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FACE AND HUMAN DETECTION USING GRADIENT PATTERN WITH NEAREST NEIGHBOR TECHNIQUE

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Abstract

Detecting and classifying the image is an important topic of computer technology that determines the sizes in digital images. It is mainly used for authentication and identification purpose. Intensity transform features convert the intensity (pixel color) into an encoded value by comparing the pixel. Normally, detection methods take the pixel color directly as information cues. These schemes are more sensitive to noise, variations in pose and changes in illumination. To tackle these effects by using GP (Gradient pattern) and nearest neighbor algorithm. Gradient feature makes the variation of edges. Nearest neighbor reduces the variations of misclassified area. The images are classified by using Background variations. The proposed approach is to rectify the intensity differences at various locations, provides a minimum processing time and the misdetections are prevented in crowd environment.

Keywords: Gradient feature pattern (GFP) and K nearest neighbor (KNN).

1. INTRODUCTION

Object detection plays an important topic in the field of computer technology. Face detection is the first step in face recognition systems, with the purpose of extracting and localizing the face region from the background images. It has several applications in areas such as video conferencing, crowd surveillance, etc.., Detection methods usually take the pixel color as information. These are sensitive to changes in illumination. To overcome this problem, have introduced transform features that convert the pixel color by a nonlinear transformation function and intensity-based transform features. Face detection techniques requires a priori information of the face, they can be effectively organized into various categories by their different approach to utilizing face knowledge. The techniques in the first category make explicit use of face knowledge and follow the classical detection methodology in which low level features are derived prior to knowledge-based analysis. However, the dimensionality of the ABH feature is huge. The LAB feature represents the local intensity differences at various locations, scales, and orientations. The local binary patterns (LBP) feature derived from a general definition of texture in the local neighborhood of the image.

Gradient-based transform features convert pixel color into gradient magnitude and orientation. Histogram of oriented gradients (HOG), which divides the object into many fixed blocks, it computes the HOG of each block, and it represents by a concatenation of the block's HOG vectors. The HOG is mostly used in many applications, including human detection; face recognition, object detection and emotion recognition. Many researchers have also extended the original HOG to use sized blocks, which improves its detection performance.

In this work, using two features as local transform features GP with background analysis method, because gradient analysis reduces the global illumination and Background method eliminates the irrelevant features from the images. However, the transform feature have some limitations in that LBP is sensitive to local intensity changes resulting from makeup, the wearing of glasses, and back-ground variety.

To overcome these limitations, we propose two new features transform: Gradient Pattern and nearest neighbor method that focuses on less false negative per image and minimizes the misclassified images. The face and human detection, which demonstrate the usefulness of the proposed method.

2. SCOPE OF THE PROJECT

An efficient implementing of background analysis method, that provides the lowest classification error. Transform feature specifically Gradient pattern is used for detection. A feature that combines several local

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features using background feature selection method improves the human detection performance.

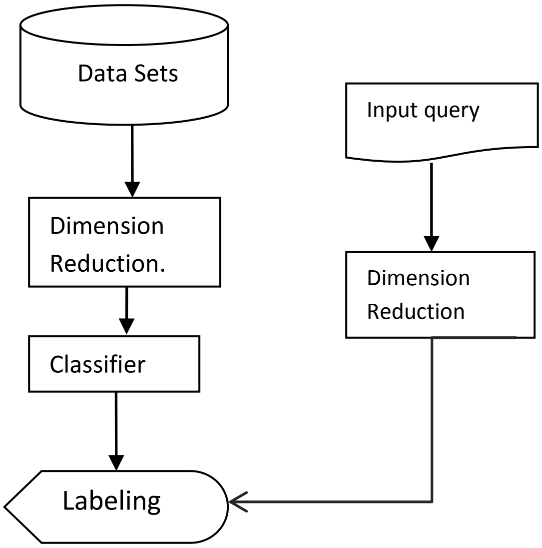

Fig 1. Structure for pattern analysis

3. PROJECT DESCRIPTION

3.1 LITERATURE SURVEY

Introduction the transform features that convert the pixel color by a certain nonlinear transformation function. Intensity-based transform features convert the pixel color into an encoded value by comparing the pixel value with that of neighboring pixels.

PCA-SIFT, uses principal component analysis instead of a histogram to normalize the gradient orientation. The feature vector is significantly smaller than the SIFT, Showed that PCA-based local descriptors are distinctive and robust to image deformations. It requires lengthy computation time to extract the local descriptors.

Part based model refers by localizing generic objects from categories such as people or cars in static images. Representing the objects by a collection of parts arranged in a multi scale part models. LBP-TOP method was employed for the recognition human using Gait. Human gait method that inherently combines both the appearance and motion. HOG feature for a block is represented by concatenating the binary 1s and 0s into a binary code used for human detection. Fig 1. Shows the steps involved in the pattern analysis. The SURF descriptor is obtained by computing the gradient magnitude and orientation key points, where the points are obtained by finding the maxima of the Haar-like box images.

