Active Learning [*]

Zhifeng Han [*] **Claire Walton** [**]

[*] *University of Texas at San Antonio, San Antonio, TX 78249 USA*
(e-mail: zhifeng.han@utsa.edu).
[**] *University of Texas at San Antonio, San Antonio, TX 78249 USA*
(e-mail: claire.walton@utsa.edu).

Abstract: As AI agents (LLMs and Robots) accumulate "crossed paths" of knowledge, internal world models become prone to "pre-convicted" illusions—internal biases that override reality. This framework proposes a Focus Mode that uses Active Learning to dynamically balance internal predictions with direct environmental interactions, ensuring the agent remains grounded in the "Working Sense."

Keywords: LLM, robotic, Reinforcement Learning, world model, Active Learning, Focus Mode, Working Sense

1. INTRODUCTION

We use world model to predict the future based on historical data. Hafner et al. (2019) world models allow for planning and behavior learning given only small amounts of real world interaction. In. the past the robot research forcus on the dynamic fo world or the dynamic of the robot itself. However, in this paper, we focus on the dynamic of the environment and dynamic of robot body framework. We emphasize the importance of understanding the environment's dynamics and the robot's body dynamics for effective planning and behavior learning. This approach can lead to more efficient and adaptive robots that can handle a wide range of tasks in various environments.

2. BACKGROUND

2.1 Main challenges

3. ARCHITECTURE

3.1 XArm Visual Pick and Place

While the UR5 robot is a high performance industrial robot, the XArm is an accessible low-cost 7 DOF manipulation, which we control at approximately 0.5 Hz. Similar to Section 3.2, the task requires localizing and grasping a soft object and moving it from one bin to another and back, shown in Figure 6. We connect the object to the gripper with a string, which makes it less likely for the object to get stuck in corners at the cost of more complex dynamics. The sparse reward, discrete action space, and observation space match the UR5 setup except for the addition of depth image observations.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work the author(s) used NotbookLM and ChatGPT in order to help English as secondary language speaker. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

REFERENCES

Hafner, D., Lillicrap, T., Ba, J., and Norouzi, M. (2019). Dream to control: Learning behaviors by latent imagination. *arXiv preprint arXiv:1912.01603*.