ANALYSIS OF HUMAN GAIT CYCLE USING MOTION CAPTURE

A dissertation submitted to the

Department of Electrical Engineering, University of Moratuwa

in partial fulfillment of the requirements for the

Degree of Master of Science.

by

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October 2009

DECLARATION

The work submitted in this dissertation is the result of my own investigation except otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree

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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.

Dedication

To My Parents,

Who dedicate their lives for me and

My Loving Wife Geethi!

Acknowledgement

This dissertation holds far more than the culmination of years of study. These pages also reflect the relationship with many generous and inspiring people I have met since my post graduate work.

This dissertation could not have been written without Dr.Rohan Munasinghe –Senior Lecture Department of Electronics and Telecommunication University of Moratuwa, who not only served as my supervisor but also encouraged and challenged me throughout my academic program never accepting less than my best efforts. Also Dr. Ranga Rodrigo-Senior Lecture Department of Electronics and Telecommunication University of Moratuwa, patiently guided me with great insights and perspectives through the dissertation process.

I also would like to extend my sincere gratitude to Dr.Lanka Udawatte, –Senior Lecture Department of Electrical Engineering University of Moratuwa, who always shows me the worth of the quality research work and encourage me to see the end results of it, and as well as the people who serve in the Department of Electrical Engineering throughout my academic works of post graduate studies.

My research partner Mr.Punsari Jinadasa, for his encouraging words and thoughtful criticisms, and time and attention during the busy life will never be forgettable.

Finally I should Thanks many individuals, especially to my loving wife and my mother-in-law who looked after my baby son 'Yumeth' born before this dissertation was completed and also friends and colleagues who have not been mention here personally in making the educational process success. May be I could not have made it without your support.

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