

# Project in Practical Machine Learning

Radar image clustering  
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# Machine Learning

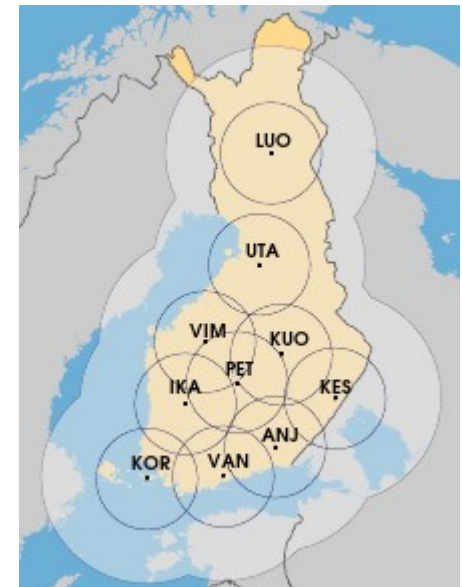
- Clustering
- Predictive clustering so far
- Implemented algorithms: k-means, k-means++ and k-medoids

# Data provider

- Data from Finnish Meteorological Institute (FMI)
- Offers open data in many formats
- FMI uses Web Map Service (WMS) to provide Weather Radar images
- WMS has different options to shape the data: for example style, resolution and format

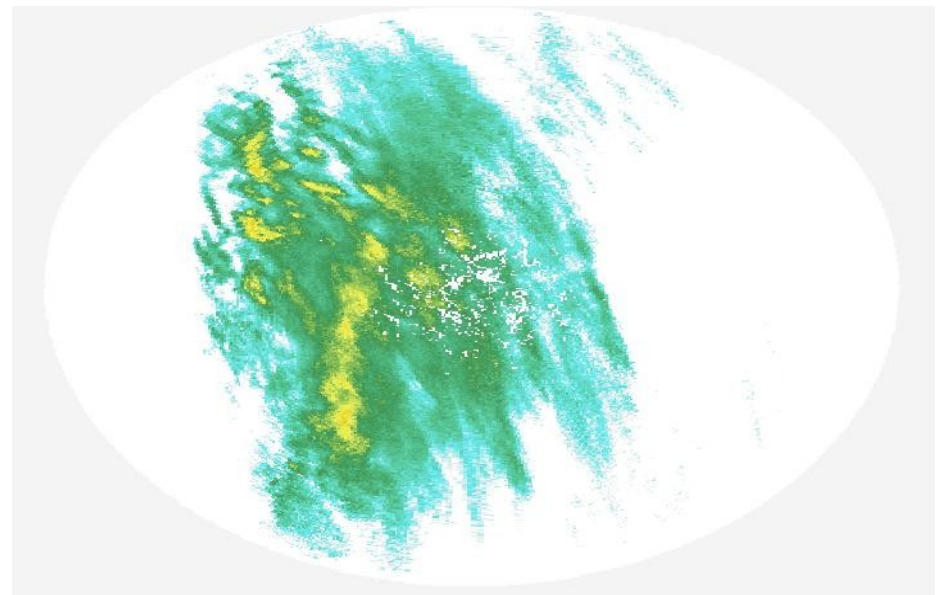
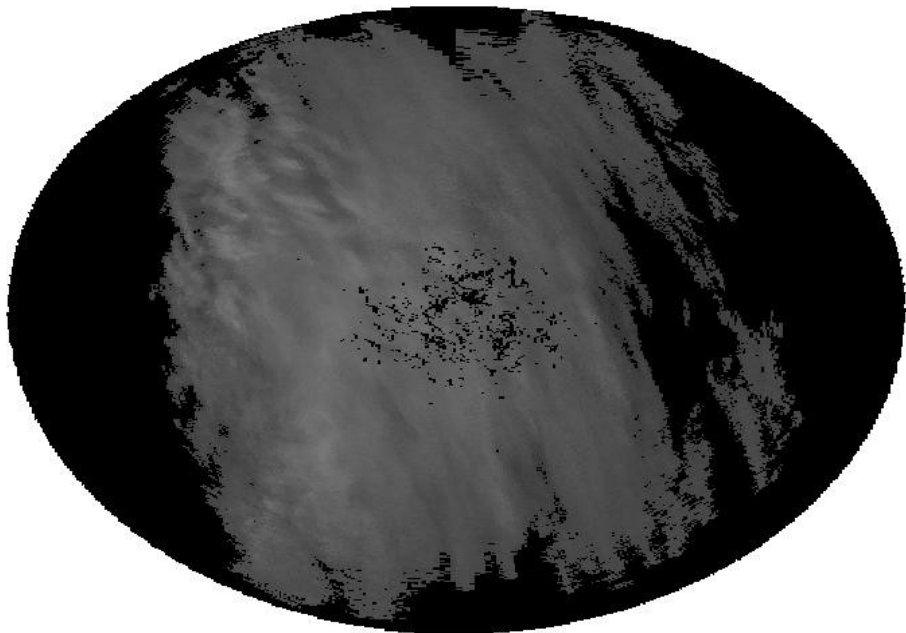
# FMI's Radars

