



UNIVERSIDADE Deep Clustering Self-Organizing Maps with Relevance Learning Heitor R. Medeiros. Pedro H. M. Brada, Hancondovor F. Deep Clustering Self-Organizing Maps with Relevance Learning Heitor R. Medeiros. Pedro H. M. Brada, Hancondovor F. Deep Clustering Self-Organizing Maps with Relevance Learning **The Personal Processing Self-Organizing Maps with Relevance Learning Self-Organizing Maps with Relevance Learning **The Personal Processing Self-Organizing Maps with Relevance Learning Self-Organizing Maps wi

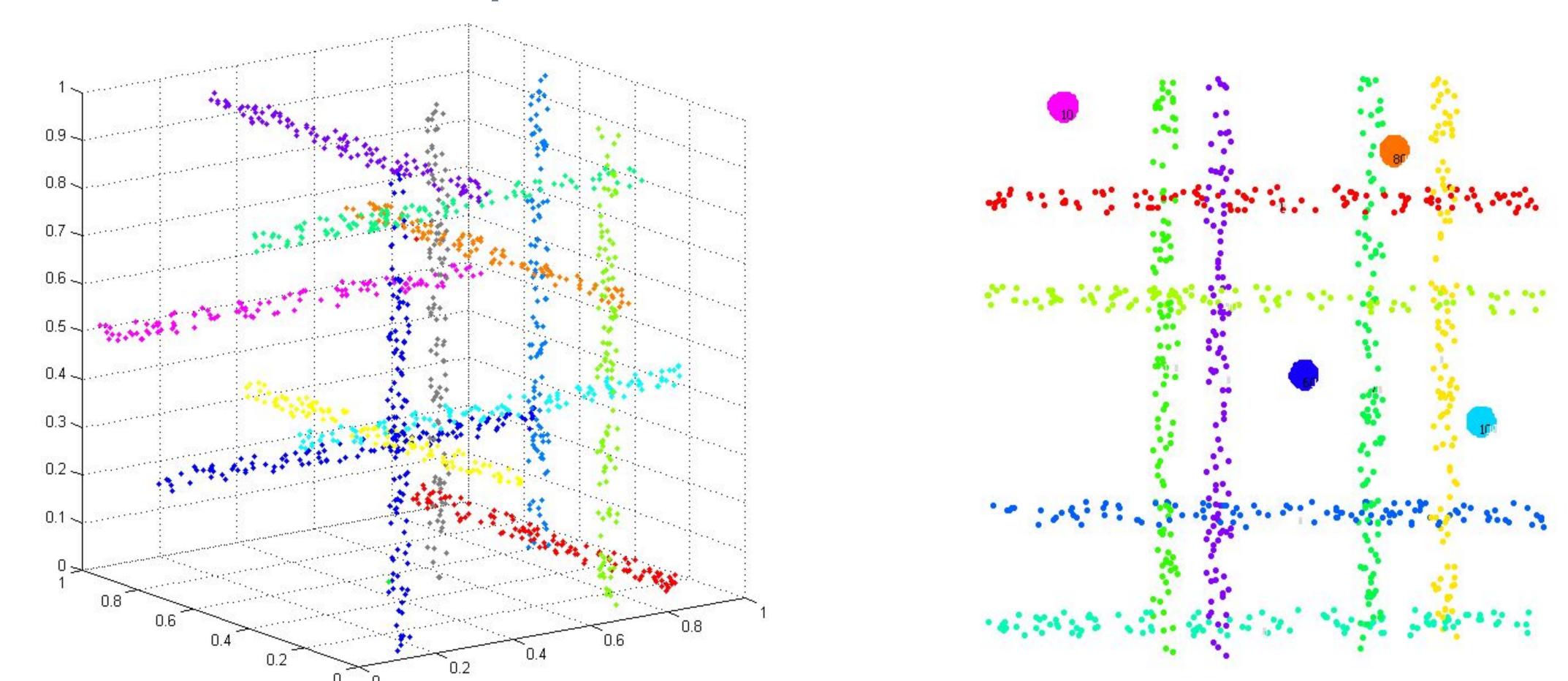
{hrm, phmb4, hfb}@cin.ufpe.br July, 2020