4. METHODOLOGY USED

4.1 GRADIENT FEATURE PATTERNS (GFP)

Dimension reduction is the modern data analysis, in which high dimensional data must be handled. Gradient based approach for dimension reduction in supervised learning. The linear feature extraction, finds effective features with the edge points, even when other methods are not applicable by high dimensions. In the feature extraction method, for each pixel, it compares with nearest neighboring pixels by threshold value. The Gradient Pattern operator uses the gradient values of the eight neighbors in a given pixel; the pixels are computed as the absolute value of the intensity difference between the given pixel and its neighboring pixels.

4.2 K NEAREST NEIGHBOUR ALGORITHM (KNN)

The KNN method measures the distance between a query scenario and a set of scenarios in the data set. The distance between two scenarios using distance function d(x, y), where x, y are scenarios composed of N features. This method computes the similarity measure based on the Euclidean distance. The distances of two scenarios are based on the intervals. It replies to a request for information by combining its stored training data. It uses local information, which can yield highly adaptive behavior. KNN method surprisingly versatile and its applications range from vision to proteins to computational geometry to graphs. It sets the feature from data points which are in a metric space. The data can be possibly even multidimensional vectors. The resulting distance can be scaled that the arithmetic mean across the dataset.

5. EXPERIMENTAL RESULTS

5.1 FACE DETECTION

5.1.1 Training Procedure:

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Three different face detectors using the features BHOG hybrid features, respectively. The background analysis training procedure for the face detectors was as follows. 1. Transformed the face and non face training images into the face and non face training feature images. 2. Computed the classification errors for all the features. 3. Selected the best feature having the minimum classification error. 4. Updated the weight values of the training face and nonface feature images. 5. checked if the stop condition of 99 percent detection rate. If the condition was satisfied stop the procedure.

5.1.2 Detection Performance:

After training the proposed cascaded face detector, evaluated the face detection accuracy using two kinds of face databases: the FDDB database and the Face Detection Data Set and Benchmark database shows in fig 2.

Fig 2 face detection results by pattern features.

The LGP feature-based face detector was six times faster than the LBP face detector because the LGP feature-based face detector computes the weak classifier, while the hybrid feature-based face detector consists of many time-saving LBP and LGP features.

5.2 HUMAN DETECTION

5.2.1 Training Procedure and Performance:

The different human detectors using the Gradient Pattern feature. Transform the human and nonhuman training images into the human and nonhuman training. Compute the classification errors for all the feature images. Check if the stop condition of 96 percent detection rate and 8 percent false positive error rate using the validation human and nonhuman feature images had been achieved. Training the proposed cascaded human detector, evaluated its human detection accuracy using the INRIA database that contained 82 test images with 128 humans. From fig .3, it can be seen that the gradient feature based human detector success in finding most of the humans.

Fig 3. Human detection results

6. CONCLUSION

The most commonly used face and human detection methods are local transform based methods. Introduced different approaches using local transform features specifically, GP and variation analysis. Each approach has its advantages and disadvantages. This work detects the face and human in complex backgrounds and different scales.

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REFERENCES

[1] T. Randen and J. Husoy, "Filtering for Texture Classification: A Comparative Study," IEEE Transaction on Pattern Analysis and Machine Intelligence, volume 21, no. 4, pp. 291-310, April. 1999.

[2] R. Zabih and J. Woodfill, "Non-Parametric Local Transforms for Computing Visual Correspondence," Proceedings. European Conference. Computer Vision, pp. 151-158, 1994.

P-ISSN: 2347-4408
E-ISSN: 2347-4734

[3] T. Ojala, M. Pietikainen, and T. Maenpaa, “Multiresolution Grayscale and Rotation Invariant Texture Classification with Local Binary Patterns,” IEEE Transaction on Pattern Analysis and Machine Intelligence, volume 24, no. 7, pp. 971-987, July 2002.

[4] H. Jin, H.L.Q. Liu, and X. Tong, “Face Detection Using Improved LBP under Bayesian Framework,” Proceedings International Conference in Image and Graphics, pp.306-309, 2004.

[5] H. Bay, A. Ess, T. Tuytelaars, and L. Gool, “Surf: Speeded Up Robust Features,” Computer Vision and Image Understanding, volume.110. no.3, pp.346-359, 2008.

[6] V. Jain and E. Learned-Miller, “FDDB: A Benchmark for Face Detection in Unconstrained Settings,” Technical Report UM-CS-2010-009, University of Massachusetts, Amherst, 2010.

[7] P. Felzenszwalb, R. Girshick, and D. McAllester, “Cascade Object Detection with Deformable Part Models,” Proceedings IEEE Conference on Computer Vision and Pattern Recognition, pp: 2241-2248, 2010.

[8] H. Rowley, S. Baluja, and T. Kanade, “Neural Network-Based Face Detection,” IEEE Transaction on Pattern Analysis and Machine Intelligence, volume 20, no. 1, pp. 23-38, January. 1998.