

Topics in Unsupervised Learning (mini-project)

HW Assignment and Final Projects

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Your HW Assignment and Choosing a Project

- The deadline for the assignment is 1/5/2023.
- The assignment focuses on your own implementation of (the fairly-simple) K -means algorithm and (P)DC-DP-means algorithm.
- In addition, when submitting your assignment you will need to declare what your final project will be.

Projects

In addition to the several suggested projects (see next slides), you can also come up with you own idea for a project as long as:

- ① it fits the topic of streaming-data clustering;
- ② you run it by me first and get my approval.

Project #1: Extend the (P)DC-DP-means Algorithm to Streaming data

- Adapt Or Dinari's the (P)DC-DP-means algorithm to streaming data (including support for concepts drifts, a varying number of clusters, etc).
- Test the algorithm on streaming data (both artificial and real data).
- Optionally: extend your streaming-data algorithm to streaming data on unit hypersphere (using von-Mises distributions). Can be used for example to segment surface normals obtained from an RGB-D video.

Project #2: Video Object Segmentation

- Based on Or Dinari's ScStream code as a building block, design and implement a method for semi-supervised Video Object Segmentation. Meaning, you are given the ground-truth mask of object in the first video frame, and from there on, the task of segmenting this object is unsupervised.

Project #3: Multiple Object Tracking

- Based on Or Dinari's ScStream code as a building block, design and implement a method for Multiple Object Tracking.
- You can use off-the-shelf object detectors to obtain bounding boxes of the objects in each frame. Your challenge is in solving the data association problem.

Version Log

- 1.00, 21/3/2023. Initial release.