Project Resources

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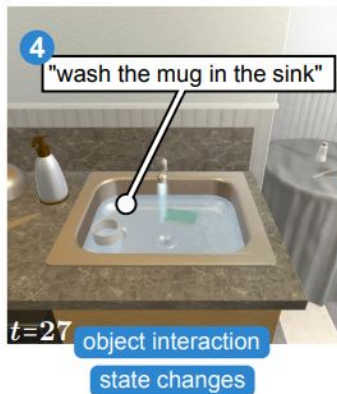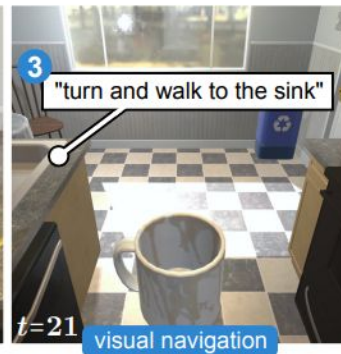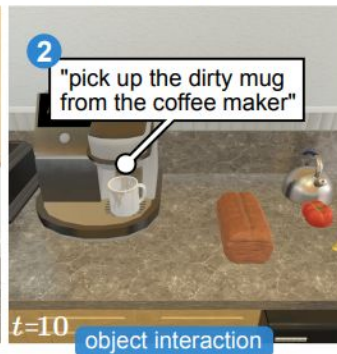CS 598: Embodied Task Oriented Dialogue

AI2THOR

- interactive environments for embodied AI
- simulation
  - physics, lighting, material, layouts
- household environments
  - kitchen, bedroom, bathroom, etc
- object interactions
  - track states
- demo
- documentation
- colab starter

Datasets (ALFRED)

- embodied task completion
  - object interaction
  - state changes
- simulated environment
- natural language instructions
- metrics
  - task success
  - goal condition success
  - path weighted metrics
  - sub-goal evaluation
- CVPR'21

Goal: "Rinse off a mug and place it in the coffee maker"

1 "walk to the coffee maker on the right" — t=0 — visual navigation

2 "pick up the dirty mug from the coffee maker" — t=10 — object interaction

3 "turn and walk to the sink" — t=21 — visual navigation

4 "wash the mug in the sink" — t=27 — object interaction, state changes

5 "pick up the mug and go back to the coffee maker" — t=36 — visual navigation, memory

