October 2012

MADALGO seminar by Wei Yu, Aarhus University

Budget Error-Correcting under Earth-Mover Distance

Abstract:

In this talk I will talk about the following budget error-correcting problem: Alice has a point set X and Bob has a point set Y in the d-dimensional grid.
Alice wants to send a short message to Bob so that Bob can use this information to adjust his point set Y towards X to minimize the Earth-Mover Distance between the two point sets.
A more intuitive way to understand this problem is: Alice tries to help Bob to recall Eve's face by sending him a short message. Of course Bob will fail to recall if he does not know Eve, but if he knows something about Eve, the message could help a lot.

Naturally, there is a trade-off between the message size and the quality of such an adjustment. Now given a quality constraint, we want to minimize the message size. That is, when X and Y are close, Bob wants to recover X from Y using a very small message from Alice. This problem is motivated by applications including image exchange/synchronization and video compression.
In this paper we give first upper and lower bounds for this problem. These bounds are almost tight in the case when d = O(1).