

Hide and Seek: Model and Data

Frank J. Lee
Computer Science
Drexel University
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Research Goal

How do people learn dynamic skill?

(*Lee, Anderson, & Matessa, 1995*)

- Skill Acquisition
 - *Lee & Anderson, 2001*
 - *Taatgen & Lee, in press*
- Multitasking
 - *Lee & Taatgen, 2001*
 - *Smith & Lee, 2003*
- Prospective Memory
 - *Lebiere & Lee, 2001*

Psychological Time: Cognitive perception, representation, and processing of time.



The Task: Hide and Seek

1. Player 1 and 2 at start location
2. Player 2 is told to hide
3. After 100 seconds, Player 1 is go told to find Player 2
4. Player 1 has 100 seconds to find Player 2
5. If Player 1 finds Player 2 in time or the time runs out, both players are asked to return to the start location
6. Repeat 1-5 with Players switching roles

The Task Environment: Unreal Tournament



The Pilot Data: Playback

Show some eye candy

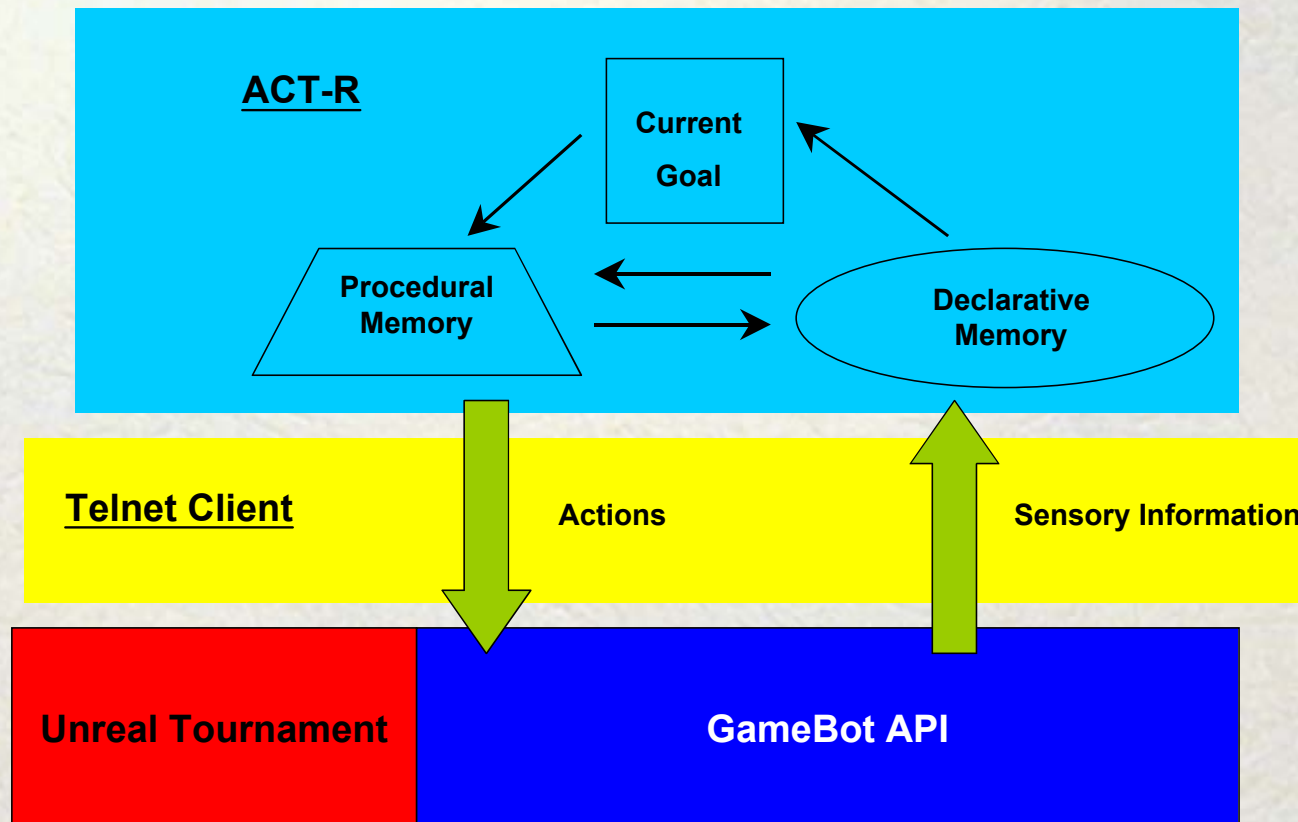
The Pilot Data: Traces

Show some more eye candy

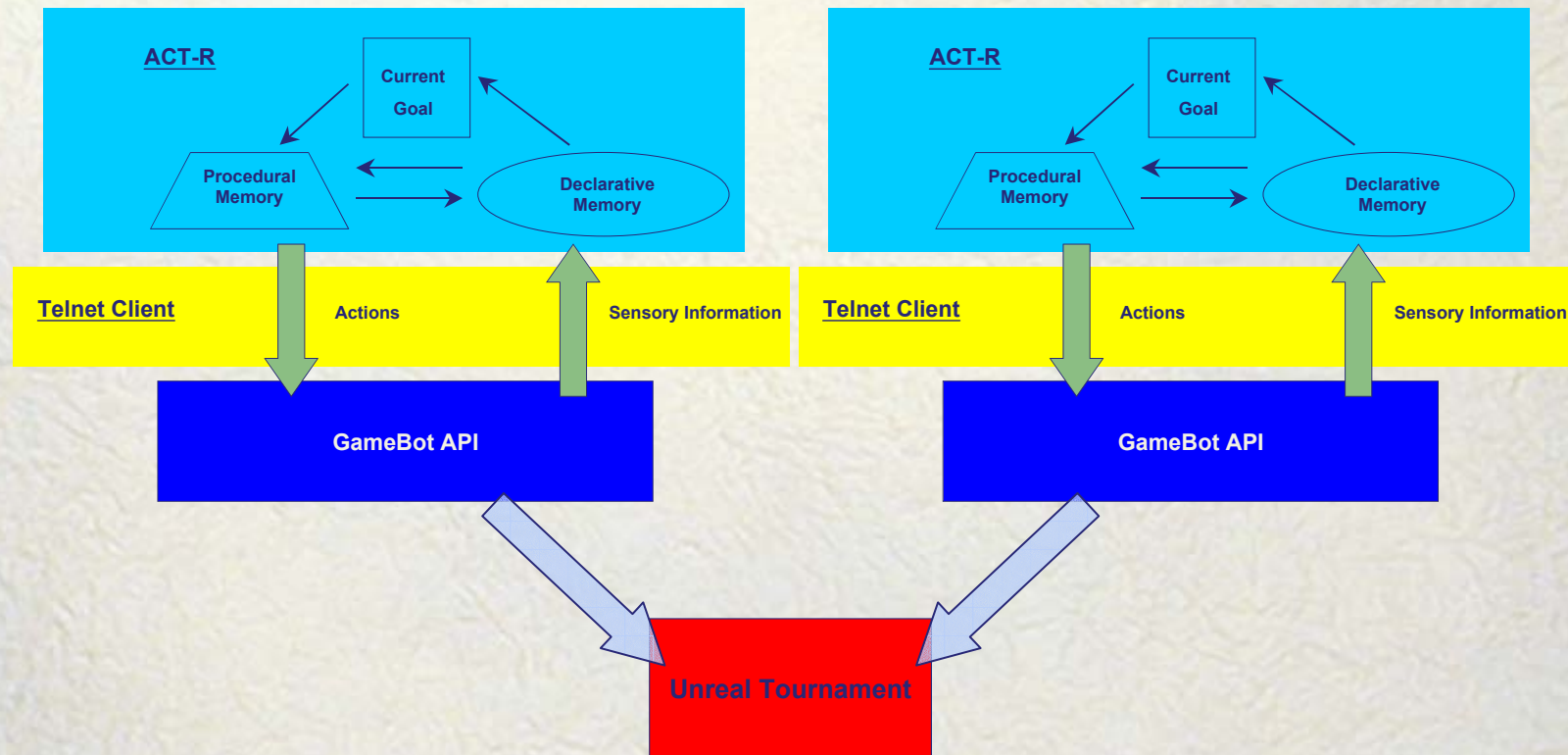
People Hiding Places



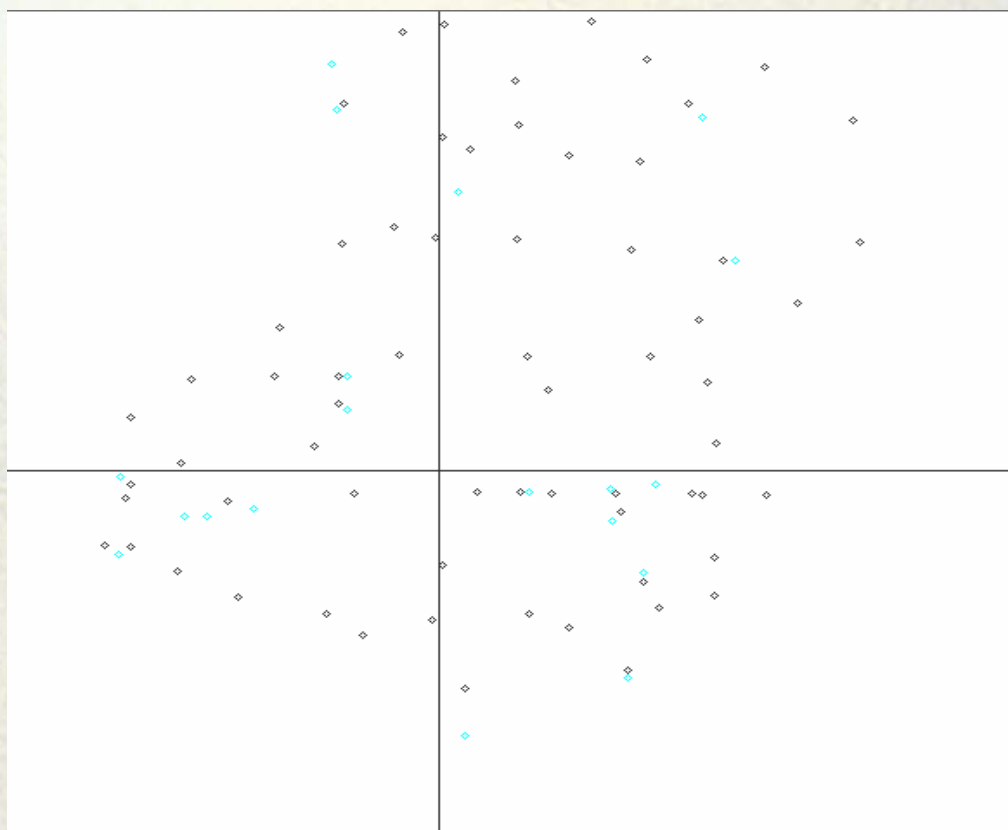
Cogbot System



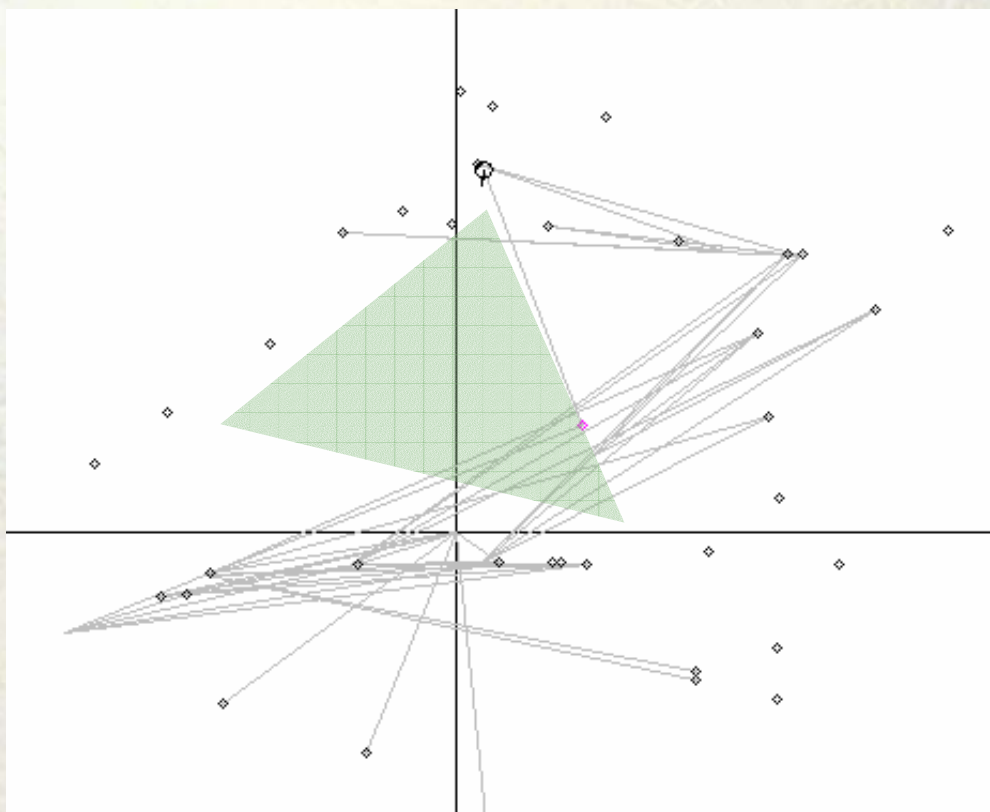
Model 1 and Model 2



Navigation in Unreal Tournament: 1000 points of light



Navigation in Unreal Tournament: Egocentric view



Best Hiding Place Location

- ✓ Limitations imposed on perception by UT's Navigation Points
- ✓ Didn't want prior knowledge of the map
- + The bot circles to look at all reachable navigation points in its local surrounding
- + The bot uses a noisy function that balances between distance from start, connectivity and new location to choose the next "best" navigation point to investigate, maintaining the current best navigation point
- + When times up, the bot then goes to the current best navigation point
- + Add noise to the evaluation to create

Bot Hiding Places



Overall Stat: Success and Failures

Human

total runs:	78		
sum_found:	52	% found:	66.7
sum_Not found:	26	% hide:	33.3

Model

total runs:	18		
sum_found:	5	% found:	27.8
sum_Not found:	13	% hide:	72.2

Issues

- Strong limitation for a realistic agent in UT is the navigational system and the paucity of perception.
- Possible Solution/Hack: Preprocessing of the maps with structural knowledge
- Work within the limitation of the UT system:
 - Assume that you bot is the young Luke Skywalker “using the force”

Future Directions

- The current work is *work in progress*...
- ✓ Continue to refine the model in UT
 1. Learning (low level multitasking rules and high level strategies), Prospective Goals, and Time
 2. Team-based problem solving and learning (enhanced representation through communication, speech acts, etc)
- ✓ In the spirit of model reuse, build a mock up maze and use ACT-R mobots to play hide and seek (c.f. Trafton, 2002)