3D Schematics of Modelica Models and Gamification

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Block diagrams have been used for a long time to express data flow in dynamic models, i.e. the input output relations between calculation blocks. SysML diagrams are also used to express other relations such as component hierarchy and inheritance. Modelica uses object diagrams, a generalization of block diagrams since acausal connections are allowed. CAD uses a 3D representation to represent the assembly of a mechanism, i.e. how bodies are coupled with joints. This paper describes a generalization of object diagrams, called *3D Schematics*, to utilize 3D representations of the icons/shapes and unification with assembly diagrams and exploded views.

The ideas have been prototyped in a program called Playmola which is inspired by computer games. The goal is to make a model authoring environment that is much more intuitive and fun than existing ones. The hope is that such a tool would be used to promote science for students already in high-school.
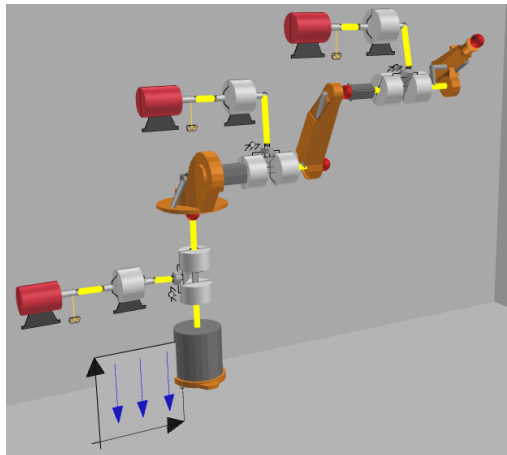
Figure 1. Exploded view of Robot model with motors and gearboxes in Playmola
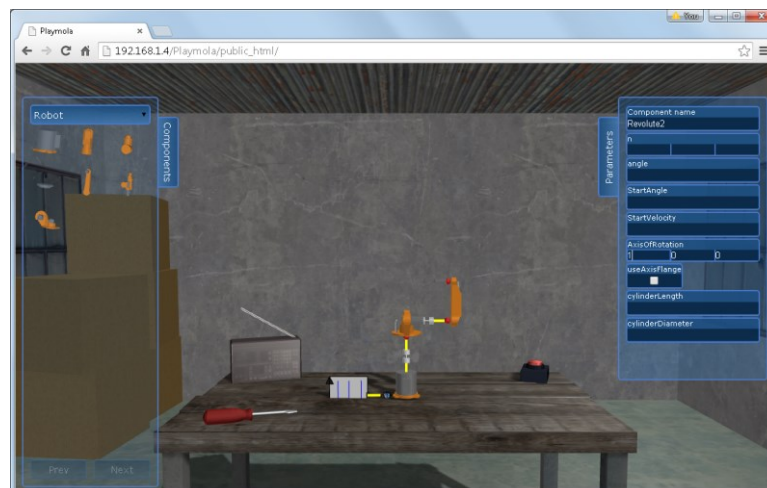
Figure 2. Garage environment for visual experiments in Playmola