IPM Farmers dimensionality and clustering report

8/6/2021

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Dataset: [Farmers\_edited data 21.12.2020\_IPS\_FINAL- WEKA\_JM.xlsx](https://kt-cloud.ijs.si/index.php/f/199967)

# Question 1 - Already\_used\_DSS

# Dimensionality reduction [with Region attributes]

Attributes: ['Age\_Cat', 'Gender\_1male', 'Degree\_Cat', 'Farm\_size\_Cat', 'Income\_Cat',

'Legislative\_requirements', 'Computer\_at\_home', 'Speed\_internet\_Cat',

'Already\_used\_DSS', 'Willing\_to\_try\_new\_products\_Cat',

'Price\_important\_factor', 'Importance\_of\_easy\_to\_use\_1to3',

'Importance\_of\_efficient\_1to3', 'Importance\_low\_price\_1to3',

'Importance\_polyvalence\_1to3', 'Enjoy\_using\_new\_techs\_1to3',

'Appreciate\_change\_1to3', 'Trust\_in\_DSS\_1to3', 'Need\_IT\_teaching\_Cat',

'DSS\_can\_improve\_your\_productivity\_Cat', 'WTP\_for\_DSS\_Cat',

'DSS\_must\_be\_tailored\_for\_your\_farm\_Cat',

'Manufacturer\_demo\_of\_DSS\_Cat', **'Region\_central\_EU', 'Region\_north\_EU',**

**'Region\_south\_EU**']

### 2D projeciton of ordinal and numeric features

Odinal attributes: 'Age\_Cat', 'Degree\_Cat', 'Farm\_size\_Cat', 'Income\_Cat',

'Speed\_internet\_Cat', 'Importance\_of\_easy\_to\_use\_1to3',

'Importance\_of\_efficient\_1to3', 'Importance\_low\_price\_1to3',

'Importance\_polyvalence\_1to3', 'Enjoy\_using\_new\_techs\_1to3',

'Appreciate\_change\_1to3', 'Trust\_in\_DSS\_1to3', 'Need\_IT\_teaching\_Cat',

'DSS\_can\_improve\_your\_productivity\_Cat', 'WTP\_for\_DSS\_Cat',

'DSS\_must\_be\_tailored\_for\_your\_farm\_Cat',

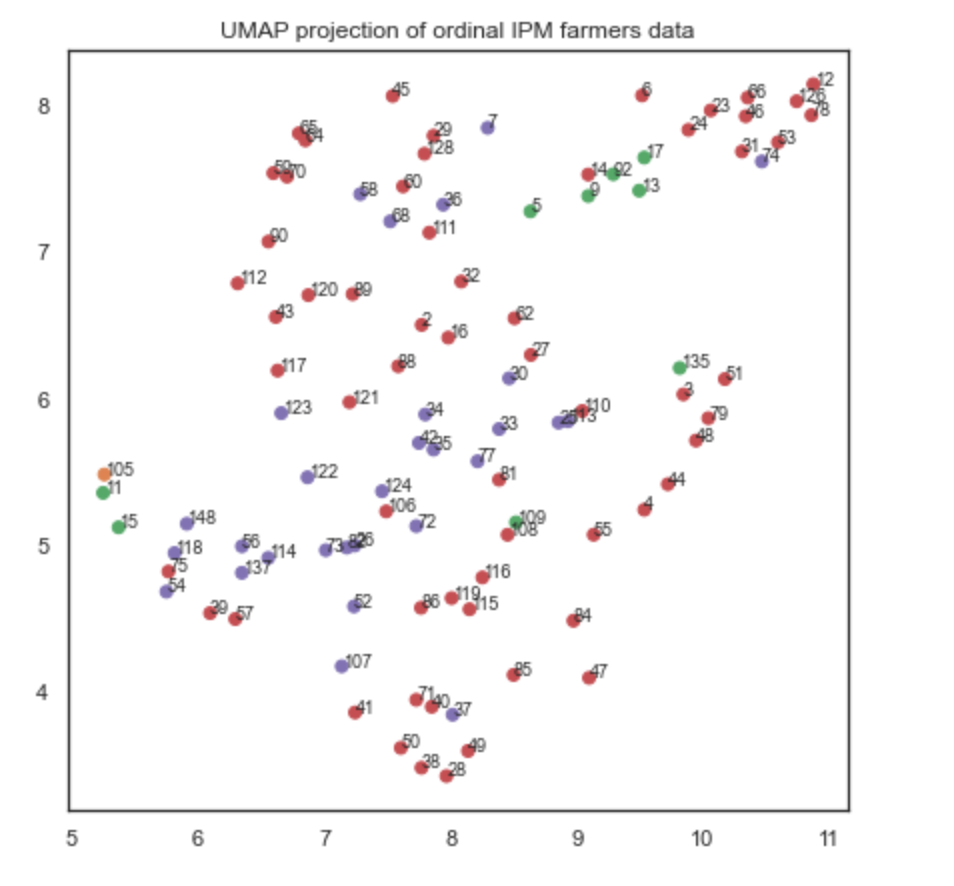
'Manufacturer\_demo\_of\_DSS\_Cat', 'Willing\_to\_try\_new\_products\_Cat'

picture:

* Numbers represent index of instancses
* Colors=«DSS\_can\_improve\_your\_productivity\_Cat«

Comment:

* Projection in 2D show disperesed data wtih no clear clusters



### 2D projeciton of nominal features

Nominal attributes: 'Gender\_1male', 'Legislative\_requirements', 'Computer\_at\_home',

'Already\_used\_DSS', 'Price\_important\_factor', 'Region\_central\_EU',

'Region\_north\_EU', 'Region\_south\_EU'

Picture:

* Numbers represent index of instancses
* Colors:
  + Orange=1
  + Blue=0

Comment:

* Projection in 2D shows 3 clear clusters, which are prettly clearly devided in respect to attributes relating to region.

