Tools of the Trade

RFID Readers, I/O Boards, Microcontrollers, and Computer Vision
Assignment 2: Technology Demo

- Work in teams of 2
- Pick any two tangible technology tools
- Integrate them into a demo application
- Don’t worry about usability or interaction design.
- Focus on learning the technology
Assignment 2: Technology Demo

What to hand in:

1. Write about your experience putting together the demo in your blog. Describe your work process and talk about things that were easy, hard, frustrating, etc.

2. Put together a short Quick Start guide for your technologies. Include links to resources, troubleshooting tips, configuration details, etc.

Phidget RFID Reader

- Read-Only RFID Reader
- Can detect single tags
- Range: 3"
- USB Interface
- APIs in Java, VB, C#, others
OBID i-scan RFID Reader

- Read-Write RFID Reader
- Can detect multiple tags
- Serial Interface
- API in Java
Phidget 8/8/8 IO Board

- 8 Digital Inputs
- 8 Analog Inputs
- 8 Digital Outputs
- USB Interface
- APIs in Java, VB, C#, others
Phidget LED Controller

- Control 64 LEDs Independently
- USB Interface
- APIs in Java, VB, C#, others
I-PAC Arcade Controller

- USB Keyboard Emulator
- No APIs Needed! It’s just a keyboard
- 56 Inputs
Handy Board

- A tiny computer
- 4 analog I/O ports
- LCD Screen
- Rechargeable Battery
- Programmed with Interactive C
LEGO Mindstorms NXT

Small computer in an easy to use package

3 Servo Motor Ports

4 Sensor Ports (light, touch, sound, ultrasonic range)

LCD Screen

Bluetooth
Computer Vision

Method for extracting information from images and video streams. Includes object identification and tracking. Often combined with video projectors to create augmented reality.
Computer Vision

- USB Webcams now available with up to 2 Megapixel resolution
Computer Vision

- **Strengths:**
  - Fast way to do mockups and prototypes
  - Can track position and orientation of multiple objects

- **Weaknesses:**
  - Can be sensitive to lighting and obstructions
  - Not portable
  - Often not robust
  - Computationally expensive
  - Rules out embedded implementations
Java Media Framework

- A Java library that will interface with most webcams
- Makes it easy to capture still frames from a video stream
- Sample code available on the compTUI website
**ARToolkit**

- Open source library
- Tracks the position and orientation of physical markers
- Real time performance
- Markers use simple black squares
- Pattern matching allows any marker patterns to be used
TopCodes

- Tangible Object Placement Codes
- Designed for fast and accurate computer vision
- Each TopCode encodes a 13-bit number
- Can track position, size, and angular orientation of multiple objects
- Self-calibrating
- Java API
- Code available on the compTUI website
  - http://hci.cs.tufts.edu/topcodes
**reactTIVision**

- Open source computer vision framework
- Fast, real-time tracking
- Uses amoeba tags
- Cross platform
- Encodes ID, location, and orientation
- http://mtg.upf.es/reactable/?software
... and much, much more ...

- Temperature sensors
- Touch sensors
- Range / Motion Sensors
- 3-D Accelerometers (e.g. Wii)
- Scales
- Motor Controllers
- Relay Boards
- Wireless (ZigBee, Bluetooth, WiFi)
- See http://www.phidgets.com/