

# Measuring Behavior using Motion Capture Symposium

Wim Fikkert, Herman van der Kooij, Zsófía Ruttkay, and Herwin van Welbergen  
*University of Twente, Enschede, The Netherlands, mb@ewi.utwente.nl*

## Introduction

Motion capture systems, using optical, magnetic or mechanical sensors are now widely used to record human motion. Motion capture provides us with precise measurements of human motion at a very high recording frequency and accuracy, resulting in a massive amount of movement data on several joints of the body or markers of the face. But how do we make sure that we record the right things? And how can we correctly interpret the recorded data? In this multi-disciplinary symposium, speakers from the field of biomechanics, computer animation, human computer interaction and behavior science come together to discuss their methods to both record motion and to extract useful properties from the data. In these fields, the construction of human movement models from motion capture data is the focal point, although the application of such models differs per field. Such models can be used to generate and evaluate highly adaptable and believable animation on virtual characters in computer animation, to explore the details of gesture interaction in Human Computer Interaction applications, to identify patterns related to affective states or to find biomechanical properties of human movement.

## Goals to be achieved

- Foster cross-disciplinary knowledge exchange on methods to construct motion models from motion capture data
- Discuss and experience (by an industry demo) the state of the art of motion capture systems
- Give a broad overview of the applications of motion capture
- Improve the participants knowledge and skills of the technological issues that are inherently related to motion capture

## Topics

The topics covered in the talks are related to the stages and applications of measuring behavior by motion capture technology, such as:

- Smoothing and cleaning the data, e.g. to eliminate noise, to correct for lost markers etc., without losing valuable details or modifying the empirical data otherwise
- Automated segmentation human motion sequences into gesture units and the recognition of gestures
- Deriving biomechanical and physical characteristics of the person based on analysis of his (dedicated) motion samples
- Deriving motion behavioral characteristics (like smoothness, velocity profiles)
- Deriving both the cognitive and the emotional state characteristics through motion analysis
- Creating a motion model based on captured samples
- Evaluation of the believability of animation generated by a motion model by comparing it with similar captured motion

- Learning motion sequences automatically
- Exploring the effect of prosthesis and other artificial items

## Symposium contents

### 6 DOF Motion Analysis Using Inertial Sensors

Daniel Roetenberg, Henk Luinge, and Per Slycke

### Hip compression force estimation with a comprehensive musculo-skeletal model

H.F.J.M. Koopman and M.D. Klein Horsman

### Ambulatory estimation of ankle and foot dynamics and center of mass movement

H. Martin Schepers, Bart F.J.M Koopman, Edwin H.F. van Asseldonk, Jaap H. Buurke, and Peter H. Veltink

### 4 years of FreeMotion: towards practical large scale application of ambulatory 3D analysis of human movement

Chris T.M. Baten

### Analysis of human navigation and manipulation motions

A. Egges

### Combining manipulation and navigation in virtual environments

B.J.H. van Basten

### Using motion capture data to generate and evaluate motion models for real-time computer animation

H. van Welbergen

### Using motion capture to recognize affective states in humans

Nadia Bianchi-Berthouze

### Online Segmentation of Continuous Gesturing in Interfaces

F.W. Fikkert, P.E. van der Vet, and A. Nijholt

### The influence of gender stereotype priming on social action

E. Ngubia Kuria, Luisa Sartori, Castiello Umberto, and Raffaella I. Rumati