Automated Student Attendance Using Facial Recognition Based On DRLBP &DRLDP

G.Deepika
UG Scholar
M.Priya Agarwal
UG Scholar
Email: deepikaganesh323@gmail.com
Mrs.K.C Aarthi
Assistant Professor,Dept of Computer Science and Engineering,
Velammal Engineering college,Chennai

ABSTRACT

The project presents an automated attendance system based on face recognition using discriminative robust local binary pattern and local directional pattern descriptors.The proposed system involves face detection,features extraction and matching.The face detection is used to detect faces based on Viola Jones algorithm using vision toolbox.In feature extraction stage,the discriminative robust local binary pattern is used for different object texture and edge contour feature extraction process.A DRLDP operator computes the edge response values in all eight directions at each pixel position and generates a code from the relative strength magnitude.The proposed features retain

The contrast information of image patterns.These features are useful to distinguish he maximum number of samples accurately and it is matched with already stored image samples for person verification.The simulated results will be shown that used methodologies have better discriminatory power and recognition accuracy compared with prior approaches.

Keywords-**Heart, Disease, Prediction, Application, Illness, Intelligent, Data, Processing, System, Technique, Naïve Bayes" Algorithm.**

I. INTRODUCTION

Facial recognition (or face recognition) is a type of biometricsoftware application that can identify a specific individual in a digital image by analyzing and comparing patterns. The Kinectmotion gaming system, for example, uses facial recognition to differentiate among players.Most current facial recognition systems work with numeric codes called faceprints. Such systems identify 80 nodal points on a human face. In this context, nodal points are end points used to measure variables of a person's face, such as the length or width of the nose, the depth of the eye sockets and the shape of the cheekbones. These systems work by capturing data for nodal points on a digital image of an individual's face and storing the resulting data as a faceprint.Thefaceprint can then be used as a basis for comparison with data captured from faces in an image or video.Facial recognition systems based on faceprints can quickly and accurately identify target individuals when the conditions are favorable. However,if the subject's face is partially obscured or in profile rather than facing forward, or if the light is insufficient,the software is less reliable. Nevertheless, the technology is evolving quickly and there are several emerging approaches, such as 3D modeling, that may overcome current problems with the systems. According to the National Institute of Standards and Technology (NIST), the incidence of false positives in facial recognition systems has been halved every two years since 1993 and, as of the end of 2011, was just .003%.Currently, a lot of facial recognition development is focused on smartphone applications. Smartphone facial recognition capacities include image tagging and other social networking integration purposes as well as personalized marketing. A research team at Carnegie Mellon has developed a proof-of-concept iPhone app that can take a picture of an individual and -- within seconds -- return the individual's name, date of birth and social security number.Facebook uses facial recognition software to help automate user tagging in photographs. Here's how facial recognition works in Facebook: Each time an individual is tagged in a photograph, the software application stores information about that person's facial characteristics. When enough data has been collected about a person to identify them, the system uses that information to identify the same face in different photographs, and will subsequently suggest tagging those pictures with that person's name.Facial recognition software also enhances marketing personalization. For example, billboards have been developed with integrated software that identifies the gender, ethnicity and approximate age of passersby to deliver targeted advertising.

1.1. Digital Image Processing

The identification of objects in an image would probably start with image processing techniques such as noise removal, followed by (low-level) feature extraction to locate lines, regions and possibly areas with certain textures.

The clever bit is to interpret collections of these shapes as single objects, e.g. cars on a road, boxes on a conveyor belt or cancerous cells on a microscope slide. One reason this is an AI problem is that an object can appear very different when viewed from different angles or under different lighting. Another problem is deciding what features belong to what object and which are background or shadows etc. The human visual system performs these tasks mostly unconsciously but a computer requires skillful programming and lots of processing power to approach human performance. Manipulating data in the form of an image through several possible techniques. An image is usually interpreted as a two-dimensional array of brightness values, and is most familiarly represented by such patterns as those of a photographic print, slide, television screen, or movie screen. An image can be processed optically or digitally with a computer.

