Mobile and Pervasive Game Technologies

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Reading Summary!

Please answer the following questions: on a piece of paper:

What do Ross et al. conclude about the relationship between *interactivity* and *media richness*? What do they suggest needs to be maintained when retargeting a game to a *mobile platform*?
Limitations of Mobile Devices

What are some of the ways that mobile platforms (e.g., cell phones) are limited as media and gaming platforms?
Limitations of Mobile Devices

What are some of the ways that mobile platforms (e.g., cell phones) are limited as media and gaming platforms?

- Screen size: needs to remain small to be mobile
- “Limited” processing power
- No keyboard and mouse
- Varying environment

Take away message from paper:
- *Richer media is harder to interactively retarget*
- “*Quality*” of the media may be less important than *experience!*
Capabilities of Mobile Devices

But what special powers do mobile devices have? What can they do that desktop computers cannot?
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- Alternative inputs (touch screens, accelerometers)
- GPS -- location detection
- Cameras
- Different social uses (sharing, combining)
- Be used in variety of contexts
  - played during everyday life!
Alternative Inputs

Different inputs allow for different kinds of interactions

Example:

- Accelerometer/Gyroscope for direct physical movement
- Touchscreen can reduce mediation caused by a mouse
Alternative Inputs

http://vimeo.com/21732583
Putting the “mobile” in mobile phone!

More interesting:

*capabilities that take advantage of the fact that a phone can move around*
Localization

- the process of determining location

Different techniques:
• Proximity detection (Active Badges, RFID)
• Triangulation (vision detection)
• Trilateration (GSM, GPS, WiFi)
GPS - Global Positioning System

- Calculating *time-of-flight* to determine distance
- Trilaterate to determine position
- Need to (directly) see the satellites!
Location-based Games

Can You See Me Now?
(Blast Theory, 2003)

Treasure!
(Barkhuus et al. 2005)
Infrastructure

Most localization systems rely on existing *infrastructure*

- Active Badges need proximity sensors
- GPS needs satellites (and is blocked by buildings)
- WiFi localization needs a database of routers
- (Desktop games need internet, electricity, etc.)

*Mobile game technologies = device + surroundings!*
Augmented Reality

Adding virtual elements to augment a real-world environment

Use embedded camera to overlay
• Google Street View directions
• Yelp Reviews

Existing APIs
• e.g., Layar
Although the term “Augmented Reality” has begun to appear in the literature with increasing frequency, we contend that this is occurring without what could reasonably be considered a consistent definition. For instance, although our own use of the term is in agreement with that employed in the call for participation in the present proceedings on Telemanipulator and Telepresence Technologies, where Augmented Reality was defined in a very broad sense as “augmenting natural feedback to the operator with simulated cues”, it is interesting to point out that the call for the associated special session on Augmented Reality took a somewhat more restricted approach, by defining AR as “a form of virtual reality where the participant’s head-mounted display is transparent, allowing a clear view of the real world” (italics added). These somewhat different definitions bring to light two questions which we feel deserve consideration:

• What is the relationship between Augmented Reality (AR) and Virtual Reality (VR)?
• Should the term Augmented Reality be limited solely to transparent see-through head-mounted displays?

Perhaps surprisingly, we do in fact agree that AR and VR are related and that it is quite valid to consider the two concepts together. The commonly held view of a VR environment is one in which the participant-observer is totally immersed in a completely synthetic world, which may or may not mimic the properties of a real-world environment, either existing or fictional, but which may also exceed the bounds of physical reality by creating a world in which the physical laws governing gravity, time and material properties no longer hold. In contrast, a strictly real-world environment clearly must be constrained by the laws of physics. Rather than regarding the two concepts simply as antitheses, however, it is more convenient to view them as lying at opposite ends of a continuum, which we refer to as the Reality-Virtuality (RV) continuum. This concept is illustrated in Fig. 1 below.

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**The Mixed Reality Spectrum**

![Reality-Virtuality (RV) Continuum](image)

Milgram, Takemura, Utsumi, Kishino (1994)
Example AR Games: ARhrrrr (2009)
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Pervasive Games

*Pervasive Games* are games that are interwoven with everyday life
Botfighters *(It’s Alive!, 2001)*
Pervasive Games

*Pervasive Games* are games that are interwoven with everyday life

- Games that are played in non-gaming contexts
- Games that integrate the physical/social world
- Games that are expanded spatially, temporally, or socially

a.k.a: ubiquitous games, appropriative games
Alternate Reality Games (ARGs)

ARGs distribute narrative elements across a variety of platforms, expanding the frame for the game beyond the screen to effectively make the entire world the “game board.”

Example: I Love Bees (http://ilovebees.com)

Use existing “technologies”:
• e.g., web pages, phone booths, fax, postal mail

Blur the boundary of “what is a game”
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Blur the boundary of “what is a game”
More Pervasive Games
More Pervasive Games
More Pervasive Games
Urban Games

where’s the tech?!
Urban Games

where’s the tech?!
Urban Games

*where’s the tech?!*
The Question:

Do we really need complex or advanced technology for pervasive games? For *any* game?

What do we get from using new, advanced tech? What do we lose?
The Moral:

Think about the experience you want people to have, *then* decide on the technologies that can best support that experience!
If you want to talk more about games as experience or the line between games and non-games...

ICS 60: Computer Games and Society
Summer Session 2

If you want to talk more about reliance on social and technical infrastructures...

ICS 5: Environmental Issues in Information Technology
Summer Session 1