Convolutive Blind Source Separation Methods

During the past decades, much attention has been given to the separation of mixed sources, in particular for the blind case where both the sources and the mixing process are unknown and only recordings of the mixtures are available. In several situations it is desirable to recover all sources from the recorded mixtures, or at least to segregate a particular source. Furthermore, it may be useful to identify the mixing process itself to reveal information about the physical mixing system. In some simple mixing models each recording consists of a sum of differently weighted source signals. However, in many real-world applications, such as in acoustics, the mixing process is more complex. In such systems, the mixtures are weighted and delayed, and each source contributes to the sum with multiple delays corresponding to the multiple paths by which an acoustic signal propagates to a microphone. Such filtered sums of different sources are called convolutive mixtures. There are already a number of partial reviews available on this topic so the purpose of this chapter is to provide a complete survey of convolutive BSS and identify a taxonomy that can organize the large number of available algorithms. This may help practitioners and researchers new to the area of convolutive source separation obtain a complete overview of the field. Hopefully those with more experience in the field can identify useful tools, or find inspiration for new algorithms.