Novelty Assessment Report

Paper: ExoPredicator: Learning Abstract Models of Dynamic Worlds for Robot Planning

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Abstract

Long-horizon embodied planning is challenging because the world does not only change through an agent's actions: exogenous processes (e.g., water heating, dominoes cascading) unfold concurrently with the agent's actions. We propose a framework for abstract world models that jointly learns (i) symbolic state representations and (ii) causal processes for both endogenous actions and exogenous mechanisms. Each causal process models the time course of a stochastic causal-effect relation. We learn these world models from limited data via variational Bayesian inference combined with LLM proposals. Across five simulated tabletop robotics environments, the learned models enable fast planning that generalizes to held-out tasks with more objects and more complex goals, outperforming a range of baselines.

Core Task Landscape

This paper addresses: **Learning Abstract World Models for Long-Horizon Robot Planning with Exogenous Dynamics**

A total of **50 papers** were analyzed and organized into a taxonomy with **19 categories**.

Taxonomy Overview

The research landscape has been organized into the following main categories:

- **Model Predictive Control for Robot Manipulation and Locomotion**
- **Vision-Language and LLM-Based Planning for Manipulation**
- **Learning-Based Control and Reinforcement Learning**
- **World Model Learning and State Abstraction**
- **Sim-to-Real Transfer and Multi-Environment Learning**
- **Reactive Planning and Perturbation Recovery**
- **Human-Robot Interaction and Collaborative Planning**
- **Multi-Agent Coordination and Distributed Control**
- **Specialized Control Applications and Domains**

Complete Taxonomy Tree

- Learning Abstract World Models for Long-Horizon Robot Planning with Exogenous Dynamics Survey Taxonomy
- Model Predictive Control for Robot Manipulation and Locomotion
  - Data-Driven and Adaptive MPC for Manipulators (6 papers)
  - [1] Data-driven model predictive control for trajectory tracking with a robotic arm (Carron, 2019) View paper
  - [15] Tracking of Uncertain Robotic Manipulators Using Event-Triggered Model Predictive Control With Learning Terminal Cost (Erlong Kang, 2022) View paper
  - [27] Active Learning of Discrete-Time Dynamics for Uncertainty-Aware Model Predictive Control (Alessandro Saviolo, 2022) View paper
  - [48] Model Predictive Controller Design Based on Residual Model Trained by Gaussian Process for Robots (Changjie Wu, 2023) View paper
  - [49] Output-Feedback Model Predictive Control with Online Identification (Nguyen, 2020) View paper
  - [50] Neural network-based model predictive tracking control of an uncertain robotic manipulator with input constraints. (Erlong Kang, 2021) View paper
  - Model-Based MPC with Constraints and Robustness (6 papers)
  - [6] Sliding mode-based adaptive tube model predictive control for robotic manipulators with model uncertainty and state constraints (Erlong Kang, 2023) View paper
  - [8] Robust Prescribed-Time Predictive Control for Mobile Robot Navigation (Maryam Sharifi, 2024) View paper
  - [18] A robust humanâ robot collaborative control approach based on model predictive control (Tianyi Zeng, 2023) View paper
  - [29] Nonlinear model predictive control of a robot manipulator (Philippe Poignet, 2000) View paper
  - [36] A Step-by-step Guide on Nonlinear Model Predictive Control for Safe Mobile Robot Navigation (Benders, 2025) View paper
  - [42] Robust Model Predictive Control for Robot Manipulators (S. Mohammad Tahamipour-Z., 2022) View paper
  - Contact-Rich and Dexterous Manipulation MPC (2 papers)
  - [4] Contact-Implicit Model Predictive Control for Dexterous In-hand Manipulation: A Long-Horizon and Robust Approach (Yongpeng Jiang, 2024) View paper
  - [16] Quadratic Programming-Based Reference Spreading Control for Dual-Arm Robotic Manipulation With Planned Simultaneous Impacts (Jari van Steen, 2023) View paper
  - MPC for Legged and Mobile Robot Locomotion (9 papers)
  - [5] A Data-Driven Model Predictive Control for Quadruped Robot Steering on Slippery Surfaces (P. Arena, 2023) View paper

