CSE 165:
3D User
Interaction

Lecture #10: Travel Part 2

Announcements

- Homework Assignment #3
  - Due this Friday at 2pm

HoloLens

- Superbowl 2017
  - http://uploadvr.com/microsoft-hololens-super-bowl/

Travel Techniques

- Physical locomotion ("natural" metaphors)
- Steering techniques
- Route planning
- Target-based techniques
- Manual manipulation
- Viewpoint orientation techniques

Physical Locomotion Techniques

- Walking techniques
  - Large-scale tracking
  - Walking in place
- Treadmills
  - single-direction with steering (Gait Master)
  - omni-directional
- Bicycles
- Other physical motion techniques
  - Magic carpet
  - Disney's river raft ride

Large Scale Tracking

Omni-Directional Treadmill

- Video:
  - http://www.youtube.com/watch?v=BQw1tsgrJOs

Omni

- https://www.kickstarter.com/projects/1944625487/omni-move-naturally-in-your-favorite-game
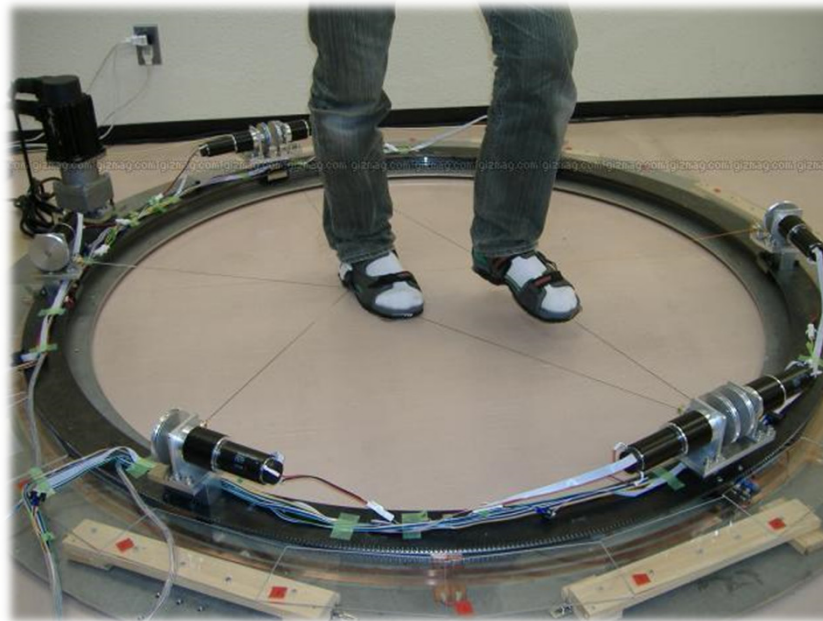
Gait Master

- Video
  - http://www.youtube.com/watch?v=RDDH1iqoDzU

String Walker

- Video from Emerging Technologies, SIGGRAPH 2007
  - http://www.youtube.com/watch?v=hyLKjyL-Dw8

Steering Techniques

o Steering:
  o Continuous specification of direction of motion
o Techniques:
  o Eye gaze
  o Head direction
  o Hand pointing
  o Torso-directed
  o Physical device (steering wheel, etc.)

Steering by Eye Gaze

- Move viewpoint in direction of eye gaze
- Gaze direction determined from eye tracker
- Cognitively simple
- Doesn't allow user to look to the side while traveling

Steering by Head Orientation

- Move viewpoint in direction head is pointed

- Direction determined from head tracker

- Cognitively simple

- Allows user to look to the side while traveling, but hard to decouple eye gaze and head direction