- Ten weather radars around Finland
- Cover almost all of Finland
- Four different measures: radar reflectivity, radial velocity, rain classification and cloud top height
- Anjalankoski, Ikaalinen, Kesälahti, Korpo, Kuopio, Luosto, Petäjävesi, Utajärvi, Vantaa ja Vimpeli



# Data

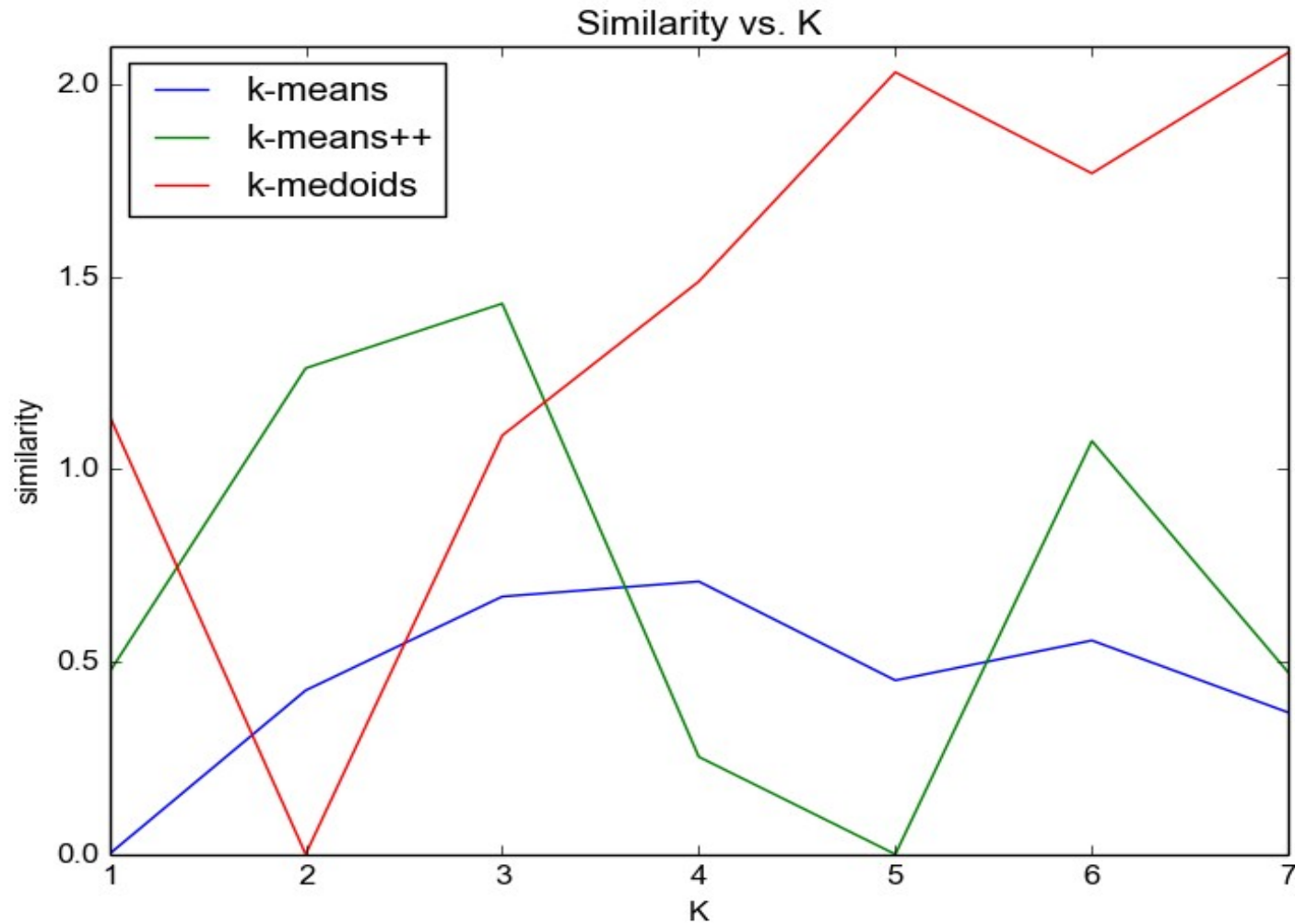
- Image resolution: 300x250 and 720x480
- Different resolution is used to compare machine learning algorithms performance
- Style options: raster and Radar dbz Summer



