Clustering

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DM 17/18

12. 12. 2017

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Inhaltsverzeichnis

1 Agglomerative and Divisive Clustering

2 K-means

3 EM

Agglomerative and Divisive Clustering

The goal of this task was to create three dendrograms for each dataset with R and the provided algorithmus Agnes and Diana. First we will present this algorithmus and then we will discuss the dendrograms of each dataset.

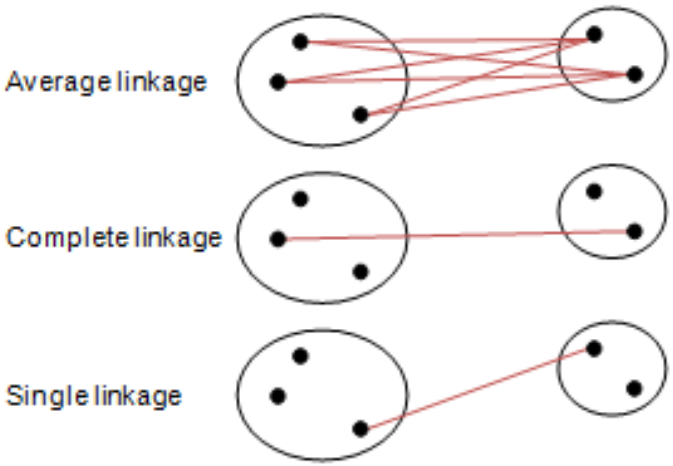
Agnes (AGglomerative NESting)

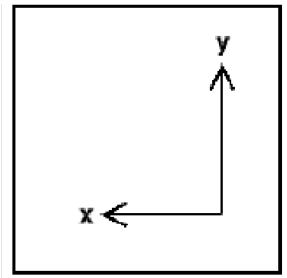
- hierarchical and deterministic cluster algorithm
- starts with n clusters and proceeds by successive fusions until a single cluster with all objects is left ("bottom up")
- uses dissimilarity coefficients for merging clusters together

Diana (DIvisive ANAlysis)

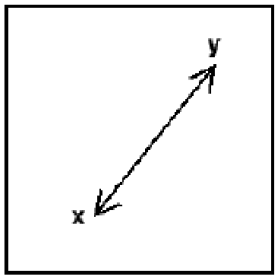
- hierarchical and deterministic cluster algorithm
- starts with one single cluster which inclueds all objects
  $\rightarrow$ split into two clusters but consider not all possible divisions
- succesive divisions until every object is cluster itself
- uses dissimilarity coefficients for divising clusters

