Review of Gait Datasets

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***Abstract*— Human gait recognition is a moment period biometrics which is honest and separate based. Human gait recognition is just recognizing a person from its walking style. Human Cooperation is not required in this biometric system. There are two approaches of gait recognition which are demonstrate based and display free philosophies. This paper gives a late thorough investigation the gait databases which are publically available for the gait recognition.**

Keywords—Gait; Dataset; Recognition

I. INTRODUCTION

Human Gait recognition system is an inconspicuous biometric feature, which had fascinated many researchers in recent years [9]. In video surveillance based application identifying the human gait is an important feature because it captures the human from a distance [1]. Human gait recognition have advantages like without knowing the person its gait can be captured and also high quality of videos are not required unlike face recognition. It is very difficult to conceal someone's gait. On the other hand factors like fillips, physical changes, clothing and psychology of human affects the individual's gait. Human gait recognition approaches are divided into two types: model free and model based. Model based approach typically uses a stick representation for modeling human. The person model is fit to the person in each frame of the walking sequence and parameters are measured with the constraints on the body model of walking sequence [2]. An advantage of model based approach is it is robust to occlusion and noise. Disadvantage of model based approach is it requires high computational cost [3].

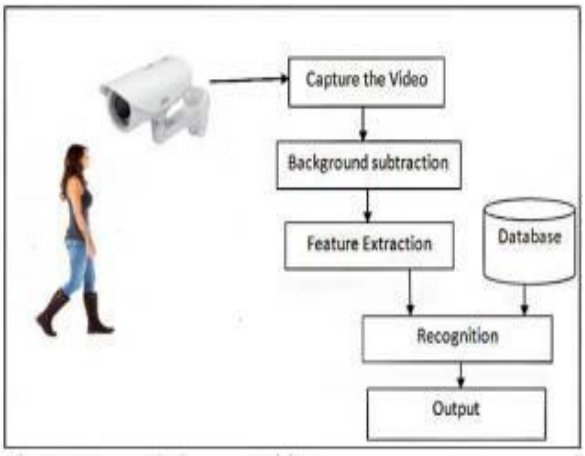

Fig1: Gait Recognition Process

The figure 1 shows the gait recognition process. Once the walking subject is captured from a distance, then background subtraction is performed on the image by using background subtraction techniques [24]. Human gait recognition process is depicted in Fig 1. The Video is captured by the CCTV camera, and then the video is divided into frames. Preprocessing step consists of detection of human from the image and background subtraction. Then the gait features are extracted by using either model-based approach or model free approach. Features extracted from the video are of high dimensionality so as to reduce the dimensionality and many dimensionality reduction methods are used. Recognition phase consists of matching the extracted features with the features which are stored within the database. We will review publically available gait dataset in section 2. Followed by conclusion in section 3.

II. GAIT DATASETS

A. CASIA Gait Dataset

The Institute of Automation Chinese Academy of Sciences has provided this dataset. In CASIA dataset there are 3 datasets A, B and C. Dataset A- Dataset A is having 20 persons. Each person has 12 image sequences and 4 sequences for each of the three directions. (Parallel, 45 degrees and 90 degrees to the image plane). The length of each sequence is not identical for the variation of the walkers speed, but it must ranges from 37 to 27.The CASIA dataset includes 19139 images and having size 2.2 GB [9]. Dataset B-Dataset B is a large multiview gait dataset. This dataset is created in January 2005.It contains 124 subjects and the gait data was captured from 11 views with three variations, namely view angle, Clothing and carrying condition [6] [9] [4]. Dataset C-Dataset C was collected by an infrared (thermal) camera in Jul.-Aug. 2005.It contains 153 subjects along with four walking conditions(normal walking with or without bag, slow walking and fast walking). These videos were all captured at night[4]. Dataset D- Dataset D was gathered synchronously by camera and Rescan Foot scan in Jul- Aug. 2009. It holds 88 subjects and considers true observation scenes and wide age dissemination. This Dataset might be considered as the endeavors in misusing the relations between conduct biometrics and its relating prints. The videos and images are gathered indoor, while all the subjects are Chinese [4].

Fig.1. Example of CASIA-A Gait dataset

B. The CMU Motion of Body (MoBo) Database

The CMU Motion of Body (MoBo) Database is collected by the robotics institute, Carniegie Mellon University. The CMU MoBo Dataset contains 25 subjects which are trained on treadmill. There are six cameras around the tread mill to capture the images in six different viewing angles. The provided database has four kinds of walking pattern which are slow walk, fast walk, incline walk and carrying a ball walk. It contains each subject walking pattern with six kinds of views in different angles where each view captured 340 frames that can be calculated minimum 14 gait cycles and each cycle has generally 18 to 20 frames.[23][24].

