



C11 Forensic Gait Analysis: A Strength of Evidence Evaluation From Closed-Circuit Television (CCTV) Footage

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Learning Overview: After attending this presentation, attendees will better understand the application of a morphometric technique for analysis and the subsequent approach to evaluate the strength of the evidence.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by revealing a gap within research that was addressed via a method of evaluating forensic gait examination through assessing the strength of evidence that was successfully applied to the research, thus highlighting both competence and performance.

Introduction: The ubiquitous nature of surveillance cameras allows continuous monitoring of an area where footage can be obtained for later use, if criminal or other activity of interest occurs, for investigative and evaluative purposes. In the process, gait is often important, as facial analysis is not always possible due to obstruction of the face. Subsequently, a photo-comparative analysis of the footage and of a Person of Interest (POI) may be required. Such examination involves evaluation of the strength of evidence at both activity (relates to activity undertaken by the individual within the footage) and source level (alludes to features observed within the anatomy and gait of an individual), thus underlining its importance.

Goals: The goals of this research are to develop a standardized method for morphometric body and gait analysis that incorporates the quantification of image distortion and to determine distinct features of the body during gait (stance, walk, run).

Hypothesis and Specific Objectives: The hypothesis and specific objectives include the development of an analytical model that shows distinctive features of gait in a forensic context while determining features of the body during stance and gait (walk and run) and determining the frequency, distinguishability, and dependency of the features within subpopulations while viewing correlations of age/ethnicity/sex and examining the robustness of gait to different conditions (person, accessories, and environment) observed in forensic scenarios.

Method: The method includes a morphometric assessment of 18 anthropometric measurements (static, dynamic, and angle), 25 morphological features for stance, and 52 morphological features for gait of both male and female volunteers.

Results: As a result, a standardized protocol was produced, and population databases established from which frequency statistics are attained. Moreover, features were observed as either common or distinct, once compared to all age, race, and sex categories for correlation determination. These components were then applied to assess the strength of evidence between the trace and the reference materials, resulting in a likelihood ratio value.

Conclusion: As a forensic tool, the forensic gait analysis method often lacks validation, and its evaluation misses empirical substantiation. Nevertheless, the availability of trace material in numerous cases and the potential for development of the method suggests that research on this topic cannot be overlooked. The broader purpose of this study established a method of evaluating gait analysis that offers valuable information to the criminal justice system while being scientifically robust and highlighting its limitations.

Forensic Gait Analysis, CCTV, Morphometric