

Creating Models from Input

A research proposal by Alastair Lansley, University of Ballarat, School of Science, Information Technology and Engineering, 2011.

Evolution of Graphical Output



Over the last 25 years, graphical fidelity has progressed markedly to the point that we can no longer believe our eyes about whether any image we see is real or has

been computer generated or manipulated. Part of the reason for this stems from the high quality of the 3D models that we are now able to create and use.



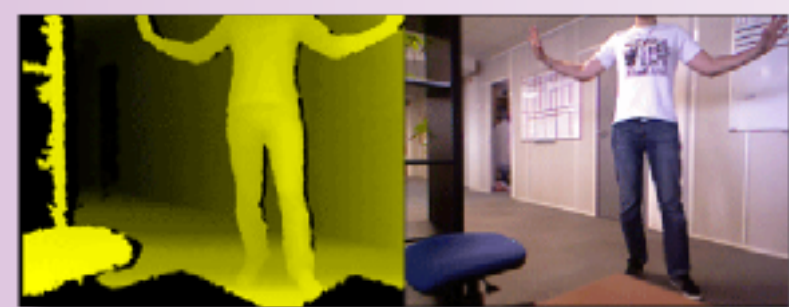
Evolution of Controller Input



But during the same time period the input methods used for creating these 3D models have remained largely unchanged - we use a mouse and keyboard, with maybe a graphics tablet (2D input) to create our 3D models via a large series of steps.

Proposed Enhancement - Direct 3D Input

By using a Microsoft Kinect sensor to sample 3D input directly from the user it is hoped that we can provide a more natural means of creating 3D objects. The goal here isn't to replace the mouse and keyboard entirely, but instead to augment it where it makes most sense - at the initial sketching & prototyping stages.

