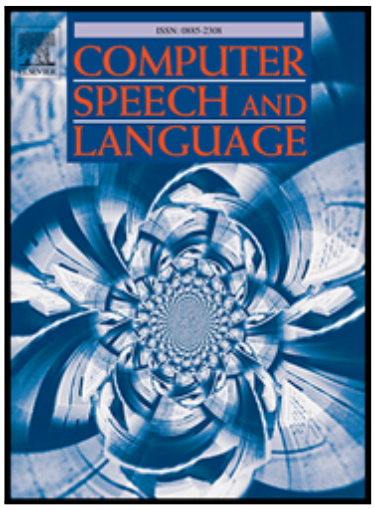

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A New Proof of a Contrast Function for Bounded Component Analysis and Further Analysis

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Abstract

Bounded Component Analysis (BCA) solves the Blind Source Separation (BSS) problem based on geometric assumptions. This paper introduces a new proof of a BCA contrast function, derived from elementary matrices, Gauss-Jordan elimination and convex geometry. The new proof and further analysis provide additional insight into a key assumption of BCA. In addition, an interpretation is presented to clarify one of the limitations of the instantaneous BCA algorithm. Experiments on audio sources support our analysis.

Keywords: bounded component analysis, blind source separation, independent component analysis, elementary matrix, convex geometry, audio signals.

1. Introduction

As the name "blind" suggests, Blind source separation (BSS) aims to recover the sources from mixtures of the sources only, without prior information of the sources and the way the sources were mixed [1]. The "blind" feature not only leads to a broad variety of applications in practice, such as

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