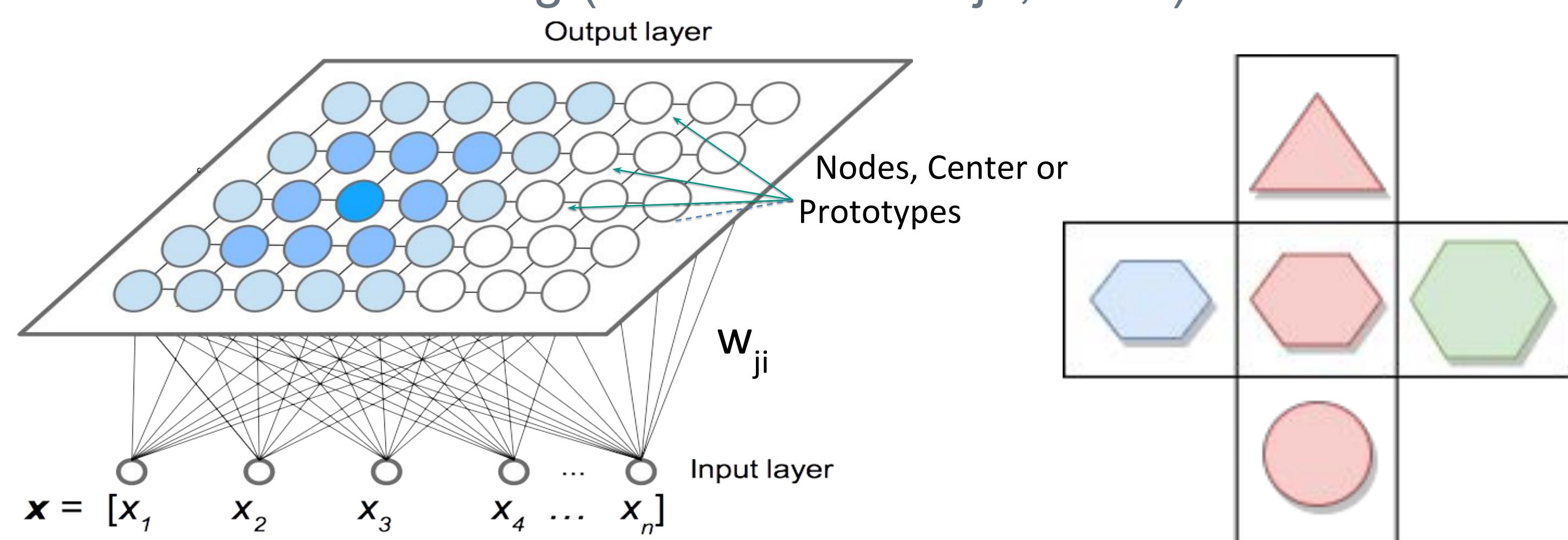


1 - Introduction

- Clustering high-dimensional data such as images and sound is very hard task for classical clustering algorithms.
- Subspace clustering is a technique which finds clusters within different subspaces.



- Analogously, this work aims to identify the relevant subsets of the input dimensions for each cluster.
- (SOM) (Kohonen, > Self-Organizing with Maps Relevance Learning (Bassani & Araujo, 2014).





