Documentation about the room impulse responses and noise data used for the REVERB challenge SimData

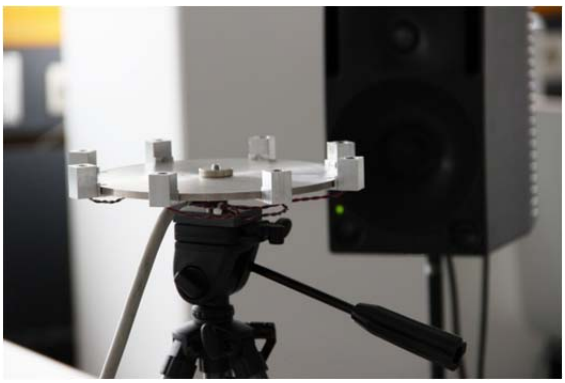
Abstract

For the SimData of the REVERB challenge, we measured room impulse responses (RIRs) and noise data using 8ch circular arrays. This document provides detailed description about recording conditions, recording equipment and acoustic characteristics of the measured RIRs.

1. Recording equipment

RIRs and noise data were measured with 8-ch circular arrays with diameter of 20 cm. All the microphones used in the array were omni-directional. Figure 1 shows an example of the array. For the RIR measurement, we used a maximum length sequence (MLS).

Fig 1: An 8ch circular microphone array



For the noise data measurement, we used the same recording conditions and equipment but with the air conditioning systems turned on.

2. Recording conditions

2.1. RIRs and noise data for SimData development and evaluation sets

Figure1, 2 and 3 show the recording conditions for the SimData room1, room2 and room3, respectively. For generating the SimData development set, we used the RIRs and noise data recorded with the speaker positions along with the 45 degree lines (cf. Fig1, 2 and 3). On the other hand, for the SimData evaluation set, those recorded with

the speaker positions along with the 135 degree lines were used. More detailed description about the recording equipment such as the specification of amplifier and microphones is summarized in the tables in appendix.

