



Is there life after standard sparse models?

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Abstract

Sparsity has been an active topic of research for several years now. Their applications in image sciences range from image restoration to scene classification. It is time to think ahead and ask a few questions about these models.

What happened since sparse models started to appear?

Are sparse models still alive?

Are they enough?

Do we understand them better?

I will present possible answers to these questions, These include:

- The development of some information theory basis for sparse coding, leading to parameter free algorithms and the derivation of better than l_1/l_0 sparsity promoting terms.
- The consideration of more structured and collaborative models with new applications.
- The somehow surprising return of PCA into image processing and matrix completion, showing (at least for me) that we have to be careful with overdoing and over applying signal models.

These models often, and for real life examples, outperform sparse models both at the practical and theoretical level.

While presenting some of these results I hope to engage the audience in the discussion about life after sparsity.

This is work in collaboration with G. Yu, I. Ramirez, P. Sprechmann, Y. Eldar, F. Leger, and S. Mallat.

Syllabus: Sparse modeling, Gaussian Mixture Models, PCA, image restoration, image classification