Different Algorithm Parameters





Manhattan



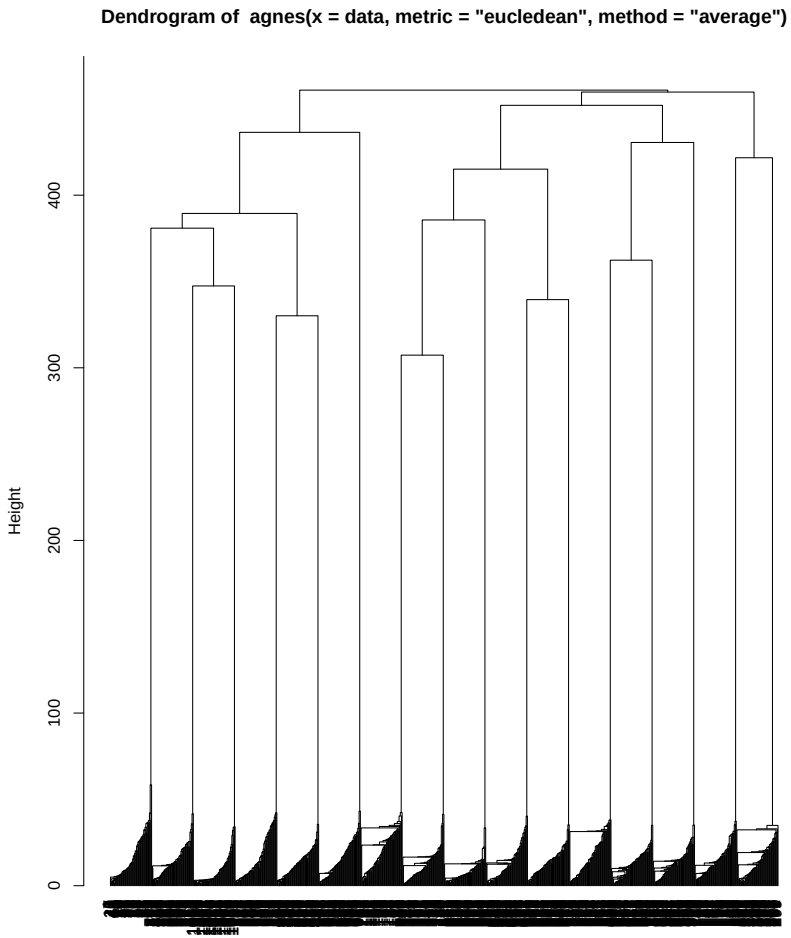
Euclidean

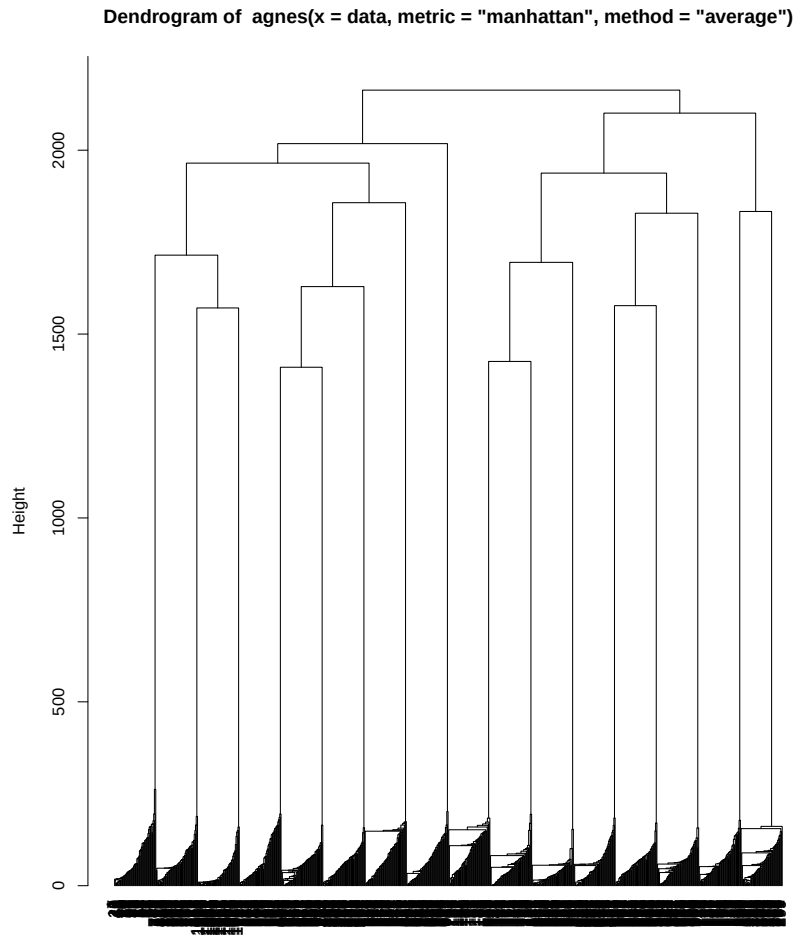
S2 from S-sets

For this dataset we were not able to create to plots, because it took to much time for proceed.

