

Ciencias de la información acústica: Una década de investigaciones en Perú y Japón

César D. Salvador^a

^a<http://cesardsalvador.github.io>

Resumen

En esta conferencia contaré mis experiencias de investigación en acústica y audición, realizadas en importantes centros de investigación de Perú y Japón desde el año 2007 hasta el presente. Recordaré la creación de los primeros paisajes sonoros 3D en Isonar, USMP, mi paso por la escuela de graduados en la Universidad de Tohoku, mis proyectos más recientes en RIEC, y mis planes hacia el futuro. Destacaré la importancia de la educación y la investigación en acústica y audición, así como la necesidad de involucrar activamente a la sociedad, especialmente a los niños y jóvenes, para poder establecer líneas sólidas de investigación. Finalmente, presentaré de manera general los campos de aplicación de la tecnología acústica 3D que se irán tratando durante la semana, destacando su impacto en el bienestar de la sociedad y el desarrollo de la industria.

Keywords:

1. Introducción

2. Importancia de la investigación

3. Inicios en Perú

3.1. ECOS

Vocoder multicanal wavelets [1].

3.2. ISONAR

Síntesis de espacios acusticos para composición de paisajes sonoros [2, 3, 4, 5].

4. RIEC

Registro, edición, transmisión y reproducción de sonido 3D para entornos multisensoriales de telepresencia [6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 2, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31].

5. Lecciones aprendidas

6. Conclusiones

Referencias

- [1] C. D. Salvador, A channel vocoder using wavelet packets on a reconfigurable device, in: Proc. 124th Audio Eng. Soc. Convention, Audio Engineering Society.
URL <http://www.aes.org/e-lib/browse.cfm?elib=14546>
- [2] C. D. Salvador, A virtual acoustic environment as auditory display front-end for sonification, in: Proc. Interactive Sonification Workshop on Human Interaction with Auditory Displays, pp. 69–72.
URL <https://pub.uni-bielefeld.de/publication/2277223>
- [3] C. D. Salvador, Discrete driving functions for horizontal reproduction using wave field synthesis and higher order ambisonics, in: Proc. 129th Audio Eng. Soc. Convention, Audio Engineering Society.
URL <http://www.aes.org/e-lib/browse.cfm?elib=15666>
- [4] C. D. Salvador, A discretization of the wave field synthesis method for auralization of natural sounds, in: Proc. Int. Multi-Conf. Complexity, Informatics and Cybernetics.
URL http://www.iiis.org/CDs2010/CD2010IMC/IMCIC_2010/index.asp?id=0&area=5
- [5] C. D. Salvador, Wave field synthesis using fractional order systems and fractional delays, in: Proc. 128th Audio Eng. Soc. Convention, Audio Engineering Society.
URL <http://www.aes.org/e-lib/browse.cfm?elib=15419>

- [6] C. D. Salvador, S. Sakamoto, J. Trevino, Y. Suzuki, Editing distance information in compact microphone array recordings for its binaural rendering 114 (3) 13–18.
- [7] C. D. Salvador, Binaural synthesis based on spherical acoustics.
- [8] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Embedding distance information in binaural renderings of far field recordings, in: Proc. EAA Joint Symp. Auralization and Ambisonics, pp. 133–139. doi:10.14279/depositonce-22.
- [9] C. D. Salvador, Binaural synthesis based on the spherical harmonic analysis with compact microphone arrays.
URL <http://hdl.handle.net/10097/56638>
- [10] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Spatial accuracy of binaural synthesis from rigid spherical microphone array recordings 38 (1) 23–30. doi:10.1250/ast.38.23.
- [11] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, A new signal processing procedure for stable distance manipulation of circular HRTFs on the horizontal plane, in: Proc. Spring Meeting Acoust. Soc. Jpn., Acoustical Society of Japan, pp. 561–564.
- [12] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Sound field interpolation in the spatial domain with a rigid spherical microphone array, Acoustical Society of America. doi:10.1121/1.4969175.
- [13] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Evaluation of white noise gain in a binaural system for microphone arrays, in: Proc. Autumn Meeting Acoust. Soc. Jpn., pp. 401–404.
- [14] C. D. Salvador, S. Sakamoto, J. Treviño, J. Li, Y. Yan, Y. Suzuki, A method to synthesize head-related transfer functions based on the spherical harmonic decomposition, in: Proc. Spring Meeting Acoust. Soc. Jpn., Acoustical Society of Japan, pp. 889–892.

