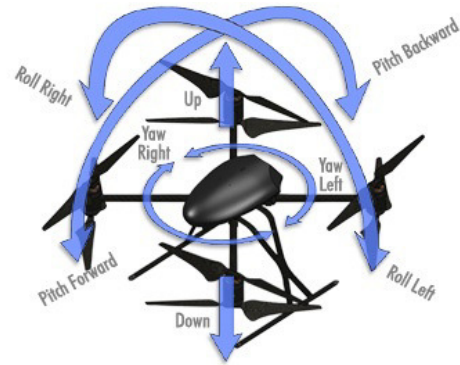


6DoF Input Device Integration for XCT Volume Visualisation

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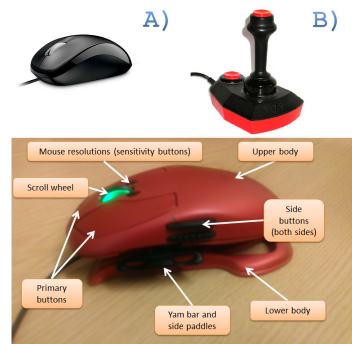


Any possible movement of a rigid body, no matter how complex, can be expressed as a combination of three translations and three rotations, the basic six degrees of freedom (6DoF) [LM10].

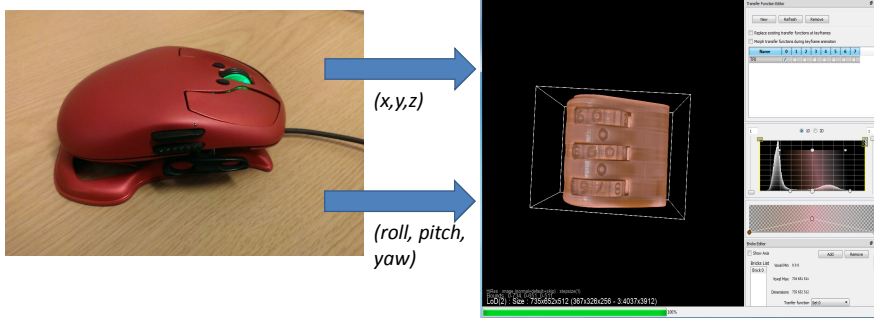
- Volume visualisation as exploited in tomography packages; e.g. Avizo (FEI), ImageJ, Paraview-TomViz or Drishti – allow for multiple other parameters and other rigid bodies to be changed.
- Current users of these systems often have to exploit a single mouse and contrived keystrokes for even the simplest of data exploration and animation task.

Using a hand, a user can send and receive information through force/torque and displacement /rotation; which are translated by device drivers for interpretation by the application.

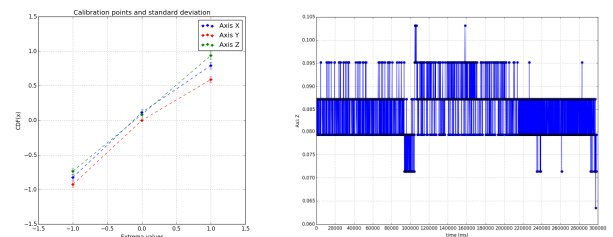
- HCI studies have classified input devices into two groups:
 - 1) *isotonic* devices - senses displacement or free movement with zero or constant resistance; e.g. **mouse** and
 - 2) *isometric* devices - senses force without perceptibly movement; e.g. **joystick** [Zha95].
- Recently a new 6DoF device - **Wing** [Wor14] - allows one hand to combine both of these.



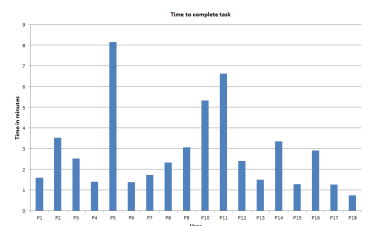
Python based device driver transfer the 6DoF (x, y, z , roll, pitch, yaw) to the Drishti volume visualiser.



Statistical calibration for the Wing device driver; allowing noise reduction and smooth multi-step movement.



User evaluation and task assignment show copycat alignment can be accomplished smoothly with the 6DoF Wing.



A python driver, with improved calibration, has been written to link with the Drishti visualisation package [Lim12]; and evaluated with XCT users.

- results showed user preference and comfort criteria (included expected cost),
- as well as timed specific tasks for comparative XCT viewing
- creating a system that has potential ease of use and speed up in exploration and discovery.

Future work is planned to include multiple **Wing** devices allowing then for simultaneous interaction; for example

- manipulating both light parameters and object position simultaneously;
- or changing clipping plane and object transparency.