6 "put the clean mug in the coffee maker" — t=50 — object interaction

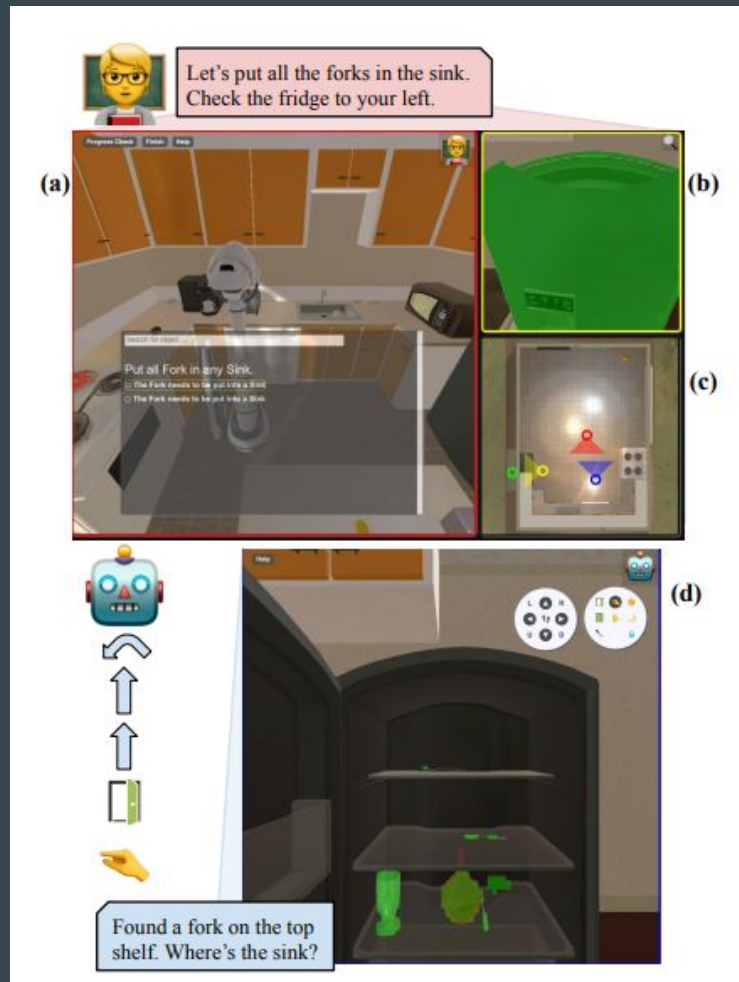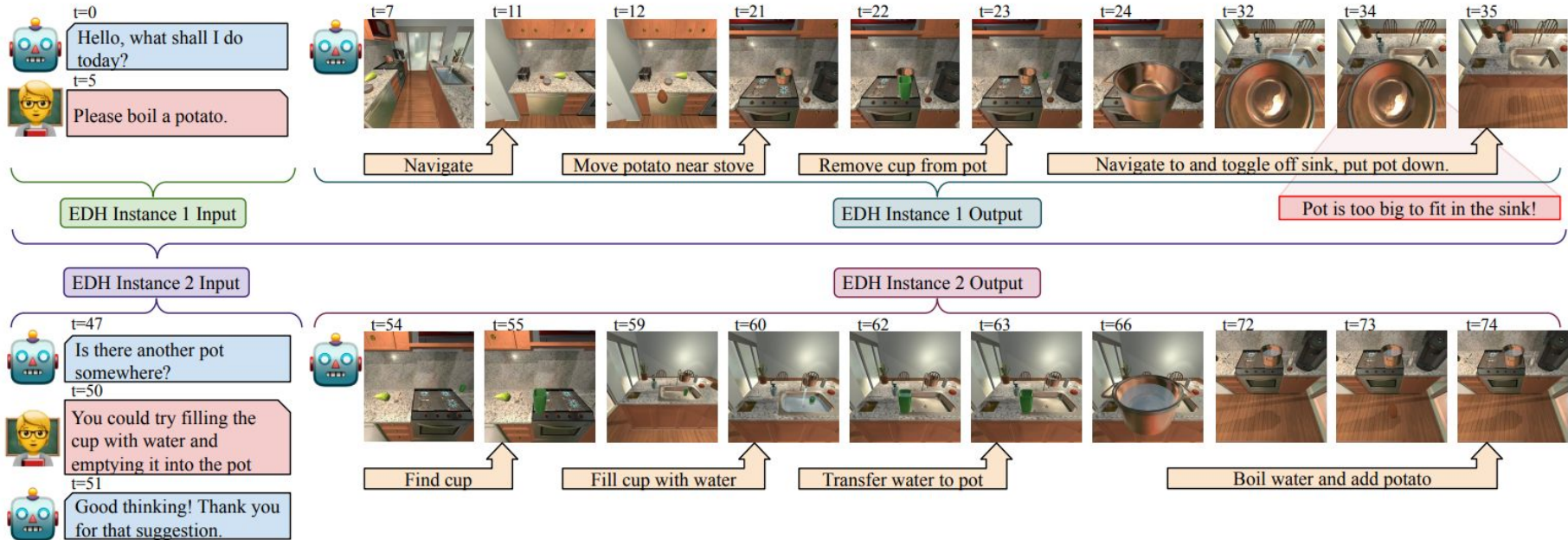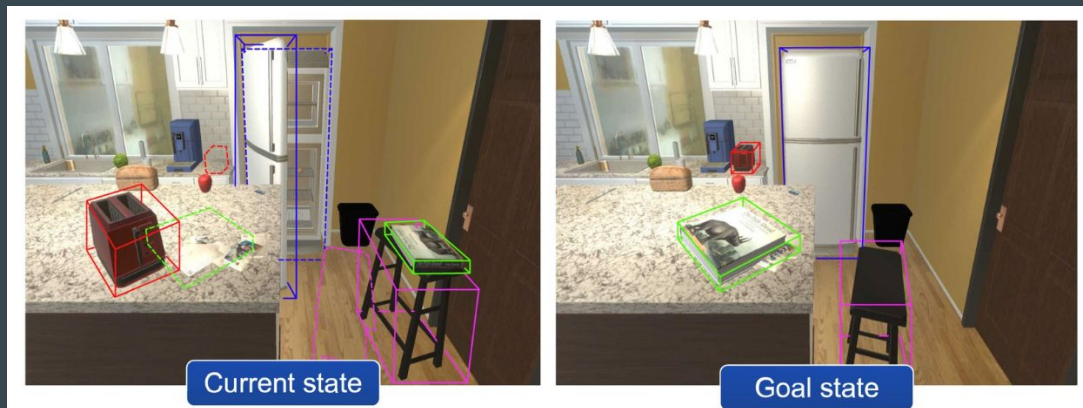|	Annotation # 1	Annotation # 2	Annotation # 3
Goals	**Put a clean rag on the top shelf of a barred rack.**	**Wash the pink towel on the shelf, put it back on the shelf.**	Clean a red cloth.
Instructions	Turn around, go to the barred rack. Pick up the rag from the bottle shelf of the barred rack. Go to the sink on the left. Put the rag in the sink, turn on then turn off the water. Go to the barred rack to the right of the sink. Put the rag on the top shelf of the barred rack.	Wash the pink towel on the shelf, put it back on the shelf. Turn around and go the shelf. Pick up the pink towel on the shelf. Turn around and put the towel in the sink. Fill the sink with water and wash the towel, take the towel out. Go back to the shelf. Put the towel back on the shelf.	walk on over to the towel drying rack. pick up a dirty red cloth from the towel rack. walk over to the left side of the bathroom sink. turn on the water to rinse the dirty red cloth and pick it back up again. walk back over to the towel drying rack. place the clean cloth on the drying rack.

