CSONG : RL Control Suite with Open-World Novelty Generator

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Abstract

We propose a Control Suite with Open-world Novelty Generator(CSONG) for authoring novelty in actors, interactions, and environment of standardized toolkits for Reinforcement Learning(RL) agents such as UnityML[1], DeepMind control Suite[2], and OpenAI Gym[3]. This demonstration will present capability of CSONG to enable novel situations with multiple levels of the novelty hierarchy applicable to the standardized platform toolkits for simulating RL agents in unseen environments.

1 The Technology Demonstrated

Proposed demonstration shows that the proposed control suite provides the baseline of novelty learning environment in real-time which generates unseen environment with user-defined parameter ranges of the values in actions, interactions, and environment. Entities and attributes, interactions, and external configurations can be changed in real-time by Changer. Components in Changer generate and replace configuration of toolkits for Reinforcement Learning. Proposed Control Suite with Open-World Novelty Generator (as of version 1.0) created using C# and existing learning environments. Changers are responsible for authoring novelty in actors, interaction, and environment of standardized toolkits for reinforcement learning agents.

2 The Elements of Novelty

To create artificial intelligent agents working appropriately in real-world domain under novel situations that violate experienced environmental condition during training stages. We need a novelty generator with capability to construct a series of unseen situations exemplifying multiple levels of the novelty hierarchy in chosen domains. Examples of the types of novel situations can be generated, such as changing the size of a game board, objectives of the game, or how pieces are allowed to move or interact.

3 The Audience-Interactive Part

The demonstration provides on-demand video as well as a real-time presentation and demonstration through live streaming. Audiences' requests are directly reflected in the on-line streaming session.

Preprint. Under review.

4 The Equipment brought by the Demonstrator

Live Streaming platform as well as runtime executable will be prepared on the author's PC to conduct the virtual presentation.

5 The Special Needs or Equipment Required at the Place of the Demo

Not at all except for YouTube live streaming service.

6 A concrete description of how the demo will run virtually, Examples are provided for inspiration below

Figure 3 shows how the demo will be presented in on-line. Audiences firstly watch the on-demand video for tutorial of this work, and they can join the live streaming presentation and demonstration session. Audiences can ask questions during the session using on-line chatting, and the presenter will reply to their questions.

Acknowledgments and Disclosure of Funding

This work was supported by Institute of Information& communications Technology Planning& Evaluation (IITP) grant funded by the Korea government(MSIT) (No.2020-0-00056, AI systems Learning for novel and open world situations)

References

[1] `https://github.com/Unity-Technologies/ml-agents`

[2] Tassa, Yuval, et al. "Deepmind control suite." arXiv preprint arXiv:1801.00690 (2018).

[3] `https://gym.openai.com/docs/`

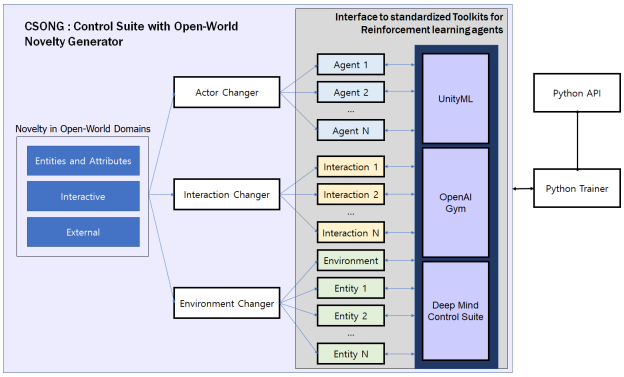

Figure 1: Proposed Control Suite with Open-World Novelty Generator (as of version 1.0). Changers are responsible for authoring novelty in actors, interaction, and environment of standardized Toolkits for Reinforcement learning agents.

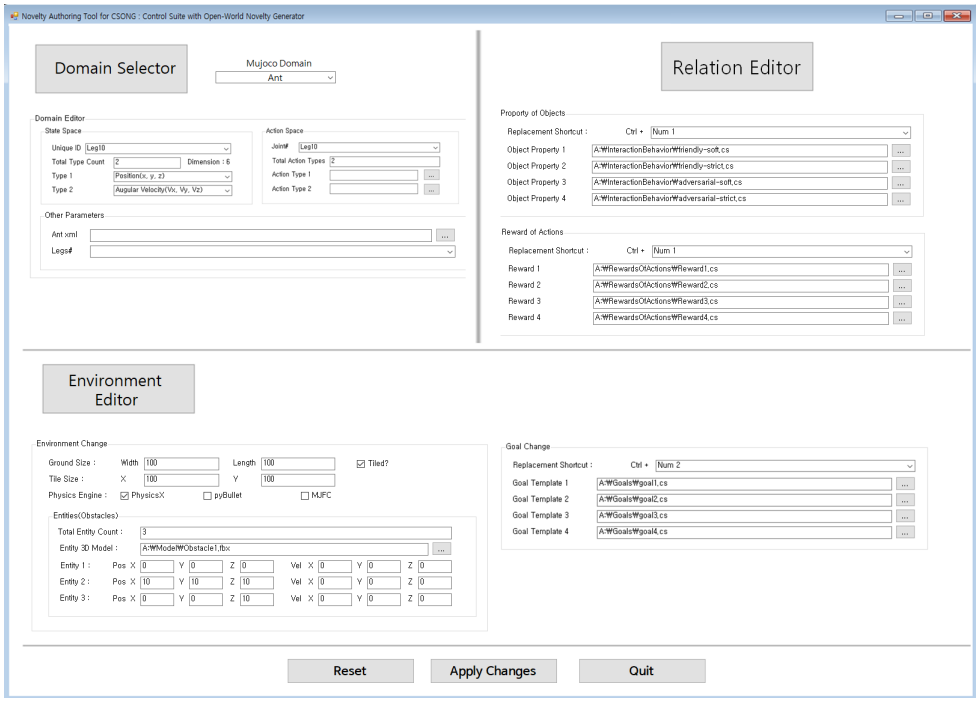

Figure 2: User Interface for the control panel of CSONG. New parameters for open-world novelty are applied to the standardized Toolkits for Reinforcement learning agents just by pressing the “Apply Changes” button.

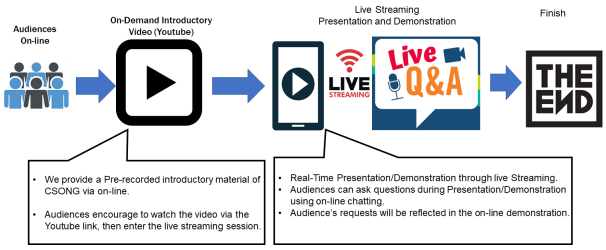

Figure 3: An illustration to show how the on-line demo will be presented. Firstly, Audiences watch on-demand video, and join into the live streaming presentation and demonstration session. Audiences can ask questions during the session using on-line chatting, and then the presenters answer to them.