RECORDING AND REPLAYING PSYCHOMOTOR USER ACTIONS IN VR

PRESENTER: Manos Kamarianakis

NOVEL RECORDING OF LOW-DIMENSIONAL UX DATA IN VR ALLOWS IMMERSIVE FULL SESSION REPLAY FROM ANY PERSPECTIVE AND POINT IN TIME.

SIGGRAPH 2022
VANCOUVER+ 8-11 AUG

MOTIVATION

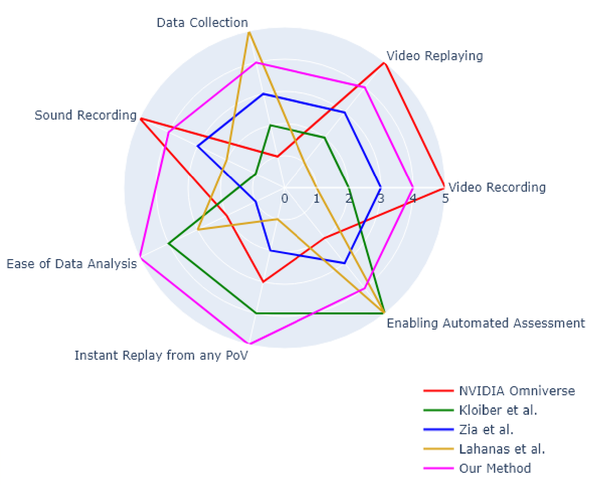
Recording and playback of a VR session:

- has become an increasingly market-required asset.
- can serve as an additional & powerful educational tool in the context of VR educational apps.
- is a feature not natively undertaken by modern game engines.

OUR METHOD

- Enables experts to record and replay their sessions.
- Novices can learn how to correctly perform a VR operation.
- Evaluators can assess the learning outcomes of the apprentices.
- Graphics and sound synchronization implemented.
- Publicly available for free.

RESULTS



OUR APPROACH

- **VR Recorder:** Logs users' transformations, interactions, sounds and scene graph states.
- **VR Replay:** Users are free to move around the virtual world and act simultaneously with the various recorded interactions and events.

RELATED WORK

VR record and replay enhance the learning impact of VR applications [2]. Usually, the data are captured in video format [5] and require a post process to obtain data suitable for analysis. Our approach, implemented within **MAGES SDK** [3,6], is close to [5] regarding Audio-Video synchronization, and [1], where user's motion are analyzed by recording their hands and head trajectories.

REFERENCES

[1] Kloiber et al. 2020. Immersive analysis of user motion in VR applications. The Visual Computer 36, 10-12 (2020), 1937–1949.
[2] Lahanas et al. 2015. A novel augmented reality simulator for skills assessment in minimal invasive surgery. Surg. Endosc. 29, 8 (2015), 2224–2234.
[3] Papagiannakis et al. 2020. MAGES 3.0: Tying the Knot of Medical VR. In ACM SIGGRAPH 2020 Immersive Pavilion. ACM, Article 6, 2 pages.
[4] Zhang et al. 2017. Research on Audio and Video Synchronization Algorithm Based on AVI Format. In Proceedings of MSMEE 2017. Atlantis Press, 959–962.
[5] Zia et al. 2016. Automated video-based assessment of surgical skills for training and evaluation in medical schools. Int. J. Comput. Assist. Radiol. Surg. 11, 9 (2016), 1623–1636.
[6] Zikas et al. 2022. Virtual Reality Medical Training for COVID-19 Swab Testing and Proper Handling of Personal Protective Equipment: Development and Usability. Frontiers in Virtual Reality 2 (2022).

ACKNOWLEDGEMENTS

Project was partially funded by the European Union's Horizon 2020 research and innovation programme under grant agreements No 871793 (ACCORDION) and No 101016509 (CHARITY).

Manos Kamarianakis
kamarianakis@uoc.gr
Ilias Chrysovergis
ilias@oramavr.com
Mike Kentros
mike@oramavr.com
George Papagiannakis
papagian@ics.forth.gr