Datasets (TEACh)

- embodied task completion
- simulated environment
- natural language **dialogue**
  - leader and follower
  - high and low level instructions
- metrics
  - EDH (Execution from History)
  - TfD (Trajectory from Dialogue)
  - TATC (Two Agent Task Completion)

EDH Instance 1 Input

t=0 🤖 Hello, what shall I do today?

t=5 🧑 Please boil a potato.

EDH Instance 1 Output

Navigate — Move potato near stove — Remove cup from pot — Navigate to and toggle off sink, put pot down.

Pot is too big to fit in the sink!

EDH Instance 2 Input

t=47 🤖 Is there another pot somewhere?

t=50 🧑 You could try filling the cup with water and emptying it into the pot

t=51 🤖 Good thinking! Thank you for that suggestion.

EDH Instance 2 Output

Find cup — Fill cup with water — Transfer water to pot — Boil water and add potato

Datasets (Other)

- Rearrangement
  - CVPR'22 Embodied AI Workshop
  - object state manipulation

- ObjectNav
  - CVPR'21 Embodied AI Workshop
  - navigation in simulated environment

Current state

Goal state

Gymnasium (formerly OpenAI Gym)

- similar to AI2THOR
  - games
    - atari, classic board/card games
    - simple 2D environments
  - RL
  - limited dialogue options

Datasets (CerealBar)

- leader and follower setup
  - different abilities
- path planning component
- virtual environment
- metrics
  - sequence accuracies
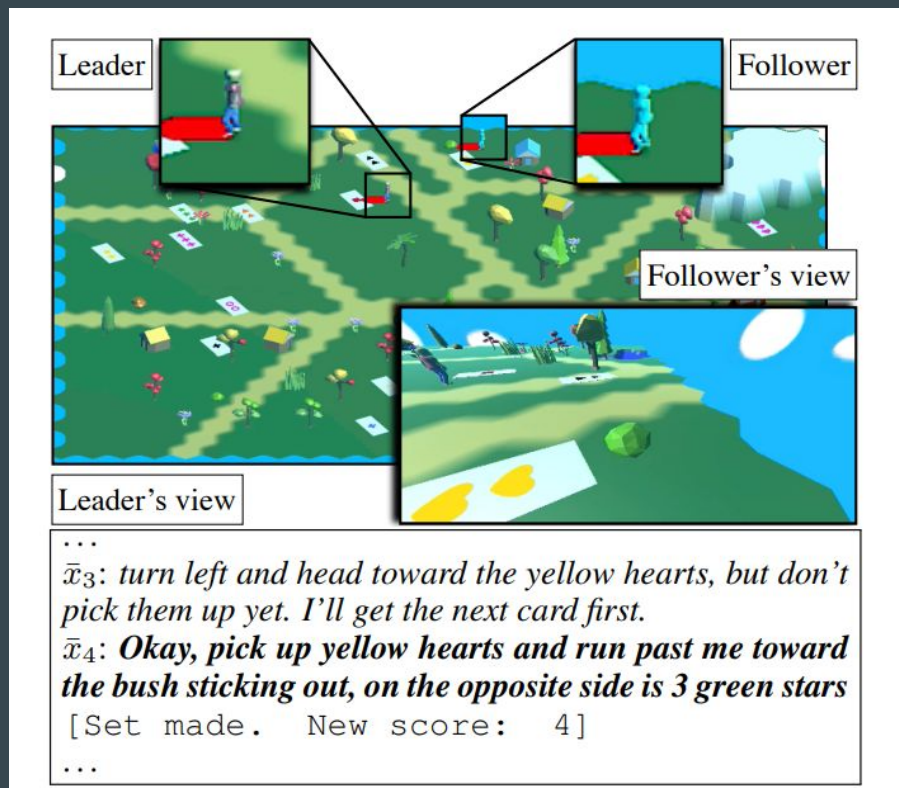 - state accuracies
  - points

