CS-525H: Immersive HCI

Wayfinding

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Navigation

- Navigation = Travel + Wayfinding
- Travel is the component of VR that involves moving from one place to another
- Wayfinding is:
  - Knowing where you are,
  - Knowing where your destination is, and
  - Having some knowledge of how to get there.
Wayfinding in the Real World

How do we do wayfinding in the real world?
Why Study Wayfinding?

- Two reasons for wayfinding improvement in VR
  - VR performance enhancement
  - Training transfer

- We can show that:
  - One set of wayfinding cues works better than another
  - Exposure to wayfinding cues in VR improve wayfinding in the real world.

- Spatial Comprehension:
  - The ability to perceive, understand, remember, and recall for future use.
Spatial Knowledge Acquisition

- Direct environmental exposure
- Indirect tools, like maps
  - These can be used outside or inside of the environment
- Direct cues (urban situations)
  - Landmarks
  - Routes (or paths) between landmarks
  - Nodes are junctions in routes
  - Districts are regions of the city
  - Edges prevent or deter travel
    - Typical edge is a river or lake
  - Landmarks and nodes typically live in districts, and routes pass through districts and connect them
Spatial Knowledge Acquisition Using Maps

- Can be used prior to travel
  - Used to plan ahead
  - Should be "North Up"

- Can be used during travel
  - Require a ego-to-geo transformation
  - Where am I? Which direction am I facing?
  - This must be updated during travel
  - Should be "Forward Up"

- The key to map use for navigation is resolving the egocentric to geocentric perspective transformation.
Spatial Acquisition

- Landmark, Route, Survey (or LRS) model described by Seigel and White and Thorndyke and Goldin
  - Landmarks are acquired
  - Route knowledge is added to go between certain pairs of landmarks
  - Survey knowledge allows me to plan a route between any two landmarks

- The use of maps allows us to leapfrog directly to survey knowledge
  - But, this is inferior to real-world survey knowledge development
Strategies

- Looking for shoes in the mall
Map Examples

- **Forward-Up Map**
  - [http://www.gametrailers.com/player/32457.html](http://www.gametrailers.com/player/32457.html)
  - [http://www.gametrailers.com/player/17541.html](http://www.gametrailers.com/player/17541.html)

- **North-Up Map**
  - [http://www.gametrailers.com/player/19720.html](http://www.gametrailers.com/player/19720.html)
Maps: North Up
Maps: Forward Up
Maps: Forward Up + Landmarks
Maps: Paths
Maps: Paths on the Map
Maps: Sun as Landmark
Landmarks

- Distinguishable (unique)
- Viewable from a good distance
- Memorable
Signage

☐ Can be:
- World fixed
- Body fixed
- Object fixed
Signage

(www.FourWindsInteractive.com)
Reference

Much material from

http://vehand.engr.ucf.edu/handbook/Chapters/Chapter28/Chapter28.html