Interactive Annotation on Large, High-Resolution Information Displays

Tobias Isenberg, Petra Neumann, Sheelagh Carpendale, Simon Nix, Saul Greenberg

UNIVERSITY OF CALGARY

Introduction

Large interactive displays provide great potential for information visualization. They will allow us to collaboratively explore & make sense of data. This will require sharing of individual experiences and interpretations of the data.

For externalizing aspects of the exploration process, labels & annotations are key factors. On large displays, the annotation & labelling process is difficult since input is often limited to touch or pen.

For high-res displays, fingers are quite blunt input instruments for selection or annotation of small information displays. We provide interactive Sticky Notes for annotation that can be drawn at low input resolution (large size) and then added to our information display at higher resolution (small size).

Dionaea muscipula

Annotation written using low-resolution input.

Motivation

- high-resolution graphic and rendering available on today's tabletop and wall displays

- input resolution usually still low and noisy

- finger and pen input relatively imprecise when compared to pixel size due to size of finger or pen tips

- annotations needed for interactive information and data visualization applications that make use of high rendering resolution

- annotation input still to be done with finger or pen to avoid input mode switching

NOISE + LOWRES

Venus fly trap

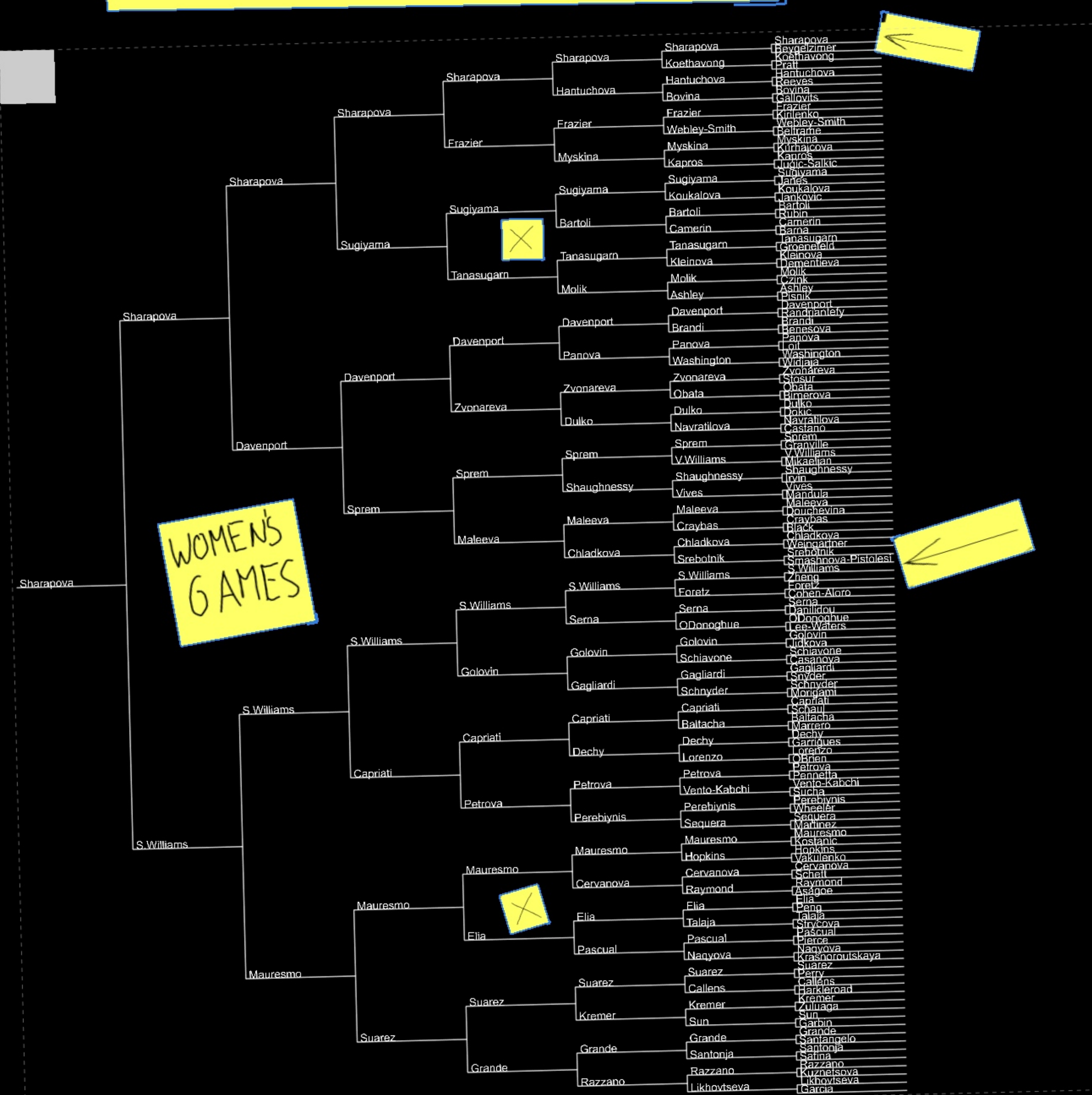*Dionaea muscipula*

Annotating images directly.
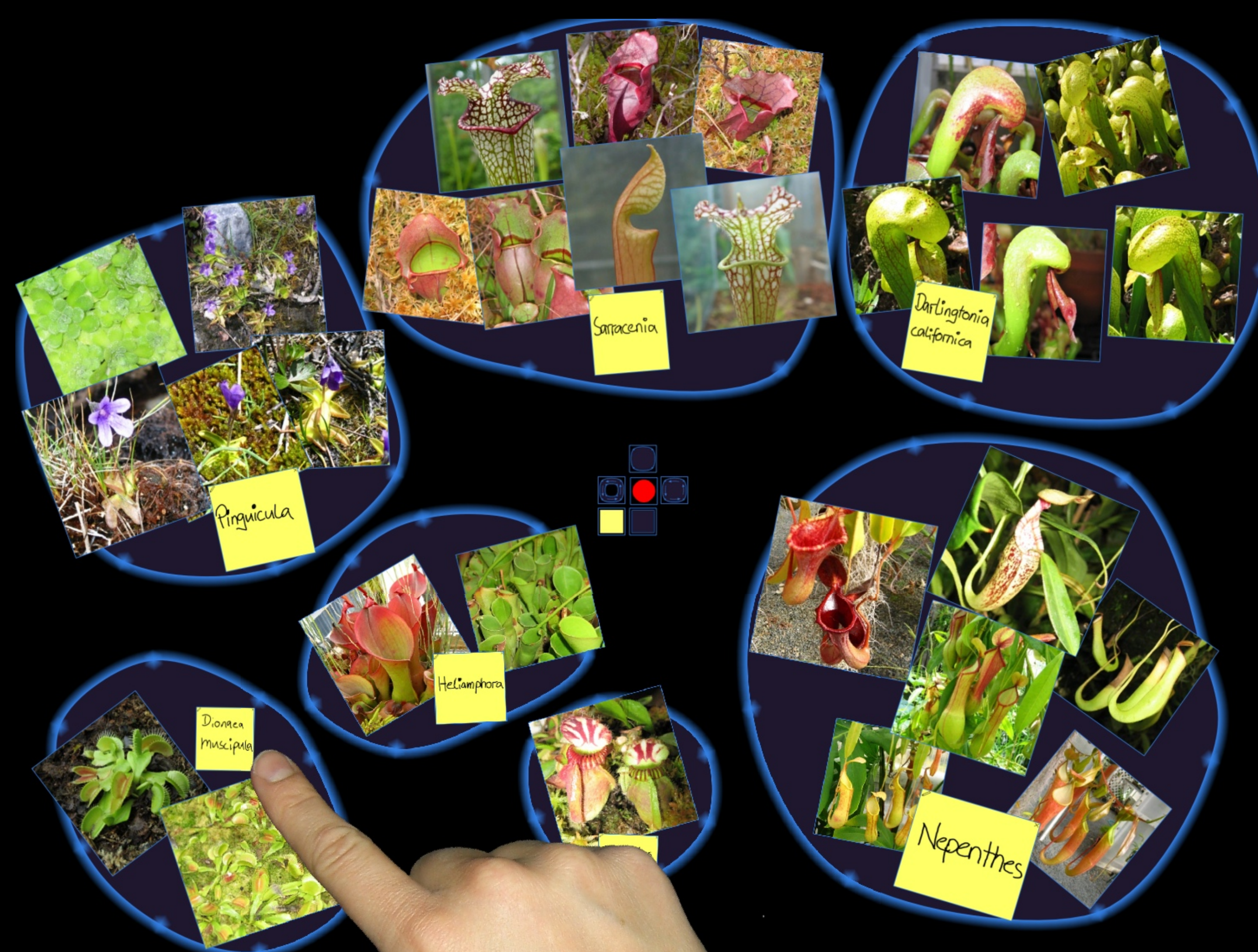
Annotation placed at high-resolution. with information

data/wimbledon2004_ladies_singles.tree

RUNNER-UP   WINNER

Annotation of a radial tree layout.

WIMBLEDON 2004

WOMENS GAMES

Annotation of small information items in a tournament diagram.

Technique

Sticky Notes are implemented with short rendering times in mind to allow smooth pen strokes. To facilitate this, they are using hardware-accelerated P-buffers provided by modern graphics hardware that allow off-screen rendering of the Sticky Note contents. This in turn is assigned to a mip-mapped texture map for the actual rendering. This way the drawing routines of OpenGL could be used for drawing lines onto Sticky Notes. OpenGL's Bézier curve rendering is used with adaptive step sizes to address the problem of low frequency input sampling.

A similar approach is used for annotating images directly. Here, P-buffer textures are created with a transparent background and are rendered on top of the actual image texture.

Carnivorous PLANTS

Usage of Sticky Notes for conceptual drafts.