Steering by Pointing

- Similar to steering by head orientation, but uses hand tracker instead of head tracker
- Cognitively slightly more complex than steering by eye/head
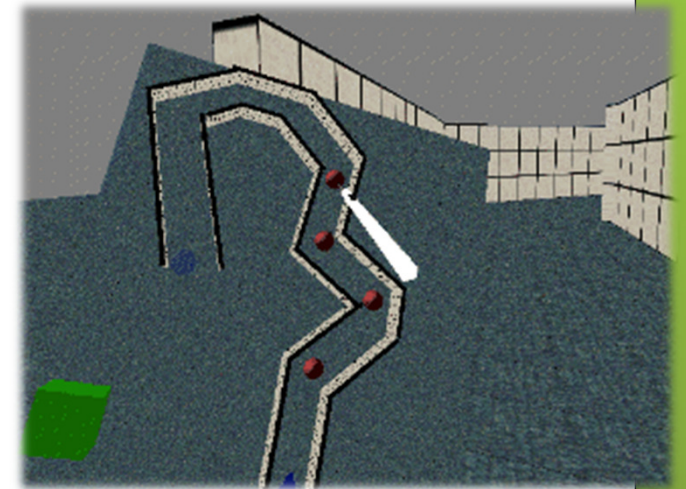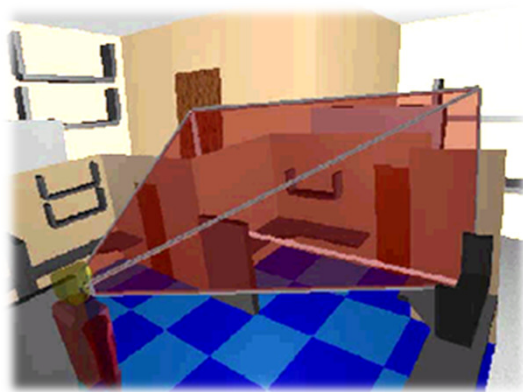- Allows travel and eye gaze in different directions

castAR

- https://www.youtube.com/watch?v=hL1qT0TK6aw

Route-Planning

- One-time specification of path
- Implementation:
  - Draw entire path
  - Specify points along path
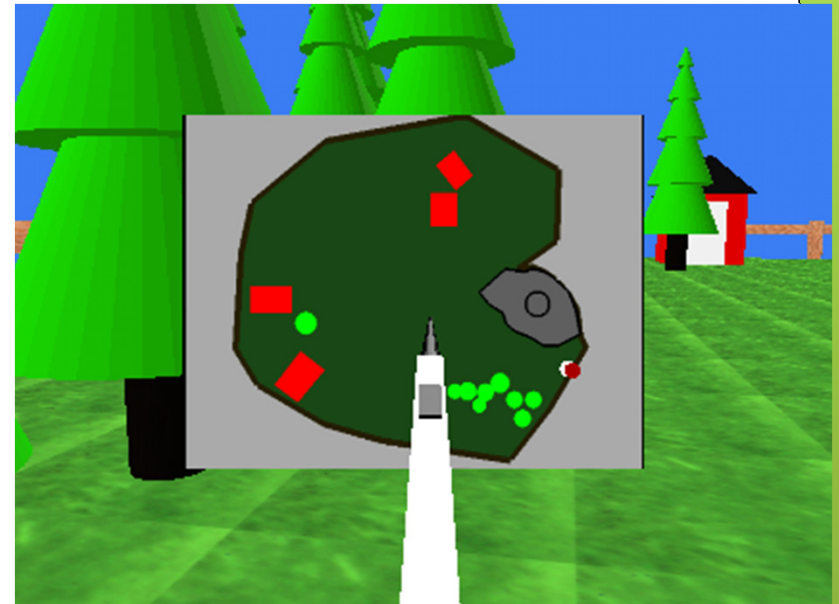 - Manipulate user representation

Target-Based Techniques

- Direct specification of destination
- Techniques:
  - Point at target object
  - Choose target from list
  - Enter coordinates
  - Use Map/WIM

Map-Based Travel Techniques

- User represented by icon on 2D map
- Drag icon with stylus to new location on map
- When released, viewpoint moves smoothly to new location

Manual Manipulation – Grabbing the Air Technique

- Use hand gestures to move yourself through the world
- Metaphor of pulling a rope
- Can be one-handed, but often a two-handed technique
- Works well with Pinch Gloves or Razer Hydra

Viewpoint Orientation Techniques

- Head tracking
- Orbital viewing
- Non-isomorphic rotation
- Virtual sphere (trackball)