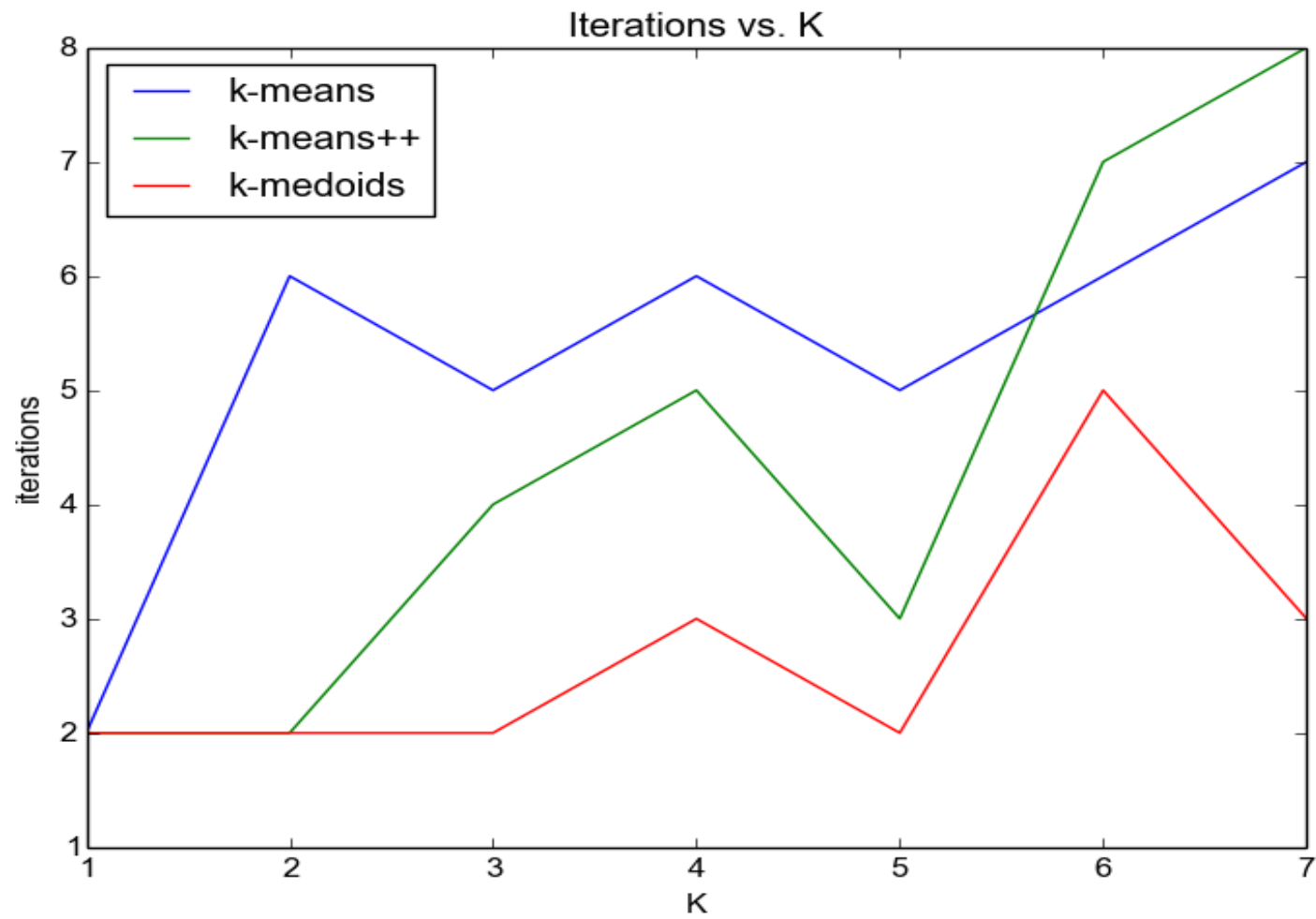
# Machine Learning algorithms

- K-means with maximum iterations and initial cluster centers are selected randomly
- K-means++: only difference compared to k-means is the way that the initial cluster centers are selected
- K-medoids, the slowest (this fact was also discussed briefly in IML)

# Similarity within clusters



# Iterations





# Sources

- [ilmatieteenlaitos.fi](http://ilmatieteenlaitos.fi)
- [en.wikipedia.org](http://en.wikipedia.org)
- <http://theory.stanford.edu/~sergei/papers/vldb12-kmpar.pdf>
- Flach, P. (2012). *Machine Learning: The Art and Science of Algorithms that Make Sense of Data*. Cambridge: Cambridge Univ. Press. (IML course book)