	Short Name	Description
Conf. 1	regular	Regular walking
Conf. 2	pocket	Walk with hands in pocket
Conf. 3	backpack	Walk with a backpack
Conf. 4	gown	Walk with gown
Conf. 5	dynamic occlusion	Occlusion by two walking people
Conf. 6	static occlusion	Occlusion by two standing people

Fig. 4: Walking configurations of TUM-IITKGR Dataset [22]

Fig.2.CMU-MOBOGait Dataset

C. USF Gait Dataset

University of South Florida has collected the USF HumanID gait dataset. This dataset consist of 1870 video clips taken from the 122 subjects walking around the elliptical path in front of the camera. Five covariates are there for each person: two viewpoints that are left and right; two surface types grass and concrete; two shoe types; with or without surface; and two different times instance May and November to test the performance in different conditions [5] [6].

Fig.2 Example of USF

D. OU-ISIR Gait Dataset

The Institute of Scientific and Industrial Research (ISIR), Osaka University (OU) has collected this datasets. There are two datasets treadmill and large population dataset. Treadmill dataset contains gait images of subjects on a treadmill with the largest range of view variations: 25 views, 9 Speed variations between 2 and 10 km/h), and clothing variations up to 32 combinations, and as such, it can be used to evaluate view invariant, speed-invariant and clothing-invariant gait recognition. In addition, it is used to analyze gait features in gender and/or age-group classification. Large Population Dataset is released on 16 January 2013.The data set consists of subjects walking on the ground. The ground is surrounded by the 2 cameras at 30 fps, 640 by 480 pixels [22]. The datasets contains silhouette sequences registered and size-normalized to 88 by 128 pixels size. This gait database includes 4007 subjects (2135 males and 1872 females) with ages ranging from 1 to 94 years. There are two subsets of this database that are A and B. Dataset A is a set of two sequences (gallery and probe sequences) per subject. Dataset B is a set of one sequences per subject and each of the main subsets is further divided into 5 subsets based on the observation angles, 55[deg], 65[deg], 75[deg], 85 [deg], and including all four angles. Dataset B is a set of one sequence per subject and it is used for identifying gait based gender classification [7] [8] [13] [16].

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Walking configurations of TUM-IITKGR Dataset [22] D. CASIA Gait Dataset The Institute of Automation Chinese Academy of Sciences has provided this dataset. In CASIA dataset there are 3 datasets A, B and C. Dataset A- Dataset A is having 20 persons. Each person has 12 image sequences and 4 sequences

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F. TUM-IITKGP Gait Dataset

The TUMIITKGP Database is having 840 sequences of 35 individuals. Each person is captured in six different configurations. Furthermore, each of the configurations is repeated two times (right-to-left motion, in a left-to-right motion), which results in a total of 840 sequences. There are six configurations for each person. Each person was primarily recorded in a regular walking configuration and three degenerated configurations including hands in pocket, backpack and gown, static and dynamic occlusion. The configurations are applied to evaluate recognition methods if different kinds of gait variations are present [21] [22] [26].

G. The AVA Multi-View Dataset(AVAMVG)

This gait recognition dataset is introduced in year 2013. In this dataset there are 20 persons, out of which 4 are females and 16 are male and each is having 10 recording sessions. The dataset consist of 200 recorded videos or we can say 6* 200 single view video. Before recording the sessions first ten gait sequences are designed.

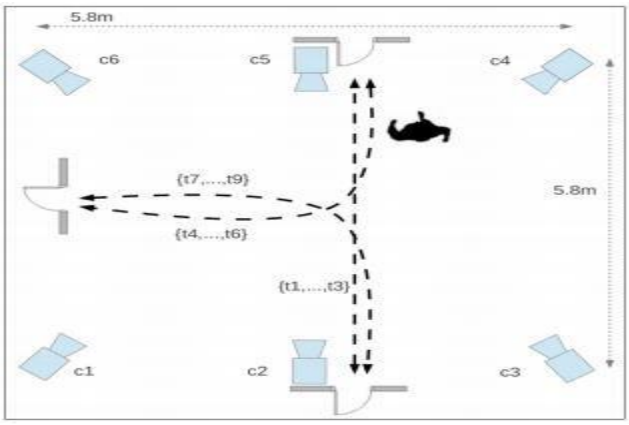

Fig. 5: Workspace Setup for Dataset Recording [27]

All persons depict three straight walking sequences (t1... t3), and six curved gait sequences (t4... t9), as if they had to rounding a corner. The curved paths are created by a first area in straight line, then a slight turn, lastly a last straight portion. In the last sequence on-screen characters portray a figure-eight way (t10) [27].

III. CONCLUSION

In this paper we have studied the different types of gait datasets. The dataset's have covered maximum types of scenarios like normal walk, fast walk, multiple views, elliptical path, walk on trade mill. Each dataset has its own importance according to the conditions.

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