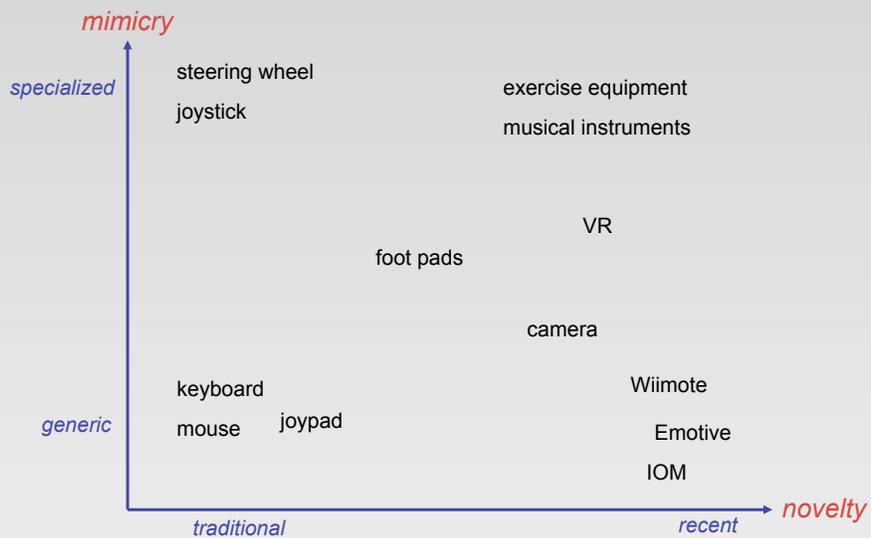# Input Controls

Technical Game Development II

Professor Charles Rich
Computer Science Department
rich@wpi.edu

For more: Take Prof. Lindeman's new course on "HCI for Real, Virtual and Teleoperated Environments" (IMGD 3XXX) in A 09...

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mimicry

specialized

steering wheel

joystick

exercise equipment

musical instruments

VR

foot pads

camera

keyboard

generic   mouse   joypad

Wiimote

Emotive

IOM

traditional   *recent*   *novelty*

IMGD 4000 (D 09)

2

Embrace alternative controllers

We haven't made a joypad game since 2003

Camera   Guitar   Microphone

Guitar + Drums + Microphone!

We've noticed some big user benefits…

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

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They look like what they do

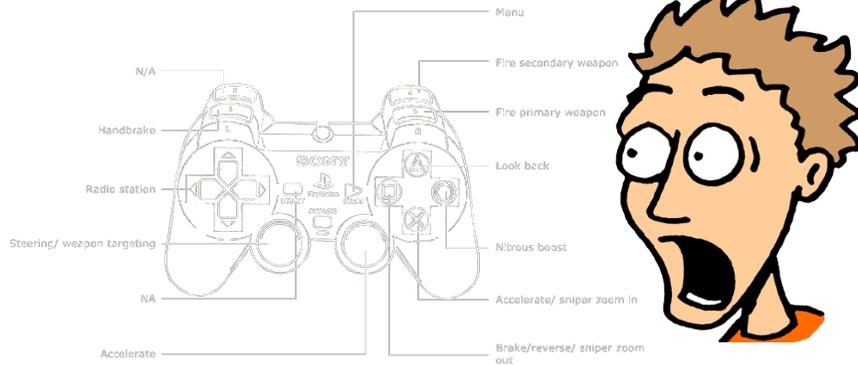*[From Harmonix presentation, IMGD Seminar 2/7/08]*

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It's obvious how to use them

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Joypads

- Generic by design
  - So <u>can't</u> "look like what it does"
  - No mental model for how to use it

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4/24/09

Today's joypads are intimidating

Menu
Fire secondary weapon
Fire primary weapon
Look back
Nitrous boost
Accelerate/ sniper zoom in
Brake/reverse/ sniper zoom out

N/A
Handbrake
Radio station
Steering/ weapon targeting
NA
Accelerate

[From Harmonix presentation, IMGD Seminar 2/7/08]
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These controllers are inviting

[From Harmonix presentation, IMGD Seminar 2/7/08]
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They level the playing field

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Ensure intuitive controls

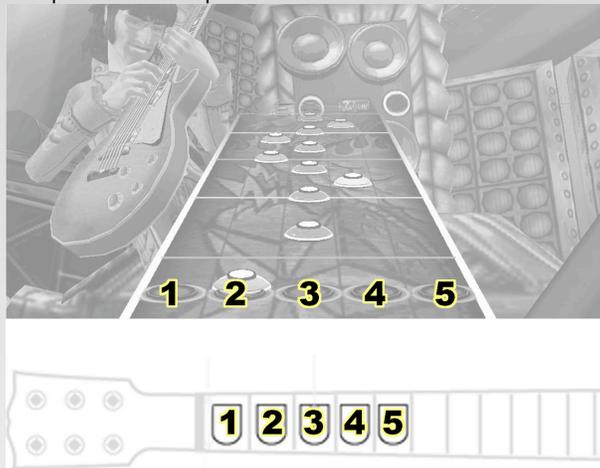IMGD 4000 (D 09)   12

Intuitive Controls

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

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

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Natural Mapping

Spatial relationship between control and result is consistent

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

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[From Harmonix presentation, IMGD Seminar 2/7/08]
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Other Physical Input Devices

- Foot (dance) pads *[video]*

- Exercise equipment

  - www.exerciseinabox.com *[video]*

  - Diamond Park *[video]*

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Dance Pad

WPI IMGD 4000 (D 09)

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www.exerciseinabox.com

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Diamond Park

FALL COMDEX '95

Mitsubishi Electric Booth
Las Vegas, Nevada
November , 1995

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Inertial and IR Sensing

- Wiimote
  - sports games *[video]*
  - finger tracking *[video]*
  - head tracking *[video]*

