UCF DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCEINCE

Spring 2014 Seminar Series

Presented by the ECE Division

NON-NEGATIVE MATRIX FACTORIZATION FOR FACIAL IMAGE ANALYSIS AND REPRESENTATION

THURSDAY APRIL 10, 2014 • 1:30 PM – HEC 101

Non-negative Matrix Factorization (NMF) is among the most popular subspace methods and is widely used in a variety of image analysis, representation and recognition problems. Recent advances in the use of NMF for Facial Image Analysis will be overviewed in this lecture.

A discriminant NMF method will be detailed that incorporates Linear Discriminant Analysis criteria and achieves an efficient decomposition of the provided data to its salient parts, including its optimized extension using projected gradients, in order to ensure convergence to a stationary limit point. Assuming multimodality of the underlying data distribution and incorporating clustering-inspired constraints into the NMF decomposition cost function results in the Subclass Discriminant NMF algorithm, which is top-performer for facial image analysis under real life settings.

The state of the art classification methods employ data dimensionality reduction (through NMF) and classification (through SVMs) in two successive steps. In a novel approach, these two steps are merged into one, by incorporating maximum margin classification constraints in the standard NMF optimization. The notion behind the proposed framework is to perform non-negative matrix factorization, while ensuring that the margin between the projected data of the two classes is maximal. The incorporation of the maximum margin classification constraints to the NMF and DNMF objective functions improves the accuracy of the classification.

Finally, a brief overview will be presented of the R&D activities on image/video processing and digital media at the AIIA Lab, Aristotle University of Thessaloniki, Greece.

DR. IOANNIS PITAS

Aristotle University

Prof. Ioannis Pitas (IEEE fellow, IEEE Distinguished Lecturer, EURASIP fellow) received the Diploma and PhD degree in Electrical Engineering, both from the Aristotle University of Thessaloniki, Greece. Since 1994, he has been a Professor at the Department of Informatics of the same University. He served as a Visiting Professor at several Universities.

His current interests are in the areas of image/video processing, intelligent digital media, machine learning, human centered interfaces, affective computing, computer vision, 3D imaging and biomedical imaging. He has published over 750 papers, contributed in 39 books in his areas of interest and edited or (co-)authored another 9 books. He has also been an invited speaker and/or member of the program committee of many scientific conferences and workshops. In the past he served as Associate Editor or co-Editor of eight international journals and General or Technical Chair of four international conferences (including ICIP2001). He participated in 68 R&D projects, primarily funded by the European Union and is/was principal investigator/researcher in 40 such projects. He has 17900+ citations (Source Publish and Perish), 6250+ (Scopus) to his work and h-index 64+ (Source Publish and Perish), 38+ (Scopus).

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