



UNIVERSITY OF WARSAW
**Faculty of Economic
Sciences**

Unsupervised Learning

Winter Semester, 2025/2026

Unsupervised learning: clustering for forecasting

Clustering for forecasting

Classify automatically new data objects with respect to a predefined model – develop clusters of observations with similar profiles of predictive factors for the target of interest

Clustering for forecasting

1 Perform clustering

2 New objects appear

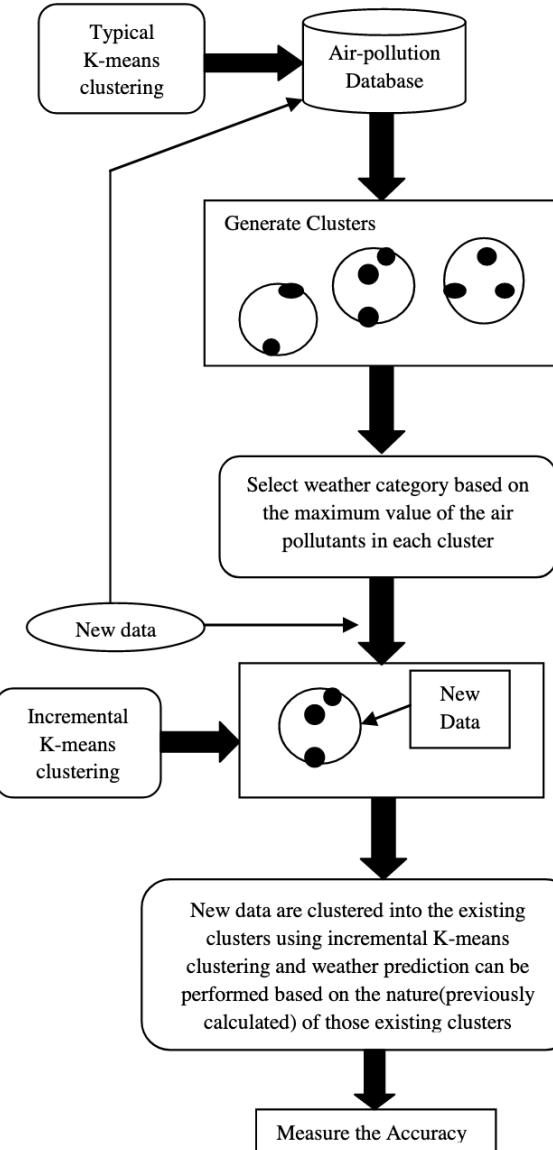
3 Allocate these objects to the established clusters

Clustering for forecasting

Train data

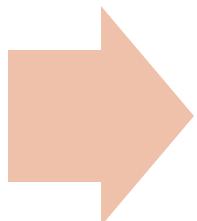
Test data

Example (Chakraborty et al.)



Cluster the forecasts for future forecasting

Cluster similar objects
based on historical
performance



Forecast the aggregated
event within each
cluster – a common
forecast is developed for
each cluster of items

Cluster the forecasts for future forecasting

- Great strength of this method
 - Mean square error (MSE) – the sum of the variance and squared bias
 - If the bias appearing as a result of combining objects is not significant as compared to the reduction in the variance of prediction, then the combined prediction would have lower MSE than the individual forecasts
 - So it is possible that combining only a subset of items brings us lower MSE with respect to individual forecasts
 - Thus, clustering in forecasting may lead to the lower MSE

Thank you!