To digitally process an image, it is first necessary to reduce the image to a series of numbers that can be manipulated by the computer. Each number representing the brightness value of the image at a particular location is called a picture element, or pixel. A typical digitized image may have 512 × 512 or roughly 250,000 pixels, although much larger images are becoming common. Once the image has been digitized, there are three basic operations that can be performed on it in the computer. For a point operation, a pixel value in the output image depends on a single pixel value in the input image. For local operations, several neighbouring pixels in the input image determine the value of an output image pixel. In a global operation, all of the input image pixels contribute to an output image pixel value.

These operations, taken singly or in combination, are the means by which the image is enhanced, restored, or compressed. An image is enhanced when it is modified so that the information it contains is more clearly evident, but enhancement can also include making the image more visually appealing.

An example is noise smoothing. To smooth a noisy image, median filtering can be applied with a 3 × 3 pixel window. This means that the value of every pixel in the noisy image is recorded, along with the values of its nearest eight neighbours. These nine numbers are then ordered according to size, and the median is selected as the value for the pixel in the new image. As the 3 × 3 window is moved one pixel at a time across the noisy image, the filtered image is formed.

Another example of enhancement is contrast manipulation, where each pixel's value in the new image depends solely on that pixel's value in the old image; in other words, this is a point operation. Contrast manipulation is commonly performed by adjusting the brightness and contrast controls on a television set, or by controlling the exposure and development time in printmaking. Another point operation is that of pseudo colouring a black-and-white image, by assigning arbitrary colours to the gray levels. This technique is popular in thermograph (the imaging of heat), where hotter objects (with high pixel values) are assigned one color (for example, red), and cool objects (with low pixel values) are assigned another color (for example, blue), with other colours assigned to intermediate values.

Recognizing object classes in real-world images is a long standing goal in Computer vision. Conceptually, this is challenging due to large appearance variations of object instances belonging to the same class. Additionally, distortions from background clutter, scale, and viewpoint variations can render appearances of even the same object instance to be vastly different. Further challenges arise from interclass similarity in which instances from different classes can appear very similar. Consequently, models for object classes must be flexible enough to accommodate class variability, yet discriminative enough to sieve out true object instances in cluttered images. These seemingly paradoxical requirements of an object class model make recognition difficult. This paper addresses two goals of recognition are image classification and object detection. The task of image classification is to determine if an object class is present in an image, while object detection localizes all instances of that class from an image. Toward these goals, the main contribution in this paper is an approach for object class recognition that employs edge information only. The novelty of our approach is that we represent contours by very simple and generic shape primitives of line segments and ellipses, coupled with a flexible method to learn discriminative primitive combinations. These primitives are complementary in nature, where line segment models straight contour and ellipse models curved contour. We choose an ellipse as it is one of the simplest circular shapes, yet is sufficiently flexible to model curved shapes. These shape primitives possess several attractive properties. First, unlike edge-based descriptors they support abstract and perceptually meaningful reasoning like parallelism and adjacency. Also, unlike contour fragment features, storage demands by these primitives are independent of object size and are efficiently represented with four parameters for a line and five parameters for an ellipse.

Additionally, matching between primitives can be efficiently computed (e.g., with geometric properties), unlike contour fragments, which require comparisons between individual edge pixels. Finally, as geometric properties are easily scale normalized, they simplify matching across scales. In contrast, contour fragments are not scale invariant, and one is forced either to rescale fragments, which introduces aliasing effects (e.g., when edge pixels are pulled apart), or to resize an image before extracting fragments, which degrades image resolution.

