification Systems", International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS-2017), 978-1-5386-1887-5/17/$31.00 ©2017 IEEE
2) Yuan Hai, Ling Li and Jia Gu, "Image Enhancement Based on Contrast Limited Adaptive Histogram Equalization for 3D Images of Stereoscopic Endoscopy", Proceeding of the 2015 IEEE International Conference on Information and Automation Lijiang, China, August 2015, 978-1-4673-9104-7/15/$31.00 ©2015 IEEE
3) S. Pawar, "A Survey of Minutiae Extraction from Various Fingerprint Images," vol. 6, no. 6, pp. 169–173, 2016.
4) S. Manikandan, P.Suganya, K. Raju, P.Ponnaruvi, "Object Removal and Error Concealment Using Mean Shift Algorithm in Free Moving Camera Videos", EIJO Journal of Engineering, Technology And Innovative Research (EIJO–JETIR), ISSN: 2455 - 9172, Volume – 1, Issue – 2, May - June 2016, Page No. : 05 - 08.
5) Y. He, J. Tian, X. Luo, and T. Zhang, "Image enhancement and minutiae matching in fingerprint verification," Pattern Recognit. Lett., vol. 24, no. 9–10, pp. 1349–1360, 2013.
6) A. Noor, "A New Algorithm for Minutiae Extraction and Matching in Fingerprint School of Engineering and Design," no. July, 2012.
7) S. Kumar and R. L. Velusamy, "Kernel approach for similarity measure in latent fingerprint recognition," Int. Conf. Emerg. Trends Electr. Electron. Sustain. Energy Syst. ICETEESES 2016, pp. 368–373, 2016.
8) V. Espinosa-Duró, "Minutiae detection algorithm for fingerprint recognition," IEEE Aerospace and Electronic Systems Magazine, vol. 17, no. 3. pp. 7–10, 2012.
9) N. A. Mngenge, L. Mthembu, F. V. Nelwamondo, and C. H. Ngejane, "A Fingerprint Indexing Approach Using Multiple Similarity Measures and Spectral Clustering," 2015 12th Conf. Comput. Robot Vis., pp. 208–213, 2015.
10) S Manikandan, "An Adaptive Lsb Pattern Substitution For Detecting Bio-Metric Inputs", Applied Science Reports, Progressive Science Publications, E-ISSN: 2310-9440 / P-ISSN: 2311-0139, DOI: 10.15192/PSCP.ASR.2018.22.1.2731, Volume 22, Issue 1, pp. 27-31, 2018
11) A. Sankaran, M. Vatsa, and R. Singh, "A Survey on Latent Fingerprint Matching Techniques," IEEE Access, vol. 2, pp. 982– 1004, 2014.