

**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  $d = O(1)$ .