In recent studies it is shown that the generic nature of line segments and ellipses affords them an innate ability to represent complex shapes and structures. While individually less distinctive, by combining a number of these primitives, we empower a combination to be sufficiently discriminative. Here, each combination is a two-layer abstraction of primitives: pairs of primitives (termed shape tokens) at the first layer, and a learned number of shape tokens at the second layer. We do not constrain a combination to have a fixed number of shape-tokens, but allow it to automatically and flexibly adapt to an object class. This number influences a combination's ability to represent shapes, where simple shapes favor fewer shape-tokens than complex ones. Consequently, discriminative combinations of varying complexity can be exploited to represent an object class. We learn this combination by exploiting distinguishing shape, geometric, and structural constraints of an object class. Shape constraints describe the visual aspect of shape tokens, while geometric constraints describe its spatial layout (configurations). Structural constraints enforce possible poses/structures of an object by the relationships (e.g., XOR relationship) between shape-tokens.

1.2. *Classification of Images*

There are 3 types of images used in Digital Image Processing. They are

- Binary Image
- Gray Scale Image
- Color Image

II. BINARY IMAGE

A binary image is a digital image that has only two possible values for each pixel. Typically the two colors used for a binary image are black and white though any two colors can be used. The color used for the object(s) in the image is the foreground color while the rest of the image is the background color.

Binary images are also called bi-level or two-level. This means that each pixel is stored as a single bit (0 or 1).This name black and white, monochrome or monochromatic are often used for this concept, but may also designate any images that have only one sample per pixel, such as grayscale images

Binary images often arise in digital image processing as masks or as the result of certain operations such as segmentation, thresholding, and dithering. Some input/output devices, such as laser printers, fax machines, and bi-level computer displays, can only handle bi-level images

III. GRAY SCALE IMAGE

A grayscale Image is digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray (0-255), varying from black (0) at the weakest intensity to white (255) at the strongest.

Grayscale images are distinct from one-bit black-and-white images, which in the context of computer imaging are images with only the two colors, black, and white (also called bi-level or binary images). Grayscale images have many shades of gray in between. Grayscale images are also called monochromatic, denoting the absence of any chromatic variation.

Grayscale images are often the result of measuring the intensity of light at each pixel in a single band of the electromagnetic spectrum (e.g. infrared, visible light, ultraviolet, etc.), and in such cases they are monochromatic proper when only a given frequency is captured. But also they can be synthesized from a full color image; see the section about converting to grayscale.

IV. COLOUR IMAGE

A (digital) color image is a digital image that includes color information for each pixel. Each pixel has a particular value which determines it's appearing color. This value is qualified by three numbers giving the decomposition of the color in the three primary colors Red, Green and Blue. Any color visible to human eye can be represented this way. The decomposition of a color in the three primary colors is quantified by a number between 0 and 255. For example, white will be coded as R = 255, G = 255, B = 255; black will be known as (R,G,B) = (0,0,0); and say, bright pink will be : (255,0,255).

In other words, an image is an enormous two-dimensional array of color values, pixels, each of them coded on 3 bytes, representing the three primary colours. This allows the image to contain a total of 256x256x256 = 16.8 million different colours.

V. LITERATURE SURVEY

5.1. *Implementation of classroom attendance system based on face recognition in class*

AjinkyaPatil1 ,Mrudang Shukla2: The face is the identity of a person. The methods to exploit this physical feature have seen a great change since the advent of image processing techniques. The attendance is taken in every schools, colleges and library. Traditional approach for attendance is professor calls student name & record attendance. It takes some time to record attendance. Suppose duration of class of one subject is about 50 minutes & to record attendance takes 5 to 10 minutes. For each lecture this is wastage of time. To avoid these losses, we are about use automatic process which is based on image processing. In this novel approach, we are using face detection & face recognition system. This face detection differentiates faces from non-faces and is therefore essential for accurate attendance. The other strategy involves face recognition for marking the student's attendance. The Raspberry pi module is used for face detection & recognition. The camera will be connected to the Raspberry pi module. The student database is collected. The database includes name of the students, there images & roll number. This raspberry pi module will be installed at the front side of class in such a way that we can capture entire class. Thus with the help of this system, time will be saved. With the help of this system, it is so convenient to record attendance. We can take attendance on any time.

