Custom UI elements for Max for Live in JavaScript

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Max/MSP

A graphical programming environment used by artists/musicians

Proprietary, but related to the open-source Pd.
Max and JavaScript

- You can embed JavaScript code in a `js` object
The `js` object

- Define functions to respond to incoming data and/or messages
- Send data out with the built-in `outlet()` function

```javascript
// double.js
function msg_int(v) {
    outlet(0, v*2);
}
```
Max for Live

Max/MSP can be used to make instruments and MIDI and audio processors for use in Ableton Live.
Comes with standard control elements built-in

...though sometimes you need something different.
A Max node type which lets you write arbitrary graphical elements.
jsui

• Like js, only presents graphics and responds to mouse events
  • Takes over its rectangle of the screen
  • Define functions for handling mouse events
  • Use OpenGL-based API for drawing
• Default jsui comes with a rotary dial widget implemented in JavaScript

• To view/edit JavaScript source, send an open message
jsui gotchas

• Bears no resemblance to the HTML/CSS stack
• OpenGL-based; coordinate system is odd
What would be nice:

What jsui gives you:
This can be fixed:

...with a bit of OpenGL magic

```javascript
with(sketch) {
    default2d();
    glMatrixMode("projection");
    glLoadIdentity();
    glOrtho(0., size[0], size[1], 0., -1, 100.);
}
```
function draw() {
    // clear background to white
    sketch.glclearcolor(1.0, 1.0, 1.0, 1.0);
    sketch.glclear();

    // set foreground to black
    sketch.glcolor(0.0, 0.0, 0.0, 1.0);

    // draw a circle if a condition is met
    sketch.moveto(8, 8);
    if(value) {
        sketch.circle(7);
    }
};
Responding to clicks

Define an `onclick()` method to respond to mouse clicks

```javascript
function onclick(x,y,but,cmd,shift,caps,opt,ctrl) {
  if (x < 10) {
    val = val - 1;
  } else {
    val = val + 1;
  }
  outlet(0, val);
}
```

Note that we send the value out to the patch as soon as we’ve changed it.
Getting values in

• We want our element to respond to incoming values, setting its internal data to them and redrawing itself.

• Here we assume the value is an integer:

```javascript
function msg_int(v) {
    val = v;
    draw();
    refresh();
}
```
Playing nice with Live’s presets

• Ableton Live lets you save control parameters in presets and automate them.

• The built-in Live controls work with this automagically.

• Our own controls need a bit of work
pattr and parameter values

- If our control sends its value out and can receive it as input, we can make its value a Live-friendly parameter easily.

- To do so, we just route its output to a pattr object, which we route into it.

The pattr object must have its “Parameter mode enable” setting switched on for this to work.
I have written a more detailed article on this subject, with a practical example, at tech.null.org

The article may be found at bit.ly/1alpUze