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Bone Model Algorithm for 3D in vivo Joint Kinematics (20180008)

Technology No. 20180008

Auto-tracking software measures 3D in vivo joint kinematics

New auto-tracking software measures 3D in vivo joint kinematics. The system employs a custom algorithm to auto-register 3D bone models to 2D fluoroscopic images for quantifying 3D joint kinematics. Such analysis and 3D shape reconstruction from 2D x-ray images are important for different orthopedic applications. The auto-tracking program measures 3D in vivo joint kinematics from radiographic images (single and/or biplane) using model-image registration. Initial estimates for bone position and orientation are obtained manually and the 3D bone model is projected on the image plane. The algorithm then minimizes the difference between the projected bone model and fluoroscopy image.

Improves efficiency and reduces manual shape matching time

Current fluoroscopic motion tracking techniques face some major barriers. Manual data processing for model-based tracking typically requires manual shape matching of a subject-specific 3D bone model to each fluoroscopy image. This manual processing of dynamic fluoroscopy task is tedious and time consuming, so researchers often process only a few selected frames instead of the entire dynamic fluoroscopy sequence. These shortcuts impair its application and clinical translation outside the research environment. This new auto-tracking software measures 3D in vivo joint kinematics. The algorithm improves efficiency of fluoroscopic motion tracking techniques and reduces novice manual shape matching time. Such technology offers greater automation of these processes and can significantly accelerate applied and translational research in the field.

Benefits

- Improves efficiency of fluoroscopic motion tracking techniques
- Reduces manual shape matching time

- Automates the processes
- Could greatly accelerate applied and translational research in the field

Features

- Auto-tracking software
- Measures 3D in vivo joint kinematics
- Custom algorithm to auto-register 3D bone models to 2D fluoroscopic images
- Measures 3D in vivo joint kinematics from radiographic images (single and/or biplane) using model-image registration
- Bone position and orientation estimates obtained manually; 3D bone model projected on image plane

Applications

- Software
- Measuring 3D in vivo joint kinematics
- Fluoroscopic motion tracking
- Research

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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