



An Efficient Method to Identify the Influences of Emotions on Gait

KEYWORDS

Gait, Emotions, data set, 3D model.

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ABSTRACT

Emotions are an important component of a human beings life. It has been proved that the person could be identified by the way of their walking. As well as the physiological intensity also identified through the pattern of walking. Some of the researches have proved that the gait is influenced by the emotions. The current study proposed to thoroughly analyze gait data to emphasize features that can describe someone and the emotion expressed. This study is proposed to undergo a research on identifying the influences of emotions on gait and to create a model for the emotional identification using a training dataset. The test data will be acquired and test with the trained data set.

INTRODUCTION

Emotions are an important component of a human beings life. They play a vital role in the decision making. The emotion of a person can be easily identified by other on watching their face. That is possible when they are having an eye-to-eye contact. The other way is to watch their behavior closely. The actions metrics are the motions implicated by them on that meticulous instance. One of the method is which reside under the behavior is gait. The gait is a pattern of walk of a person. It has been proved that the person can be identified by their way of walking. As well as the physiological intensity also identified through the pattern of walking. Some of the researches have proved that the gait is influenced by the emotions. The current study proposed to thoroughly analyze gait data to emphasize features that can describe someone and the emotion expressed. This study is proposed to undergo a research on identifying the influences of emotions on gait and to create a model for the emotional identification. This can be used by the organizations, which is need of identifying their employees' emotional background before assigning a complex job.

REVIEW OF RELATED WORKS

Ritta Baddoura and Gentiane Venture [1] discussed about the human motion characteristics in relation to feeling of common or anxious during a make known short interface with a proactive humanoid. They proved that, Emotions have a certain impact on body travels and attitude of the person who is experience them. This effect is reflected in both interior physiological transform and outside physical expressions (Frijda 1986).

The experiment involves a triad: a robot and 2 participants (X and Y) at a time. The participants are only invited to answer a questionnaire (in their own language to avoid ambiguity) on the perception of robots. They are informed that the set is filmed and the IMU (Inertial Measurement Unit) are used for each participant and placed around their head and wrist for motion capture. They do not know about the robot's intervention. The only instruction given to them is to answer a questionnaire. The experiment's scenario was validated by the ethical committee. To identify the motion characteristics the Principal component Analysis (PCA)

is used. Hence they proved that certain body movements and gestures can be closely associated to affective states and that the arm and head motions of a human interacting with a humanoid partner are strongly correlated to emotional experience.

Saša Radovanovi , Milica Jovi i , Nadja P. Mari ,Vladimir Kostić [2], discussed about the alteration in motor and cognitive functioning of the depressed patients. They have explored the gait parameters and variability of patients with major depressive disorder in dual task walking situations. Eight patients with 20 health controls performed motor, mental and combined motor + mental task while walking.

The parameters used by them are cycle tie, stride length, swing tie, double support time and their coefficients of variation (CV). To analyze the differentiations between the patients and controls like age, gender and years of education, the t-test, Fisher's exact test and Mann-Whitney U test are used. The pair wise comparisons are made, such as: base vs. mental, base vs. motor, motor vs. mental and mental vs. combined task performance. The association between severity of depression and gait parameters were analyzed using Pearson correlation coefficient. Hence the gait variability is having differences while involved in dual task.

Thus the study proved the gait characteristics are affected by the emotions. They suggested that, it is possible to make use of the tool in differential diagnosis of psychiatric and neurological disorders based on gait pattern, as well as monitoring response to therapy.

