

Re: Model-based source separation

Source: <http://sci.tech-archive.net/Archive/sci.stat.math/2004-11/0389.html>

From: shankar (v.shankar_at_gmx.de)

Date: 11/18/04

Date: 18 Nov 2004 15:05:03 -0800

Single-channel source separation is achieved by first representing the signal in the time-frequency (TF) domain. Transforms like STFT, Wavelets, ERB etc. can be used. ICA is then performed on the TF matrix.

Ref:

1. "Redundancy Reduction for Computational Audition, a Unifying Approach", PhD thesis, Paris Smaragdis, Massachusetts Institute of Technology, Media Laboratory, May 2001.

<http://web.media.mit.edu/~paris/phd/>

2. "Separation of Mixed Audio Sources by Independent Subspace Analysis", Michael A. Casey, September 2001.

<http://www.merl.com/reports/docs/TR2001-31.pdf>

3. "Auditory Group Theory with Applications to Statistical Basis Methods for Structured Audio", PhD thesis, Michael Anthony Casey, Massachusetts Institute of Technology Media Laboratory, February 1998.

<http://xenia.media.mit.edu/~mkc/thesis/>

Hope this helps,
Shankar.

Tomi Kinnunen <tkinnu@cs.joensuu.fi> wrote in message news:<cnh8ik\$021\$1@news.cs.joensuu.fi>...

> *Hi there,*

>

> *Apologies for cross-posting; I'm not sure in what newsgroup I should post my question.*

>

> *There seems to be a lot of literature about signal separation algorithms that are based on statistical independence assumption of the signals (ICA). Often it is also assumed that there are many channels available (e.g. several microphones). However, my interest is in the single-channel case.*

>

> *My intuition (wrong ?????) says that it would be possible to do separation/source detection from a single channel, having the following:*

>

> *1) p.d.f. estimates for each source, trained*

- > *on the "clean" data of that source :*
- >
- > $p(x/\text{Source}1), \dots, p(x/\text{Source}N)$
- >
- > 2) *Assumption of the independence of the sources*
- >
- > *Let me try to be a bit more formal. Suppose we observe a feature vector*