

Abstract

With the rising popularity of virtual and mixed reality in several application fields, advances are required in many technological and algorithmic solutions. Mainly, to deliver a realistic experience for human interaction with other virtually modeled human subjects, the accurate capture of human motion and its reconstruction are necessary. This thesis focuses on two aspects of this problem: motion capture of human bodies and hands and virtual representation for body human body models. We contribute with a method that enhances the position tracking of inertial motion capture suits, which is the main drawback of currently used inertial motion capture systems. Also, we present a method that aims to simplify actor-specific calibration before the motion capture session via automatization. Next, we design a novel representation for 3D surface storage that allows for surface-to-topology queries with minimal effort. At last, we supplement our novel ideas with an extensive state-of-the-art report and explain commonly used terms in this field.

Keywords: motion capture, human body modeling, computer vision, 3D graphics, skeletal structures.