



CONTACT: ipm@innovatecalgary.com | 403.284.6400

Marker-less Motion Capture System

TECH ID #: 1160.1

Background

Full 3D gait analysis involves comprehensive analysis of walking and running biomechanics and is frequently used for the assessment, management and prevention of musculoskeletal injury. However current methodology often requires the use of markers to describe a patient's movements. This process is invasive, time consuming and limits the productivity of sports injury clinics.

Researchers at the University of Calgary's Department of Geomatics Engineering have developed a marker-less motion capture system based on three synchronized SR4000 range cameras. The motion capture system provides full-body coverage, does not require the use of invasive markers and is being developed for clinical gait analysis applications.

Areas of Application

- Clinical gait analysis
- Marker-less motion capture system for the entertainment industry

Competitive Advantages

- Reduced set-up time and improved patient work-flows
- Full-body coverage
- System has been developed in a clinical setting in collaboration with the Running Injury Clinic and is a tailored motion capture solution for applications in sports injury clinics

Stage of Development

The current system utilizes three SR4000 range cameras. The sensor data are collected simultaneously from the three cameras, registers the data into a global coordinate system and corrects the data for instrument errors to improve accuracy. The data set describing a subject's body is extracted from the background and analyzed for gait parameters.

- Estimation of frontal plane knee angle, stride length gait speed and average stride time has been demonstrated



- Future work includes the extraction of other gait parameters and process optimization to achieve near real time calculation of gait parameters

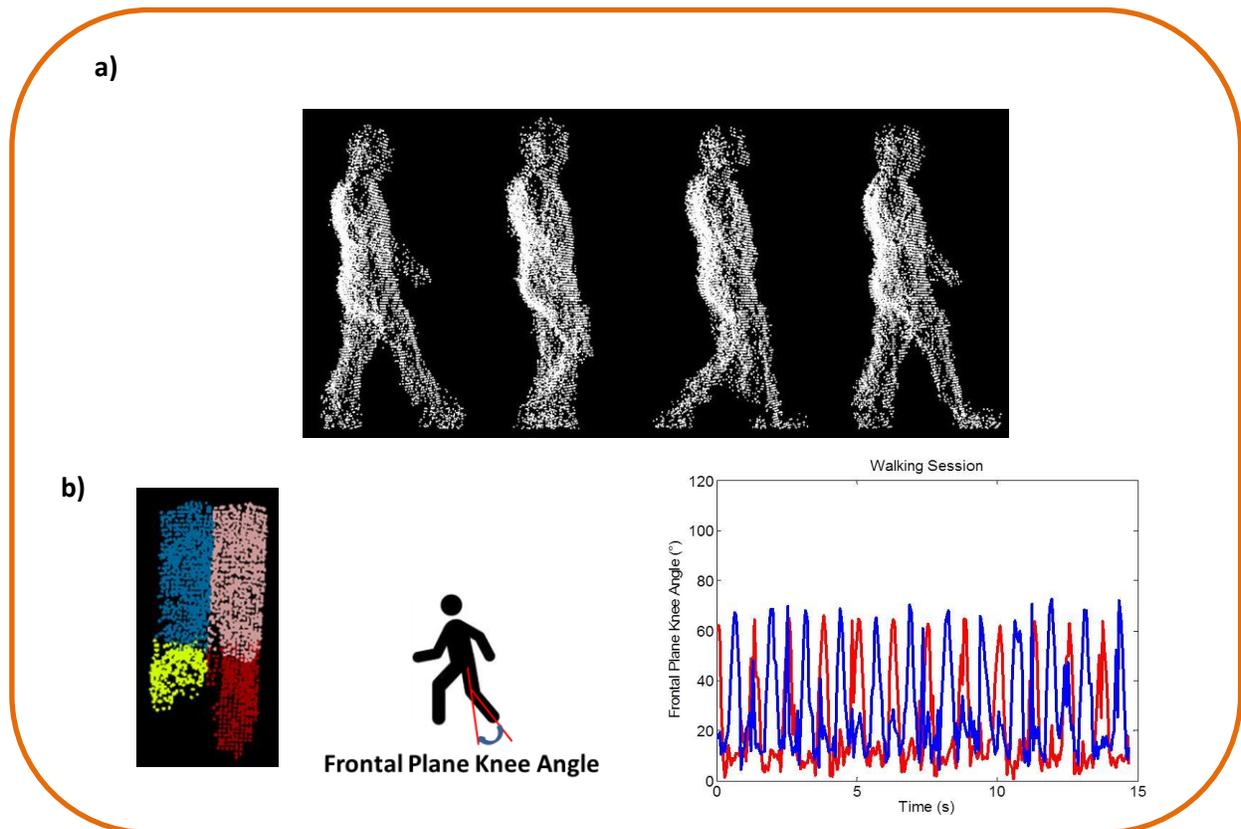


Figure 1. a) four samples of the walking time series of data from all 3 cameras
b) Estimation of frontal plane knee angles during walking.

Publications

Lahamy H., Lichti D., Ahmed T., Ferber R., Hettinga B., Chan T. O. (2014) Marker-less Human Motion Analysis using Multiple SR4000 Range Cameras. International Symposium on 3D Analysis of Human Movement, Lausanne, Switzerland, 14-17 July. 4 pp.

David Krawczuk, 2015. Walking Gait Parameter Derivation Using Time-of-Flight Cameras. Undergraduate biomedical engineering thesis, The University of Calgary, 35 pp.