12 | AR GAMIFIED SOLUTION FOR HUMAN SKILLS TRAINING

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ABSTRACT

This paper presents the intermediate results of the HOST project (Human & Organizational Skills Training) which transforms an existing gamified training method for medical staff, into a richer, more efficient and more immersive version. The initial method is based on simulating childbirth in an airplane, with a real setting, real actors, and real puzzles to be solved in a stressful situation. The HOST project transforms the decor, the actors, and the puzzles into their virtual equivalents, using Unity game engine, augmented reality and Hololens glasses. We also added monitoring and debriefing capabilities, which did not exist at the start.

KEYWORDS

AR; Escape room; Hololens; Human Skills; Training.
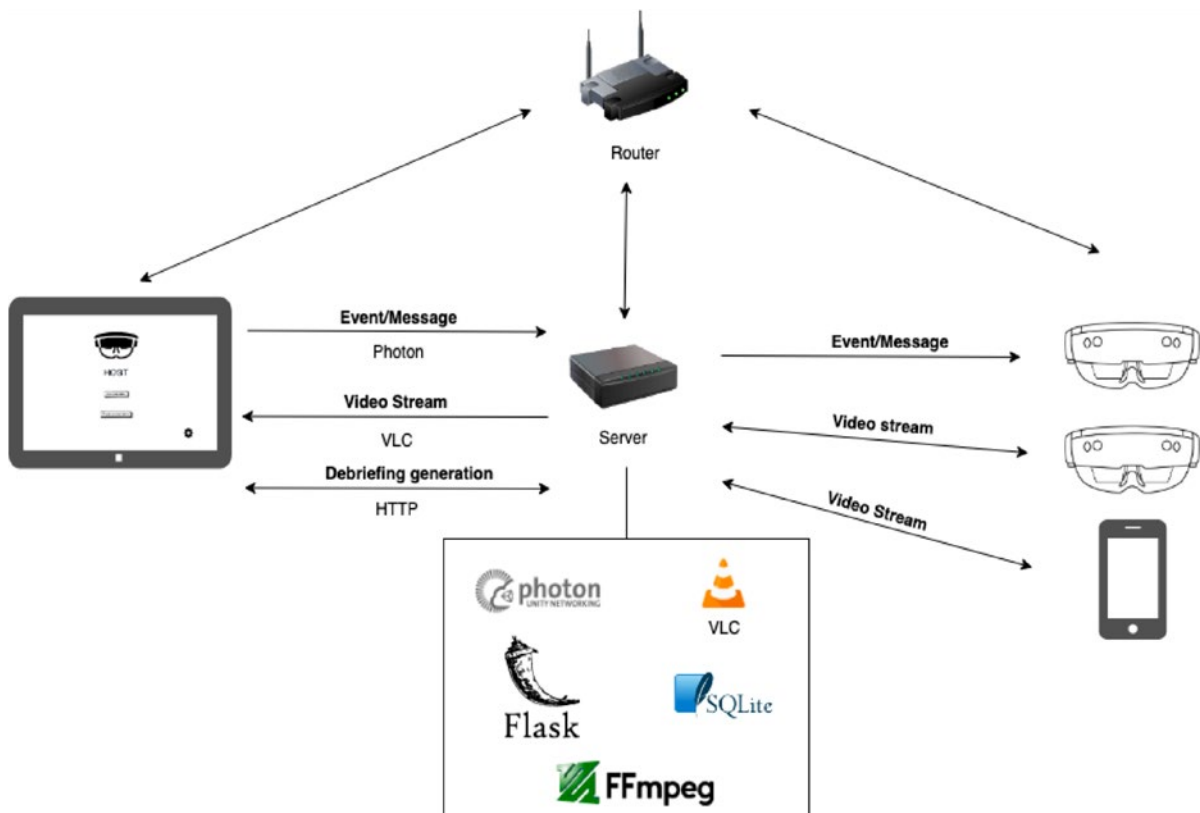
CONTEXT

In recent years, a team at the HUG (Hôpitaux Universitaires de Genève) has implemented an innovative training method to strengthen the human aspects of medical staff. This method is largely inspired by the concept of "Crew Resource Management" used in civil aviation and is based on 2 pillars, an operational and a relational one. This second aspect works on the analysis of the conditions for success through the composition of teams and their personal characteristics. The operational aspect is enhanced by the presentation of practical tools which can be used to strengthen communication and interdisciplinary collaboration. Finally, the method simulates childbirth in an airplane, with a real setting, real actors, and real puzzles to be solved in a stressful situation.

