



Promoting Integrity and Knowledge for the Well-Being of Humanity and Peace

Je crois invinciblement que la science et la paix triompheront de l'ignorance et de la guerre (*I believe invincibly that science and peace will triumph over ignorance and war*)

—Louis Pasteur, 1892

One year ago, I was writing the *IEEE Signal Processing Magazine* 2022 May editorial when the Russian army brutally attacked Ukraine. One year after, war is always present... I can't understand how a single man and his entourage can unleash such a killing spree and be responsible for so many deaths, especially innocent victims like children. Earth itself is cruel enough without human help, as the terrible earthquakes in Turkey and Syria have reminded us. My thoughts and sympathy go out to the victims of these disasters and their families, but I also do not forget the victims of less publicized events.

In this issue

The feature article “Neural Target Speech Extraction” [A1] is a survey of methods used to process the cocktail party effect, and extract the speaker of interest from a mixture of audio signals, using audio, visual, or spatial clues. Speech (signal) extraction is thus different from source separation since it

is focused on one signal of interest. In this article, it is clear that multimodal clues (e.g., combining audio and visual clues, or audio and spatial clues, or all together) are much more efficient than using only one. These results promote the very general approach of multimodal data fusion [1], which can be considered in many domains where data are recorded from different kinds of sensors or devices.

It is a remarkable coincidence that another article of the May issue, “Historical Audio Search and Preservation: Finding Waldo Within the Fearless Steps Apollo 11 Naturalistic Audio Corpus” [A2], is strongly related to the feature article [A1]. The *Apollo 11* mission was an outstanding event when I was teenager, and it is very interesting to see the specificities of the audio recordings (9,000 hours of audio data) and how they can be processed for extracting the main speakers during the different phases of the mission such as lift off, lunar standing, and lunar walking.

In the “Lecture Notes” column “Analysis of the Minimum-Norm Least-Squares Estimator and Its Double-Descent Behavior” [A3], the authors present an interesting analysis of the square error, which can be decomposed in two orthogonal terms. They show with simple

examples and derivations that this explains how the approximation error varies according to the number n of data samples with respect to the number d of parameters, especially when n is less than d .

The May issue contains three “Tips and Tricks” columns, which share the same spirit: proposed methods for achieving high performance at low complexity and cost.

The article “Bounded-Magnitude Discrete Fourier Transform” [A4] proposes an efficient method for computing the upper and lower bounds to the magnitude response using bounding kernels and two discrete Fourier transforms. The article is nicely completed by providing a MATLAB implementation and

all figures on Github.

Cascaded integrator-comb decimators provide natural aliasing rejection in folding bands. In “Simplifying Zero Rotations in Cascaded Integrator-Comb Decimators” [A5], for improving the rejection without increasing the number N of integrator/comb pairs, the author suggests slightly modifying one term of the cascade. He studied two examples, shows the improvement in aliasing rejection, and compares the additional complexity with a classical approach consisting of increasing the number N .

The May issue contains three “Tips and Tricks” columns, which share the same spirit: proposed methods for achieving high performance at low complexity and cost.

In “Tricks for Cascading Running-Sum Filters With Their Variations for High-Performance Filtering” [A6], the authors propose an approach to reach high-performance filtering with lower implementation complexity. This approach designs a composite low-pass filter by cascading a number of simple filters of diverse magnitude responses.

Signal/image processing and machine learning are ubiquitous. In the article “A Survey of Artificial Intelligence in Fashion” [A7], this appears clearly and surprisingly, since fashion is not a usual application domain. The article surveys recent contributions on popularity prediction, fashion trends, and recommendations, based on visual and social features. It also discusses amazing applications in virtual makeup and try-on services. These applications are obtained using various deep neural networks,

and in addition to the nice results, I believe that future research could focus on achieving a better explainability of the main discriminant features.

Enjoy your reading, and in your personal and professional life, be promoters of integrity and knowledge, for the well-being of humanity and for peace.

Reference

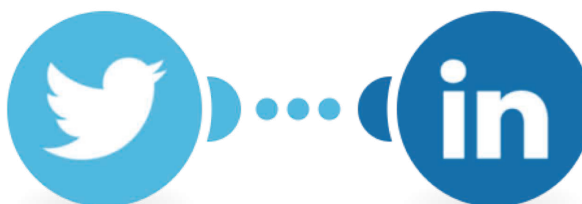
- [1] D. Lahat, T. Adali, and C. Jutten, “Multimodal data fusion: An overview of methods, challenges, and prospects,” *Proc. IEEE*, vol. 103, no. 9, pp. 1449–1477, Sep. 2015, doi: 10.1109/JPROC.2015.2460697.

Appendix: Related articles

- [A1] K. Zmolikova, M. Delcroix, T. Ochiai, K. Kinoshita, J. Černocký, and D. Yu, “Neural target speech extraction: An overview,” *IEEE Signal Process. Mag.*, vol. 40, no. 3, pp. 8–29, May 2023, doi: 10.1109/MSP.2023.3240008.
- [A2] M. M. Chandra Shekar and J. H. L. Hansen, “Historical audio search and preservation: Finding Waldo within the fearless steps Apollo 11 naturalistic audio corpus,”

IEEE Signal Process. Mag., vol. 40, no. 3, pp. 30–38, May 2023, doi: 10.1109/MSP.2023.3237001.

- [A3] P. Mattsson, D. Zachariah, and P. Stoica, “Analysis of the minimum-norm least-squares estimator and its double-descent behavior,” *IEEE Signal Process. Mag.*, vol. 40, no. 3, pp. 39–44, May 2023, doi: 10.1109/MSP.2023.3242083.
- [A4] S. J. Schlecht, V. Välimäki, and E. A. P. Habets, “Bounded-magnitude discrete Fourier transform,” *IEEE Signal Process. Mag.*, vol. 40, no. 3, pp. 46–49, May 2023, doi: 10.1109/MSP.2022.3228526.
- [A5] D. E. Troncso Romero, “Simplifying zero rotations in cascaded integrator-comb decimators,” *IEEE Signal Process. Mag.*, vol. 40, no. 3, pp. 50–58, May 2023, doi: 10.1109/MSP.2023.3236772.
- [A6] D. Shiung and J.-J. Huang, “Tricks for cascading running-sum filters with their variations for high-performance filtering,” *IEEE Signal Process. Mag.*, vol. 40, no. 3, pp. 59–63, May 2023, doi: 10.1109/MSP.2023.3247903.
- [A7] H.-J. Chen, H.-H. Shuai, and W.-H. Cheng, “A survey of artificial intelligence in fashion,” *IEEE Signal Process. Mag.*, vol. 40, no. 3, pp. 64–73, May 2023, doi: 10.1109/MSP.2022.3233449.



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