mGloves

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Project Concept

• Wireless gloves that allow users to interact with their computer using sophisticated hand motions
• Enable spatial manipulation of computer data, which is more natural than with traditional means
Competitive Analysis

• The Peregrine ($150)
  – Gaming glove which maps hotkeys to up to 32 gestures and motions
  – Uses thumb contact with resistive pads on fingers to determine gestures; connects with USB (wired)

• 5DT’s Datagloves
  – Wired gloves start at $2,000
  – Wireless for $3,500
Requirements

• Need to recognize motion accurately and quickly
  – Unresponsive devices are major cause of user frustration

• Gloves must be lightweight & comfortable
  – Can’t restrict natural hand motions

• Diverse software integration
  – CAD, media center (image/video playback), presentation, browsing / reading
  – Provide device library for extensible use
Technical Specifications

• Units needed per hand
  – Glove
  – Arduino Mini
  – Flex Sensors x7
    • 5 for fingers, 2 for wrist
  – Bluetooth Transmitter
• Webcams x2
Architecture

Flex Sensors in Gloves → Arduino Mini → Webcams → Computer

Bluetooth Module
# Risks and Mitigation Strategies

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<tr>
<th>Risks</th>
<th>Mitigations</th>
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<tr>
<td>Packet loss under unreliable Bluetooth link</td>
<td>Implement fault-tolerant transmission protocol</td>
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<td>Bulky gloves (housing wireless transmitter, batteries, controller)</td>
<td>Move heavier components outside gloves and into a package that can either strap to your arm, or sit in your pocket</td>
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<td>Speed loss or unresponsiveness due to overloaded data processing</td>
<td>Disregard some data; choose to use strictly one source of data between sensors on glove and cameras Plan B: Wired connection to computer</td>
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| OpenCV / computer vision becomes unusably difficult                 | - Install [IR] LEDs in glove to aid computer vision tracking / processing  
- Try other CV libraries / Kinect  
Plan B: IMU for simpler gesture processing                             |
| Integration with various software packages may be difficult          | Focus on a few specific software package that showcase our device’s capabilities                                                                |
Questions?