

Creating a virtual reality serious game using a domain specific language for interactive 3D environments

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Abstract: Virtual reality (VR) places players in immersive environments with which they can interact. This allows players to experience lifelike scenarios in various contexts. However, setting up a scenario in a game can turn out to be a long and complex process for the developer for two main reasons : (1) the large number of different objects composing a scene and their arrangement in it, making the task of taking into account all the parameters in the creation of a scenario (what the user sees, can touch, what they can interact with, ...) challenging, and (2) the diversity of tasks with varying complexity that the user must be able to accomplish. A way to set a realistic and achievable goal for the user to make them feel like they are progressing through the game and provide them with help as and when they need it is necessary. This project presents a system allowing the creation of interactive scenarios in virtual reality. A scenario is composed of a series of tasks that the user must accomplish in a given time. This system uses a DSL (Domain Specific Language) to help the developer in creating such scenarios, and it allows two functionalities for this purpose : (1) annotate the various elements of the scene according to the type of object as well as its location and (2) define the tasks composing a scenario and the various constraints and aids related to them. Thus, the developer can create scenarios that provide progressive assistance to the user while taking into account the different properties of the objects in the scene and their situation in relation to the player. This system is implemented in Unity, it features two types of 3D environments: an indoor scenario in a house and an outdoor scenario near a road with traffic.