- [15] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Design theory for binaural synthesis: Combining microphone array recordings and head-related transfer function datasets 38 (2) 51–62. doi:10.1250/ast.38.51.
- [16] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Distance-varying filters to synthesize head-related transfer functions in the horizontal plane from circular boundary values 38 (1) 1–13. doi:10.1250/ast.38.1.
- [17] C. D. Salvador, S. Sakamoto, J. Treviño, J. Li, Y. Yan, Y. Suzuki, Accuracy of head-related transfer functions synthesized with spherical microphone arrays 19 (1). doi:10.1121/1.4800833.
- [18] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Enhancement of spatial sound recordings by adding virtual microphones to spherical microphone arrays 8 (6) 1392–1404.
- [19] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Validity of distance-varying filters for individual HRTFs on the horizontal plane, in: Proc. Spring Meeting Acoust. Soc. Jpn., Acoustical Society of Japan.
URL <http://www.ais.riec.tohoku.ac.jp/~salvador/>
- [20] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, A model for spatial sound systems comprising sound field recording, spatial editing, and binaural reproduction 116 (449) 61–65.
- [21] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Boundary matching filters for spherical microphone and loudspeaker arrays 26 (3) 461–474. doi:10.1109/TASLP.2017.2778562.
- [22] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Numerical evaluation of binaural synthesis from rigid spherical microphone array recordings, in: Proc. Audio Eng. Soc. Int. Conf. Headphone Technology, Audio Engineering Society. doi:10.17743/aesconf.2016.978-1-942220-09-1.

- [23] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Dataset of near-distance head-related transfer functions calculated using the boundary element method, in: Proc. Audio Eng. Soc. Int. Conf. Spatial Reproduction —Aesthetics and Science—, Audio Engineering Society.
URL <http://www.aes.org/e-lib/browse.cfm?elib=19602>
- [24] C. D. Salvador, S. Sakamoto, J. Treviño, Y. Suzuki, Enhancing binaural reconstruction from rigid circular microphone array recordings by using virtual microphones, in: Proc. Audio Eng. Soc. Int. Conf. Audio for Virtual and Augmented Reality, Audio Engineering Society.
- [25] C. D. Salvador, Synthesis of head-related transfer functions in the peripersonal space.
URL <http://web-ext.u-aizu.ac.jp/~mcohen/welcome/ISSM/18-19/program.html>
- [26] S. Hu, J. Trevino, C. D. Salvador, S. Sakamoto, J. Li, Y. Suzuki, A local representation of the head-related transfer function 140 (3) EL285–EL290. doi:10.1121/1.4962805.
- [27] S. Hu, J. Trevino, C. D. Salvador, S. Sakamoto, Y. Suzuki, Modeling head-related transfer functions with spherical wavelets 146 81–88. doi:10.1016/j.apacoust.2018.10.026.
- [28] J. Treviño, C. D. Salvador, V. Braciulis, S. Sakamoto, Y. Suzuki, K. Yoshikawa, T. Yamasaki, K. Kidokoro, Sound source separation in complex environments using an array-of-arrays microphone system, in: Proc. 22nd Int. Cong. Acoust., International Commission for Acoustics (ICA).
- [29] J. Treviño, T. Okamoto, C. D. Salvador, Y. Iwaya, Z. Cui, S. Sakamoto, Y. Suzuki, High-order ambisonics auditory displays for the scalable presentation of immersive 3d audio-visual contents, in: Proc. 23rd Int. Conf. Artificial Reality and Telexistence.
- [30] J. Treviño, S. Hu, C. D. Salvador, S. Sakamoto, J. Li, Y. O. Suzuki, A compact representation of the head-related transfer function inspired by the wavelet transform

on the sphere, in: Proc. Int. Conf. Intell. Inf. Hiding and Multimedia Signal Process., pp. 372–375. doi:10.1109/IIH-MSP.2015.108.

- [31] S. Sakamoto, A. Wicaksono, J. Treviño, C. D. Salvador, Y. Suzuki, Prediction method for compression of spherical microphone array signals using geometric information, in: Proc. Int. Conf. Intell. Inf. Hiding and Multimedia Signal Process., pp. 376–379. doi:10.1109/IIH-MSP.2015.91.