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AN EXAMINING FACE RECOGNITION BY LOCAL DIRECTIONAL NUMBER PATTERN (Image Processing)

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ABSTRACT - The main objectives of this paper is an find out the human Emotion From Human Gray scale Image (B/W Image) using an FER(Facial Expression Recognition) Method's using LDN method. The proposed Local Directional Pattern (LDP) is an eight bit binary code assigned to each pixel of an input image. This pattern is calculated by comparing the relative edge response value of a pixel in different directions.

This paper proposes a novel local feature descriptor, local directional number pattern (LDN) for face analysis, (i.e) face and expression recognition. LDN encodes the directional information of the face's textures (i.e) the texture's structure in a compact way, producing a more discriminative code than current methods. The system compute the structure of each micro-pattern with the aid of a compass mask that extracts directional information, and its encode such information using the prominent direction indices (directional numbers) and sign which allows to distinguish among similar structural patterns that have different intensity transitions. The system divides the face into several regions, and extracts the distribution of the LDN features. The system concatenates these features into a feature vector and uses a face descriptor. It performs several experiments in which face descriptor performs consistently under illumination, noise, expression and time lapse variations. Moreover, test with different masks to analyze its performance in different face analysis task.

Keywords- Local Directional Number pattern (LDN), Local Directional Pattern (LDP)

I. INTRODUCTION

In the literature, there are many methods for the holistic class, such as, Eigen faces and Fisher faces, which are built on Principal Component Analysis (PCA); the more recent 2D PCA, and Linear Discriminate Analysis are also examples of holistic methods. Although these methods have been studied widely, local descriptors have gained attention because of their robustness to illumination and pose variations.

The local-feature methods compute the descriptor from parts of the face, and then gather the information into one descriptor. Among these methods are Local Features Analysis, Gabor features, Elastic Bunch Graph Matching, and Local Binary Pattern (LBP). The last one is an extension of the LBP feature that was originally designed for texture description, applied to face recognition. LBP achieved better performance than previous methods, thus it gained popularity, and was studied extensively. Newer methods tried to overcome the shortcomings of LBP, like Local Ternary Pattern (LTP), and Local Directional Pattern (LDiP).

The last method encodes the directional information in the neighborhood, instead of the intensity. Both methods use other information, instead of intensity, to overcome noise and illumination variation problems. However, these methods still suffer in non-monotonic illumination variation, random noise, and changes in pose, age, and expression conditions. Although some methods, like Gradient faces, have a high discrimination power under illumination variation, they still have low recognition capabilities for expression and age variation conditions. However, some methods explored different features, such as, infrared, near infrared, and phase information, to overcome the illumination problem while maintaining the performance under difficult conditions. In that we were identified the drawbacks as: (i) instead of intensity to overcome noise and illumination variation problems.(ii)non-monotonic illumination variation, random noise changes in pose, age, and expression conditions. (iii) Gradient faces, have a high discrimination power under illumination variation, they still have low recognition capabilities for expression and age variation conditions.

II. PROPOSED WORK

The paper proposes a face descriptor, Local Directional Number Pattern (LDN), for robust face recognition that encodes the structural information and the intensity variations of the face's texture. LDN encodes the structure of a local neighborhood by analyzing its directional information. Consequently, it computes the edge responses in the neighborhood, in eight different directions with a compass mask. Then, from all the directions, it chooses the top positive and negative directions to produce a meaningful descriptor for different textures with similar structural patterns. This approach allows us to distinguish intensity changes (e.g., from bright to dark and vice versa) in the texture. Furthermore, our descriptor uses the information of the entire neighborhood, instead of using sparse points for its computation like LBP. Hence, this approach conveys more information into the code, yet it is more compact—as it is six bit long. Moreover, the experiment with different masks and resolutions of the mask to acquire characteristics that may be neglected by just one, and combine them to extend the encoded information.

The system found that the inclusion of multiple encoding levels produces an improvement in the detection process. Its having advantages as: (i) coding scheme is based on directional numbers, instead of bit strings, which encodes the information of the neighborhood in a more efficient way.(ii)Implicit use of sign information, in comparison with previous directional and derivative methods encode more information in less space and at the same time, discriminate more textures.(iii)Use of gradient information makes the method robust against illumination.

III. SYSTEM ARCHITECTURE:

1.Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

2. It is achieved by creating user-friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities.

3. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user will not be in maize of instant. Thus the objective of input design is to create an input layout that is easy to follow

3.1 Input Design

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy.

3.2 Output Design

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system's relationship to help user decision-making.

