

Three-Dimensional Analysis of Human Movement

Three-Dimensional Reconstruction of the Human Skeleton in Motion

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Abstract

This chapter illustrates the conceptual background underlying the in silico reconstruction of the human skeletal motion. A specific focus is given to the experimental and analytical methods that allow acquiring information related to both bone movement and morphology in vivo in the framework of rigid body mechanics. This process involves the definition of global and local frames of reference. Common anatomical and mathematical conventions that are used to describe global bone pose and joint kinematics are illustrated. Issues concerning accuracy and reliability of the estimated quantities when using skin markers and stereophotogrammetry and magneto-inertial measurement units are also dealt with.

Keywords

Rigid body mechanics • Human movement analysis • Bone pose estimation • Anatomical calibration • Joint kinematics

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