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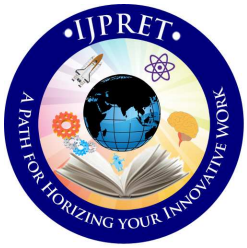

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A PATH FOR HORIZING YOUR INNOVATIVE WORK

GAIT RECOGNITION BY MODIFIED COUNTER PROPAGATION METHOD

SWITI KEWATKAR[1], SNEHAL KATHALE[2], YOGDHAR PANDE[3]

1. Department of Computer Science, SIRT, Bhopal, (M.P.), India.
2. Department of Computer Science, RHCE, Nagpur (MH), India.
3. Department of Computer Science, SIRT, Bhopal, (M.P.), India.

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Corresponding Author

Ms. Switi Kewatkar

Abstract

This paper proposed a new method for recognizing human by their gait using modified counter propagation method. In this modified CPN model, there was no need of training parameters because it is not an iterative method like back propagation architecture which took a long time for learning. The model based approach is chosen so that the effect of exterior factors like clothing, shoes, briefcase and environmental context is minimized. The approach is to first extract the gate features from the image sequences for constructing a locomotion human model. We employed here a Model based technique by combining 2D and 3D feature by plotting different circle into gait portion and get a sequential set of 2D stick figure. A 3D model is used for gait sequences to get arbitrary view angles. Artificial neural networks which is one of the widely used automated techniques having high accuracy, most of the neural networks are computationally heavy due to their iterative nature. Hence, there is a significant requirement for a neural classifier which is computationally efficient and highly accurate. To this effect, Counter Propagation Neural Network (CPN) is employed in this work with 2D and 3D, which proves to be faster than the conventional BP

1. INTRODUCTION

Biometrics refers to technologies that measure and analyze human body characteristics, such as DNA, fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes. Human gait characterizes the walking style of an individual which is periodic in nature and called as Gait cycle. This project focuses on the biometric of human gait and attempts to use a person's gait to identify him or her. The main advantage of identifying human using Gait is that it is non-contactable, non-invasive and can be hidden from the subject. Although the study of kinematic V parameters that define human gait can form a basis for identification, there are apparent limitations in gait capturing that make it extremely difficult to identify and record all parameters that affect gait. Instead, gait recognition has to rely on a video sequence taken in controlled or uncontrolled environments.

Gait recognition process performed by two methods Model free approach and Model based approach. In Model free approach the silhouetted image is captured this approach is based on principal component analysis (PCA) which is binary silhouetted object represent 1D signals. These approaches are computationally efficient but because they operate directly on walking frame sequence, they are sensitive to outfit variations, lighting properties, background change, silhouetted noise [2],[3].

In Model based approach it use the model of subject's body structure or motion. It is reassembling knowledge of the shape and dynamic aspects of human gait into the feature extraction process that take into the proper data set.

In this present paper we are using a Model based approach with gait recognition using CPNN. This new method of doping circle into silhouetted image get help for proper 2D stick figure by connecting the center of circle. A 3D model is helpful for getting arbitrary view angles which help for recognition.

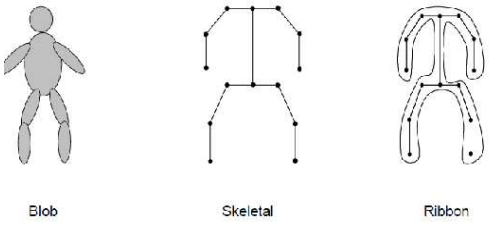

Fig1: Model Based Approach

Wang [5] has present recognition algorithm by combining 3D features of the infrared gait. Here human model and image were measured using pose evaluation function which include boundary and region characteristics. The authentication performance is confirmed with support vector machine (SVM). The infrared gait image generally used for the construction of large structure or sky scrapers. Infrared based on temperature variance of object so they can't detect difference. SVM having limitation on speed and size in process of training and testing. SVM having high algorithmic complexity and extensive memory requirement of the required quadratic programming in large scale task. Hawang [6] has described a method back propagation algorithm (BP) for recognition of gait.

It operate in supervised learning factor so it not efficient according to performance criteria. It overcomes with the use of CPNN.

II..Proposed Approach

1. Preprocessing:

Image should be processed before gait feature are extracted in order to make proper work. The steps are followed as,

a) Capturing the video having person walking

Segmenting the video into frames for one gait cycle. Removing the outer layer of pixel from object. The binary image produced from the segmentation process will be used as input for the model fitting process. This module will fit a model of the human form onto the segmented area.

In background subtraction method with the use of codebook utility, the background and foreground differentiating by setting values 0 and 1 respectively. It is relatively simple and it not primary important so it has to be rejected and get only foreground image.

Fig. 2:- Human silhouette Image

1. Human Detection and Tracking:

In this approach the human body get detect with their Kinematic parameter by height, mass. Motion, shape etc. After this binary silhouetted image get extracted.

2. Feature Extraction:

The feature is extracted with 3D model by different arbitrary angles. Multiview image sequences are extracted and their reconstructions are done with distance and different view direction.