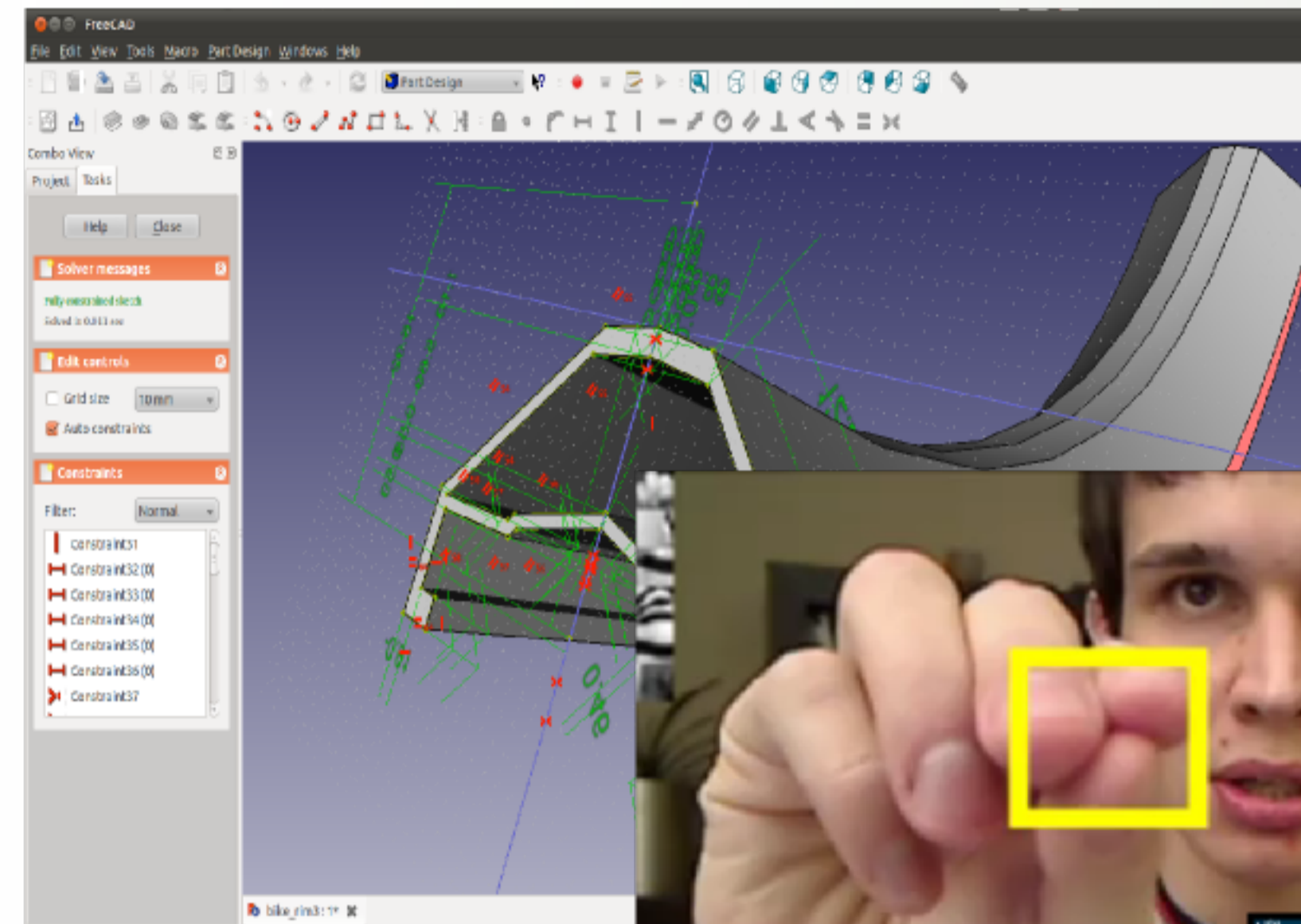


(Left) A false-colour depth image, and a standard RGB image as seen by the Kinect sensor.

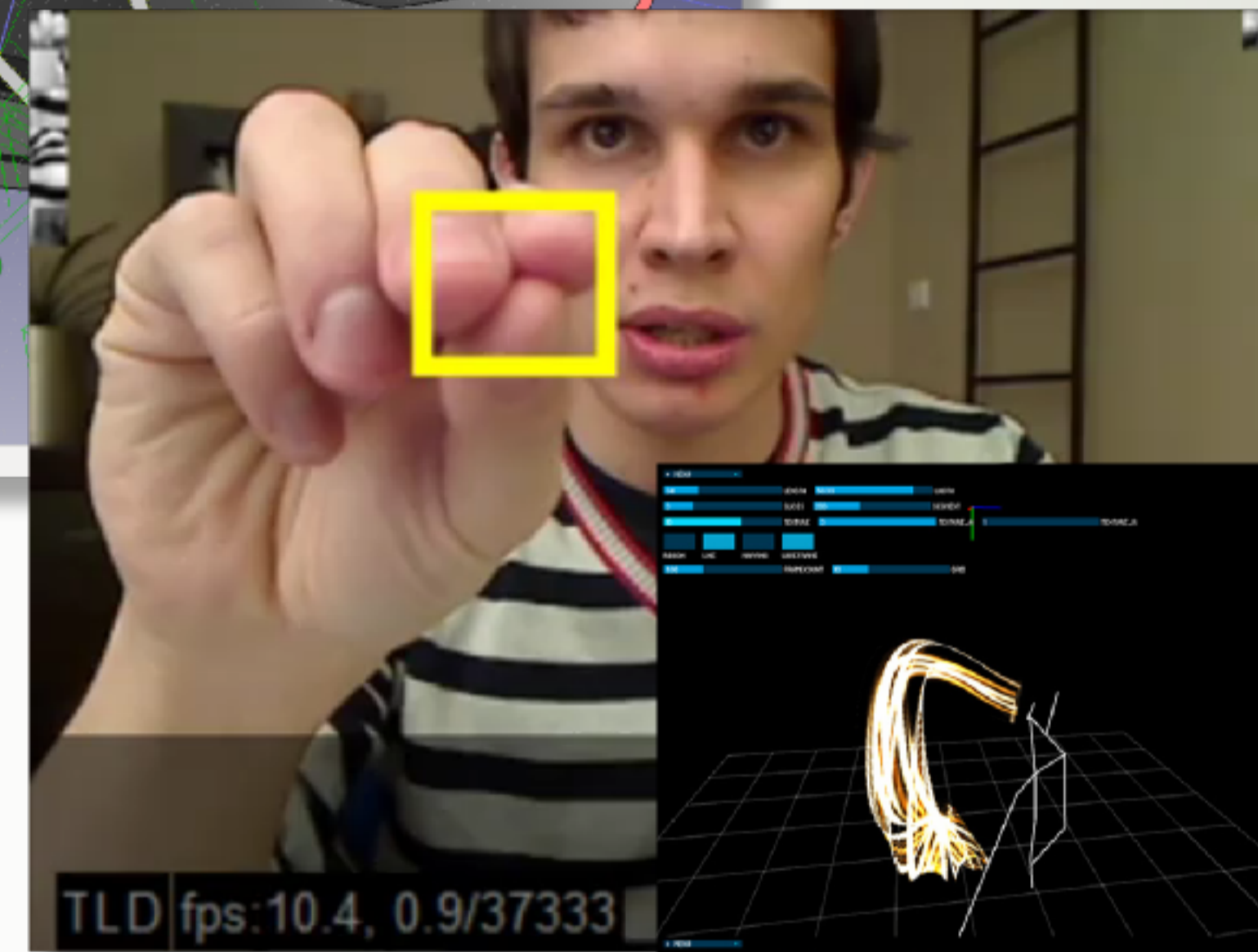
Combined into a Multi-Modal User Interface

As well as using depth information, we can utilise speech recognition and speech synthesis to minimise switching back and forth between different sets of controls...

