

HEADSET CONTROL WITH ASSISTIVE AI FOR LIMITED MOBILITY USERS

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Why I'm interested



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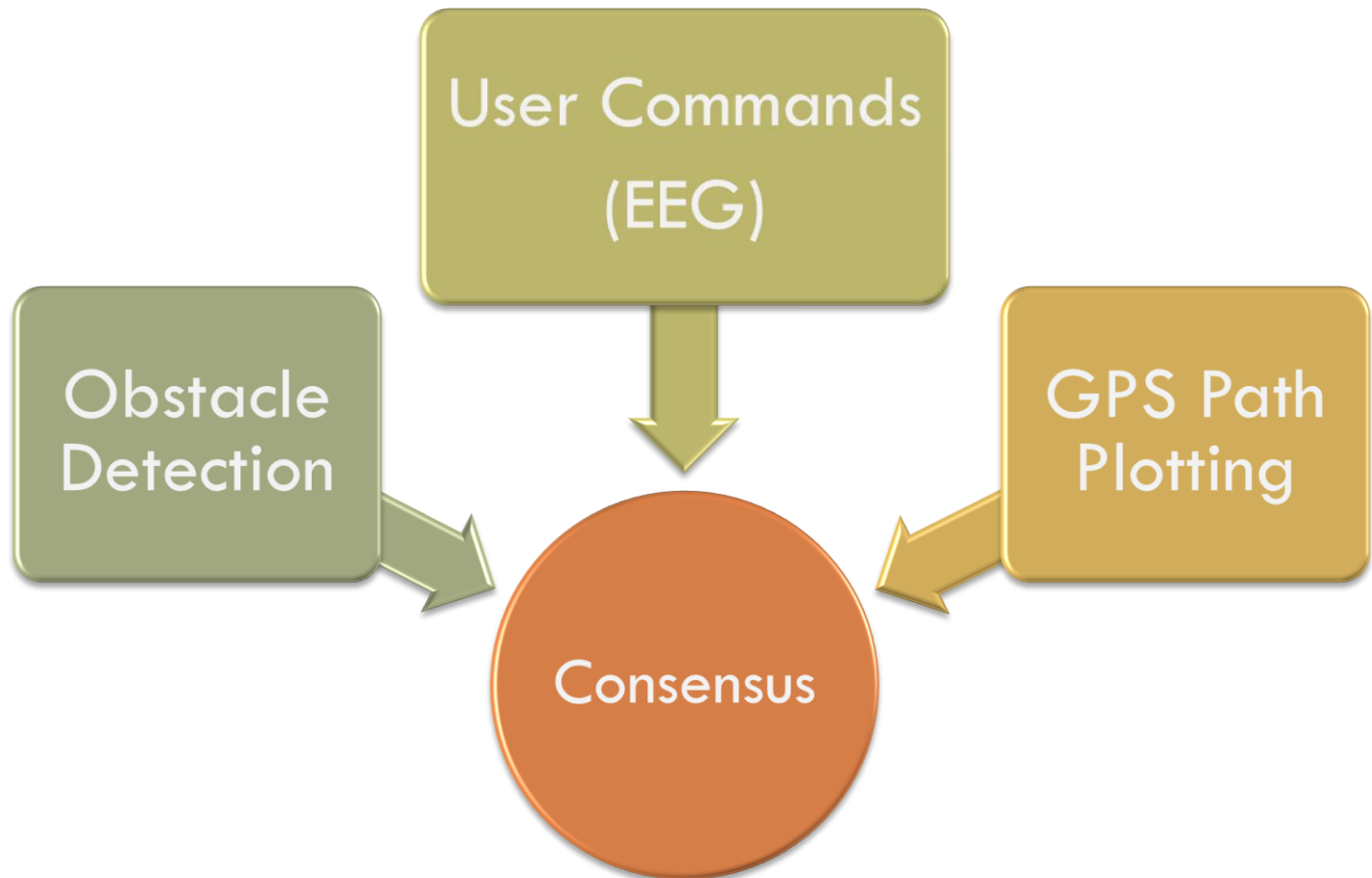


But that's EASY!