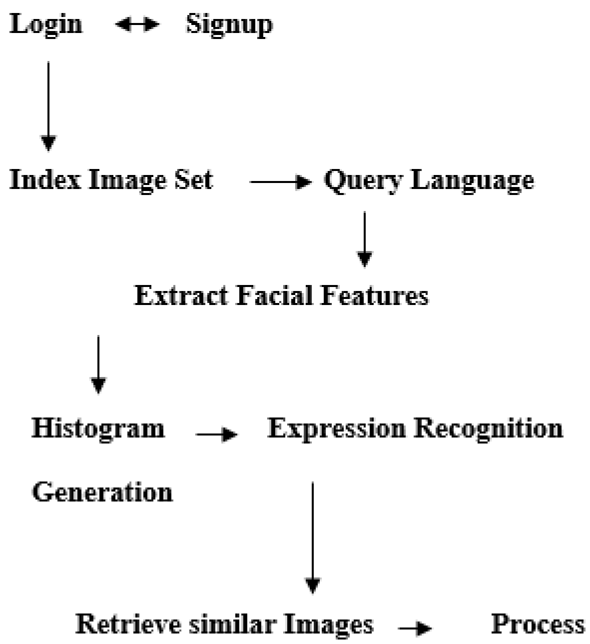

Fig: System Architecture

3.3 Levels to Identify:

1. Login
2. Registration
3. Face recognition
4. Histogram generation
5. Expression recognition
6. Face retrieval

3.3.1 Login

This helps a user to enter into their own accounts by specifying their unique password and user id. The additional features of login page are signup; exit. Here signup helps to create new accounts whereas exit helps to exit the application.

3.3.2 Registration

The ultimate subjective of this module is to obtain all necessary or basic information's about the user to create an account. The details provided in this module will automatically get submitted to the database connected to it. Some of the basic details of this page include userid, password, DOB, address and phone number etc.

3.3.3 Face Recognition

In that design the system such that first the image dataset folder should be indexed by the user. After index is made, it shows the number of images in the folder which we indexed. Next the query image is selected by the user. The LH and MLH are used during the face recognition process. The objective is to compare the encoded feature vector from one person with all other candidate's feature vector with the Chi-Square dissimilarity measure. This measure between two feature vectors, F1and F2, of length N is measured. The corresponding face of the feature vector with the lowest measured value indicates the match found.

3.3.4 Histogram Generation

The histogram is generated based on the query image selected from the image dataset. The horizontal axis of the graph represents the tonal variations, while the vertical axis represents the number of pixels in that particular tone. The left side of the horizontal axis represents the black and dark areas, the middle represents medium grey and the right hand side represents light and pure white areas. The vertical axis represents the size of the area that is captured in each one of these zones. Thus, the histogram for a very dark image will have the majority of its data points on the left side and center of the graph. Conversely, the histogram for a very bright image with few dark areas and/or shadows will have most of its data points on the right side and center of the graph.

3.3.5Expression Recognition

It performs facial expression recognition by using a Support Vector Machine (SVM) to evaluate the performance of the proposed method. SVM is a supervised machine learning technique that implicitly maps the data into a higher dimensional feature space. Consequently, it finds a linear hyper plane, with a maximal margin, to separate the data in different classes in this higher dimensional space. After the histogram identified in the previous module, we extract the entire feature automatically and the features are stored separately. Based on the extracted features, the expression is recognized.

3.3.6 Face Retrieval

It retrieves the similar images based on the expression recognized on the previous module. The efficiency of the descriptor depends on its representation and the ease of extracting it from the face. Ideally, a good descriptor should have a high variance among classes (between different persons or expressions), but little or no variation within classes

IV. CONCLUSION

In this paper we introduced a novel encoding scheme, LDN, that takes advantage of the structure of the face's textures and that encodes it efficiently into a compact code. LDN uses directional information that is more stable against noise than intensity, to code the different patterns from the face's textures. Additionally, we analyzed the use of two different compass masks (a derivative-Gaussian and Kirsch) to extract this directional information, and their performance on different applications. In general, LDN, implicitly, uses the sign information of the directional numbers which allows it to distinguish similar texture's structures with different intensity transitions—e.g., from dark to bright and vice versa.

V. FUTURE ENHANCEMENTS:

In this paper, two novel methods for facial expression recognition in facial image sequences are presented. The user has to manually place some of candied grid nodes to face landmarks depicted at the first frame of the image sequence under examination. The grid-tracking and deformation system used, based on deformable models, tracks the grid in consecutive video frames over time, as the facial expression evolves, until the frame that corresponds to the greatest facial expression intensity. The geometrical displacement of certain selected Candied nodes, defined as the difference of the node coordinates between the first and the greatest facial expression intensity frame, is used as an input to a novel multiclass Support Vector Machine (SVM) system of classifiers that are used to recognize either the six basic facial expressions or a set of chosen Facial Action Units (FAUs). The results on the Cohn-Kanata database show a recognition accuracy of 99.7% for facial expression recognition using the proposed multiclass SVMs and 95.1% for facial expression recognition based on FAU detection.

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