

Title: Taming the Beast of the Preimage in Machine Learning for Temporal Data

Funding: API (ANR Project)

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Description

Machine learning has been increasingly investigated with success within the last decades. The rise in great prominence is undoubtedly driven by the easiness to derive efficient nonlinear models with the corresponding estimation algorithms, driven by kernel machines, with the celebrated support vector machines, and the revival of deep neural networks. The backbone of these machines is the pre-processing of the data with a (cascade of) nonlinear transformation, in order to embed data into some feature space, also called latent space, where data-processing techniques can be easily carried out. The major bottleneck is that generally one needs to extract patterns (i.e., “antecedent” or inverse image) in the data space, not in the “virtual” feature one. This **reverse embedding** (Fig. 1) is of primary interest for pattern recognition and data mining. In this project, we focus on **embeddings for temporal data** and the **preimage estimation problem** under two major representation settings for temporal data: kernel machinery representations and deep learning. This internship is a preliminary work for a funded thesis at AMA-LIG.

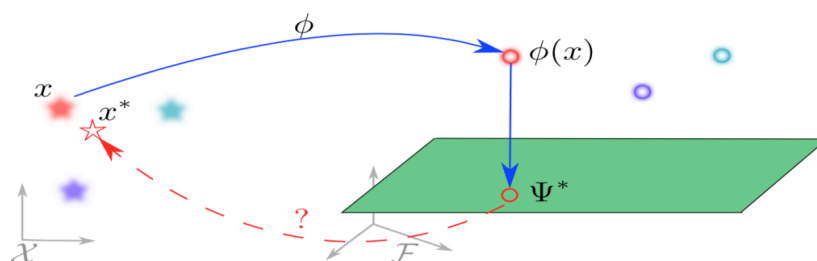


Fig. 1