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Robot Tag

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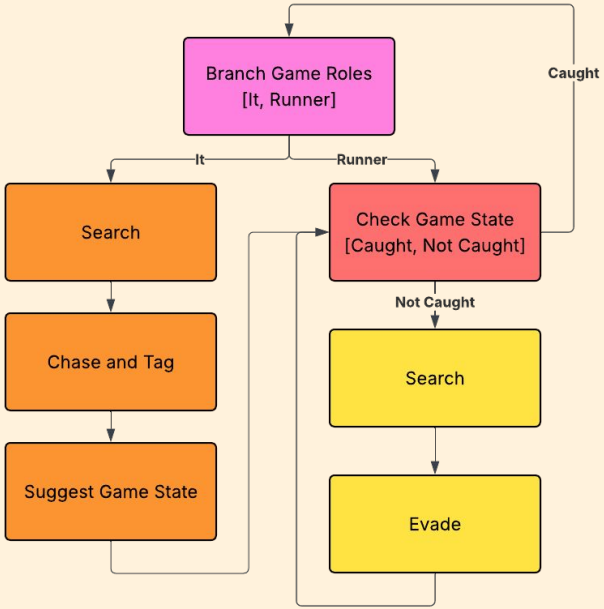
15-494/694 Cognitive Robotics

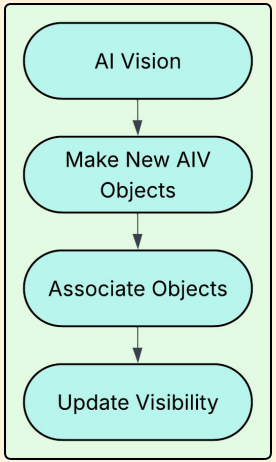
Proof of concept: Can two VEX AIMs interact with each other fast enough to play tag?

Approach

1. FSM handles game logic



2. Modified vex-aim-tools



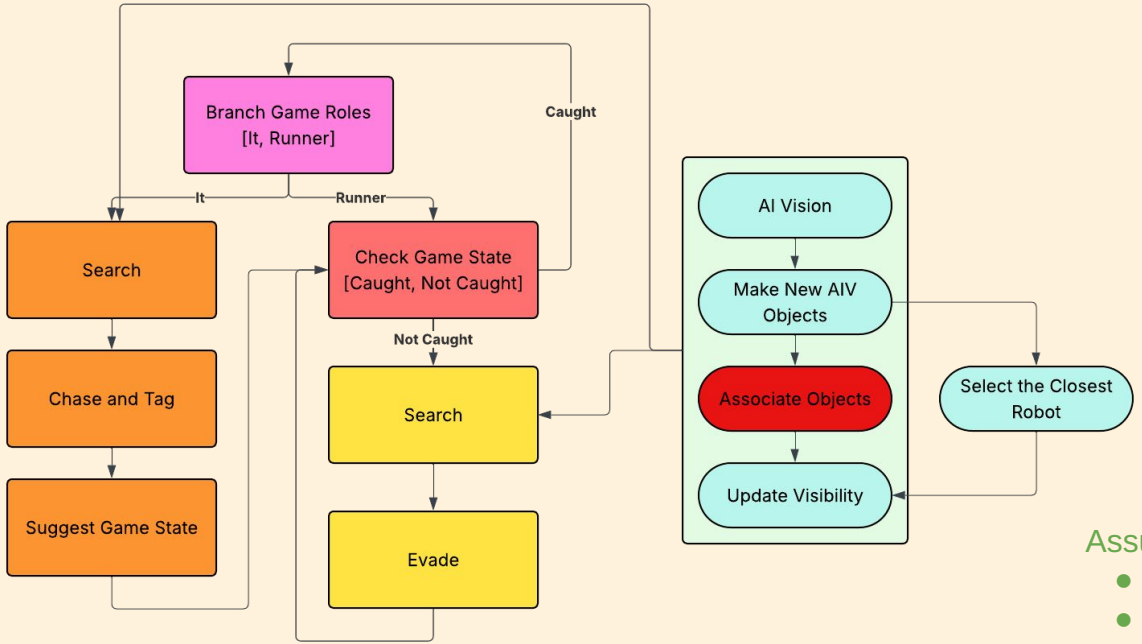
- Use built-in Robot Object Recognition
- Turn on vision during motion

Problems:

- Associating objects creates buffer before updating object visibility
- Modifying association of objects leads to spurious detection

Approach

1. FSM handles game logic



2. Modified vex-aim-tools

- Use built-in Robot Object Recognition
- Turn on vision during motion
- Use Custom Logic

Assumptions:

- Only one robot is visible
- That robot is the closest one
- Low position accuracy is OK

Interesting Aspects

Assumptions:

- Only one robot is visible
- That robot is the closest one
- Low position accuracy is OK

Similar to what we would be attentive to during a game of tag

- The only person that matters is the closest one
- Tunnel vision
- Need not know exact position, rather the general direction to move

The final bottleneck to fast reaction:

- The event loop never updates vision objects
- Solved by using =T(0.05)=>

Results

1

Instant Reaction

Both It and Runner react to their targets instantly once vision is updated

2

Robot Interaction

Simple communication and syncronizaiton of game states works well with a simple text file that both robots can view. Now can view robot on world map!.

3

Faster Vision

Trading off object position accuracy and multiple objects for faster visibility updates. Avoids the spurious object problem. Detects other objects as robots (See video)

4

No Spacial Awareness

Cannot localize its position accurately, and cannot avoid obvious obstacles like walls and ledges.

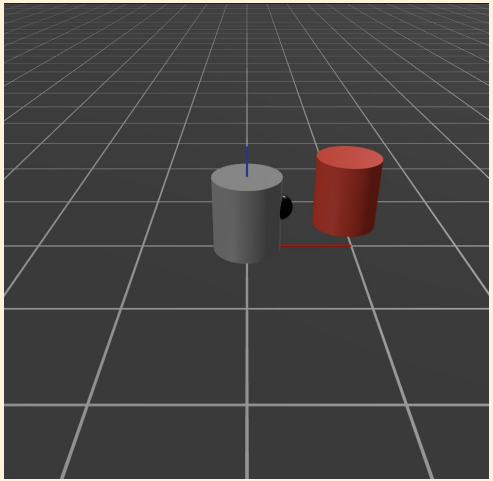
5

Robots Obsessed With Each Other

Robots always try to face each other.Runner is incapable of running away from a robot object that is not visible.

Future Directions

- Sending robot objects that are further away to the normal vision system
- Representing the robots visually on world map (Implemented. Due to robot assuming the other robot moves, unseen or missing state is not implemented. Also, theta not supported)
- Robot personal stats:
  - Movement speed
  - Vision reaction time
  - Evading and seeking behavior



Demo (old)