Fig 1: Recording condition for SimData room1

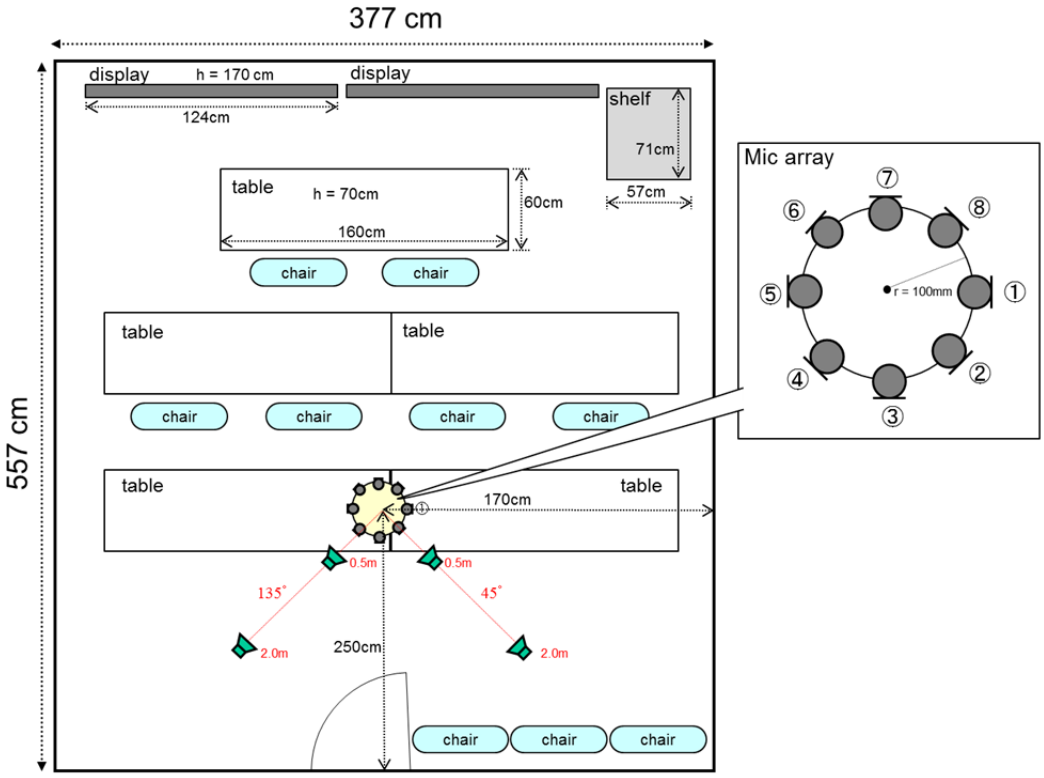


Fig 2: Recording condition for SimData room2

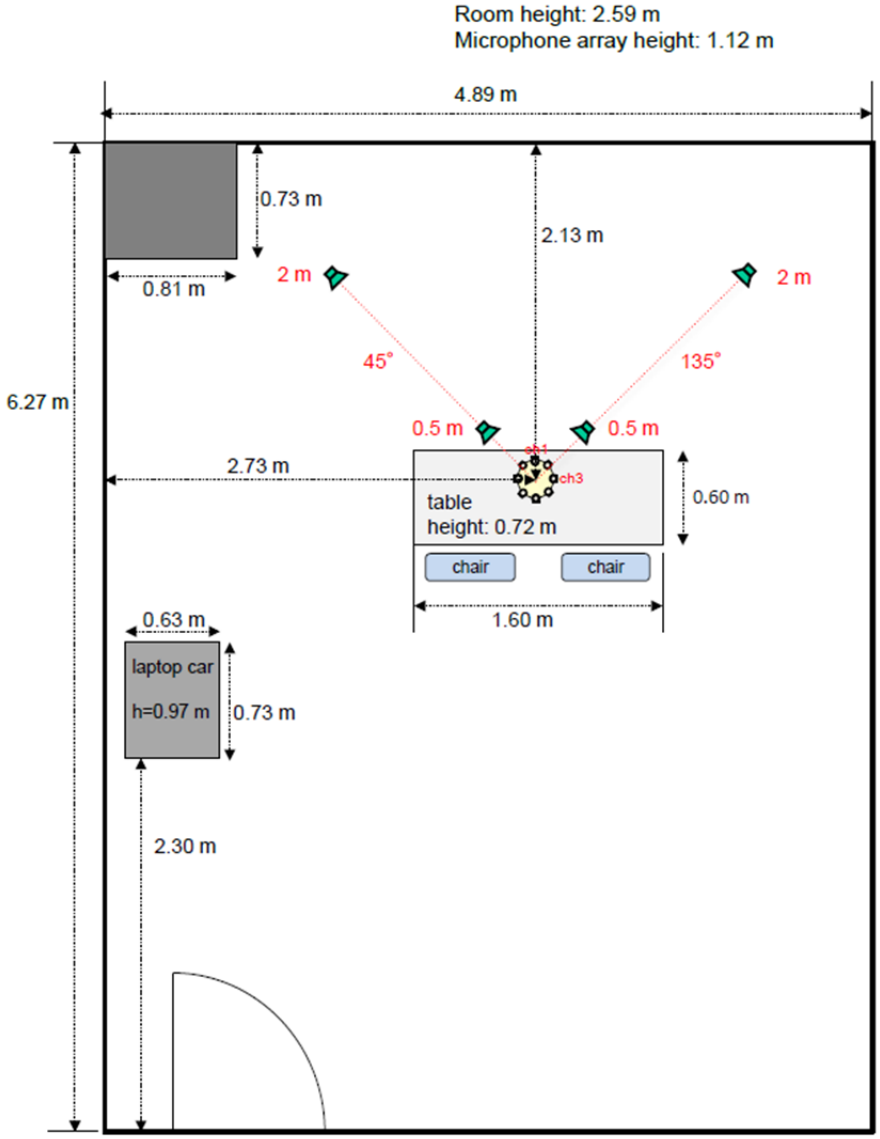
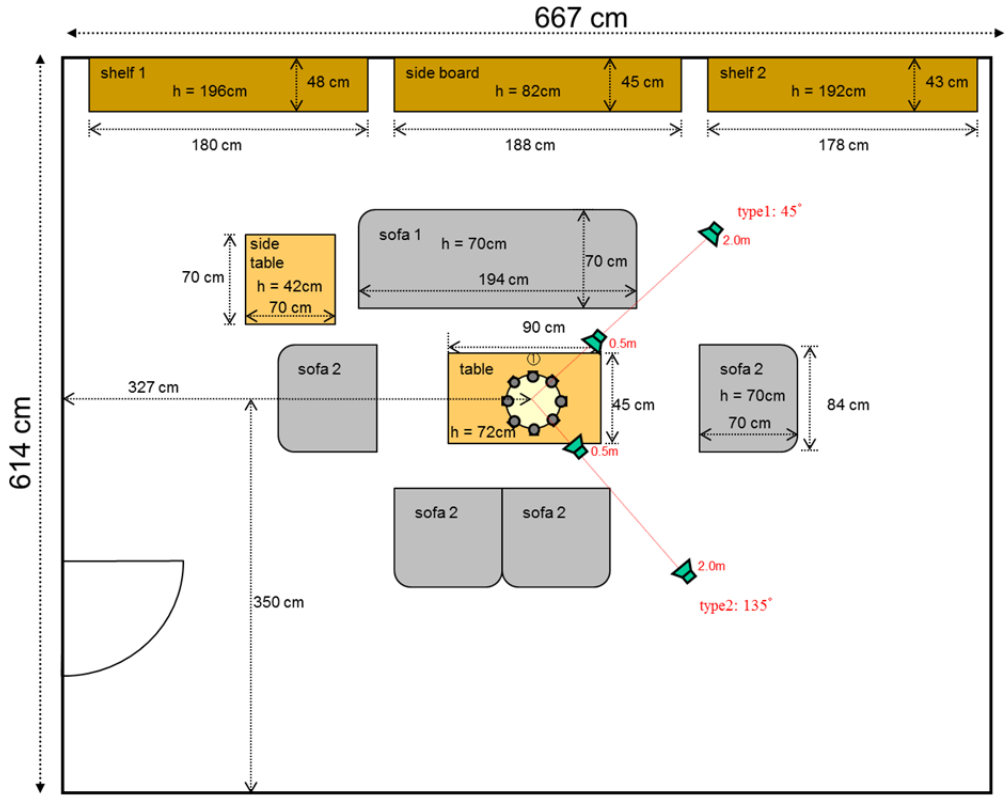