dim_032

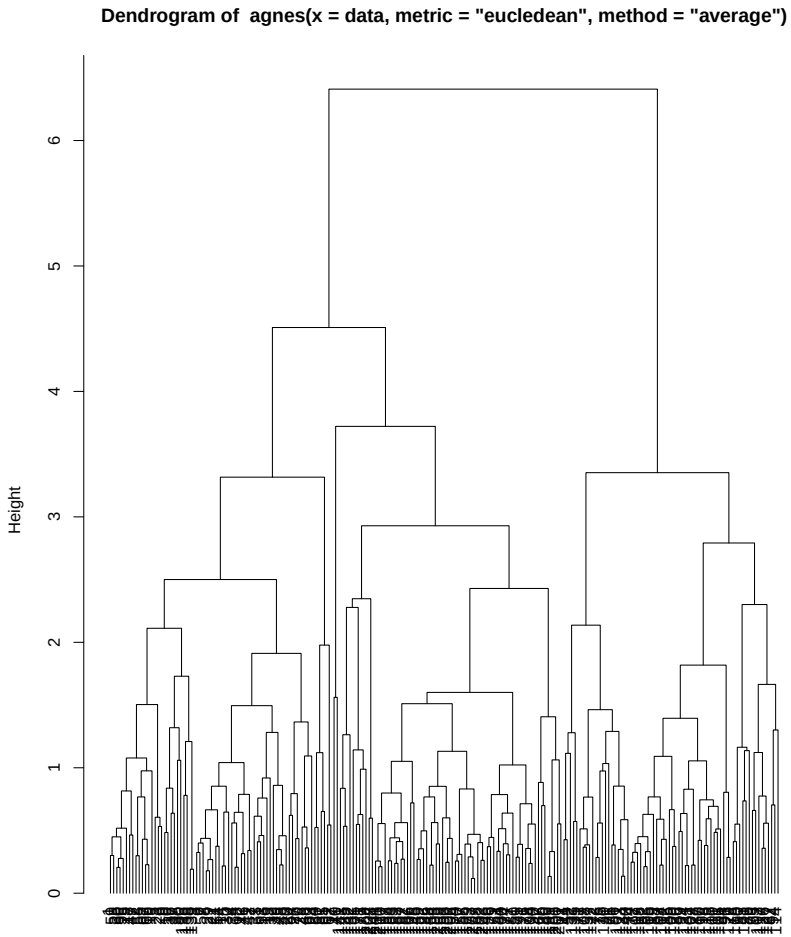
Dataset dim_032

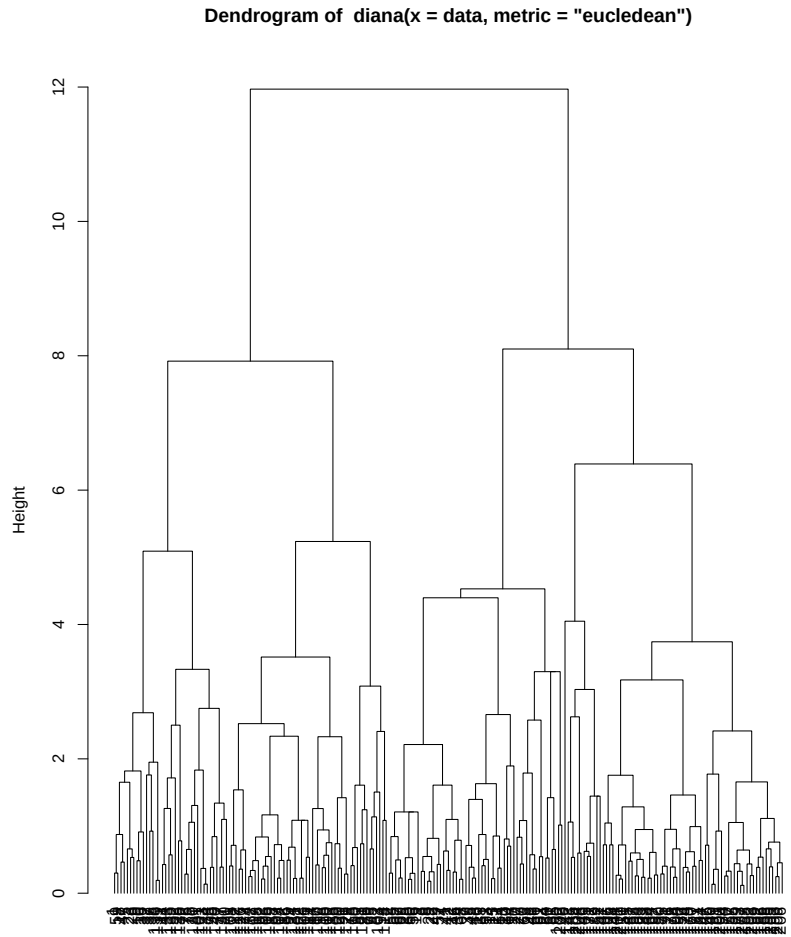




Seeds

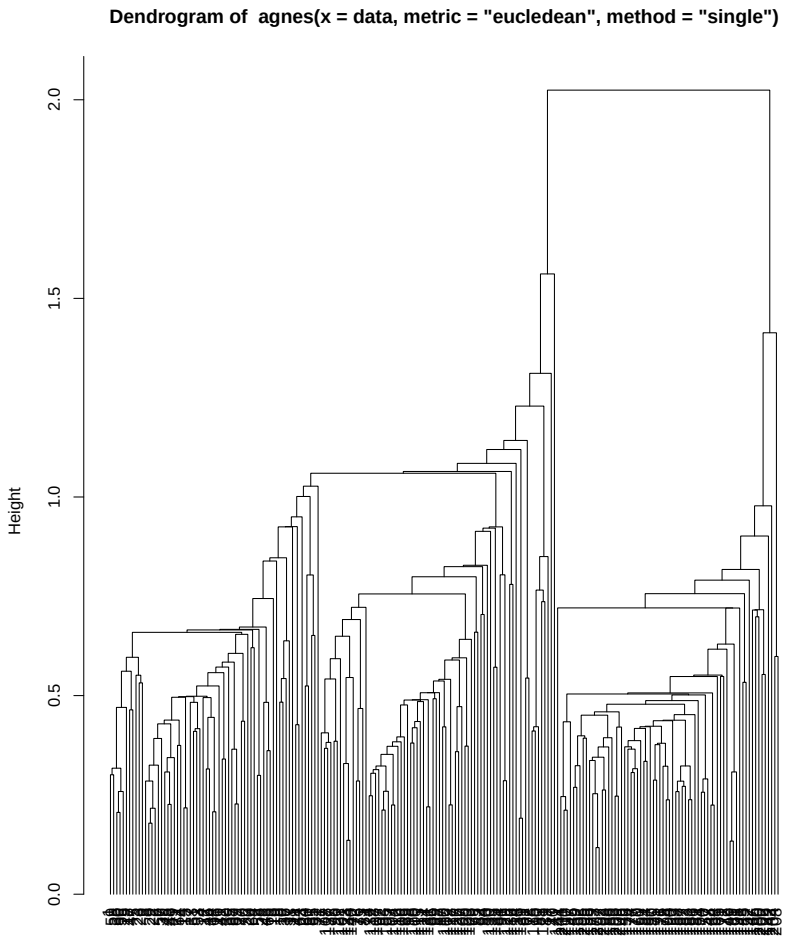
Dataset Seeds

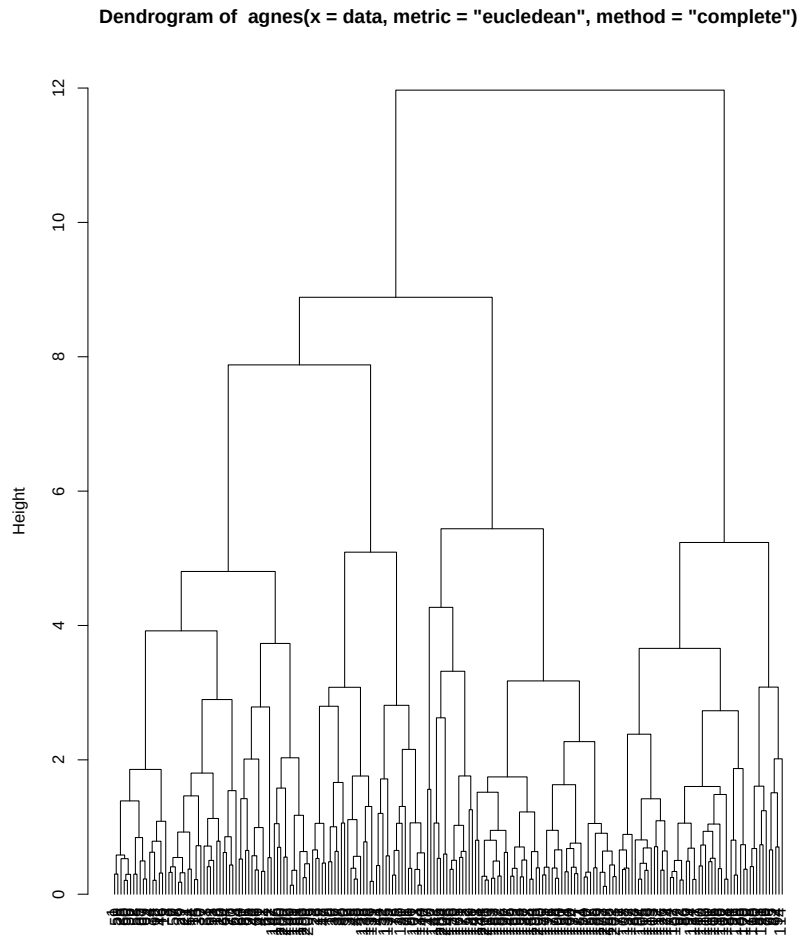




Seeds

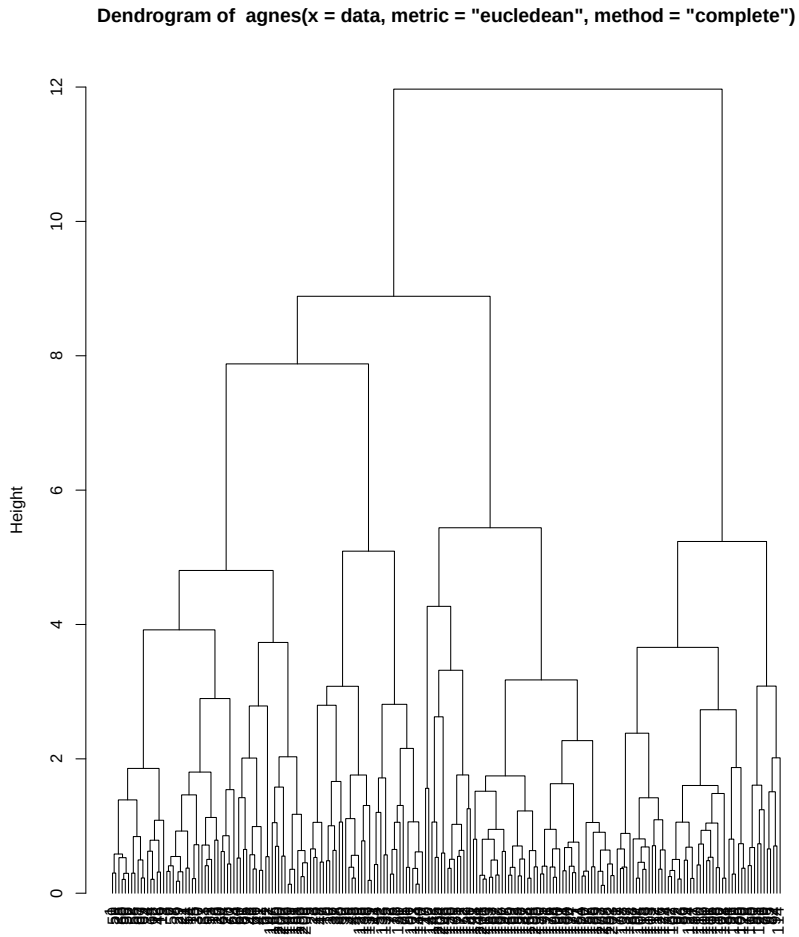
Dataset Seeds





Seeds

Dataset Seeds



Conclusion

TODO (MANUEL): Was ist hight in dentogram?, Wie gehen die Algorithmen und Interpretation der unterschiedlichen Teile.

K-means

```
import sys
import random
from math import sqrt
import matplotlib.pyplot as plt
from sklearn import metrics
from sklearn.metrics import accuracy_score
import numpy as np

# Idea from http://www.caner.io/purity-in-python.html
def purityScore(clusters, classes):
    """
    Calculate the purity score for the given cluster
        assignments and ground truth classes

    :param clusters: the cluster assignments array
    :type clusters: numpy.array

    :param classes: the ground truth classes
```

K-means

Data	RAND	normalized mutual information	purity of clus
jain.txt	2	6	1
compound.txt	3	3	1

Set S2 had no lable so it was not possible to calculate the best k

K-means

ADD EXAMPLE PLOTS

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K-means

ADD PROBLEM WITH LINEAR CLUSTERING ADD IMAGE FROM ML U9

EM

```
import numpy as np
import math

def read(path):
    data = []
    lable = []
    with open(path) as csv:
        for line in csv:
            data.append(float(line.split("\n")[0]))
            lable.append(0)
    return lable, data

def logLikelihood(data, k, parameters):
    logLikeli = 0
    for x in data:
        logLikeli += np.log(parameters["p"] *
            gaus(parameters["sig1"], parameters["mu1"], x)
                        + parameters["p"] *
```