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Research Article

Gait Recognition by Computing Fixed Body Parameters

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ABSTRACT

Biometrics is a very important science, especially in recent years. This science was used to identify people based on their physical and behavioral characteristics. Gaiting is a behavioral characteristic that arises from the feeling that a person close to us can be identified even from a distance simply by recognizing how the person walks. The main advantage of gait recognition is that they are hidden and unnoticed. People can be identified from a distance. This paper implement Using computing fixed Body Parameters in the gait recognition. Computing fixed Body Parameters techniques has the advantage of being less sensitive to gait variance. The data captured manually from 50 persons, and the system can identify about (50)% from the number of persons.

1. INTRODUCTION

Behavioral biometrics systems use behavioral attributes based on an individual's action; they are an indirect measure of human form characteristics such as Speaker, Signature, and gait recognition. The use of time as a metric is the primary feature of a behavioral biometric. Physical Fingerprint, Palm print, Iris, Ear, Face, DNA, and Hand Geometry recognition are examples of physical features derived from direct measurements of a part of the human body.

Physical biometrics systems can be used for identification or verification, while behavioral biometrics systems are typically utilized for verification., [1,2,4]. The verification process entails the system attempting to verify an individual's identity against a known template, whereas the identification process entails the system attempting to determine an individual's identity against the system's whole database. [3]. Biometrics has seen widespread use in recent years. These applications can be divided into three categories: commercial, government, and forensic. [1]. People can be recognized using gait recognition technology. This method is based on the idea that people may recognize a familiar person from distance only by looking at how they walk. [5].

Traditional biometrics techniques (such as fingerprints) cannot be used in some applications, particularly in public areas and bus/subway stations. Because there are so many people in those places, we need a technique for recognizing people from a distance.. The gait recognition method do this needing. The main advantages of gait recognition are it hidden and unobtrusive from the person, identification of the person can be performed from long distance. But also have disadvantaged such as Physical changes, Psychological. Pathologic, etc [2,6]. The main processes in gait recognition and any biometrics technique are data collection, background subtraction, feature extraction, and recognition.

2. GAIT RECOGNITION

People frequently assume that they can recognize a familiar person from a distance simply by recognizing the way the person walks [5]. However, it is important, particularly in public places, because the identification process is hidden from the person, identification from a long distance, and there is no direct connection with the person. The majority of gait

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recognition systems operate in the same general manner. First, data must be gathered. Second, by segmenting the human body from the background, we can obtain a silhouette image. The third feature is gait extraction. Finally, the person is recognized by matching the features of the person with the features stored in the database (see figure 1) [2,6].

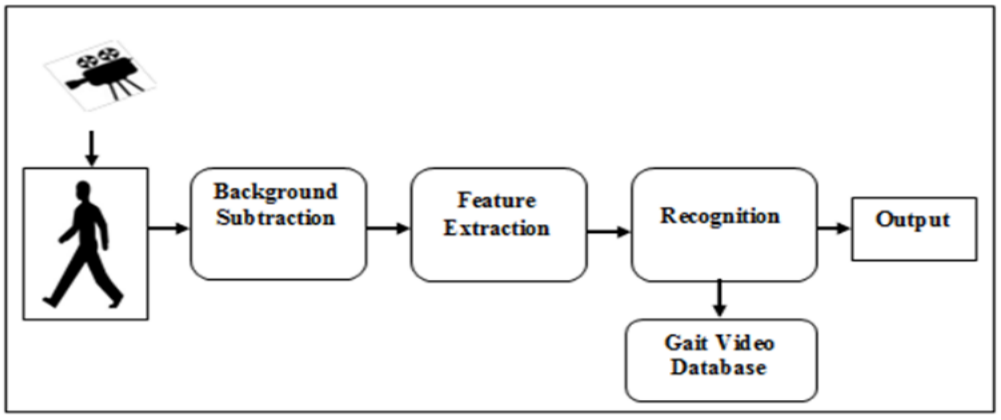

Fig .1. A diagram of gait recognition system.

3. RELATED WORK

There have been numerous papers published on the subject of gait recognition. Most of the recent gait analysis methods talk about fixed parameters and dynamic parameters. Muzhir et al. (2011) In their study, they describe an intriguing method for creating silhouette images based on the histogram of a color image. They built the best bundle rectangle around the object from the green area of the image. Each color's histogram is used to determine the range of intensities that represented the backdrop, and these three silhouettes are then crossed to create the final silhouette [2].

