The Smart Commons: Sensor-Based Space Assessment of Learning Environments

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Slides available at:  https://goo.gl/GLA8H2
What is the Internet of Things?
What can the Internet of Things do for libraries?
The Prototype Hardware
C.H.I.P. Controller
Force Sensitive Resistor
ADXL345 Accelerometer
Piezo Element
Lithium Polymer Battery
Battery Bank
Perma-proto Perf Board
Misc
3D Printed Enclosures
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Entire Module
The Prototype Software

Node.js
Johnny-Five
Bleacon
Slim Framework
module.exports = {
  closestBeacon: closestBeacon,
  getLocationName: function (beacon) {
    var name
    config.areas.forEach(function (area, index) {
      if (area['major'] === beacon.major) {
        name = area['name']
      }
    })
    return name
  },
  watchForRelocation: function (request, battery, alarm) {
    Beacon.startScanning(config.uuid)
    Beacon.on('discover', function (beacon) {
      if (module.exports.closestBeacon === '') {
        module.exports.closestBeacon = beacon
      }
      if (beacon.major !== module.exports.closestBeacon.major) {
        if (getProximity(beacon) > getProximity(module.exports.closestBeacon)) {
          if (delayedTest(beacon)) {
            var location = module.exports.getLocationName(beacon)
            console.log(module.exports.getLocationName(beacon))
            var event = 'Moved from ' + module.exports.getLocationName(module.exports.closestBeacon)
            var timestamp = moment()
            request.post(config.postOptions, function (error, response, body) {
              if (error) {
                console.log('Error: ' + error)
              } else {
                console.log('Beacon POST response: ' + response.statusCode)
              }
            })
          }
          module.exports.closestBeacon = beacon
        }
      }
    })
  }
}
The Prototype Data

MySQL Database

REST API

Location Data

Movement Data

Battery Levels

Pressure Data

Timestamps
Security and Privacy

All anonymous data

Transmitted data is all encrypted

Individual devices do not act as servers

Unused ports are blocked

API Key required for reporting data

Transparency of study
Security and Privacy

We will be gathering data on furniture use in this area.

Library staff will be conducting a study of students' use of the 4th floor commons, including how and when furniture is used so that we can better understand students' needs as we make future changes to our public spaces.

This study is anonymous. No information will be gathered that could identify individuals.

Please contact Jonathan Bradley at bradley1@vt.edu or 540-231-8238 if you have any questions.
Moving Forward

Size

Battery Life

Real-time Feed w/ Socket.io and Rawgraphs.io

Other Sensors/Devices:

PIR

Thermal Cameras

Humidity/Temperature
Questions?

https://github.com/VTUL/smart-commons

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