- GPS = where we are
- Cameras = what we don't want to hit
- Mind control = magic



Architecture



But that's EASY!



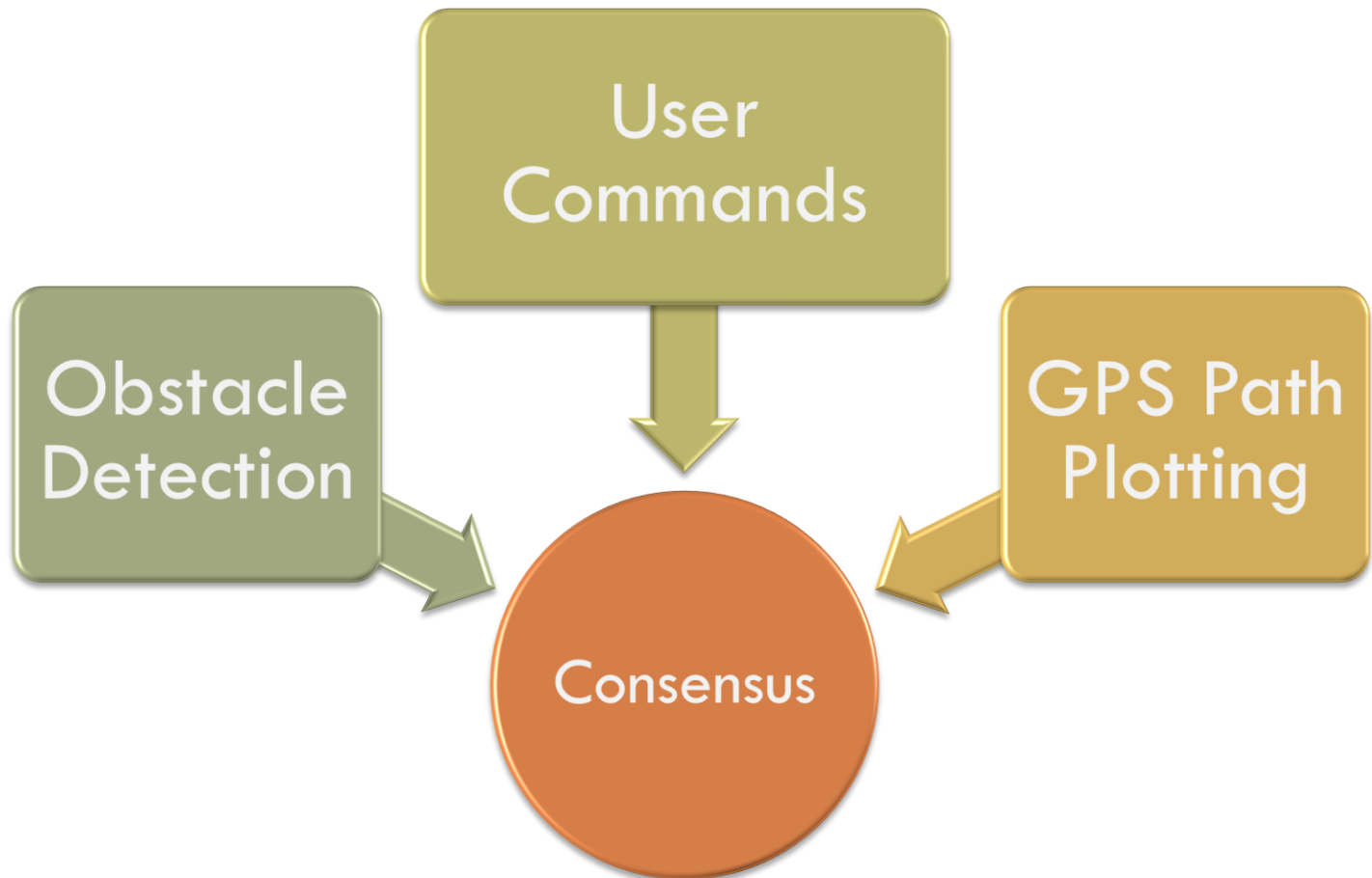
But that's EASY!



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Architecture



eBay!

