LERa: Replanning with Visual Feedback in Instruction Following

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Motivation

LLM-based planners often fail in dynamic environments because they rely solely on textual representations and cannot perceive real-world changes or execution errors.

To overcome this limitation, we propose a vision-driven replanning approach that enables robots to interpret visual feedback and recover from failures without requiring object detection or predefined conditions.

Method

The LERa module performs a sequence of Visual Language Model queries — **Look**, **Explain**, and **Replan** — to identify execution errors and adjust the current task plan accordingly. LERa is **not** a standalone task planner; instead, it acts as a **corrective layer** that refines and updates existing plans when failures occur.

This modular design allows LERa to be seamlessly integrated into any existing agent and planning system, enhancing their robustness through vision-based feedback.

Experiments

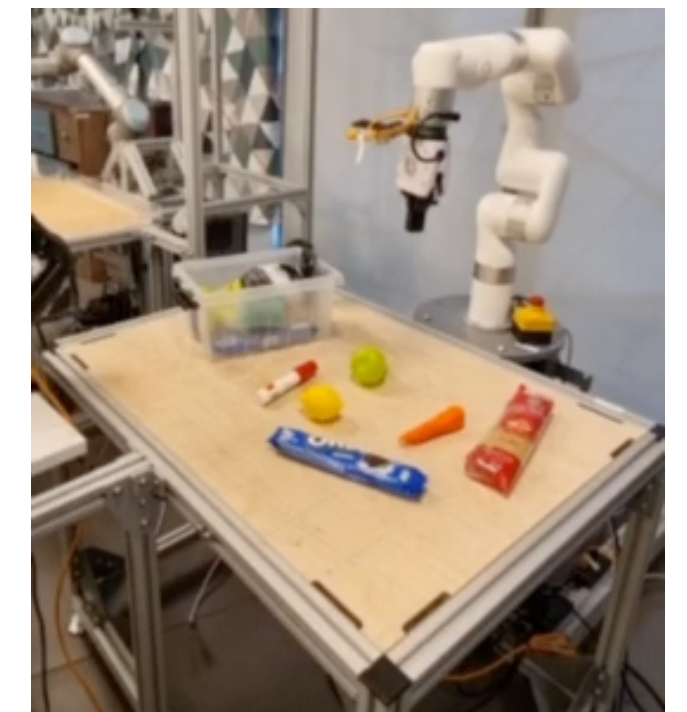| Agent	ALFRED-ChaOS (Seen)			ALFRED-ChaOS (Unseen)		
	SR↑	GCR↑	SRep↑	SR↑	GCR↑	SRep↑
Oracle	33.04	50.04	-	31.65	51.71	-
O-Ra	34.38	51.19	7.69	34.17	54.08	14.16
O-ERa	40.18	56.40	37.08	42.81	61.81	33.33
O-LRa	34.38	51.00	6.73	33.45	53.57	11.01
Baseline	33.04	50.15	3.15	32.01	51.89	0.98
O-LERa	**49.55**	**64.55**	**73.39**	**53.60**	**70.23**	**74.57**

Robot Experiments

1 Move **apple** and **orange** into container

2 Pick apple

3 Fail

4 **Replan:** Pick apple

5 Fail

6 **Replan: apple** finally recognised as **pear**

7 Pick lemon

8 Place lemon into container

LERa Overview

Instruction
Cut a tomato slice, refrigerate it, place it on a sponge

Current Task Plan
open(fridge)
put(fridge)
close(fridge)
open(fridge)
pick_up(tomatosliced)
close(fridge)
move(sidetable)
put(sidetable)

Observation

Look
The robot attempted to perform the **open("fridge")** action. **It failed**. Explain why.

Explain
What would be the **correct plan** to accomplish the goal if the first step of the current plan failed?

Replan
What is **correct plan**? Description:
1. The first step of the current plan has failed because the fridge is already open...

VLM

The image you provided shows a fridge **that is already open**. Therefore, the robot cannot open it again.

1. The **first step** of the current plan **has failed** because **the fridge is already open**.

2. The **next step** would be to **put the tomato slice in the fridge** and **close the fridge door**, since the robot **cannot open it any further**.

put(fridge)
close(fridge)
open(fridge)
pick_up(tomatosliced)
close(fridge)
move(sidetable)
put(sidetable)