- [11] Terrain-Aware Model Predictive Control of Heterogeneous Bipedal and Aerial Robot Coordination for Search and Rescue Tasks (Abdulaziz Shamsah, 2024) View paper
  - [12] Hierarchical Adaptive Motion Planning with Nonlinear Model Predictive Control for Safety-Critical Collaborative Loco-Manipulation (Sombolestan, 2024) View paper
  - [23] Adaptive legged manipulation: Versatile disturbance predictive control for quadruped robots with robotic arms (Qingfeng Yao, 2023) View paper
  - [24] Learning for Depth Control of a Robotic Penguin: A Data-Driven Model Predictive Control Approach (Jie Pan, 2023) View paper
  - [35] Model Predictive Controller Design for Precision Agricultural Robot (Ermias Kassahun, 2024) View paper
  - [38] Gait Optimization Control of Robots Based on Model Predictive Control (Jian Zhao, 2025) View paper
  - [39] Model Predictive Control for Legged Robots (Rathod, 2023) View paper
  - [43] Model Predictive Control of Running Biped Robot (Jaeuk Cho, 2022) View paper
  - Human-Aware and Collaborative MPC (4 papers)
  - [7] Efficient Context-Aware Model Predictive Control for Human-Aware Navigation (Elisa Stefanini, 2024) View paper
  - [10] Deep haptic model predictive control for robot-assisted dressing (Erickson, 2018) View paper
  - [28] An Autonomous Robot for Collision-Free Person Following through Model Predictive Control (Wenjie Lei, 2023) View paper
  - [37] Adaptive Model Predictive Control for Mobile Robots with Localization Fluctuation Estimation. (Jie Meng, 2023) View paper
  - Specialized MPC Applications (1 papers)
  - [22] Evaluation of different control strategies for trajectory following of a robotic capsule endoscope under rotating magnetic actuation (Yangxin Xu, 2022) View paper
- Vision-Language and LLM-Based Planning for Manipulation
  - LLM-Driven Symbolic and Hierarchical Planning (3 papers)
  - [3] LLM-driven symbolic planning and hierarchical imitation learning for long-horizon deformable object assembly (Jiaming Qi, 2026) View paper
  - [9] Towards human awareness in robot task planning with large language models (Liu, 2024) View paper
  - [32] LA-RCS: LLM-Agent-Based Robot Control System (Young-Jun Choi, 2025) View paper
  - Vision-Language Model Integration for Control (1 papers)
  - [2] Vision-Language Model Predictive Control for Manipulation Planning and Trajectory Generation (Chen Jia-ming, 2025) View paper
- Learning-Based Control and Reinforcement Learning
  - Deep RL and Policy Learning for Control (3 papers)
  - [13] Learning High-Level Policies for Model Predictive Control (Song, 2020) View paper
  - [19] Multi-Temporal Predictive Coding for Robotic Arm Control (AA Jimoh, 2025) View paper
  - [33] Learning to guide: Guidance law based on deep meta-learning and model predictive path integral control (Liang Chen, 2019) View paper
  - Safe RL for Navigation and Collision Avoidance (2 papers)
  - [14] Confidence-aware Robust Dynamical Distance Constrained Reinforcement Learning for Social Robot Navigation (Zhu Kai, 2025) View paper
  - [46] Robot Navigation in Crowded Dynamic Scenes (Xie, 2024) View paper
  - Hybrid Symbolic-RL Planning (1 papers)
  - [26] PEORL: Integrating Symbolic Planning and Hierarchical Reinforcement Learning for Robust Decision-Making (Fangkai Yang, 2018) View paper
- World Model Learning and State Abstraction
  - Abstract World Models with Exogenous Dynamics ★ (1 papers)
  - [0] ExoPredicator: Learning Abstract Models of Dynamic Worlds for Robot Planning (Anon et al., 2026) View paper
  - Latent State Discovery and Control-Endogenous Representations (1 papers)
  - [21] Guaranteed discovery of control-endogenous latent states with multi-step inverse models (Lamb, 2022) View paper
  - State and Action Abstraction for Planning (1 papers)
  - [20] Learning State and Action Abstractions for Effective and Efficient Planning (Chitnis, 2022) View paper
- Sim-to-Real Transfer and Multi-Environment Learning (2 papers)
  - [17] Leveraging Multiple Environments for Learning and Decision Making: a Dismantling Use Case (Alejandro Muchada SuÃ¡rez, 2020) View paper
  - [30] Randomized-to-Canonical Model Predictive Control for Real-World Visual Robotic Manipulation (Yamanokuchi, 2022) View paper
- Reactive Planning and Perturbation Recovery (2 papers)
  - [25] Reactive Model Predictive Contouring Control for Robot Manipulators (Baek, 2025) View paper
  - [31] Reactive locomotion decision-making and robust motion planning for real-time perturbation recovery (Gu, 2022) View paper
- Human-Robot Interaction and Collaborative Planning (1 papers)
  - [45] Probabilistic human action prediction and wait-sensitive planning for responsive human-robot collaboration (Kelsey P. Hawkins, 2013) View paper
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  - [44] 1Shrinivas R. Zanwar, 2Dr. Shashikant Rangnath Dikle, 3Laxman Baburao Abhang, 4Dr. Deepak A. Vidhate, 5Abhinav Pathak, 6Yogesh (Bhosale, 2025) View paper
  - [47] MULTI-AGENT SYSTEMS AND CONTROL ENGINEERING: A MATHEMATICAL DEEP LEARNING APPROACH FOR ROBOTICS AND AUTOMATION (Shrinivas R. Zanwar, 2025) View paper
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  - [34] Planning and decision making for aerial robots (Yasmina Bestaoui Sebbane, 2014) View paper
  - [40] Obstacle avoidance for redundant manipulators via indirect adaptive control based on surrogate models with real-time null-space reconfiguration (YANG, 2024) View paper
  - [41] An agent based framework for adaptive control and decision making of autonomous vehicles (N. Lincoln, 2010) View paper

