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viSkillz – a project dealing with Mental Cutting Test exercises*

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Abstract

Various test formats can be used to test the spatial skills of people. Many researchers have dealt with the most common, standard test types, such as the *Mental Cutting Test* (MCT), where a 3D object is cut by a plane, and the shape of this cut must be selected from 5 potential solutions. The initially paper-based exercises, which are applied in several exams and evaluations around the world, have been moved to virtual spaces in the last decade, using Augmented Reality (AR) and Virtual Reality (VR) tools to enhance the effectiveness of the exercises.

In our *viSkillz* project, which primarily focuses on the AR version of MCT, our goal was to develop applications that help students, instructors, and researchers in practicing for this type of test. First, we started with an Android application that offered a gamified learning process with the support of AR. The main bottleneck of practice, however, is the lack of 2D and 3D assets similar to the standard MCT exercise. Thus, we developed a framework that can automatically generate assets and methods needed to build an MCT exercise.

In this presentation, we give an overview of our recent results and further research goals of this field, related to the following software packages:

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- Package `viskillz-blender` – A Python package built on Blender's Python API to automatically permute MCT scenarios, yielding 2D and 3D assets [1, 3].
(https://github.com/viskillz/viskillz-blender)
- Package `viskillz-glb` – A Python package to encode efficiently the 3D assets that represent MCT scenarios [2].
(https://github.com/viskillz/viskillz-glb)
- Application *viSkillz Browser* – A web application that lets its users browse the automatically generated, raw scenarios [5].
(https://viskillz.inf.unideb.hu/browser)
- Application *viSkillz Quiz* – The mixture of a sheet of MCT exercises and survey elements to organize exams and measurements [5].
(https://viskillz.inf.unideb.hu/quiz)
- Application *viSkillz Play* – The prototype mobile application that implements AR and gamification elements to offer practicing exercises for students [6].
- The post-processing of answers (intersections) of MCT exercises [4].

References

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