Multi-Agent Decision Engine

Agents

NavClasses

Auctioneer

Auction

Bidders

Message
Feed

Timer

OAS

Long Range Planner

User

3D
Cameras

GPS

Compass

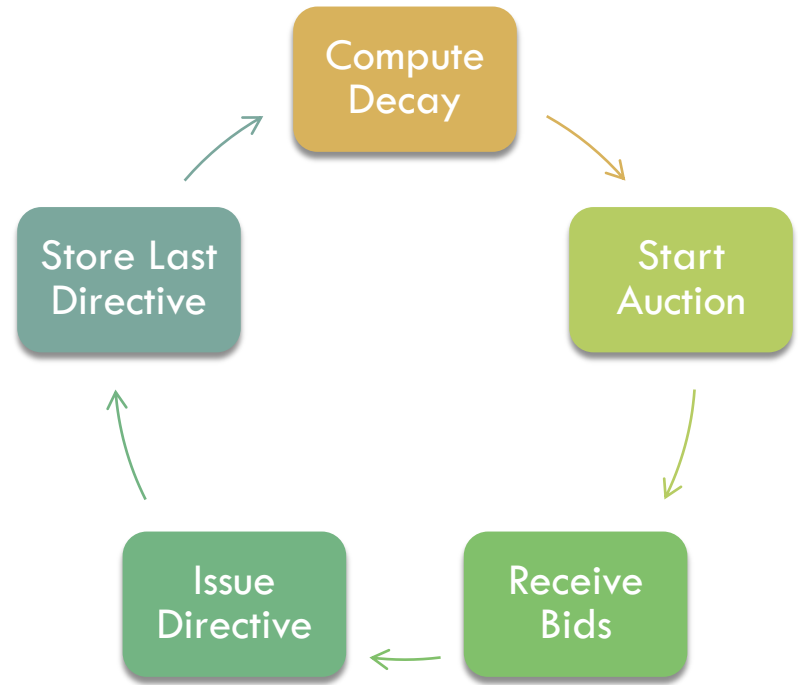
EEG Filter

Override

Agent Lifecycles

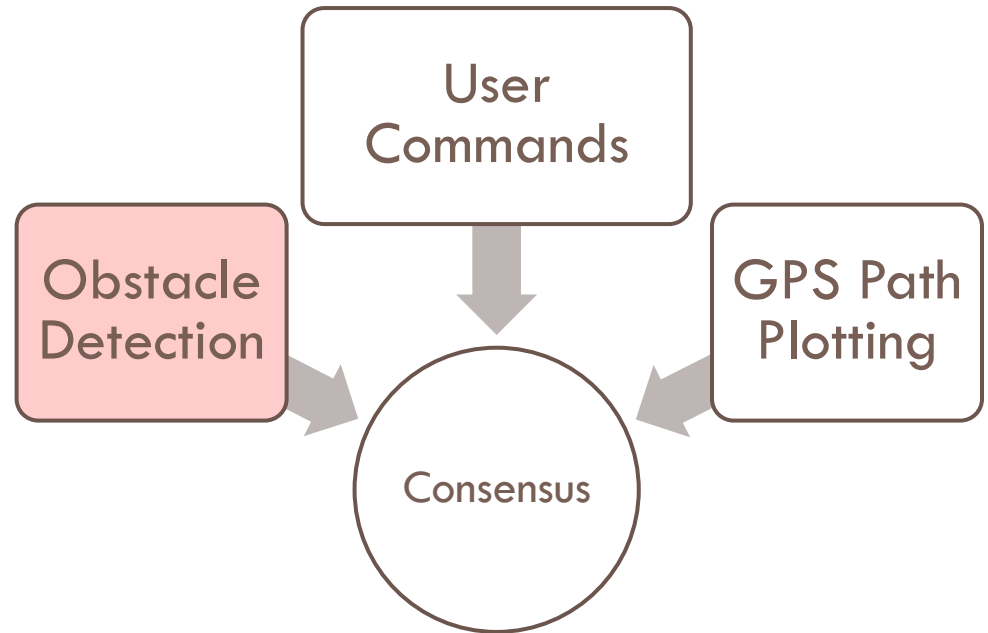


Bidder

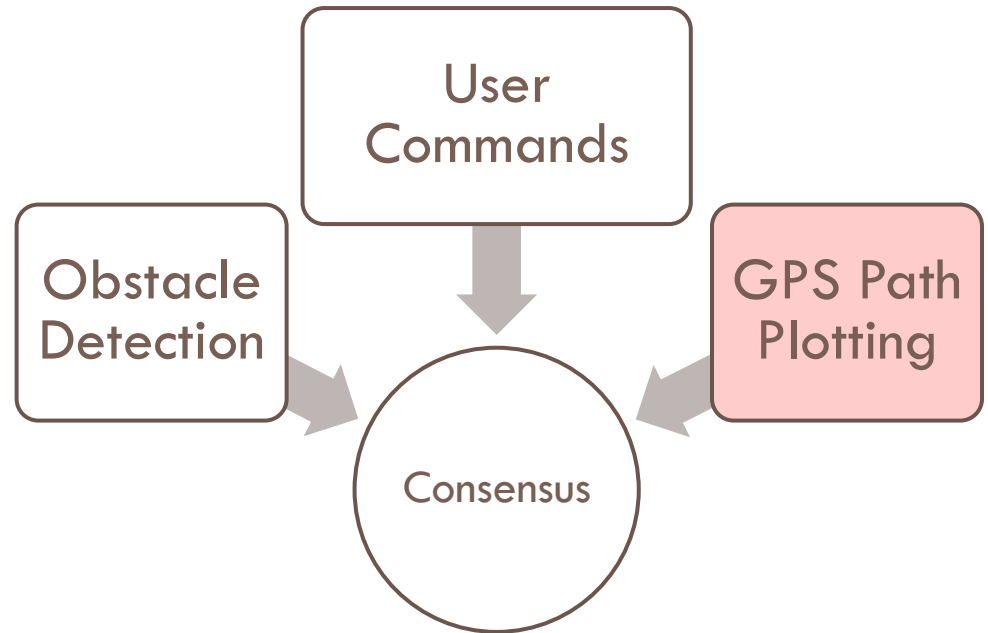


Monitor

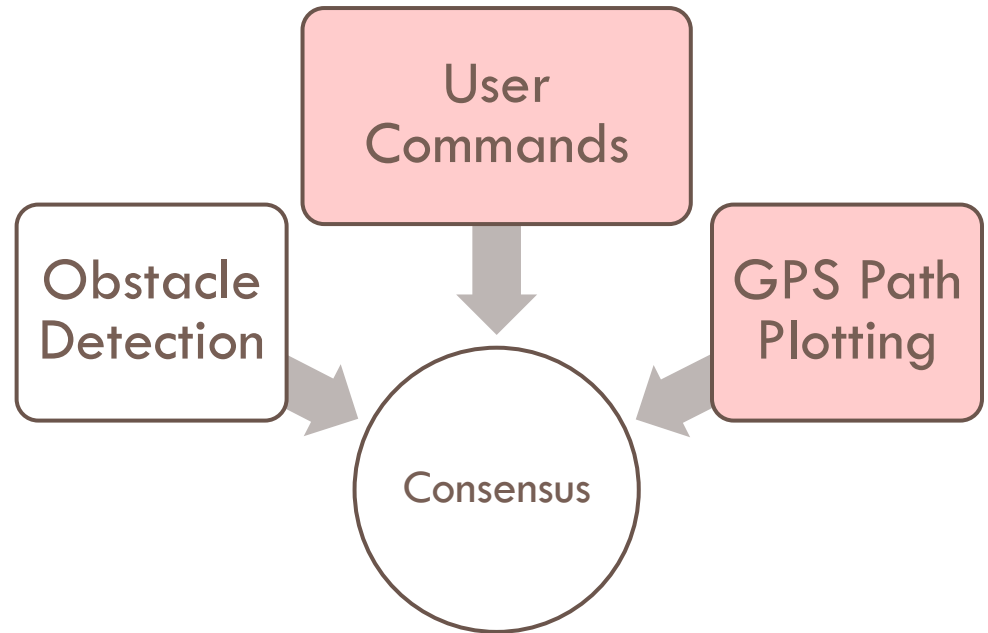
Architecture



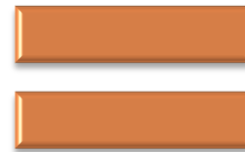
