

## **Simple and Efficient Marker-Based Approach in Human Gait Analysis Using Gaussian Mixture Model**

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Gait analysis is a valuable tool that can be used in human motion tracking in many applications. Most motion tracking are performed using Marker-based System technologies. Objective: we present a simple but efficient two dimensional (2D) marker-based method that extracts the gait parameters automatically from an image sequence to be used in different human identification applications. The proposed method consists from four main steps: 1) three simple colored markers are added to the clothes of the targeted subject; where ankle has a green color ,knee has a blue color and hip has a red color 2)a gait video sequence captured by a static camera; and we are concerned with only side view videos and normal gait3) Segmentation method based on Gaussian Mixture Model is used to partition each frame to ankle, knee, hip and outlier region, and 4) the joint position and other variables such as segment lengths, and dynamic parameters of human gait were then calculated to extract gait features. For each frame within the video sequence we form a vector that contain position, Angular position, Angular displacement, Angular velocity and Angular acceleration; this vector is created for each low limb joint and segment part; then all frame vectors are stacked on each other to form a feature vector for gait motion parameters. Results: Our results shows that The developed method can effectively establish the gait motion parameters to be used in human gait identification applications. Conclusion: The main advantages for the presented system is that it does not suffers from the common shortfalls of skin based marker techniques such as skin artifact, the excessive time and complexity required for marker placement, the need for a controlled environment to acquire high-quality data, the high cost for the markers, and the effect of the markers on the subject's movement.

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