Working_with_Motion_Capture_Data

If you have surface-marker-based motion capture data for an x-ray trial, you can use it to calculate initial poses for the bones you want to track in the trial. To use this data in X4D, you must have C3D files with labelled marker trajectories for the motion trial and its associated static trial, and Visual3D files defining a kinematic model and its motion constraints. In the DSX software, this model is referred to as a *mocap model*. Creating the model template and the constraint scripts requires a good working knowledge of Visual3D. The *model template* file (MDH) defines the segments and landmarks in the kinematic model, based on a specific marker set. The *build script* (V3S) creates the constraints that define the relative motions of the segments in the model. The *recalc script* (V3S) updates the segment poses to satisfy the constraints. Once the model is defined, and applied to a particular DSX trial, it can be used in three modes:

- **Marker Mode** The motions of the segments are driven by the surface markers, with constraints enforced. This mode is used to calculate mocap poses in X4D.
- **Interactive Mode** You can interactively change all of the model's degrees of freedom (the 6 degrees of freedom of the root segment, and the joint angles). Constraints are enforced. This mode is used when you manipulate the bone poses in X4D.
- **DSX Mode** The motions of the segments are driven by DSX tracking results (transform matrices). Constraints are not enforced. This mode is used when DSX results are viewed and analyzed in Visual3D.

In addition to generating initial poses for the tracking objects, you can use the mocap model to help with manual positioning of the objects. In the //Mocap Model// widget in X4D, you can turn on the model's joint constraints, making it easier to move all of the objects together as a group, or to move them relative to each other in a realistic manner (e.g., flexing or twisting the vertebrae in a spine model).

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Last update: **2024/07/12 13:56**