Despite the good results and the very encouraging feedbacks about this method, two main limitations have been detected. The first one are the logistical constraints due to setting a training session: The installation of the decor, the selection of actors, and the elaboration of the puzzles represent a significant investment, difficult to reproduce at high frequency. The second limitation is linked to the participants' immersion level in the training scenario. Indeed, the rudimentary decor and the frequent interventions of the moderators break the immersion and reduce the training efficiency.

TARGET ISSUE

The objectives of HOST project is to tackle the limitation detected by moderators during last training sessions. The main limitations can be enumerated as follows:

› Lack of autonomy: The participants don't discover the situation on their own. They watch a video that explains the context and what they need to do. In a more realistic situation, participants would discover the problem on their own and try to come up with a solution.

› Not realistic enough decor: The current decor consists of tables and chairs, which is not very realistic and doesn't bring enough immersion.

› Regular interruptions: The moderators often interrupt the game to guide the participants and thus considerably reducing game immersion.

› Moderators can't enter in direct contact with the actors to direct them without interrupting and giving away their inputs.

› Moderators don't have a contextualized way to take notes. The debriefing is oral. Participants might have issues remembering or relating to a specific point.

PROPOSED SOLUTION

In order to enhance the participant immersion, the project HOST aims at developing a multi-user augmented reality app allowing to substitute the decor and the actors by virtual ones. With this app, participants will still be able to see each other and communicate directly, but with enhanced view through the use of Hololens headsets. The Hololens allows participants to visualize the plane, the passengers, the patient, and virtual enigmas to be solved.

The HOST project aims at building Augmented Reality solutions for human skills training based on gamified scenarios involving puzzles and enigmas
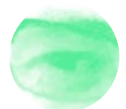
The second aspect of HOST project is to enhance immersion by avoiding the animators' interruptions and direct interventions. To achieve this goal, we developed a tablet-based monitoring app allowing any monitor to supervise participants by sending them text messages, audio messages, displaying hints and indicators, and activating predefined events within the scenario (passenger moves, captain messages, etc.).
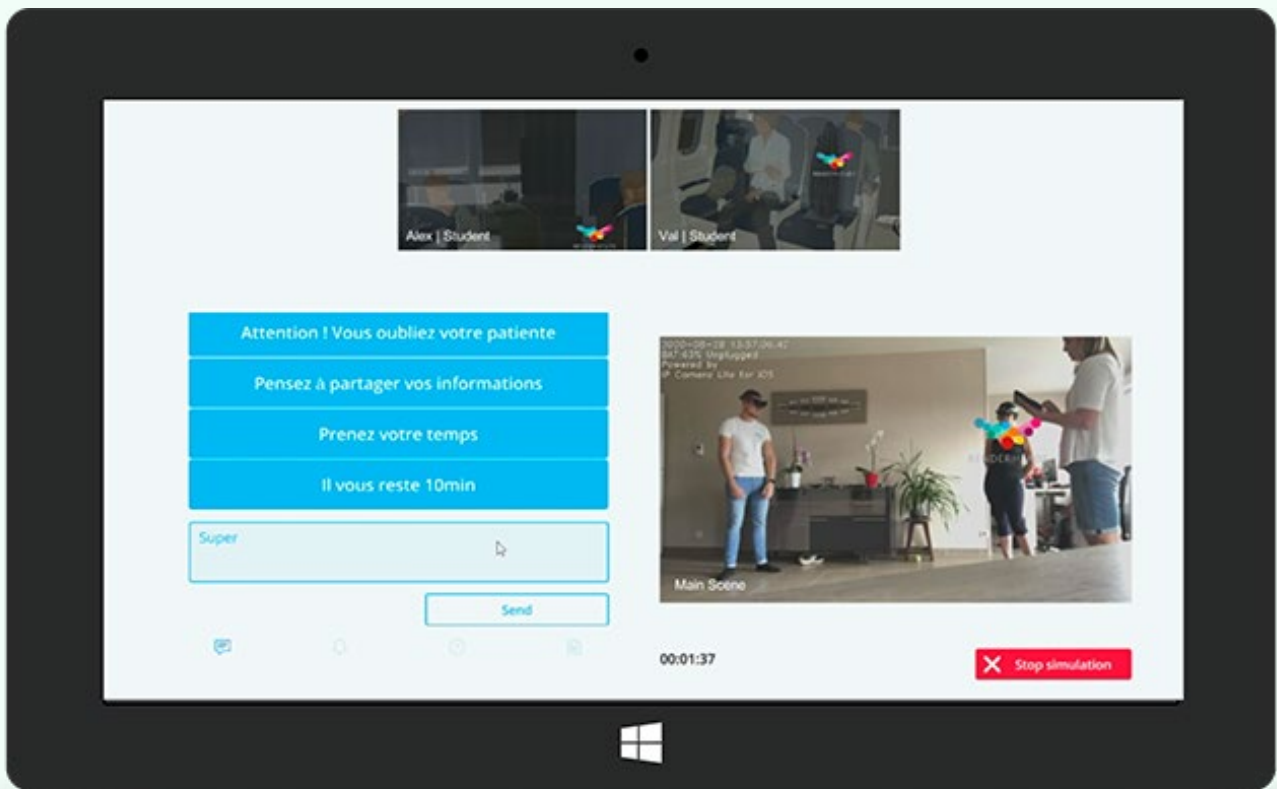
Finally, the monitoring app will be able to record important events and comments during the training session and generate PDF files and/or a video listing all these significant moments. PDF and video files can then be used during debriefing sessions or later for personal training.