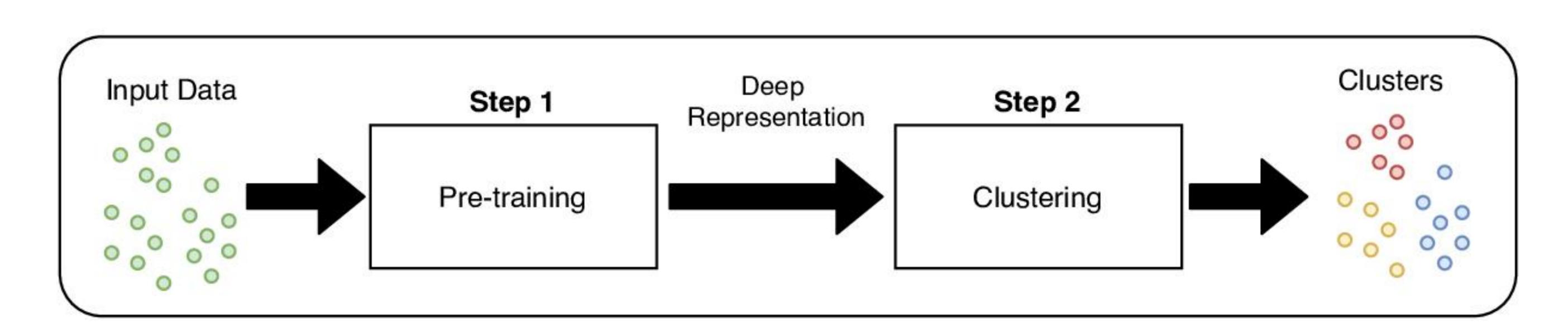




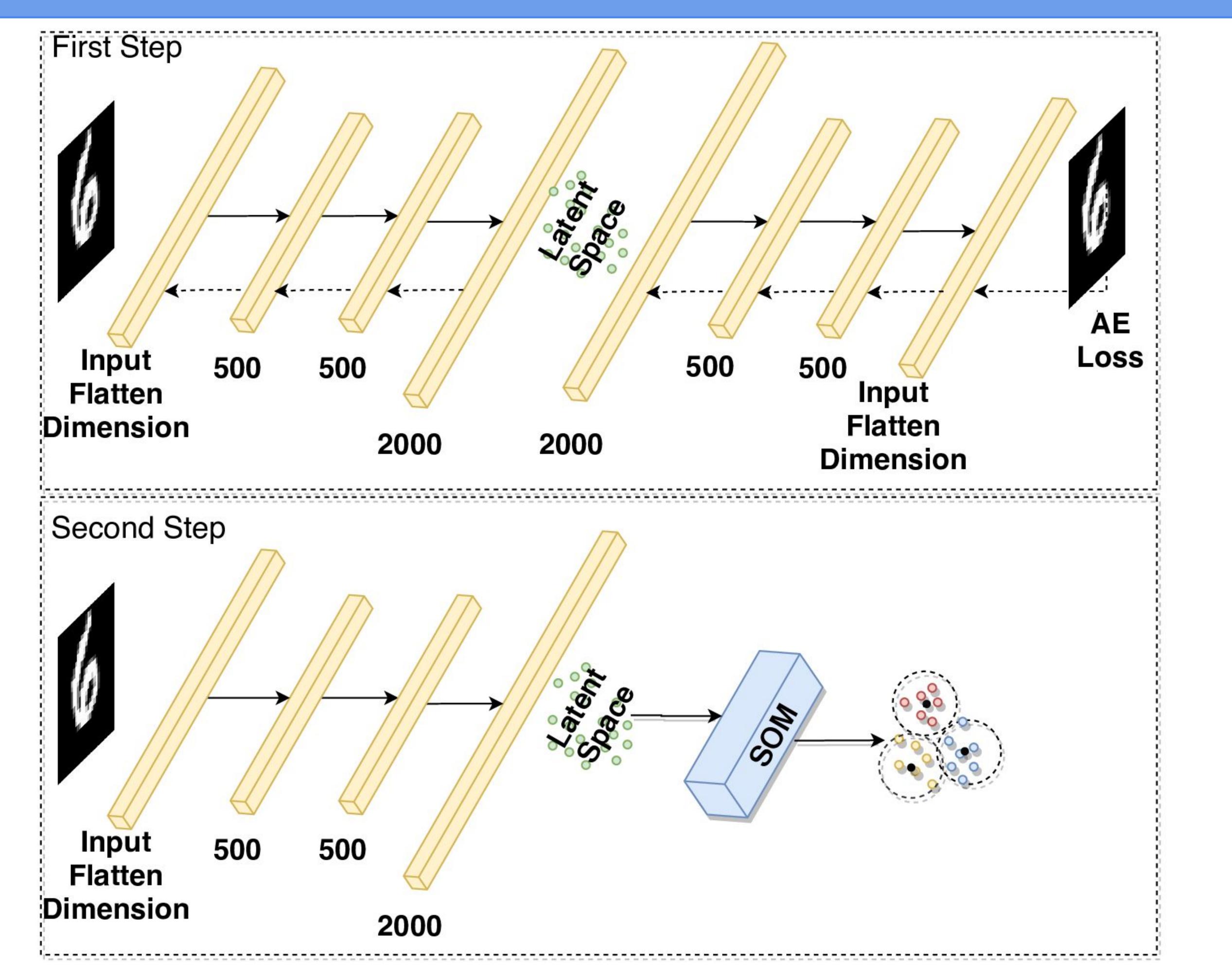


2 - Background and Motivation

- Techniques based on Deep Learning have been very successful in yielding good high-level representations. (Bengio et al., 2013; Aljalbout et al., 2019).
- Combine positive points of Deep Representation Learning with SOM-based models capable of learning relevance seems to be promising.



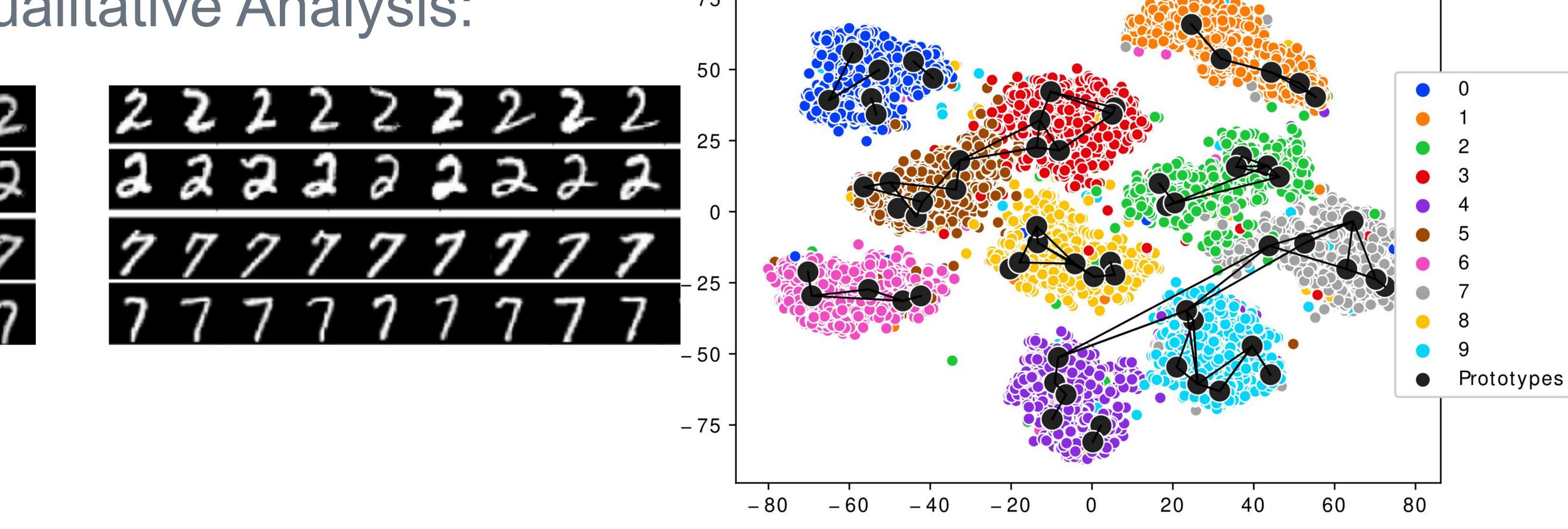
3 - SOM with Relevance Learning (DCSOM-RL)



4 - Results

Method	PUR	NMI
SOM-VAE	0.868	0.595
DESOM	0.939	0.657
DC-SOMRL	0.921	0.615

Dualitative Analysis:



5 - Conclusion and Future Work

- ► The multi-step DCSOM-RL is a novel way of learning a time-varying structure map with relevance learning.
- The prototypes identified represent frequent variations observed in the input data.
- Future Work:
- o Investigate the capability of DCSOM-RL to perform Joint Clustering.
- Improve the model with autoencoder based models capable of generating samples, e.g. VAE, VQ-VAE.