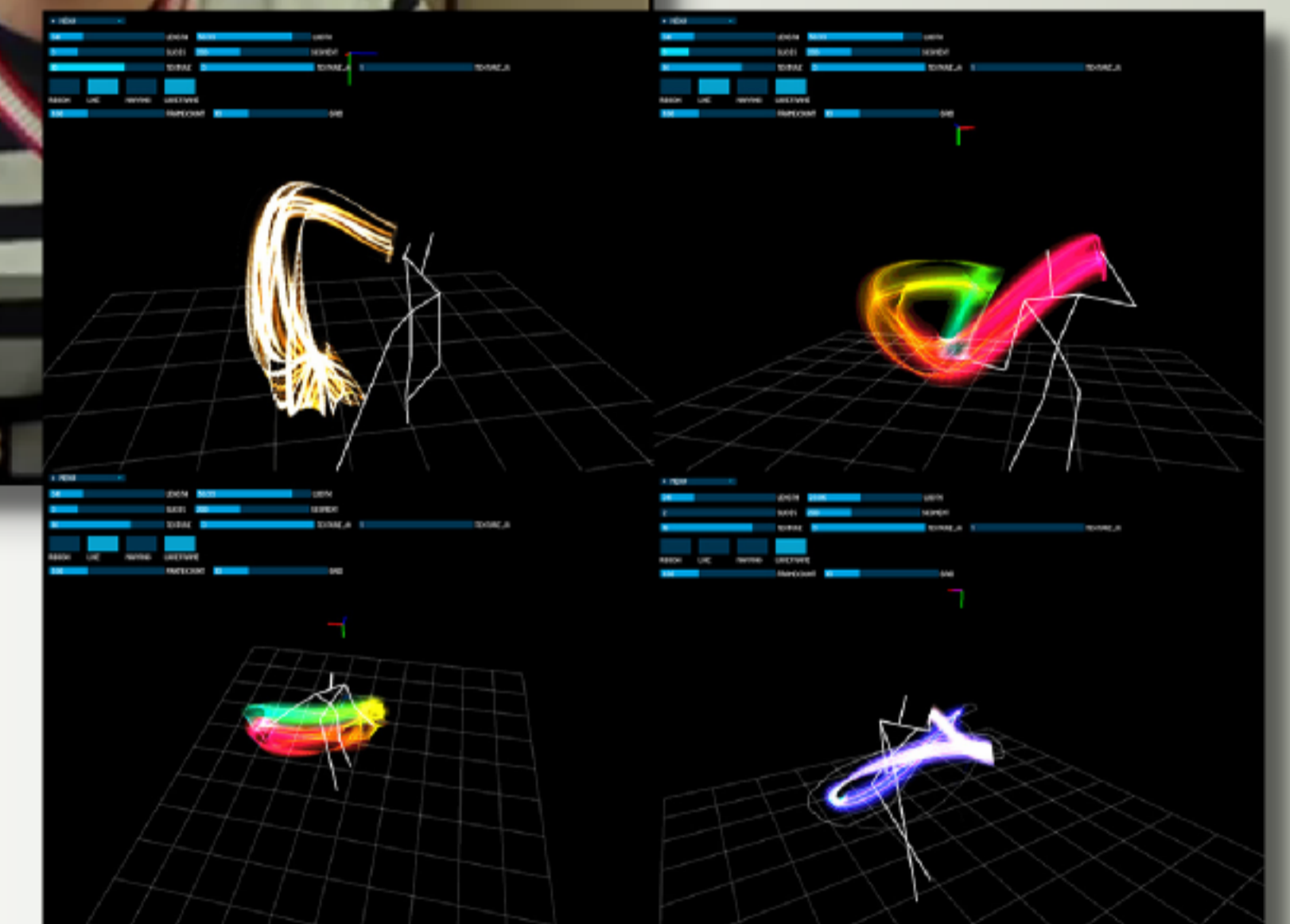
(Below) Limb tracking in 3D space results in colourful 3D graffiti - creating geometry from this same input may enable rapid prototyping possibilities.



(Above) The Open Source FreeCAD application, which will form the basis of the project. (Right) The TLD project can identify and track anything it can see quickly and automatically.



... and by using libraries and projects already in existence, it will be possible to create this hybrid CAD system within the available Ph.D. timescale.



(Below) The Kinect sensor projects a structured light grid, which it uses to calculate the depth field, onto the face of a model. In normal lighting conditions this grid is invisible.



Proposed Research Goals

By utilising modern programming libraries, sensors and techniques in novel combination, we are aiming to find out to what extent the next generation of 3D modelling software can step away from its more cumbersome 2D roots to become easier and more intuitive to use, and thus become more accessible to a larger potential audience of users.