Narrative

Core task: learning abstract world models for long-horizon robot planning with exogenous dynamics. The field addresses how robots can plan and act over extended horizons when faced with external disturbances or unmodeled forces. The taxonomy reveals a rich landscape organized around nine major branches. Model Predictive Control for Robot Manipulation and Locomotion (e.g., Data-driven MPC Trajectory[1], Contact-Implicit Dexterous MPC[4]) focuses on optimization-based methods that handle contact dynamics and terrain variations. Vision-Language and LLM-Based Planning (e.g., Vision-Language MPC[2], LLM Deformable Assembly[3]) leverages modern foundation models to ground high-level instructions in robotic actions. Learning-Based Control and Reinforcement Learning emphasizes data-driven policy synthesis, while World Model Learning and State Abstraction tackles the challenge of building compact, predictive representations of environment dynamics. Sim-to-Real Transfer and Multi-Environment Learning addresses generalization across diverse settings, and Reactive Planning and Perturbation Recovery (e.g., Reactive Locomotion Perturbation[31]) deals with online adaptation to unexpected disturbances. The remaining branches cover Human-Robot Interaction, Multi-Agent Coordination, and Specialized Applications, reflecting the breadth of robotic planning challenges.

A central tension across these branches is the trade-off between model fidelity and computational tractability: detailed physics-based models (as in Contact-Implicit Dexterous MPC[4] or Quadruped Slippery Surfaces[5]) offer precision but can be expensive, whereas learned abstractions promise efficiency at the cost of potential modeling errors. Within World Model Learning and State Abstraction, works like Control-Endogenous Latent States[21] and State Action Abstractions[20] explore how to distill high-dimensional observations into compact latent dynamics. ExoPredicator[0] sits squarely in this branch, emphasizing abstract representations that explicitly account for exogenous factors—external influences not directly controlled by the robot—enabling more robust long-horizon planning. Compared to approaches that assume fully observable or control-endogenous dynamics (e.g., Control-Endogenous Latent States[21]), ExoPredicator[0] addresses scenarios where environmental changes arise independently, a distinction that becomes critical in real-world settings with unpredictable disturbances or multi-agent interactions.

Related Works in Same Category

No sibling papers were found in the same taxonomy leaf. A taxonomy-subtopic-level comparison will be produced instead.

Taxonomy-Level Summary

Sibling Subtopics

- **Latent State Discovery and Control-Endogenous Representations** (leaves: 1, papers: 1)
- Scope: Methods discovering minimal latent states sufficient for control by filtering task-relevant from task-irrelevant information.
- Exclude: Excludes causal world models with exogenous processes; see Abstract World Models.
- **State and Action Abstraction for Planning** (leaves: 1, papers: 1)
- Scope: Approaches learning hierarchical abstractions of states and actions to enable efficient long-horizon planning.
- Exclude: Excludes world model learning without explicit abstraction; see other categories.

