

Wavelet alternative for solving specific problems in pattern recognition of Human Gait

Peter Amoako-Yirenkyi¹, F. T. Oduro¹ and J.B. Hayfron-Acquah²

¹ Department of Mathematics, Kwame Nkrumah UNiversity of Science and Technology, Ghana

² Department of Computer Science, Kwame Nkrumah University of Science and Technology, Ghana

From Shakespearian times, humans have envisaged their ability to recognize the way people walk. Psychophysical and Biomechanical studies [3] have also indicated that humans have a small but statistically significant ability to recognize the gaits of individuals that they know. Computer vision methods have [1], in recent years been used to implement and improve on this human ability mainly as a means of biometric identification. In 2003 Hayfron et-al [2] used symmetry analysis and achieved remarkable results. Current approaches used to recognize human gait have confirmed the early results that suggested that gait could be used for identification. Gait is the coordinated, cyclic combination of movements that result in human locomotion. Unlike gait, most biometrics requires proximal sensing, which makes them inapplicable from afar. Human gait on the otherhand can be measured at a distance, difficult to cover-up or disguise, unobtrusive, does not need cooperation from the subject, does not require high resolution videos or images and hence the increased interest in using gait features as a behavioural biometric for human identification especially in surveillance applications. Complete and accurate characterization of gait dynamics however, requires [1] knowledge of the kinematics of body landmarks which must be cyclic or almost periodic. Automatically extracting these features for recognition using especially low-resolution videos reduces recognition rate due to occlusion, insufficient texture, errors involved in Large-Matrix calculations, scale, translation and rotation invariance and general associated noise that may be concealed within the video of a walking subject. This work applies wavelets analysis with symmetry in mind combined with contemporary video and image processing techniques to best characterize gait dynamics and recognize human gait by reducing the aforementioned problems to the bearest minimum.

References

- [1] A. Kale, Rajagopalan A.N., Cuntoor N., Kruger V., Chellappa R.,2004: Identification of Humans Using Gait. IEEE Transactions on Image Processing, vol. 13, no. 9 1163- 1173.
- [2] James B. Hayfron-Acquah, Mark S. Nixon, John N. Carter,2003: Image, Speech and Intelligent Systems Group, Department of Electronics and Computer Science, University of Southampton,Southampton, S017 1BJ, United Kingdom.
- [3] G. Johansson,1973: Visual perception of biological motion and a model for its analysis. Perception and Psychophysics, 14(2).