L.R. Sudha et al. (2011) in their paper shows Using a revolutionary hybrid holistic method, human gait is used to distinguish persons when they enter a monitoring area. Video sequences acquired by a stationary camera in a surveillance area are used to model the background, which is an important step in segmenting forgery and moving objects. The multi-class Probabilistic Neural Network (PNN) model is then trained and tested using gaits that represent spatial, temporal, and wavelet information [8].

Sanjeev Sharma et al.(2011) They introduced a new method for gait recognition in their study. The binary silhouette of a walking person is initially recognized in each frame using this method. Second, image processing operations are used to extract features from each frame. The important features are the center of mass, step size length, and cycle length. Finally, neural networks are employed for training and testing[9,14]. several volunteers, as well as the identification of the human skeleton and the automatic extraction of the body's kinetic and kinematic parameters[11].

Ke Yang et al.(2016**)** This research focuses on person recognition using Kinect gait data, showing that gait features may efficiently discriminate between different humans utilizing a novel representation – relative distance-based gait features. According to the findings, relative distance features can achieve an identification accuracy of up to 85%, which is comparable to anthropometric features. More than 95% accuracy can be achieved by combining relative distance and anthropometric parameters

4. IMPLEMENTATION OF GAIT RECOGNITION SYSTEM

The implemented of gait recognition system involve four steps which are video divide, preprocessing for each frame, object extraction and compute feature extraction by compute static parameters of the body (see fig 2).

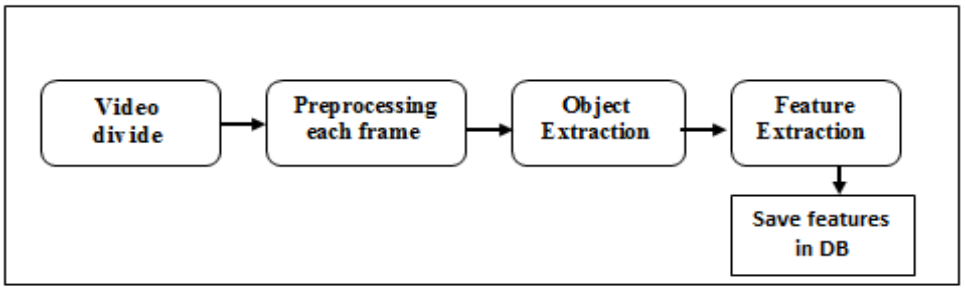

Fig .2. Shows the proposed systems block.

This work shows how to compute fixed gait parameters. Computing fixed gait parameter techniques has the advantage of being less susceptible to gait variance. People's gait can change for several reasons, but the general structure of walking remains constant [5,13].The system measure a include four parameters that describe a static pose extracted from a gait sequence. Height, torso length, leg length, and stride length are the are the parameters. All of which may be calculated just on a single photograph. (see fig 3) [5,10,15]. It's worth noting that these techniques are necessitate some camera calibration as well as an understanding of the distance between the camera and the subject. The data used in this project are taken manually from digital camera with resolution (12-mega pixel) with 50 persons. Used fixed length between the object and the camera (2M between the object and the camera), the high of the camera (90sm). The steps of the system involves read the video, convert the video to sequence of frames, apply median filter on each frame, extract the object from background, compute features extraction and save the features in DB (see figure 4).(see fig. 5 shows the flowchart of the system).

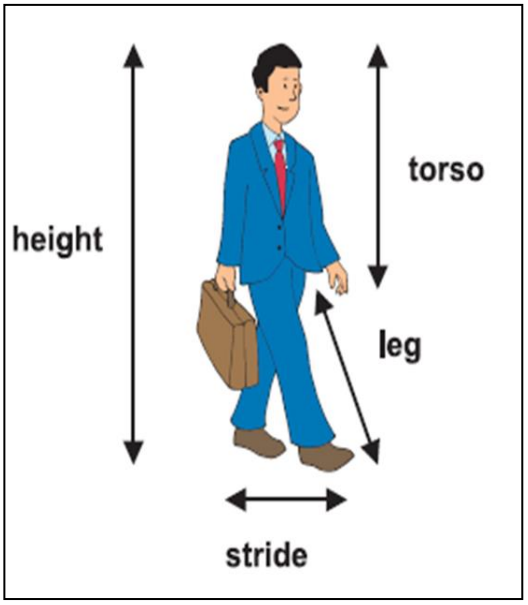

Fig .3. the following static gait features: height, torso length, leg length, and stride length [5].