Contributions Analysis

Overall novelty summary. The paper proposes a framework for learning abstract world models that jointly represent symbolic states and causal processes for both endogenous actions and exogenous mechanisms, enabling long-horizon robot planning in environments where external processes unfold concurrently with agent actions. Within the taxonomy, it occupies the 'Abstract World Models with Exogenous Dynamics' leaf under 'World Model Learning and State Abstraction'. Notably, this leaf contains only the original paper itself—no sibling papers are present—indicating this is a relatively sparse and potentially underexplored research direction within the broader field of 50 papers surveyed.

The taxonomy reveals that the paper's parent branch, 'World Model Learning and State Abstraction', contains two neighboring leaves: 'Latent State Discovery and Control-Endogenous Representations' and 'State and Action Abstraction for Planning'. These adjacent directions focus on filtering task-relevant information and hierarchical abstractions respectively, but explicitly exclude causal modeling of exogenous processes (per the exclude_note). The broader field shows substantial activity in MPC-based methods (25 papers across six leaves) and learning-based control (5 papers), suggesting the paper diverges from dominant optimization-centric and purely data-driven paradigms by emphasizing symbolic causal reasoning over external dynamics.

Among 28 candidates examined across three contributions, none were found to clearly refute any claimed novelty. The 'Framework for abstract world models with exogenous processes' examined 10 candidates with 0 refutable; 'Variational Bayesian inference method for learning causal models' examined 10 with 0 refutable; and 'State abstraction learner using foundation models' examined 8 with 0 refutable. This suggests that within the limited search scope, the combination of symbolic causal modeling for exogenous dynamics, variational inference for learning, and LLM-based state abstraction appears relatively unexplored in the examined literature, though the search scale (28 papers) is modest relative to the field's breadth.

Based on the top-28 semantic matches and taxonomy structure, the work appears to occupy a distinct niche: explicitly modeling exogenous causal processes in abstract world models for robotics. The absence of sibling papers in its taxonomy leaf and the lack of refuting prior work among examined candidates suggest potential novelty, though the limited search scope means more comprehensive surveys or domain-specific venues might reveal closer precedents. The analysis covers semantic similarity and citation-based expansion but does not exhaustively survey all world modeling or causal inference literature in robotics.

This paper presents **3 main contributions**, each analyzed against relevant prior work:

Contribution 1: Framework for abstract world models with exogenous processes

Description: The authors introduce a framework that learns symbolic state abstractions and causal processes modeling both agent actions (endogenous) and external environmental dynamics (exogenous) that unfold concurrently with agent actions, enabling abstraction over temporal granularity.

This contribution was assessed against **10 related papers** from the literature. Papers with potential prior art are analyzed in detail with textual evidence; others receive brief assessments.

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1. Verifiable Autonomous Systems: Using Rational Agents to Provide Assurance about Decisions Made by Machines

URL: View paper

Brief Assessment

Verifiable Rational Agents[65] focuses on verification and assurance of autonomous systems using rational agent architectures. The provided context fragments discuss agent states and environmental effects but do not address symbolic state abstractions, causal processes, or the distinction between endogenous and exogenous dynamics that characterizes the original paper's contribution.

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2. Rational and symbolic uses of performance measurement: Experiences from Polish universities

URL: View paper

Brief Assessment

Rational Symbolic Performance[63] examines performance measurement systems in Polish universities, focusing on rational versus symbolic uses by organizational actors. This is entirely unrelated to robot planning, world models, or exogenous/endogenous processes in the technical sense used by the original paper.

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3. Uncovering Emergent Physics Representations Learned In-Context by Large Language Models

URL: View paper

Brief Assessment

Emergent Physics LLM[69] focuses on in-context learning of physics dynamics in LLMs, not on learning symbolic state abstractions or causal process models for robot planning with endogenous/exogenous processes.

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4. What drives substantive versus symbolic implementation of ISO 14001 in a time of economic crisis? Insights from Greek manufacturing companies

URL: View paper

Brief Assessment

ISO Symbolic Implementation[62] focuses on ISO 14001 environmental management system implementation in Greek manufacturing companies during economic crisis. This is entirely unrelated to robot planning, symbolic state representations, or causal processes in dynamic environments.

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5. The nature of external representations in problem solving

URL: View paper

Brief Assessment

External Representations Problem-Solving[67] focuses on how external representations (physical symbols, spatial layouts) affect problem-solving behavior in tasks like tic-tac-toe, not on learning symbolic state abstractions or modeling endogenous/exogenous causal processes for robot planning.

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6. Algebras of actions in an agent's representations of the world

URL: View paper

Brief Assessment

The candidate paper (Algebras Actions Representations[68]) is not available for comparison. Without access to the full text, it is impossible to assess whether it demonstrates prior work on symbolic state abstractions with endogenous and exogenous processes or challenges the novelty of the original paper's framework.

