Online adaptive PCA and its extensions

Jianjun Yuan   Andrew Lamperski

Department of Electrical and Computer Engineering
University of Minnesota
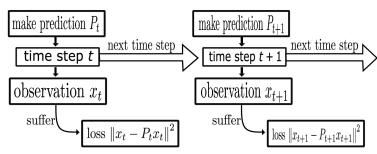
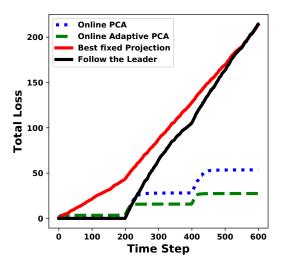June 13, 2019

The data points come in a stream, we want to find a good projection matrix P_t.

Why care about it?

Batch or incremental PCA fails for some cases
Example: Consider 3 different 2-dimensional subspaces generating data samples.

Online adaptive PCA

Our algorithm (online adaptive PCA) is designed to tackle data from changing environment.

Main idea

It mixes the previous online PCA algorithm with the fixed-share update.

Theoretical guarantee

The adaptive regret $\mathcal{R}_a$ is upper bounded as

$$\mathcal{R}_a \leq O(\sqrt{TD})$$

where T is the time horizon and D is some constant.

Thank you for your listening!

Come to check it out on the Poster session @ Pacific Ballroom #162