Shigeru Kuriyama, Yoshimi Kurihara, Yusuke Irino and Toyohisa Kaneko propose a control methodology for human gait with a pattern generator. The pattern generator generates cyclic signals via a couple of mutually inhibited neurons, and drives a proportional derivative controller that supplies joint angles of a virtual human. The state of the pattern generator is entrained by the signal of the controller, and such mutual feedback stabilizes the generation of rhythmic signals for variable conditions. Legs and arms can automatically synchronize their periodical movements with-

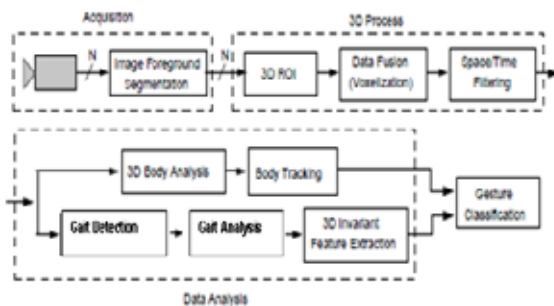
out using a central supervisor because the corresponding neural oscillators mutually feed their output signals. Our system generates various gaits in a common mechanism with a small number of parameters, which is well suited for real-time, interactive and on-the-fly controls. Moreover, the movements obtained from motion capture data can be controlled by introducing adjustable non-linear filters.

In order to extract a set of features describing the body of a person that performs an action, a geometrical configuration of human body must be considered. Since the aim of our research is to increase robustness of gesture classification by embedding human body configuration information in our data analysis loop while keeping real-time performance, an ellipsoid model of human body has been adopted. In spite of this fairly simple approximation compared with more complex human body models.

PROPOSED RESEARCH

The proposed work is to identify the human emotions using the analysis of gait. The experiment involves 200 sample volunteer from different age groups. The 3D video coverage will be used by using multiple cameras. The figure 1 is explains about the 3D Gait capturing system. The front and side view of a sample will be captured. To identify their psychological emotions the psychological tool (questionnaire) will be used. The volunteers are asked to give answers for the questions to identify their emotional feelings at the particular time. The capturing of gait video will be unknown to them. When they are entering into that particular area their gait will be captured. After the completion of the interview the video coverage will be informed to them to get their acceptance, to maintain the research ethics. After the acceptance their video will be classified into groups depends upon their emotions identified through the questionnaire. The targeted emotions of this study are happy or joyful, sad or depressed, anger or irritation.

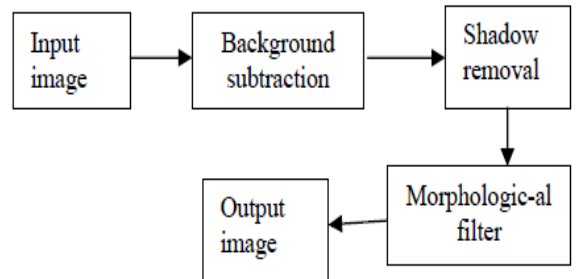
FIGURE 1
3D DATA ANALYSIS



PREPROCESSING

The preprocessing in gait is two folded. First by using background subtraction the sample alone will be extracted, and then the targeted frames changed into silhouette by using morphological filter. The figure 2 explains the silhouette extraction processes.

FIGURE 2
SILHOUETTE EXTRACTION



FEATURE EXTRACTION

The region of interest will be defined for each silhouette. Additionally the following parameters are measured to classify the emotions on the gait. The component of measurement is formed by both legs and the pelvis. The study in the step length, stride length, step height, velocity, and the stance/swing ratio from the normal walk will be conducted.

SCOPE OF THE RESEARCH

By storing the classified result an

anonymous person's gait can be classified in terms of their present emotional feelings. This can be used by the psychiatrist to identify their persons emotions while they are entering into the room or lab for counseling also in the modern world whit colored employees are in a high tampered stress, the manager like HR can easily identify their employees' emotions, before assigning a complex or vital job to them.

CONCLUSION

This paper discussed about the various researches on emotional identification using gait. There are plenty of researches have been proposed and proved on emotional identification through gait motion. The proposed model is simple and user friendly. The proposed work will stay away from the clinical or laboratory setup with gait recognition mat, wearable sensors and marker sets, etc. Since the real time untailored gait identification could not be done in a pre organized set up. There is no study being undergone on this real time infrastructure.

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