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7. Substantive or symbolic environmental strategies? Effects of external and internal normative stakeholder pressures

URL: View paper

Brief Assessment

The candidate paper (Substantive Symbolic Environmental[64]) focuses on organizational environmental strategies and stakeholder pressures in business contexts, not on abstract world models, symbolic state representations, or robotic planning with exogenous/endogenous dynamics.

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8. Thinking with external representations

URL: View paper

Brief Assessment

External Representations Thinking[66] focuses on how humans use external representations (diagrams, annotations, physical models) to enhance cognitive processes during thinking and sense-making. It does not address symbolic state abstractions, causal processes, or robot planning frameworks with endogenous/exogenous dynamics.

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9. Position Paper: Towards Open Complex Human-AI Agents Collaboration System for Problem-Solving and Knowledge Management

URL: View paper

Brief Assessment

Human-AI Collaboration System[61] focuses on human-AI collaboration architectures and knowledge management systems, not on learning symbolic state abstractions or modeling exogenous environmental dynamics for robot planning.

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10. Situated action: A symbolic interpretation

URL: View paper

Brief Assessment

Situated Action Symbolic[70] focuses on defending symbolic systems for cognitive modeling and human-computer interaction, not on learning abstract world models with endogenous/exogenous causal processes for robot planning. The candidate does not address temporal dynamics modeling or state abstraction learning for planning tasks.

Contribution 2: Variational Bayesian inference method for learning causal models

Description: The paper contributes an efficient Bayesian inference method that learns the parameters and structures of causal processes from limited trajectory data, using variational inference for continuous parameters and LLM-guided proposals for discrete structure search.

This contribution was assessed against **10 related papers** from the literature. Papers with potential prior art are analyzed in detail with textual evidence; others receive brief assessments.

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1. Interventions, where and how? experimental design for causal models at scale

URL: View paper

Brief Assessment

Interventions Experimental Design[74] focuses on experimental design for causal discovery using variational inference over DAG structures, not on learning abstract world models with symbolic state representations and causal processes for robot planning from limited trajectory data.

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2. Identifying Causal Direction via Variational Bayesian Compression

URL: View paper

Brief Assessment

Causal Direction Compression[76] focuses on bivariate causal discovery using variational Bayesian coding to identify cause-effect relationships between two variables. The original paper addresses learning causal processes in dynamic robotic environments with temporal dynamics and exogenous mechanisms, which is a fundamentally different problem domain.

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3. Variational causal inference

URL: View paper

Brief Assessment

Variational Causal Inference[73] focuses on counterfactual outcome prediction in high-dimensional settings (e.g., gene expressions) using variational inference to estimate individual treatment effects. The original paper addresses learning causal process structures and parameters for robot planning in dynamic environments with temporal delays and exogenous processes, which is a fundamentally different problem domain and model class.

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4. Sparse Bayesian Causal Forests for Heterogeneous Treatment Effects Estimation.

URL: View paper

Brief Assessment

Sparse Bayesian Causal Forests[80] focuses on heterogeneous treatment effects estimation in observational studies using tree ensembles with Dirichlet priors for feature selection, not on learning causal process structures from trajectory data with variational inference as in the original paper.

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5. Bayesian learning of causal structure and mechanisms with gflownets and variational bayes

URL: View paper

Brief Assessment

GFlowNets Variational Bayes[75] focuses on learning causal DAG structures and linear Gaussian mechanisms using GFlowNets with variational inference. The original paper addresses learning abstract world models for robot planning with temporal dynamics and exogenous processes, which is a fundamentally different problem domain and methodology.

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6. Learning Latent Structural Causal Models from Low-level Data

URL: View paper

Brief Assessment

Latent Structural Causal[79] focuses on learning latent structural causal models from low-level data. The original paper's variational Bayesian inference method is specifically designed for learning causal processes with temporal dynamics and LLM-guided proposals for discrete structure search in robot planning contexts, which represents a different technical approach and application domain.

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7. ProDAG: Projected Variational Inference for Directed Acyclic Graphs

URL: View paper

Brief Assessment

ProDAG[78] focuses on learning directed acyclic graphs (DAGs) for structure discovery, not on learning causal processes with temporal dynamics and exogenous mechanisms from trajectory data as in the original paper.

