How usable is virtual reality?

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Virtual Reality and the virtual world are taking over more and more areas of our lives. This means that it is really important that virtual worlds are user-friendly and offer a high usability. Up until now, the only way to check this was to conduct manual tests with volunteers. This can be both time-consuming and cost-intensive. Dr. Patrick Harms from the Institute of Computer Science at the University of Göttingen has

developed a technology that automatically detects many problems with user-friendliness and usability in the virtual environment. The results appeared in the scientific journal "*ACM Transactions on Computer-Human Interaction*".

Dr. Harms chose two virtual scenarios to test his new technology: in the "coffee scene," the user had to fetch a cup, place it exactly under a coffee machine and press the appropriate button. In another virtual scenario, the user had to copy a piece of paper. The new technology of automated evaluation runs in three steps. First, the individual activities and movements of test persons are recorded in detail. This results in "activity lists." In a second step, the computer program MAUSI-VR, developed by Dr. Harms, automatically searches these lists for typical user behaviour. In the third step, this behaviour is evaluated by the program with regard to defined irregularities. "This makes it possible, among other things, to determine how well users of a specific VR system are guided by it and whether they usually have to perform ergonomically inconvenient procedures during its operation," says Harms. In addition, the program recognises interaction problems that cause users to repeat or abort certain processes multiple times.

The concept of MAUSI-VR is based on preliminary work of the research group Software Engineering for Distributed Systems with Professor Jens Grabowski, of the Institute of Computer Science at the University of Göttingen, on the automated usability evaluation of websites and desktop software. This work was transferred into the virtual world and supplemented by Harms. "In contrast to manual evaluations, automated evaluations can take place more frequently, more cost-effectively and without special preparation both during the development of a VR system and after its release into the market. This gives developers the opportunity to consider VR improvements quickly for the next software update."

More information: Patrick Harms, Automated Usability Evaluation of Virtual Reality Applications, *ACM Transactions on Computer-Human Interaction* (2019). DOI: 10.1145/3301423