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A QoE and Visual Attention Evaluation on the Influence of Spatial Audio in 360° videos

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RESEARCH QUESTION

What is the impact of different types of audio (stereo & spatial) on user QoE (Quality of Experience) and Visual Attention in 360° video environments?

DOES SPATIAL AUDIO MATTER IN 360° VIDEOS?

Adding spatial audio may completely change the way how users watch the 360° videos: how they move their heads; directions they focus; and what content they can remember after each session.

RESEARCH AIM

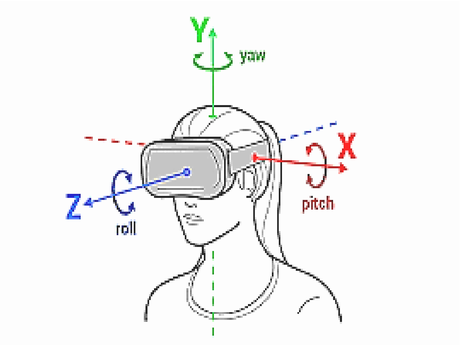
This research aims to investigate if we can use multimodal datasets (eye-gaze, head-pose, heart-rate, electrodermal activity) captured from users as they consume immersive content, to predict their QoE (Quality of Experience)and Visual Attention in 360° video experiences enhanced with different types of audio.

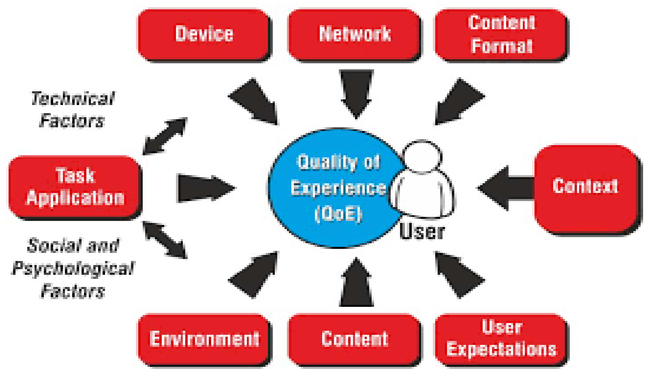
RESEARCH NEED

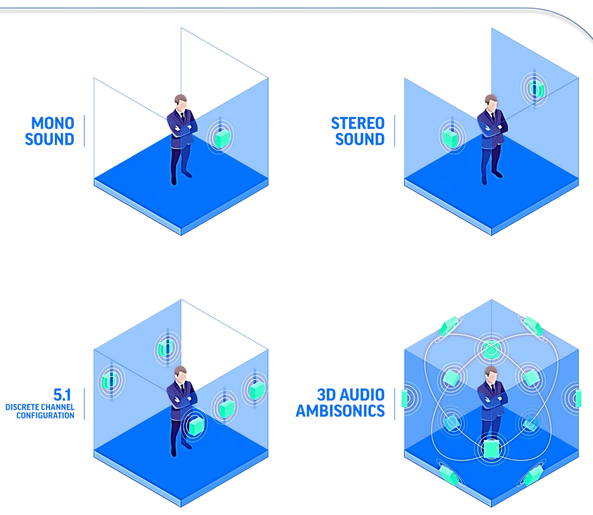
- The research community needs a dataset with multisensory experiences for 360° content production, storage and transmission.
- QoE evaluation will help to understand new paradigms in terms of Immersion and Presence.

METHODOLOGY (BASED ON ITU-T RECOMMENDATION P.913 , DESIGNED BETWEEN SUBJECTS)

Phase, Duration	Activity	Tools
Informative, 10-min	Explain test details to subject	Information Sheet, Consent Form
Screening, 10-min	Assess visual acuity and color perception	Snellen Chart, Ishihara color blindness test
Training, 5-min	Get subject to be familiar with the VR environment	Training Video
Testing, 15-min	Subjects views two 360° videos of 5-min each in one of the four audio conditions	360° video with non-spatial/ spatial audio viz. No Sound, Stereo, First Order, Third Order
Questions, 10-min	Subject answers questionnaire	Subjective Questionnaire



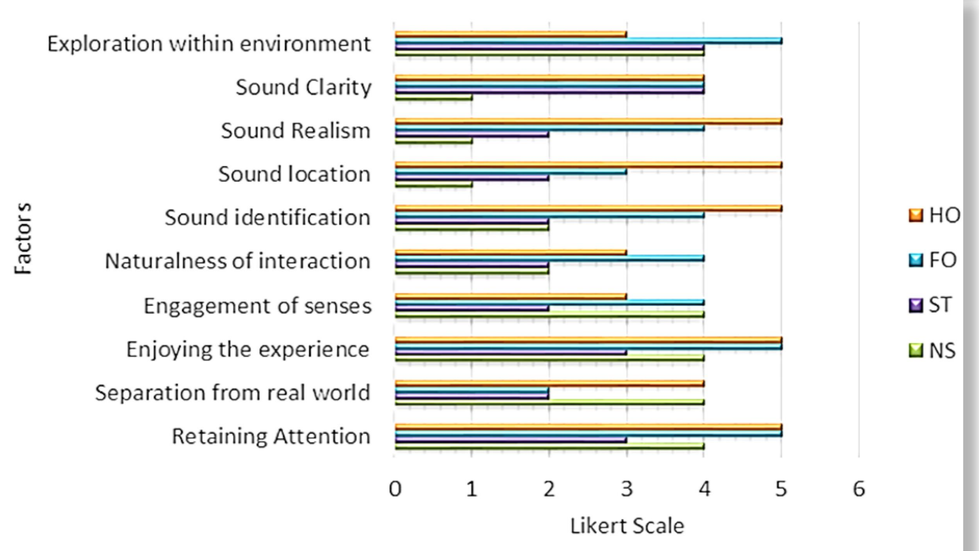




TESTBED

Component	Manufacturer	Used For
HMD	HTC Vive with Tobii Pro VR Integration	Watching 360° videos
Headphones	Beyerdynamic DT 990 Pro	Listening to non-spatial/spatial audio
360° Player	GoPro VR Player	Obtaining head-orientation as Yaw, Pitch and Roll
Wristband	Empatica E4	Recording EDA and Heartrate
SDK	Tobii Pro Python SDK	Obtaining Gaze origin, Direction and Pupil Diameter

QOE EVALUATION FROM PILOT TEST



PRELIMINARY FINDINGS

- First order (FO) and High Order (HO) Ambisonics outperform stereo (ST) on sound realism, localization & and identification.
- Also, in terms of attention retainment and enjoying the experience.

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