VI. EXISTING SYSTEM

6.1. *Algorithm for Efficient Attendance Management: Face Recognition based approach*

Naveed Khan Balcoh, M. HaroonYousaf, Waqar Ahmad and M. IramBaig:Students attendance in the classroom is very important task and if taken manually wastes a lot of time. There are many automatic methods available for this purpose i.e. biometric attendance. All these methods also waste time because students have to make a queue to touch their thumb on the scanning device. This work describes the efficient algorithm that automatically marks the attendance without human intervention. This attendance is recorded by using a camera attached in front of classroom that is continuously

capturing images of students, detect the faces in images and compare the detected faces with the database and mark the attendance. The paper review the related work in the field of attendance system then describes the system architecture, software algorithm and results
EigenFace method is less accurate

6.2. An Efficient Face Detection Method

In order to build a fully automated system that analyzes the information in face image, there is a need for robust and efficient face detection algorithms. One of the fastest and most successful approaches in this field was presented by Viola. In this paper, Viola approach is used as the basis algorithm in order to propose a new efficient face detection system. Using Haar-like features for facial parts and learning these features by AdaBoost algorithm make proposed approach possible to detect occluded faces and increase the detection rate. Moreover, some preprocessing techniques are also used to limit the candidate places which make final algorithm runs faster. The experimental results represent that, the proposed approach has the capability of achieving a detection rate of 94.7% while false positive rate is just 2% .Furthermore, this system can detect faces in image, averagely four times faster than Viola approach.

VII. PROPOSED SYSTEM

7.1. A new Method for Face Recognition Using Variance Estimation and Feature Extraction

WalaaMohamed1 , Mohamed Heshmat2 , Moheb Girgis3 and Seham Elaw4: Face recognition has been one of the most studied topics in the last decades. Its research has increased in many applications in communications and automatic access control systems. In this paper, a new face recognition will be accessed.

7.2. Study of Implementing Automated Attendance System Using Face Recognition Technique

NirmalyaKar, MrinalKantiDebbarma, AshimSaha, and DwijenRudra Pal:Authentication is a significant issue in system control in computer based communication. Human face recognition is an important branch of biometric verification and has been widely used in many applications, such as video monitor system, human-computer interaction, and door control system and network security. This paper describes a method for Student's Attendance System which will integrate with the face recognition technology using Personal Component Analysis (PCA) algorithm. The system will record the attendance of the students in class room environment automatically and it will provide the facilities to the faculty to access the information of the students easily by maintaining a log for clock-in and clock-out time.

VIII. CONCLUSION

The project presented the robust human face recognition system based on discriminative robust local binary pattern and LDP for automatic attendance system. The discriminative robust local binary pattern was used for different object texture and edge contour feature extraction process. A local directional pattern was used to extract the features from face regions to discriminate the illumination changes. These approaches were well used to identify the illumination changes, intensity distributions characteristics. Here, matching was done between input and original samples using Euclidean distance metrics. These features were useful to distinguish the maximum number of samples accurately Finally the simulated results shows that used methodologies provides better recognition rate with minimum error rate for all samples.

REFERENCES

[1] Jianke Zhu, Mang I Vai and Peng Un Mak, "Gabor Wavelets Transform and Extended Nearest Feature Space Classifier for Face Recognition," Proceedings of the Third IEEE International Conference on Image and Graphics (ICIG'04), 2004.

[2] M. Kirby and L. Sirovich, "Application of the Karhunen- Loeve Procedure for the Characterization of Human Faces," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 12, no. 1, pp. 103-108, 1990.

[3] A. Samal and P.A. Iyengar, "Automatic recognition and analysis of human faces and facial expressions: a survey," Patt. Recog,.25 (1), pp. 65–77, 1992.

[4] A. Porebski, N. Vandenbroucke, and L. Macaire, "Haralick feature extraction from LBP images for color texture classification," in Proc. 1st Workshops Image Process Theory, Tools Appl., Nov. 2008, pp. 1–8.

[5] J. Ren, X. Jiang, and J. Yuan, "Noise-resistant local binary pattern with an embedded error-correction mechanism," IEEE Trans. Image Process., vol. 22, no. 10, pp. 4049–4060, Oct. 2013.