RELEVANT INNOVATION

The HOST project integrates several innovations. The training method is the first: The aerospace-inspired method has been adapted and extended so that it can be used for the training of hospital staff. Based on an "escape room" approach, this method is a gamification of a stressful situation simulation that allows training on important aspects such as communication, organization, prioritization, task distribution and coordination. The second innovation is technological with the transformation of the whole real training environment into its virtual equivalent reinforced by rich communication and supervision functions. Finally, the whole solution has been designed and developed in a generic way so as to ease the extension of other decors, the integration of new puzzles, and the addition of new supervisory functions.

PROJECT OUTCOMES & RESULTS

Currently, HOST solution is composed by three main components. First, a Unity app running on Hololens and allowing participants to view virtual decor, virtual actors and virtual enigmas as well as to view messages and animations sent and activated by moderators. This app communicates using Photon API with the moderation app as a second component, which is a Unity app running on tablet and enabling moderators to visualize the whole training setting by watching the video streams of all connected Hololens and acting on the training session by sending text messages or audio messages, triggering animations and hints on the Hololens app, and pointing important events or actions. Finally, a media server runs on a distant server and is responsible for encoding and sharing all the video streams as well as all the exchanged information. The whole solution is running on a local network independent of any external API or services, which eases its use and deployment in any context.

This solution is currently used and is being tested within the HUGs. We aim to assess its acceptability by users. Our short-term goal is to use the test feedback to develop a new improved version in terms of robustness, realism, immersion and scalability.

CONCLUSION

The HOST project aims at building Augmented Reality solutions for human skills training based on gamified scenarios involving puzzles and enigmas. The project involves several conceptual and technical challenges. Currently, an integrated solution has been developed and is tested with real end users at HUG. A request to the HUG foundation was formulated and submitted to finance a second version of HOST solution, based on the current evaluation and testing.

PERSPECTIVES & NEEDS

We are currently waiting for our application review of the HUG Foundation. In case of a positive answer, a second version of HOST will be developed to reach a high level of robustness, a total packaged solution with an easy deployment and a better acceptability level.

ACKNOWLEDGEMENTS

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