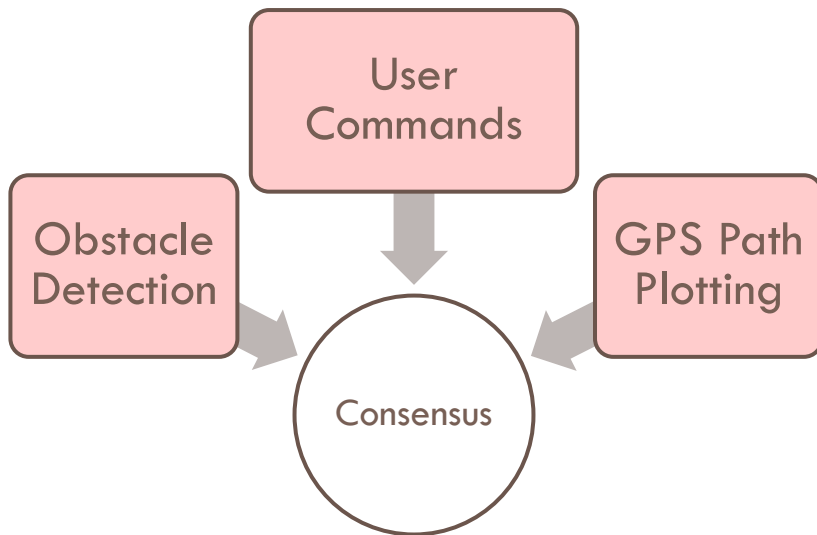
Architecture



Architecture



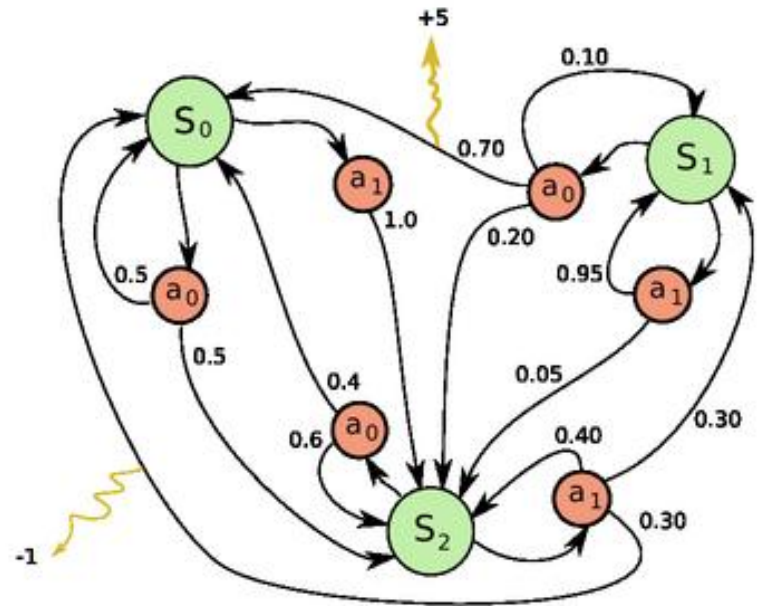
Architecture



Partially Observable
Environment

POMDPs

- Partially Observable Markov Decision Processes
 - Allow modeling with uncertainty
 - Uncertainty in state
 - Uncertainty in transition
 - PSPACE-Hard (Go)



Xavier (Carnegie Mellon)

- One of the first POMDP based
 - ▣ 3000 states
 - ▣ Periodic re-evaluation
- 60km of testing in offices
- Compartmentalized Nav
 - ▣ Landmark: 80%
 - ▣ POMDP: 93%
- Resilient to failure



RHINO

- Tested in a museum
- Builds model of environment
- Decentralized processing
- Markov models for localization

- *V1: Glass is invisible to lasers*
 - ▣ *What else is?*



Collaborative Wheelchair Control

- Guided
- Follow, not push
- Side by side
- Pass through door
- Follow behind
- *Heuristics for dense environments*



Doable and worthwhile

