Independent Component Analysis: A Tutorial Introduction

[Independent Component Analysis: A Tutorial Introduction_下载链接1_](#)

著者:James V. Stone

出版者:Mit Pr

出版时间:2004-9

装帧:Pap

isbn:9780262693158

Independent component analysis (ICA) is becoming an increasingly important tool for analyzing large data sets. In essence, ICA separates an observed set of signal mixtures into a set of statistically independent component signals, or source signals. In so doing, this powerful method can extract the relatively small amount of useful information typically found in large data sets. The applications for ICA range from

speech processing, brain imaging, and electrical brain signals to telecommunications and stock predictions.In Independent Component Analysis, Jim Stone presents the essentials of ICA and related techniques (projection pursuit and complexity pursuit) in a tutorial style, using intuitive examples described in simple geometric terms. The treatment fills the need for a basic primer on ICA that can be used by readers of varying levels of mathematical sophistication, including engineers, cognitive scientists, and neuroscientists who need to know the essentials of this evolving method.An overview establishes the strategy implicit in ICA in terms of its essentially physical underpinnings and describes how ICA is based on the key observations that different physical processes generate outputs that are statistically independent of each other. The book then describes what Stone calls "the mathematical nuts and bolts" of how ICA works. Presenting only essential mathematical proofs, Stone guides the reader through an exploration of the fundamental characteristics of ICA.Topics covered include the geometry of mixing and unmixing; methods for blind source separation; and applications of ICA, including voice mixtures, EEG, fMRI, and fetal heart monitoring. The appendixes provide a vector matrix tutorial, plus basic demonstration computer code that allows the reader to see how each mathematical method described in the text translates into working Matlab computer code.

作者介绍:

目录:

Independent Component Analysis: A Tutorial Introduction_下载链接1_

标签

计算机

科学

数学

评论

ICA入门。第七章重点，颇有难度。大三以后自己数学就进入小学水平，无语。作者本身是心理学研究者，因此他尽可能使本书在缺乏数学基础的情况下仍有易读性。当然他也强调了具有一些数学背景的读者也能有相当的收获。所以，一般的心理学研究生想通读或完全理解本书所有推理内容是很难的(其实心理测量学用得最多的还是相关层面的P

CA和PAF，不会涉及到独立层面)。但是无所谓，如果只是想进一步学习ICA based LiNGAM基本知道思路就可以，即了解BSS是做什么用的，再看看常见的非高斯性最大化，联合信息熵最大化的思路即可。因为直接做ICA的心理学方向还是和脑成像图信号和脑电声信号有关。(ps作者第四章矩阵有些符号用得不够严谨，影响阅读体验扣一星)

Independent Component Analysis: A Tutorial Introduction_下载链接1_

书评

Independent Component Analysis: A Tutorial Introduction_下载链接1_