



THE CHINESE UNIVERSITY OF HONG KONG
DEPARTMENT OF ELECTRONIC ENGINEERING
SEMINAR

**Log-determinant Non-Negative Matrix Factorization via Successive
Trace Approximation**

by

Mr. Man Shun (Andersen) Ang

University of Mons

Date: 27 Nov 2017 (Monday)

Time: 14:30 — 16:00

Venue: Room 222 Ho Sin Hang Engineering Building, CUHK

Abstract

Non-negative matrix factorization (NMF) is the problem of approximating a nonnegative matrix X as the product of two smaller nonnegative matrices W and H so that $X = WH$. In this talk, we consider a regularized variant of NMF, with a log-determinant (logdet) term on the Gramian of the matrix W . This term acts as a volume regularizer: the minimization problem aims at finding a solution matrix W with low fitting error and such that the convex hull spanned by the columns of W has minimum volume. The logdet of the Gramian of W makes the columns of W interact in the optimization problem, making such logdet regularized NMF problem difficult to solve. We propose a method called successive trace approximation (STA). Based on a logdet-trace inequality, STA replaces the logdet regularizer by a parametric trace functional that decouples the columns on W . This allows us to transform the problem into a vector-wise non-negative quadratic program that can be solved effectively with dedicated methods. We show on synthetic and real data sets that STA outperforms state-of-the-art algorithms.

Biography

Mr. Man Shun (Andersen) Ang is a PhD student at the Department of Mathematics and Operational Research, Faculté polytechnique, Université de Mons, Belgium. Before his pursuit of a PhD degree, he received a Bachelor of Engineering (B.Eng.) in electronics and communication engineering in 2014 and a Master of Philosophy (M.Phil.) in biomedical engineering in 2016, both from the University of Hong Kong, Hong Kong. In 2017, he received the European Research Council (ERC) Scholarship. During his PhD study, he visited the Université Catholique de Louvain (UCL), Belgium and the Universität Trier, Germany. His current research interests include Matrix-Tensor Factorization, Optimization Methods, and Randomized Algorithms, which are linked to his previous research interest in mining patterns of neuroinformatic signals collected from human body.

***** ALL are welcome*****

Enquiries: Prof. W.K. Ma, email: wkma@ee.cuhk.edu.hk