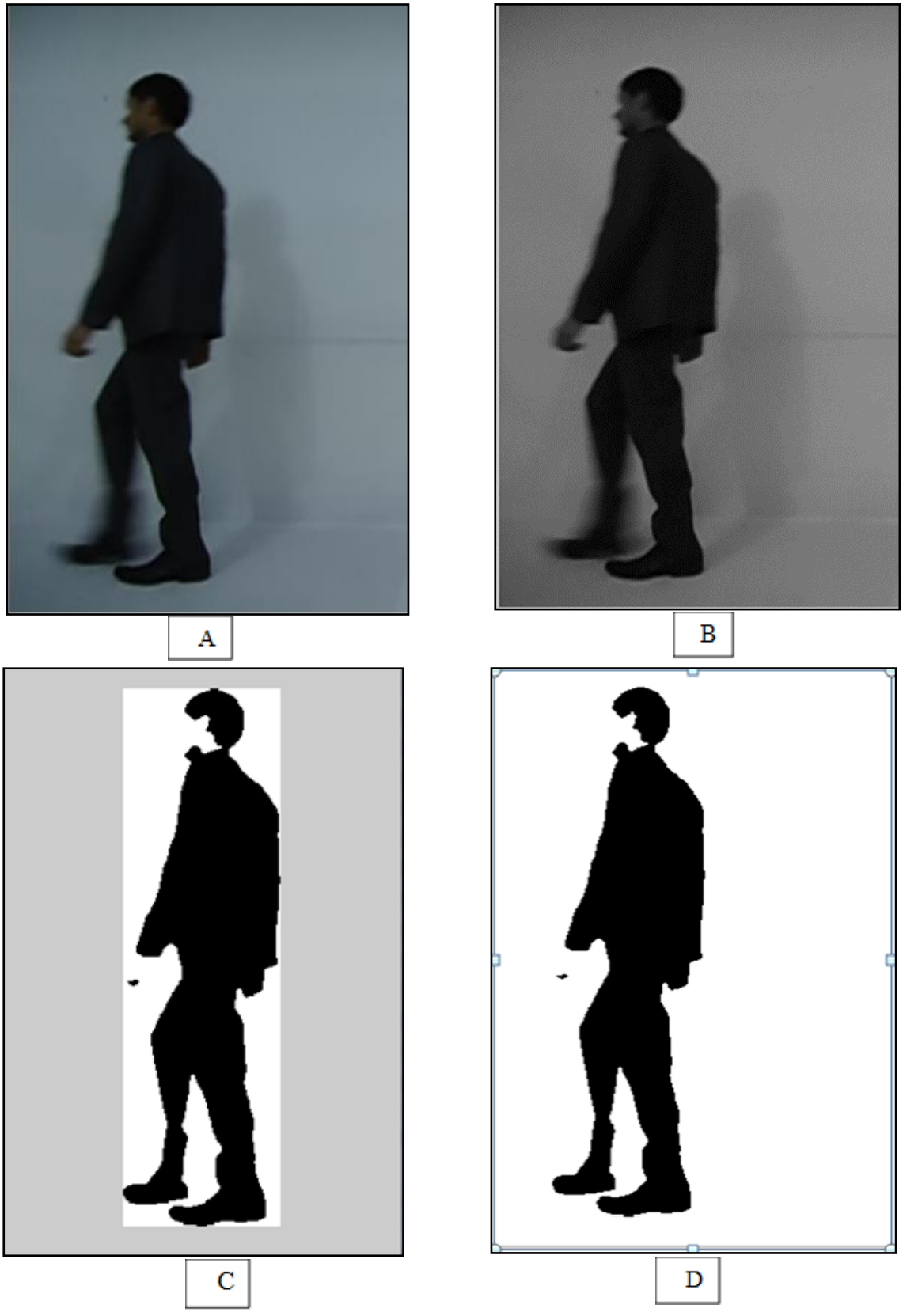

Fig .4. (A) Original image, (B) Gray image, (C) Binary image, (D) Background extraction