Leader

Follower

Follower's view

Leader's view

...
$\bar{x}_3$: *turn left and head toward the yellow hearts, but don't pick them up yet. I'll get the next card first.*
$\bar{x}_4$: **Okay, pick up yellow hearts and run past me toward the bush sticking out, on the opposite side is 3 green stars**
[Set made. New score: 4]
...

Figure 3: The CEREALBAR leader gameplay interface.

Plan distributions

Leader

Score 3

Time left: 39
Moves: 5 moves left in turn

Turns left: 6

-- [DONE] turn left and head toward the yellow hearts, but don't pick them up yet. I'll get the next card first.
-- [CURRENT] Okay, pick up yellow hearts and run past me toward the bush sticking out, on the opposite side is 3 green stars

Follower's View:

Follower

Score 3

Time left: 15
Moves left: 2 moves left in turn

Turns left: 6

-- [DONE] turn left and head toward the yellow hearts, but don't pick them up yet. I'll get the next card first.
-- [CURRENT] Okay, pick up yellow hearts and run past me toward the bush sticking out, on the opposite side is 3 green stars

FINISH COMMAND & GET NEXT COMMAND

Figure 4: The CEREALBAR follower gameplay interface.

Datasets (MDC)

- leader and follower setup
  - differing abilities
- tasks
  - representing environment
  - producing dialogue
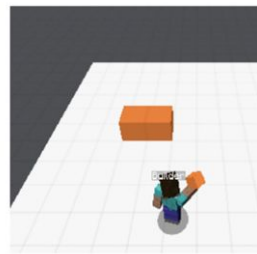 - predicting actions
- contact:
  rsidhu3@illinois.edu
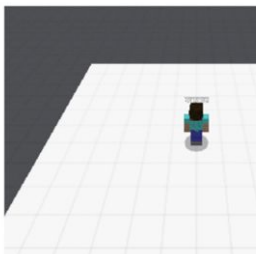
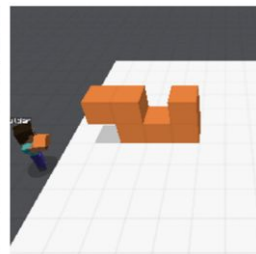A: go to the middle and place an orange block two spaces to the left

(a)
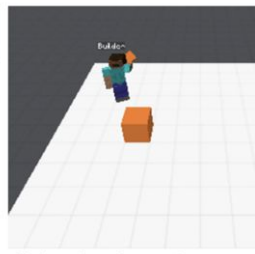
B: (puts down 1 orange)
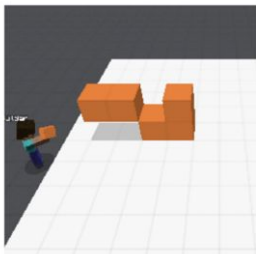A: now make a staircase with 2 stairs left and 2 right with orange

(b)

B: (puts down 1 orange)
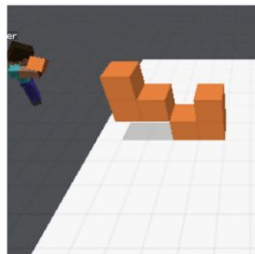A: so it will look like a v
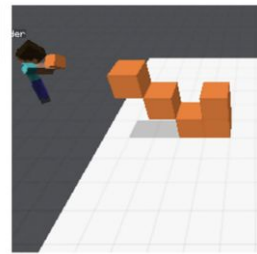
(c)

B: (puts down 4 orange)

(d)

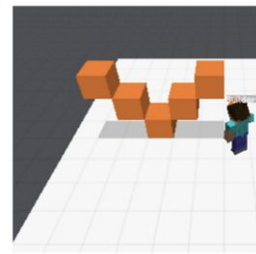B: (removes 1 orange, creating a floating section)

(e)

B: (places 1 orange)

(f)

B: (removes 1 orange, creating a floating block)

(g)

B: (follows similar pattern to complete the shape)

(h)

Datasets (general)

- look for
    - API (for video game based datasets)
    - dialogue
    - multiple agents/players
    - clear/quantifiable goal
    - Vision and Language Navigation (VLN) tasks
- feel free to reach out if you're not sure