



Input Controls: Beyond the Keyboard, Mouse and Joypad

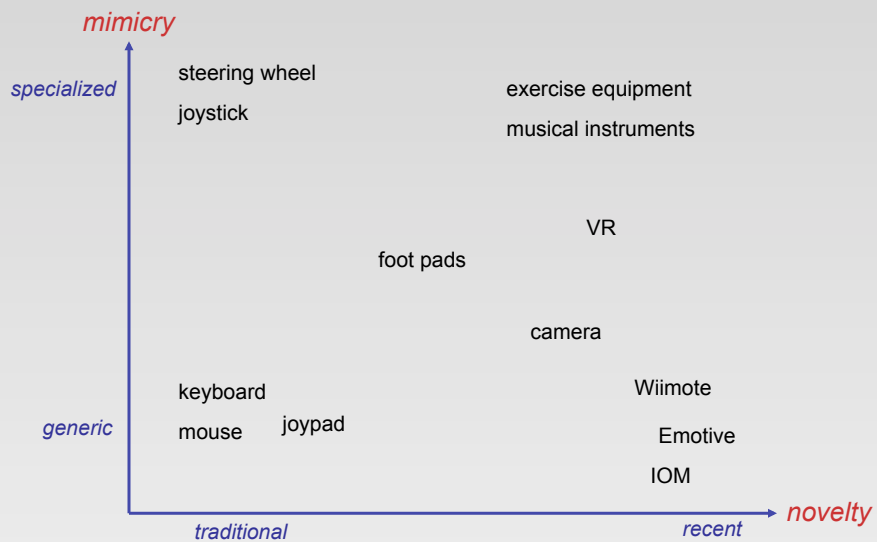
Technical Game Development II

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For more: Take Prof. Lindeman's new course on "HCI for Real, Virtual and Teleoperated Environments" (IMGD 3XXX) in A10...

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1



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2

Embrace alternative controllers



[From Harmonix presentation, IMGD Seminar 2/7/08]
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3

We haven't made a joypad game since 2003



Camera

Guitar

Microphone

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4



Guitar + Drums + Microphone!

We've noticed some big user benefits...

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5

They look like what they do



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6

It's obvious how to use them



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7

Joypads

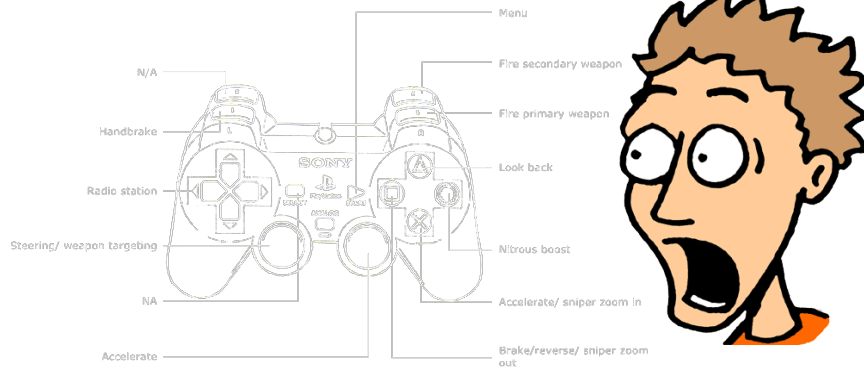


- Generic by design
 - So can't “look like what it does”
 - No mental model for how to use it

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8

Today's joypads are intimidating



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These controllers are inviting



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They level the playing field



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11

Ensure intuitive controls

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12

Intuitive Controls

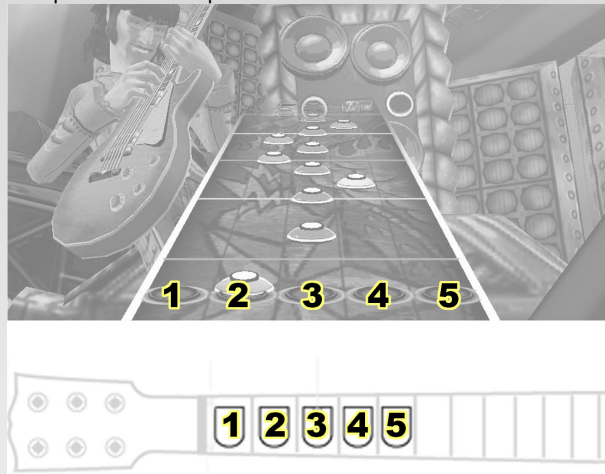
- It just works
- This is our responsibility
- Employ usability principles

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13


Natural Mapping

Spatial relationship between control and result is consistent



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14



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15

Other Physical Input Devices

- Foot (dance) pads [\[video\]](#)
- Exercise equipment
 - www.exerciseinabox.com [\[video\]](#)
 - Diamond Park [\[video\]](#)

