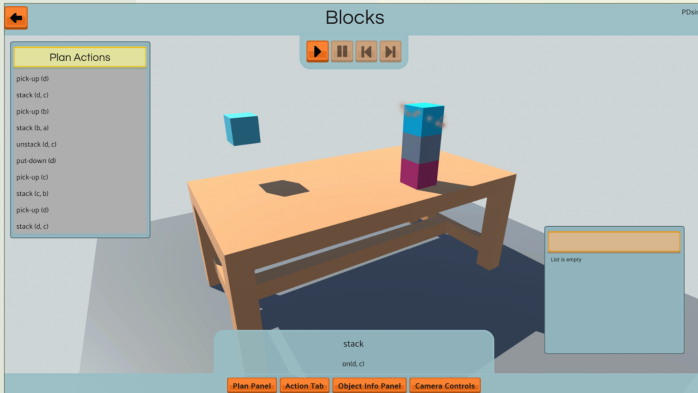




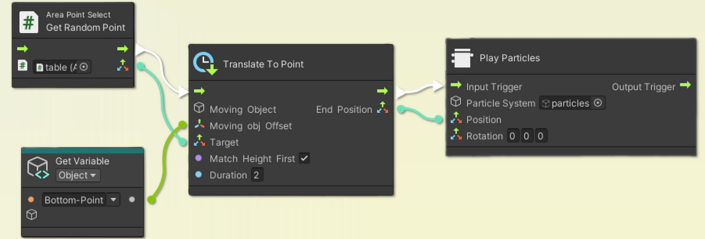
INTRODUCTION

PDSim is used to simulate classical planning domains, problems, and plans. The user can create real-world scenes that reflect the execution environment of the planning problem, exploiting the functionalities of the Unity game engine combined with an automated planning tool. A text plan containing a sequence of actions is translated into 3D graphics and animations.



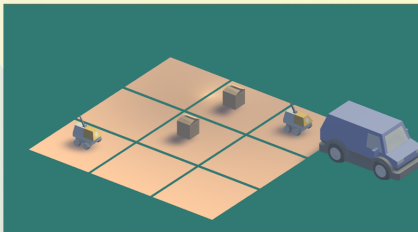
METHOD: Animations

Animations can be created by the user using Unity's visual scripting language that has been adapted for PDSim. The user can create animations for PDDL predicates without using a programming language to create scripts, by connecting nodes and drag-and-drop objects from the scene.



EXAMPLES

PDSim comes with a set of example domain and problem simulations already set up so that the user can easily run and learn about how to operate within the system.

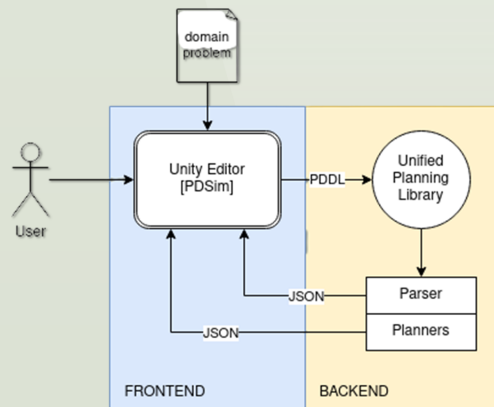


Custom Warehouse

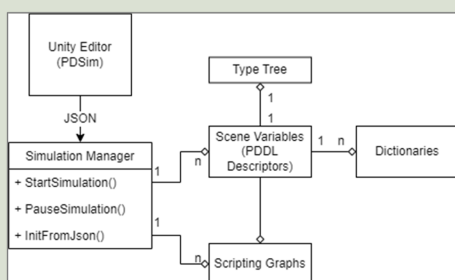
A set of robots needs to load parcels in a van moving around a warehouse.

METHOD

PDSim acts as a plugin component to Unity, enabling it to use common Unity features such as the physics engine, path planning system, and audio engine, without the need to implement such components from scratch.



Users can import their own 2D/3D models to create different simulations and customise these models with waypoints to help define animations. PDSim communicates with a backend server when creating a new simulation, which is responsible for parsing the PDDL domain and problem files, and building a JSON representation for objects, actions, and predicates.



Robot Lab

Simple interaction with ROS where kitchen sensors are predicates being animated (e.g., open/close cupboard, turn boiler on/off, etc.)



FUTURE WORK

As future work, we plan to introduce a more intuitive way to create and modify the knowledge model, using the same visual scripting paradigm, and thus completely remove the need to know the PDDL language syntax. We will also create an in-engine planner interface that the user can interact with at planning time to change object properties and replan on the fly. Finally, an evaluation of PDSim is planned in an education setting to gather feedback about the usefulness of PDSim as a development aid for students learning automated planning.

CONTACT

Emanuele De Pellegrin
ed50@hw.ac.uk
<https://cryoscopic-e.github.io/>