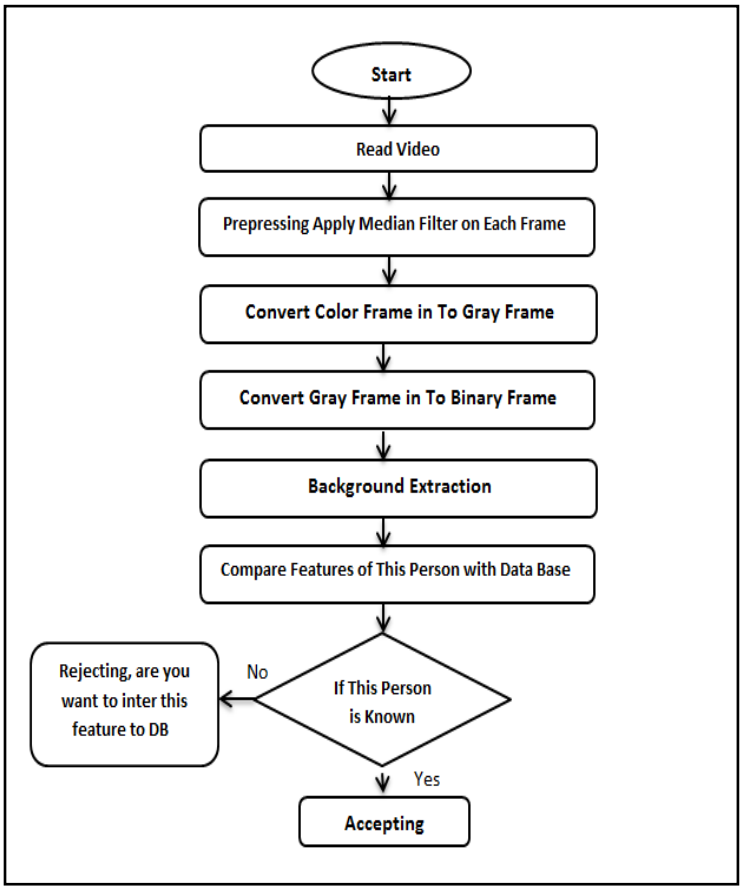

Fig .5. The flowchart of the system

5. ANALYSIS AND RESULTS

The implemented system given an accepted result. The statistical measures (Height, torso length, leg length, stride length,) This data for some of persones shows in table 1. This system can identify (50%) persones from all persones.

TABLE I. STATISTCAL MEASUERES OF GAIT

	Height	Stride length	Torso length	Leg length
Person 1	362	214	233	129
Person 2	353	206	211	142
Person 3	347	117	211	136
Person 4	391	212	252	139
Person 5	364	193	223	141
Person 6	317	110	265	52
Person 7	339	111	203	136
Person 8	336	126	277	59

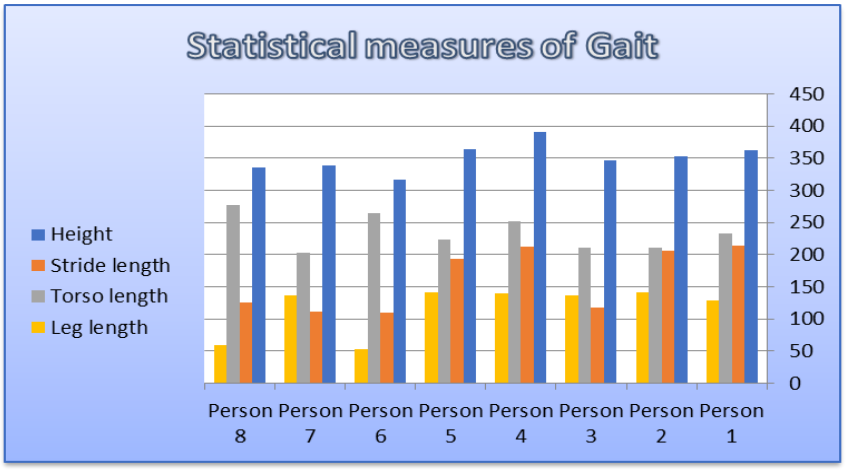

Fig .6. The Statistical Measure of Gait

5. CONCLUSION

This paper presents an overview of the biometric Gait Recognition idea and algorithm. The proposed technique is used to create a gait recognition system that uses preset body parameters to compute. This system is made up of four primary steps: video division, frame preprocessing, object extraction, and compute feature extraction using fixed body parameters. Four factors that describe a static stance extracted from a gait sequence are measured by the system. Height, torso length, leg length, and stride length are the variables. One advantage of computing fixed Body Parameters approaches is that they may be less sensitive to variation in a gait .The data captured manually from 50 persons, and the system can identify about (50) % from the number of persons.

Conflicts of Interest

The author declares no conflict of interest in relation to the research presented in the paper.

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