

Recommendation

ITU-T P.812 (05/2024)

SERIES P: Telephone transmission quality, telephone installations, local line networks

Methods for objective and subjective assessment of speech and video quality

Principles of subjective test methods for interactive virtual reality (VR) applications

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Recommendation ITU-T P.812

Principles of subjective test methods for interactive virtual reality (VR) applications

Summary

Recommendation ITU-T P.812 provides methods and procedures for conducting subjective evaluation experiments for interactive virtual reality (VR) applications. Such interactive VR applications enable the user to interact with generated videos, images, sounds, and other sensations that aim at, but are not limited to the simulation of a user's physical presence in this virtual environment with the use of a specialized VR equipment.

History *

Edition	Recommendation	Approval	Study Group	Unique ID
1.0	ITU-T P.812	2024-05-29	12	11.1002/1000/15899

Keywords

Interaction, quality of experience, subjective test method, virtual reality.

* To access the Recommendation, type the URL <https://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID.

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Recommendation ITU-T P.812

Principles of subjective test methods for interactive virtual reality (VR) applications

1 Scope

This Recommendation describes general principles of subjective evaluation methods of interactive virtual reality (VR) applications. The methods described aim to assess the quality of the interactive VR applications from the user's point of view. Based on the laboratory experiments, user testing as part of the method is based on realistic use case scenarios of interactive VR applications with predefined tasks. The user's opinion on perceptive quality dimensions is determined with the help of questionnaires and/or physiological measurements.

The Recommendation addresses general principles for the set-up of content, test methods, and environment, minimal requirements for equipment, minimal number of subjects, as well as the experiment design with evaluation.

Additionally, in the development process, [b-ITU-T G.1035] will be followed when addressing the influencing factors in general for VR services. Guidelines for specific services, such as telemeeting or gaming services will be addressed in separate Recommendations.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

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|---------------|---|
| [ITU-T P.800] | Recommendation ITU-T P.800 (1996), <i>Methods for subjective determination of transmission quality</i> . |
| [ITU-T P.809] | Recommendation ITU-T P.809 (2018), <i>Subjective evaluation methods for gaming quality</i> . |
| [ITU-T P.910] | Recommendation ITU-T P.910 (2023), <i>Subjective video quality assessment methods for multimedia applications</i> . |

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

- 3.1.1 cybersickness or simulator sickness** [b-ITU-T G.1035]: A physiological condition arising when exposed to a virtual reality environment.
- 3.1.2 degree of freedom (DoF)** [b-ITU-T G.1035]: Represents the ways an object can move within a space, which is a key element in helping create an immersive environment for a user.
- 3.1.3 immersion:** A psychological state characterized by perceiving oneself to be enveloped by, included in and interacting with an environment that provides a continuous stream of stimuli and experiences.

3.1.4 motion-to-photon latency [b-ITU-T G.1035]: The time it takes between the user moving their head and this motion being reflected on the screen of the head-mounted display (HMD).

3.1.5 presence [b-ITU-T G.1035]: The subjective experience of being in one place or environment, when one is physically situated in another place or environment.

3.1.6 quality of experience (QoE) [b-ITU-T P.10]: The degree of delight or annoyance of the user of an application or service.

3.1.7 QoE influencing factors [b-ITU-T P.10]: Includes the type and characteristics of the application or service, context of use, the user's expectations with respect to the application or service and their fulfilment, the user's cultural background, socio-economic issues, psychological profiles, emotional state of the user, and other factors whose number will likely expand with further research.

3.1.8 user experience [b-ISO 9241-210]: A person's perceptions and responses coming from the use or anticipated use of a product, system, or service.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 interactive VR applications: Applications that enable the user to interact with generated videos, images, sounds, and other sensations that aim at but are not limited to, the simulation of a user's physical presence in this virtual environment with the use of specialized VR equipment.

3.2.2 social acceptability: A prospective evaluation of how people will feel about a technology or set of measures that will be implemented in the future.

NOTE – Definition based on [b-Distler].

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AR	Augmented Reality
ATI	Affinity for Technology
DoF	Degrees of Freedom
EEG	Electroencephalogram
FSS	Flow State Scale
GOMS	Goals, Operators, Methods, and Selection Rules
HMD	Head Mounted Display
IEQ	Immersive Experience Questionnaire
IPQ	Igroup Presence Questionnaire
ISO	International Organization for Standardization
MOS	Mean Opinion Score
MR	Mixed Reality
PC	Personal Computer
PQ	Presence Questionnaire
QoE	Quality of Experience
SAM	Self-Assessment-Manikin
SDT	Self-Determination Theory