Enhancing an Analog Pinball Experience using IoT, NodeJS and Visualizations

DGMD E-598 DIGITAL MEDIA DESIGN CAPSTONE
FRANK PIZZUTA - FALL 2019
Project Description
Technologies Used

**Technology #1:** Arduino

**Technology #2:** NodeJS

**Technology #3:** Lifx bulbs

**Technology #4:** Augmented Reality System - Wikitude

**Technology #5:** Voltage Detector

**Technology #5:** Web Sockets

**Technology #6:** Cordova
Arduino

```java
Arduino

EthernetClient client;

if (client.connect("192.168.1.48", 8080)) {
    Serial.println("connected");
    client.println("POST /drwho HTTP/1.1");
    client.println("Host: 192.168.1.48");
    client.println("Content-Type: application/x-www-form-urlencoded");

    client.println("Connection: close");
    client.println("User-Agent: Arduino/1.0");
    client.println();
}

delay(200);
```
Websockets Server Side

```javascript
server.listen(port);
server.on('listening', () => {
  console.log("Listening on %s", server.address().port);
});
var io = require('socket.io').listen(server);
app.io = io;

req.app.io.emit('master', 'You lose Doctor!');
```
Websockets Client Side

```html
<script src="https://cdn.socket.io/socket.io-1.4.5.js"></script>

var socket = io();
socket.on('master', function(msg){
  $('.master').toggle();
});
```
Wifi Bulbs

```javascript
const LIFX = require('node-lifx-lan');

LIFX.discover().then((device_list) => {
  device_list.forEach((device) => {
    console.log([device['ip'],
                 device['mac'],
                 device['deviceInfo']['label']
               ].join(' | '));
  });
}).catch((error) => {
  console.error(error);
});

router.post('/', (req, res, next) => {
  console.log(process.env.NODE_ENV);
  req.app.io.emit('master','You lose Doctor!');
  // Turn on all LIFX bulbs in the local network
  if (req.app.locals.lightsOn == 0) {
    LIFX.turnOnBroadcast(
      color: (css: 'green')
    ).then() => {
      console.log('Light On!');
    }.catch((error) => {
      console.error(error);
    });
    req.app.locals.lightsOn = 1;
  } else {
    LIFX.turnOffBroadcast(
      duration: 3000
    ).then() => {
      console.log('Light Off!');
    }.catch((error) => {
      console.error(error);
    });
    req.app.locals.lightsOn = 0;
  }
  res.end();
});
```
Augmented Reality

```
var socket = io.connect('http://192.168.1.48:8080');
socket.on('master', function (data) {
    if (World.pageOne.enabled == true) {
        World.pageOne.enabled = false;
    } else {
        World.pageOne.enabled = true;
    }
});
```
Final Thoughts

AR still isn’t ready for mass adoption. The phone is too limiting and implementation is difficult.

I would like to investigate sound based triggers. This would remove the need for tapping switches.

Combining an Arduino with a NodeJS backend allowed me to learn and test physical computing concepts very easily. I want to try the Johnny-five, JavaScript robotics and IoT, library next.

My job has expressed interest in having me enhance our Modern Art collection with AR.

I wish there was a full IoT / Physical Computing degree program at the Extension School!!

Thank you and Happy Holidays!