Game Control
- Sync
- Select
- Deselect
- Move Direction

Methods

Arm Model
- Arm orientation computed using Myo armband quaternion
- Used typical arm/hand dimensions
- Used typical shoulder position as the center of rotation

Force Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>z</td>
<td>Arm position</td>
</tr>
<tr>
<td>z₀</td>
<td>Arm direction</td>
</tr>
<tr>
<td>x</td>
<td>Object position</td>
</tr>
<tr>
<td>y</td>
<td>Desired object position</td>
</tr>
<tr>
<td>Fₚ</td>
<td>Radial force</td>
</tr>
<tr>
<td>Fₐ</td>
<td>&quot;Angular&quot; force</td>
</tr>
<tr>
<td>Fₛ</td>
<td>Damping force</td>
</tr>
</tbody>
</table>

\[ F = F_r + F_θ + F_d \]
\[ y = |x - z| \]
\[ F_r = \pm \sqrt{|x - z|} \]
\[ F_θ = \frac{y - x}{|y - x|} \]
\[ F_d = -\gamma \dot{y} \]

Force Diagram

Physics Equations

Spring-Mass-Damper Model

Push & Pull Gestures

Linear Acceleration on Z-axis
- Remove gravity using quaternion
  \[ a = (Q + a_θ - g) \cdot \dot{z}_θ \]
- Peak-detection algorithm

Future Work
- Position Tracking
- More EMG Integration
- EEG (Brain Signals)

References
- stanford.edu/class/ee267/
- myo.com
- unity3d.com
- en.wikipedia.org/wiki/Damping

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