Naturalistic audio-visual volumetric sequences dataset of sounding actions for six degree-of-freedom interaction

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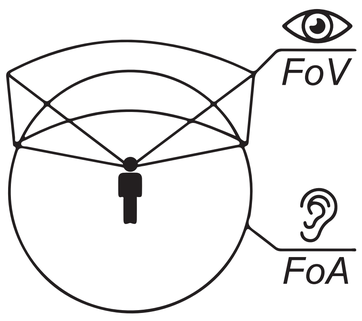
Introduction

Sight and **hearing**, together, are primary means for experiencing real, virtual and mixed realities around us



Existing datasets do not reflect bimodal integration of the senses, as the data:

- address **specific** technical problems (e.g. only hand or body movements)
- are limited to **one modality** (i.e. audio only, or video only)
- **lack quality**, esp. of audio recordings

We present the **NAVVS** dataset:

- volumetric **3D-video** data high-quality **audio**
- **naturalistic** actions
- semantic and acoustic-feature **coverage**
- **freely-accessible** for research

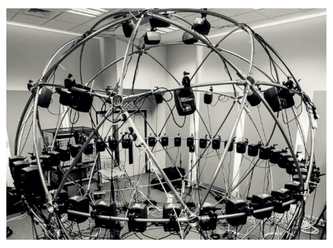
Use cases

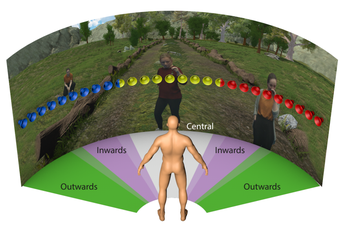
NAVVS dataset supports:

- technical and scientific studies VR/AR/XR
- 2D or 3D visual displays
- 3DoF or 6DoF interaction

For perceptual evaluations:

- transmission/rendering quality, localization, rendering techniques
- audio-visual congruence, synchronization, spatial alignment

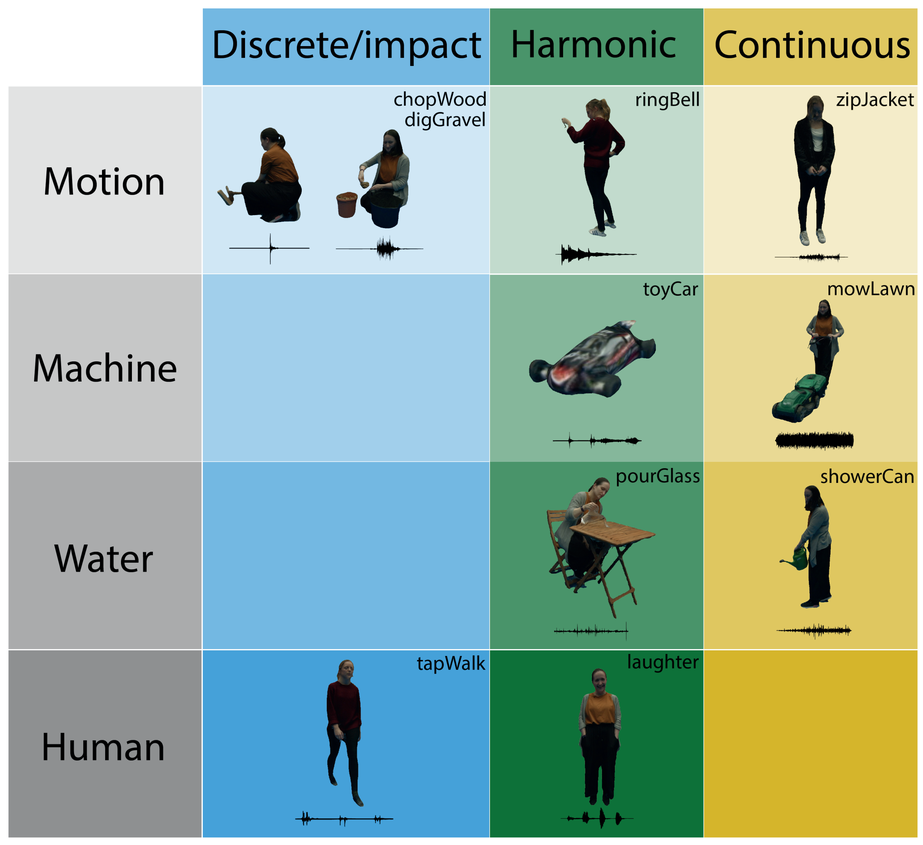




Design of dataset

- **Aim**: to enable subjective perceptual evaluation
- **Semantic categories** distinguish sound sources as linked to brain activity
- **Acoustic feature classes** describe sound character and relate to localisability