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8. Variational Bayesian learning of directed graphical models with hidden variables

URL: View paper

Brief Assessment

Variational Bayesian Hidden[77] focuses on learning structure and parameters of directed graphical models with hidden variables using variational inference, but does not address causal process learning from trajectory data or temporal dynamics modeling as in the original paper.

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9. BCD Nets: Scalable Variational Approaches for Bayesian Causal Discovery

URL: View paper

Brief Assessment

BCD Nets[72] focuses on learning DAG structures for structural equation models from observational data using variational inference over continuous parameters. The original paper learns causal processes (both endogenous and exogenous) with temporal dynamics and discrete structure search guided by LLMs, which is a fundamentally different problem setting.

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10. Bacadi: Bayesian causal discovery with unknown interventions

URL: View paper

Brief Assessment

Bacadi[71] focuses on Bayesian causal discovery from interventional data with unknown intervention targets, using variational inference for continuous parameters. The original paper addresses learning causal processes (both endogenous and exogenous) from limited trajectory data in robotic planning domains with temporal dynamics, which is a fundamentally different problem setting.

Contribution 3: State abstraction learner using foundation models

Description: The authors develop a method for learning symbolic state abstractions (predicates) by prompting language models to propose candidate predicates and then performing local search to select subsets that optimize Bayesian objectives.

This contribution was assessed against **8 related papers** from the literature. Papers with potential prior art are analyzed in detail with textual evidence; others receive brief assessments.

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1. What's left? concept grounding with logic-enhanced foundation models

URL: View paper

Brief Assessment

Logic-Enhanced Concept Grounding[52] focuses on grounding abstract concepts (like 'left') across multiple modalities (2D images, 3D scenes, human motion, robotics) using first-order logic and LLMs for program generation, not on learning symbolic state abstractions (predicates) for robot planning in dynamic environments with exogenous processes.

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2. Reasoning with Commonsense Knowledge and Decision Heuristics for Scalable Ad hoc Human-Agent Collaboration

URL: View paper

Brief Assessment

Commonsense Human-Agent Collaboration[57] uses foundation models for natural language processing and goal prediction in ad hoc teamwork, not for learning symbolic state abstractions (predicates) through local search optimization of Bayesian objectives as in the original paper.

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3. Towards AGI? Evaluating Current Limitations of Foundation Models in Reasoning Tasks

URL: View paper

Brief Assessment

AGI Foundation Limitations[59] focuses on evaluating reasoning limitations of foundation models rather than developing methods for learning symbolic state abstractions for robot planning. The candidate examines commonsense reasoning errors, while the original develops a specific framework for predicate invention and world model learning.

4. Nature's Insight: A Novel Framework and Comprehensive Analysis of Agentic Reasoning Through the Lens of Neuroscience

URL: View paper

Brief Assessment

Agentic Reasoning Neuroscience[55] focuses on neuroscience-inspired reasoning frameworks for AI agents, not on learning symbolic state abstractions or predicates using foundation models for robot planning.

5. The role of foundation models in neuro-symbolic learning and reasoning

URL: View paper

Brief Assessment

Foundation Models Neuro-Symbolic[56] focuses on vision-language models for extracting symbolic features through visual question answering in neuro-symbolic AI tasks, not on learning symbolic state abstractions (predicates) for robot planning in dynamic environments with temporal processes.

6. Foundation Models for Robotic Tasks: Survey, Challenges and Future Directions

URL: View paper

Brief Assessment

Foundation Models Robotic Survey[54] is a survey paper that discusses various uses of foundation models in robotics, including scene understanding and symbolic representation generation. However, it does not present a specific method for learning symbolic state abstractions through Bayesian optimization of predicate subsets, which is the core technical contribution of the original paper.

7. Neurosymbolic Cognitive Methods for Enhancing Foundation Model-based Reasoning

URL: View paper

Brief Assessment

Neurosymbolic Cognitive Enhancement[58] focuses on integrating foundation models with cognitive architectures (ACT-R) for reasoning tasks, not on learning symbolic state abstractions or predicates for robot planning as in the original paper.

8. Challenges and opportunities in neuro-symbolic composition of foundation models

URL: View paper

Brief Assessment

Neuro-Symbolic Composition Challenges[53] focuses on composing foundation models using symbolic programs for visual question-answering tasks, not on learning symbolic state abstractions (predicates) for robot planning through Bayesian model selection and local search.

Appendix: Text Similarity Detection

No high-similarity text segments were detected across any compared papers.

References

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