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Online algorithms for Nonnegative Matrix Factorization with the Itakura-Saito divergence

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Nonnegative matrix factorization (NMF) is now a common tool for audio source separation. When learning NMF on large audio databases, one major drawback is that the complexity in time is O(FKN) when updating the dictionary (where (F;N) is the dimension of the input power spectrograms, and K the number of basis spectra), thus forbidding its application on signals longer than an hour. We provide an online algorithm with a complexity of O (FK) in time and memory for updates in the dictionary. We show on audio simulations that the online approach is faster for short audio signals and allows to analyze audio signals of several hours.

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