10 selected 2-s **scenes**
4 same-person **repetitions**
40 volumetric **sequences**



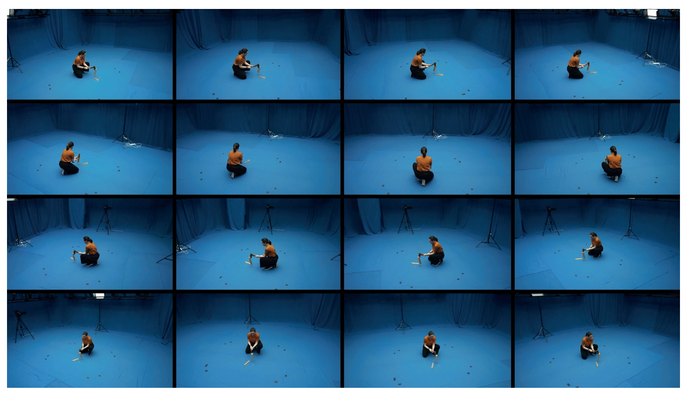
Data capture & processing

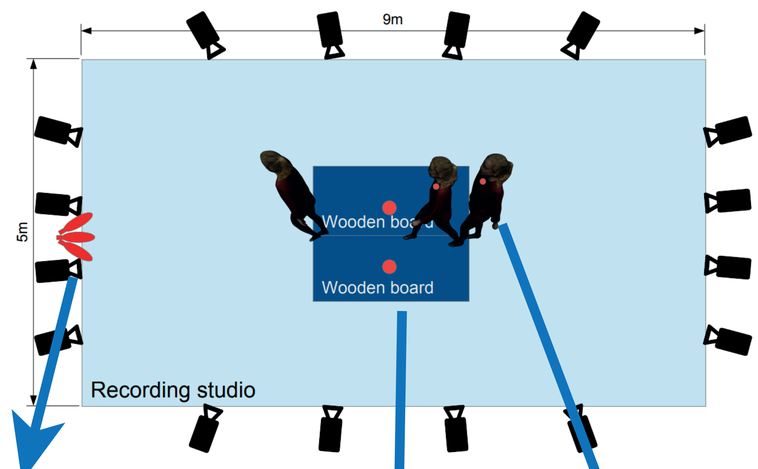
Scan to visit the website

Video

- 16 UHD video streams (30 fps)
- Background masks using chroma keying
- Foreground volumes recovered using shape-from-silhouette
- Volumetric graphs cut refines the visual hulls

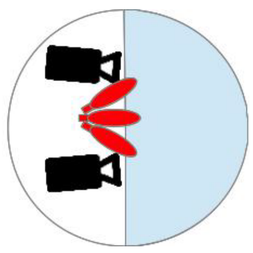
3D foreground mode per frame with UV texture atlasees





Audio

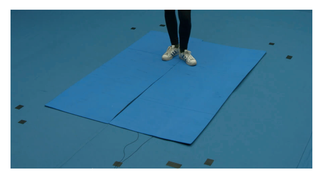
- Multimicrophone recording technique
- De-noise and de-crackle filtering(Izotope RX7)
- **Stereo-mix with left-right motion & distance cues**
- **Spot mic raw audio**



Shotgun microphones directed at actor

Lavalier clip-on mic

Wooden board with DPS contact mics
OPtional boom mic



Conclusion

- Audio-visual dataset needed for realistic tests & multimodal VR/AR/XR research
- We present **NAVVS** short volumetric action sequences, designed with semantic and acoustic diversity for technical evaluation and scientific perceptual studies
- Future work may compare threshold across scenes, add metadata & sequences
- For more info, visit **cvssp.org/data/navvs/**.

References

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