



Independent Vector Analysis: Identification Conditions and Performance Bounds

[Matthew Anderson](#), [Geng-Shen Fu](#), [Ronald Phlypo](#), [Tülay Adalı](#)

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Recently, an extension of independent component analysis (ICA) from one to multiple datasets, termed independent vector analysis (IVA), has been the subject of significant research interest. IVA has also been shown to be a generalization of Hotelling's canonical correlation analysis. In this paper, we provide the identification conditions for a general IVA formulation, which accounts for linear, nonlinear, and sample-to-sample dependencies. The identification conditions are a generalization of previous results for ICA and for IVA when samples are independently and identically distributed. Furthermore, a principal aim of IVA is the identification of dependent sources between datasets. Thus, we provide the additional conditions for when the arbitrary ordering of the sources within each dataset is common. Performance bounds in terms of the Cramer-Rao lower bound are also provided for the demixing matrices and interference to source ratio. The performance of two IVA algorithms are compared to the theoretical bounds.

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