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Wii Tennis

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Wii Finger Tracking

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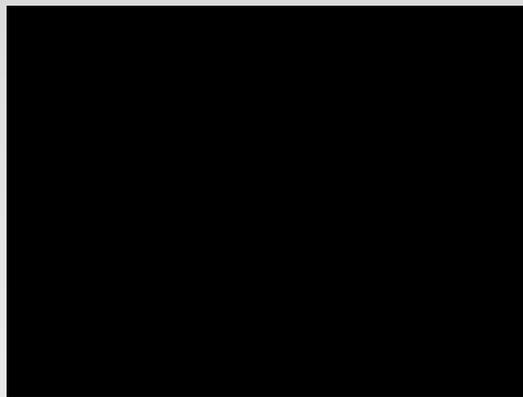
Wii Head Tracking

Head Tracking for
Desktop Virtual Reality Displays
using the Wii Remote

Johnny Chung Lee
Human-Computer Interaction Institute
Carnegie Mellon University

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Using Cameras and Computer Vision

- EyeToy for PS2
  - AntiGrav (Harmonix) *[video]*
    - face tracking
    - template matching
    - rough pose estimation
  - and *many* others (see EyeToy wikipedia page)
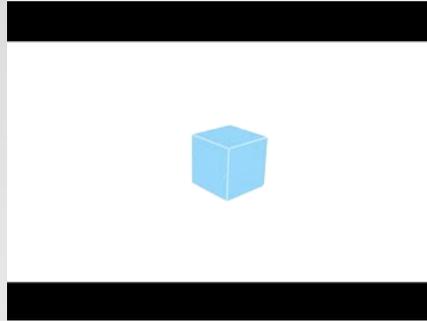
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AntiGrav

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Augmented Reality

- Eye of Judgement   *[video]*

- Lab Demos *[2 videos]*

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Eye of Judgement

Augmented Reality

Augmented Reality

Virtual Reality

- Prof. Lindeman's TactaVest *[video]*
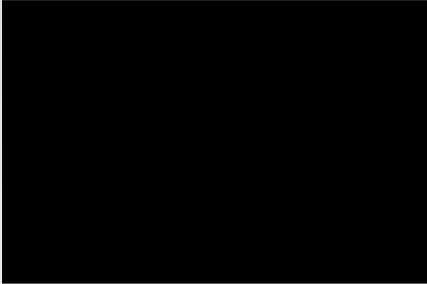
  part of the "Playstation 6"

TactaVest

Neural and Bio Feedback

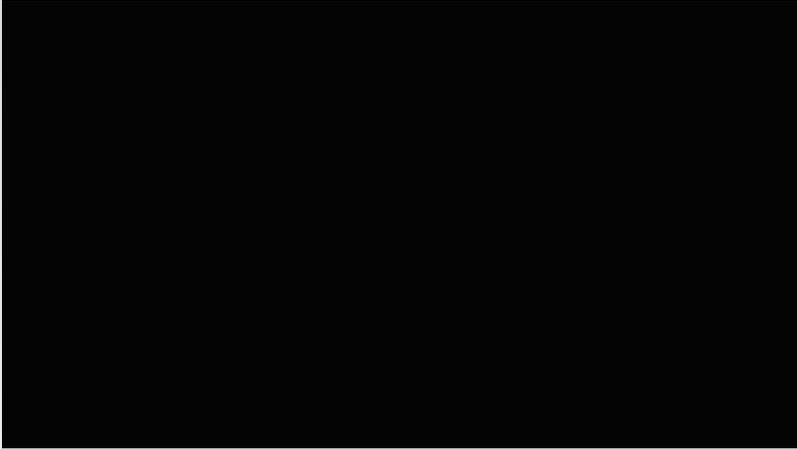- Heart rate and skin conductance
  - Wild Divine IOM *[video]*
    - http://www.meditations-uk.com/products/wilddivine.html

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

Wild Divine IOM

Emotiv

Game Design Ideas using EmotivEPOC

- What can you do with EPOC that you *couldn't do* before?

- What's *more fun* with EPOC than with previous technologies?

- EPOC *enhances* gameplay, rather than replacing traditional controllers

[From Z. Drake, GDC'08]

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Example Emotiv Game Applications

- Spontaneous avatar animation for MMORPG and virtual world situations: why "/wink" when you can just wink?
- NPC interactions in RPGs: don't just select the "friendly" or "angry" dialogue choices.
- *Clench:* a good conscious, short-term, low-latency detection that your player is unlikely to trigger unintentionally.
- Remember to go easy on your players' physiology!

[From Z. Drake, GDC'08]

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Example Emotiv Game Applications

- *Excitement:* modulate music volume, crowd excitement, graphical flourishes.
- *Difficulty modulation:* excitement, frustration
- *Game testing:* quantifiable user data
- *Mental challenges:* complete a task while remaining focused, meditate to restore mana

[From Z. Drake, GDC'08]

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Example Emotiv Game Applications

- Some things are just more fun to do with your mind than with a button!
- Manipulating objects: Telekinesis (push, pull, lift, etc), Disintegration (disappear)
- Social manipulation: using pull as a social attractor
- Think of a cognitiv action as a "super combo" or elaborate "special move" rather than as a button press.

[From Z. Drake, GDC'08]

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Emotiv Training

- Make training part of the game
- Training in-context works better than training in a completely different environment
- Allow players to return to training when they want
- Save profile information

[From Z. Drake, GDC'08]

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Other Input Control Ideas

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

- "Embodied Gaming"
  - e.g., robosoccer with Sony Aibos

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4/24/09

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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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