



# CSE 165: 3D User Interaction

Lecture #12: Travel

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# Announcements

- Homework Assignment #4
  - Due February 27<sup>th</sup> at 1:00pm
  - Homework discussion February 18<sup>th</sup>

# Navigation

Wayfinding – Cognitive Component

**Travel – Motor Component**

# Travel

- The motor component of navigation
  - Good travel techniques integrate aids to wayfinding
- Movement between two locations, setting the position (and orientation) of the user's viewpoint
- The most basic and common VE interaction technique, used in almost any large-scale VE

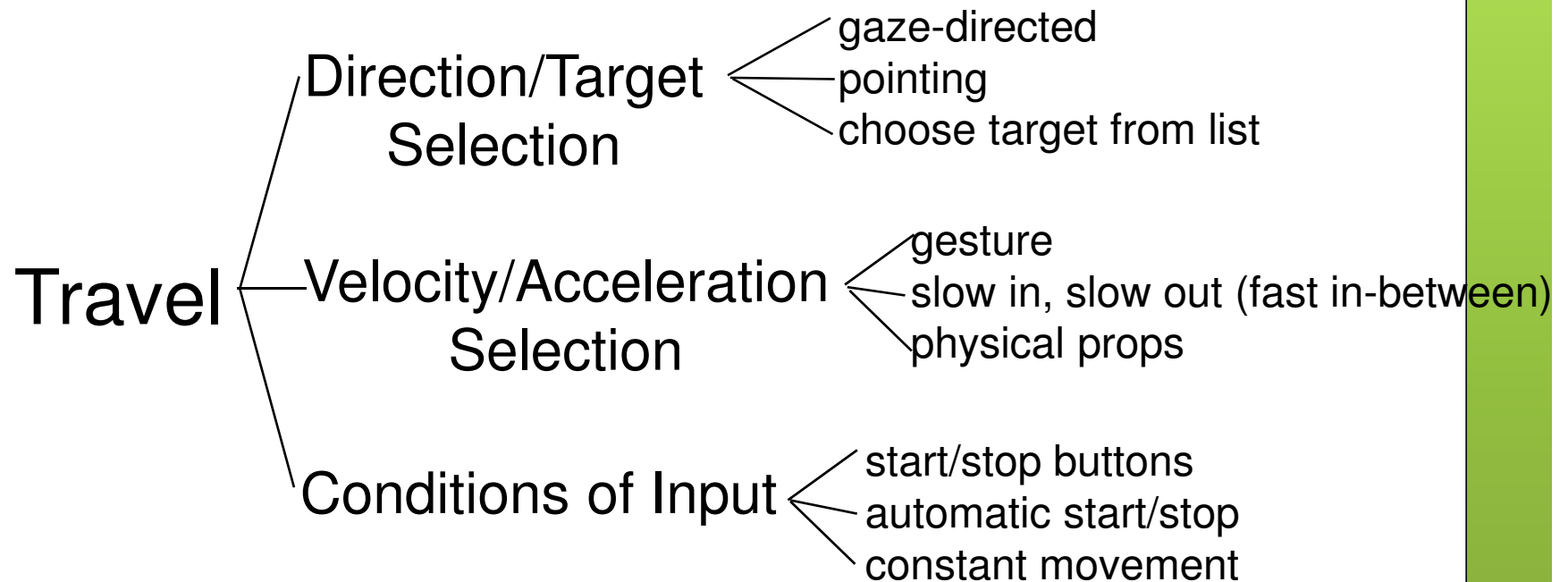
# Travel Tasks

- Exploration
  - travel which has no specific target
  - build knowledge of environment
- Search
  - naïve: travel to find a target whose position is not known
  - primed: travel to a target whose position is known
  - build layout knowledge; move to task location
- Maneuvering
  - travel to position viewpoint for task
  - short, precise movements

# Travel Characteristics

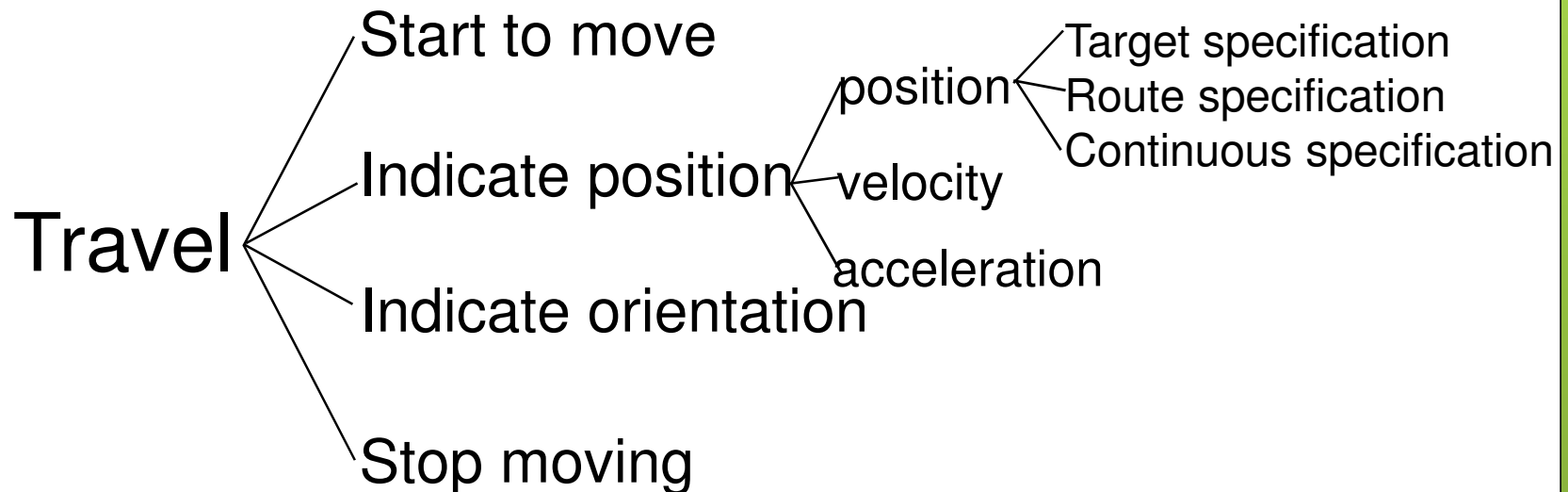
- Travel distance
- Amount of curvature/number of turns in path
- Target visibility
- DOF required
- Accuracy required
- Other tasks during travel
- Active vs. passive
- Physical vs. virtual

# A Technique Classification – Component Decomposition



*From: Bowman, Koller, and Hodges, Travel in Immersive Virtual Environments. IEEE VRAIS '97*

# Alternate Technique Classification – User Control Level





# 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=BQw1t\\_sgrJOs](http://www.youtube.com/watch?v=BQw1t_sgrJOs)



# Omni

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