3. Circle Doping:

The silhouetted binary image of a different arbitrary view angles are extracted after feature extraction. As it is a Model based approach, the setoff circles are doped into silhouetted image. 2D stick figures are used for determining the body points after joining the centre of the circle as Fig. 2. The set of this points are taking into proper data set.

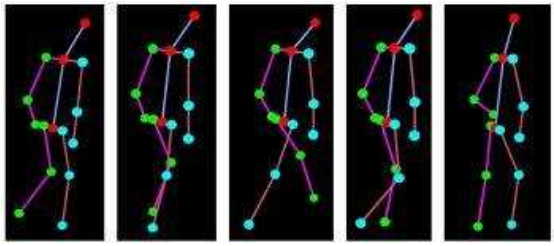

Fig. 3 2D stick after joining circle

4. Training and Classification:

The training algorithm involves the following two phases:

(i) Weight adjustment between the input layer and the hidden layer

The weight adjustment procedure for the hidden layer weights is same as that of the conventional CPN. It follows the unsupervised methodology to obtain the stabilized weights. This process is repeated for a suitable number of iterations and the stabilized set of weights are obtained. After convergence, the weights between the hidden layer and the output layer are calculated.

(ii) Weight adjustment between the hidden layer and the output layer

The weight adjustment procedure employed in this work is significantly different from the conventional CPN. The weights are calculated in the reverse direction without any iterative procedures. In conventional CPN, the weights are calculated based on the criteria of minimizing the error. But in this work, a minimum error value is specified initially and the weights are estimated based on the error value.

5. Recognition – The recognition engine will take data from either a newly captured subject via the feature extraction module, or a previously stored signature, and perform recognition based on a database of test subjects. The modified CPN model did not require training parameters because it is not an iterative method like back-propagation architecture which took a long time for learning. Rather, a minimum error value is specified initially and the weights are estimated based on the specified error value and this is what accounts for higher convergence rate of the model since one set of weights are estimated directly.

The detailed steps of the modified CPN algorithm are given below.

Step 1: The stabilized weight values are obtained when the error value (target output) is equal to zero (or) a predefined minimum value. The following procedure uses this concept for weight matrices calculation.

Step 2: Supply the target vectors t1 to the output layer neurons

Step 3: Since (t1 – y1) = R for convergence

Where t1 is the target value (target output), y1 is the network output and R is the minimum error value (threshold value). The output of the output layer neurons is set equal to the target values as:

$y1 = t1 – R$

Step 4: Once the output value is calculated, the sum of the weighted input signals (y _ in1) can be estimated. Since the sigmoid activation function is used, the following equation yields the value for

y _ in1 y _ in1 =ln

Step 5: Based on the values of y _ in1, the weight matrix vj1 is calculated using the following expression.

$$y\_in1 = \Sigma\, hj\, .vj1$$

Where hj is the output value of the hidden layer and this value is obtained at the completion of phase 1. Thus without any training methodology, the weight values are estimated

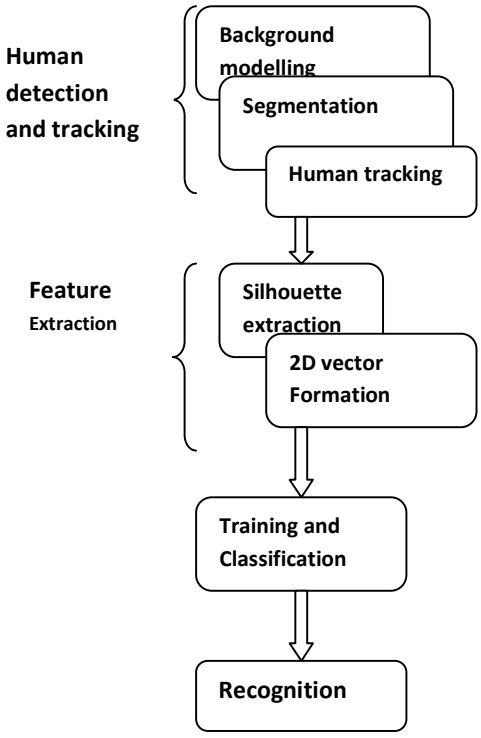

Fig. 4. Overview of Proposed

III. Conclusion:-

In this paper, we approach to represent and recognize people by their gait using counter propagation method. There uses two methods 2D and 3D approach with advanced mechanism. The 2D dataset will get help for proper recognition process which gives better result. The width of the outer contour of the binarized silhouette as well as the silhouette itself was used as features to represent gait. In one approach, a low-dimensional observation sequence is derived from the silhouettes during a gait cycle and an it is trained for each person. Gait identification is performed by CPNN with learning that a given observation sequence was generated by a particular model. In the second approach, the distance between an image feature and exemplar was used to estimate the observation probability . Other gait representations, which consider only foreground pixels in a surrounding as silhouette. The proposed method represents human motion as a multi-sequence of templates for each individual and considers all background pixels unlike other gait cycle estimation algorithms, which analyze the variation of the

silhouette image and periodicity of gait is produced by analyzing silhouette data itself. The proposed 3D technique has estimated the periodicities in gait sequences obtained from all views with respect to the image plane (lateral, oblique, and frontal). The approach for estimation of gait recognition is fully automatic for real-time applications. The performance of the methods was illustrated using different real time gait databases

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