16

Dance Pad



www.exerciseinabox.com



Diamond Park



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19

Inertial and IR Sensing

- Wiimote
 - sports games [\[video\]](#)
 - finger tracking [\[video\]](#)
 - head tracking [\[video\]](#)



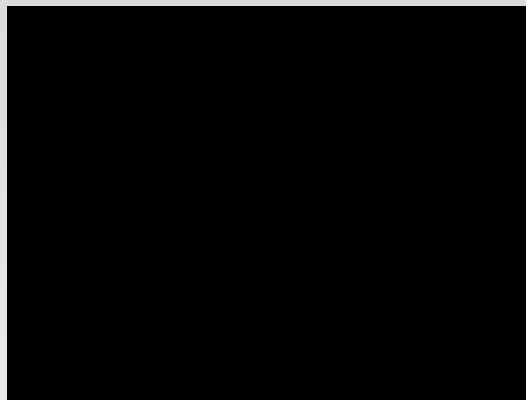
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20

Wii Tennis



Wii Finger Tracking



Wii Head Tracking

Head Tracking for
Desktop Virtual Reality Displays
using the Wii Remote

Johnny Chung Lee
Human-Computer Interaction Institute
Carnegie Mellon University

Using Cameras and Computer Vision

- EyeToy for PS2
 - AntiGrav (Harmonix) [\[video\]](#)
 - face tracking
 - template matching
 - rough pose estimation

- Webcam
 - open source software, e.g., OpenCV
 - cf. robotics

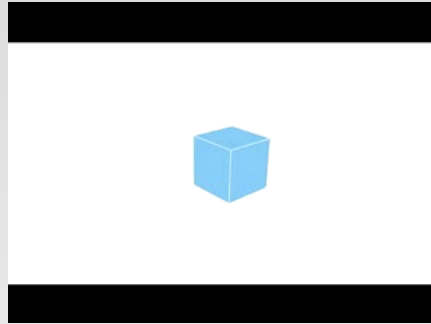
AntiGrav



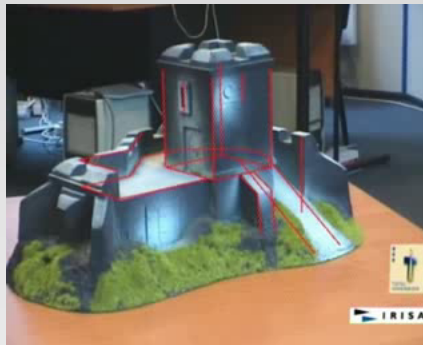
Augmented Reality

- Eye of Judgement [\[video\]](#)
- Lab Demos [\[2 videos\]](#)

Eye of Judgement



Augmented Reality



Augmented Reality



Virtual Reality

- Prof. Lindeman's TactaVest [\[video\]](#)

part of the "Playstation 6"

TactaVest



Neural and Bio Feedback

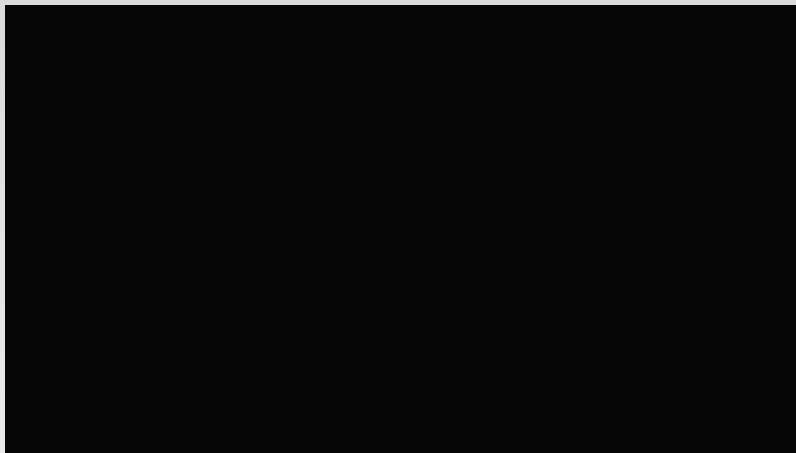
- Heart rate and skin conductance
 - Wild Divine IOM *[video]*
 - <http://www.meditations-uk.com/products/wilddivine.html>

- Neural activity (EEG)
 - EmotivePOC *[video]*
 - <http://www.emotiv.com>

Wild Divine IOM



Emotiv



Other Input Control Ideas

- Speech
 - cheap, easy to get
 - slow, unreliable (esp. in noisy env.)

- “Embodied Gaming”
 - e.g., robosoccer with Sony Aibos



Input Controls Summary

- What can you do with _____ that you *couldn't do* before?
- What's *more fun* with _____ than with previous technologies?
- Does _____ *enhance* game play, rather than replacing traditional controller?

[From Z. Drake, GDC'08]



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37