Fig 3: Recording condition for SimData room3



Appendix

More detailed information about recording conditions and equipment are summarized in the form of the AcouSP recommendation [1]. Table 1, 2, and 3 correspond to the information regarding SimData room1, room2 and room3 respectively.

Table 1: Recording specification regarding SimData room1

Hardware	Microphone array	Number of mics	8
	Microphones	Commercial product description (brand, type, serial number, etc.)	SONY ECM-77B
		Type (omnidir., ...)	omnidirectional
		Frequency range	40Hz - 20kHz
	Preamplifiers	Commercial product description (brand, type, serial number, etc.)	YAMAHA HA8
		Noise level	N/A
	ADC	Commercial product description (brand, type, serial number, etc.)	DASmini 2408-100k-AD
		Resolution (bit)	24 bit
		Sampling frequency	102.4KHz
		Noise level after ADC	N/A
		Synchronization method (for multichannel)	master clock with a higher-precision timebase
	Loudspeakers	Commercial product description (brand, type, serial number, etc.)	BOSE 101MM
	DAC	Commercial product description (brand, type, serial number, etc.)	DASmini 2408-200k-DA
Sources	Types	Humans, Loudspeakers, Musical instruments, Sounding objects, Ambient noise,	Loudspeakers
	Signal type	Test signal/ Speech/ Music/ Noise …	maximum length sequence
	Bandwidth		0-48kHz
Acoustic environment	Type (Car, Office, Living room,…)		Experimental room
	T_60		0.25 sec
	Background noise level (stationary)		40dB SPL
Recording Topology	Relative sensor positions		Circular

Table 2: Recording specification regarding SimData room2

Hardware	Microphone array	Number of mics	8
	Microphones	Commercial product description (brand, type, serial number, etc.)	AKG capsules CE20 V17 (2112Z0017)
		Type (omnidir., ...)	omnidirectional
		Frequency range	20Hz - 20kHz
	Preamplifiers	Commercial product description (brand, type, serial number, etc.)	Studer Mic24ADAT
		Noise level	N/A
	ADC	Commercial product description (brand, type, serial number, etc.)	Studer Mic24ADAT
		Resolution (bit)	24 bit
		Sampling frequency	48 kHz
		Noise level after ADC	N/A
		Synchronization method (for multichannel)	word clock
	Loudspeakers	Commercial product description (brand, type, serial number, etc.)	Genelec 1029A
	DAC	Commercial product description (brand, type, serial number, etc.)	HDSP Multiface II
Sources	Types	Humans, Loudspeakers, Musical instruments, Sounding objects, Ambient noise,	Loudspeakers
	Signal type	Test signal/ Speech/ Music/ Noise …	maximum length sequences
	Bandwidth		0-48kHz
Acoustic environment	Type (Car, Office, Living room,…)		acoustic laboratory (reflective surfaces)
	T_60		0.68 sec
	Background noise level (stationary)		N/A
Recording Topology	Relative sensor positions		Circular

Table 3: Recording specification regarding SimData room3

Hardware	Microphone array	Number of mics	8
	Microphones	Commercial product description (brand, type, serial number, etc.)	SONY ECM-77B
		Type (omnidir., ...)	omnidirectional
		Frequency range	40Hz - 20kHz
	Preamplifiers	Commercial product description (brand, type, serial number, etc.)	YAMAHA HA8
		Noise level	N/A
	ADC	Commercial product description (brand, type, serial number, etc.)	DASmini 2408-100k-AD
		Resolution (bit)	24 bit
		Sampling frequency	102.4KHz
		Noise level after ADC	N/A
		Synchronization method (for multichannel)	master clock with a higher-precision timebase
	Loudspeakers	Commercial product description (brand, type, serial number, etc.)	BOSE 101MM
	DAC	Commercial product description (brand, type, serial number, etc.)	DASmini 2408-200k-DA
Sources	Types	Humans, Loudspeakers, Musical instruments, Sounding objects, Ambient noise,	Loudspeakers
	Signal type	Test signal/ Speech/ Music/ Noise …	maximum length sequence
	Bandwidth		0-48kHz
Acoustic environment	Type (Car, Office, Living room,…)		Experimental room
	T_60		0.73 sec
	Background noise level (stationary)		31dB SPL
Recording Topology	Relative sensor positions		Circular

Reference

[1] W. Kellermann, S. Makino, P. A. Naylor, M. Omologo. (2010). The AcouSP recommendation for annotation of acoustic data collections. (Version 1.0). [On-line]. Available: www.commsp.ee.ic.ac.uk/~acousp.