



ΠΑΝΕΠΙΣΤΗΜΙΟ ΙΩΑΝΝΙΝΩΝ



ΤΜΗΜΑ ΜΑΘΗΜΑΤΙΚΩΝ

Εβδομαδιαίο Σεμινάριο

**An edge-preserving regularization model for color image demosaicing
in the presence of noise**

Ivan Gerace

Department of Mathematics and Computer Sciences, Università degli Studi di Perugia, Italy

In this paper, we propose edge-preserving regularization to solve the color image demosaicing problem in the realistic case of noisy data. We enforce both intrachannel local smoothness of the intensity (low frequency components), and interchannel local similarities of the object borders and textures (high frequency components). To describe local correlation, discontinuities of both the low frequency components and the high frequency components are accounted for in an implicit manner, i.e. through suitable functions of the proper derivatives. For the treatment of even the finest image details, derivatives of first, second and third order are considered. The solution of the demosaicing problem is defined as the minimizer of an energy function, accounting for all these constraints plus a data fidelity term. This non-convex energy is minimized via an iterative deterministic algorithm, applied to a family of approximating functions, each implicitly referring to edge elements marking meaningful discontinuities. Our method is general, in the sense that it does not refer to any specific color filter array. However, to permit a quantitative comparison with other published results, we tested it in the case of the Bayer CFA, and on the Kodak 24-image set. The performed comparisons with some among the most recent demosaicing algorithms show the good performance of our method, in both the noiseless and noisy case.

Τετάρτη 11 Οκτωβρίου 2023, Αίθουσα 201α, 18:00

Μετά την ομιλία ακολουθεί καφές και συζήτηση στο εντευκτήριο του Τμήματος.