



# **ANALYSIS OF HUMAN GAIT CYCLE USING MOTION CAPTURE**

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by

**H.K. PRAMINDA MANOJ KUMARA**

Supervised by: Dr. Rohan Munasinghe  
Department of Electrical Engineering  
University of Moratowa, Sri Lanka

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93944



## Abstract

Bio mechanics is the study of body movements in order to design and produce ideal prosthesis. Biomechanical gait analysis is used widely as an objective tool to evaluate the walking capability of patient before and after various sorts of treatments (e.g. surgery or rehabilitation), design of locomotive apparatus etc. It is therefore important to know the test-retest reliability of each gait analysis, pattern of gait cycle with respect to time and rate of change of angular movements of each joint with respect to the given world reference frame.

Irrespective of different expensive and sophisticated system are available such as VICON system, Ariel Performance Analysis System (APAS), we have built the low cost camera calibration system with the elementary stereo geometry in canonical configuration method to gait analysis process in a sagittal plane. The makers' base motion capture methodology was used to analyze the gait cycle with two different speeds.

Finally, all the results have taken through the process feed for the graphical illustration of the gait cycle against to time function and hence rate of change of extension and flexion movements, joints accelerations and jerks values during the gait cycle was calculated.

Two different speeds have shown that significant change of joint angles and joint velocities in each leg joint. More importantly jerk values which are generating in leg joints shown these differences sharply.

In knee and toe joints the generated jerk patterns have shown more noises and which mean that the knee and toe joints are more vulnerable joints during the normal gait of human being.



The rate of change of joint angles and joint accelerations with jerk values where it has obtained as the experimental results can be used for future works such as to evaluate and verify the healing process of the patients who have undergone the leg surgeries or lost their normal walking ability. Out of that this will also help to design of artificial limbs to people who has lost their legs due to various accidents.