### 

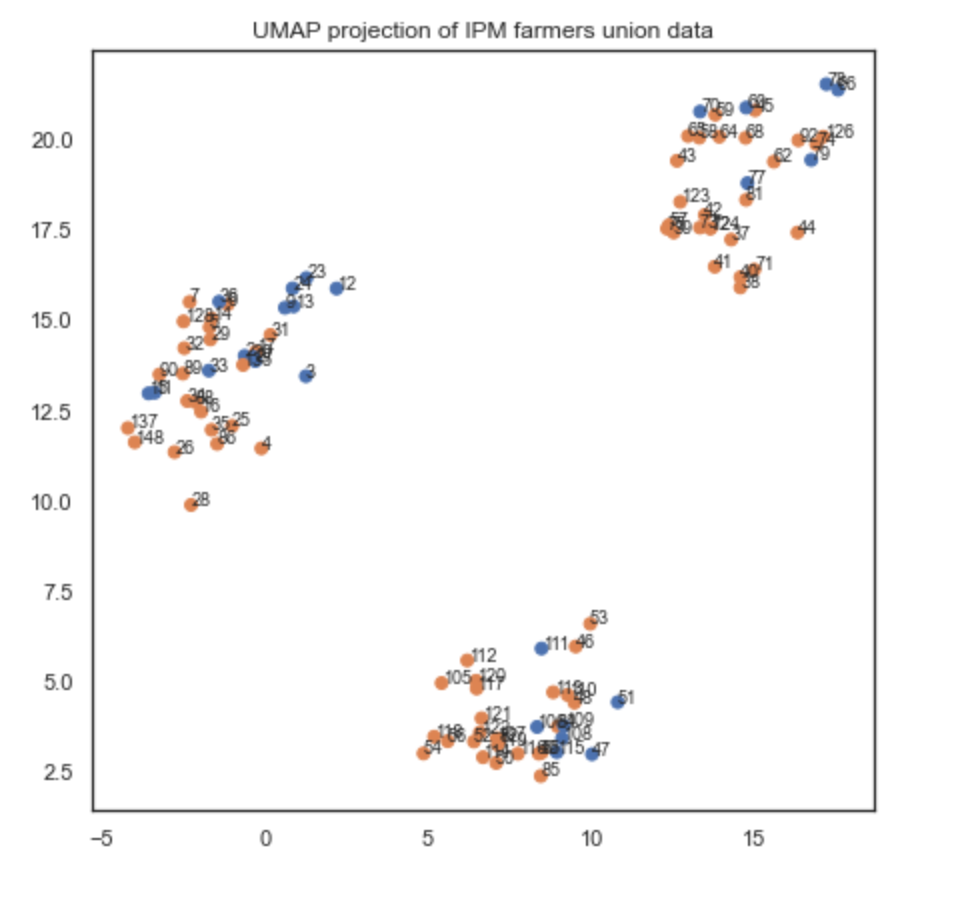
### 2D projeciton of Union of nominal and ordinal features

Picture:

* Numbers represent index of instancses
* Colors:
  + Orange=1
  + Blue=0

Comment:

* Projection of union of ordinal and nominal dim reducitons in 2D still points to 3 clusters, seems influenced by region attributes.



# Dimensionality reduction [without Region attributes]

Attributes: ['Age\_Cat', 'Gender\_1male', 'Degree\_Cat', 'Farm\_size\_Cat', 'Income\_Cat',

'Legislative\_requirements', 'Computer\_at\_home', 'Speed\_internet\_Cat',

'Already\_used\_DSS', 'Willing\_to\_try\_new\_products\_Cat',

'Price\_important\_factor', 'Importance\_of\_easy\_to\_use\_1to3',

'Importance\_of\_efficient\_1to3', 'Importance\_low\_price\_1to3',

'Importance\_polyvalence\_1to3', 'Enjoy\_using\_new\_techs\_1to3',

'Appreciate\_change\_1to3', 'Trust\_in\_DSS\_1to3', 'Need\_IT\_teaching\_Cat',

'DSS\_can\_improve\_your\_productivity\_Cat', 'WTP\_for\_DSS\_Cat',

'DSS\_must\_be\_tailored\_for\_your\_farm\_Cat',

'Manufacturer\_demo\_of\_DSS\_Cat', ~~'Region\_central\_EU', 'Region\_north\_EU',~~

~~'Region\_south\_EU'~~]

### 2D projeciton of ordinal and numeric features

Odinal attributes: 'Age\_Cat', 'Degree\_Cat', 'Farm\_size\_Cat', 'Income\_Cat',

'Speed\_internet\_Cat', 'Importance\_of\_easy\_to\_use\_1to3',

'Importance\_of\_efficient\_1to3', 'Importance\_low\_price\_1to3',

'Importance\_polyvalence\_1to3', 'Enjoy\_using\_new\_techs\_1to3',

'Appreciate\_change\_1to3', 'Trust\_in\_DSS\_1to3', 'Need\_IT\_teaching\_Cat',

'DSS\_can\_improve\_your\_productivity\_Cat', 'WTP\_for\_DSS\_Cat',

'DSS\_must\_be\_tailored\_for\_your\_farm\_Cat',

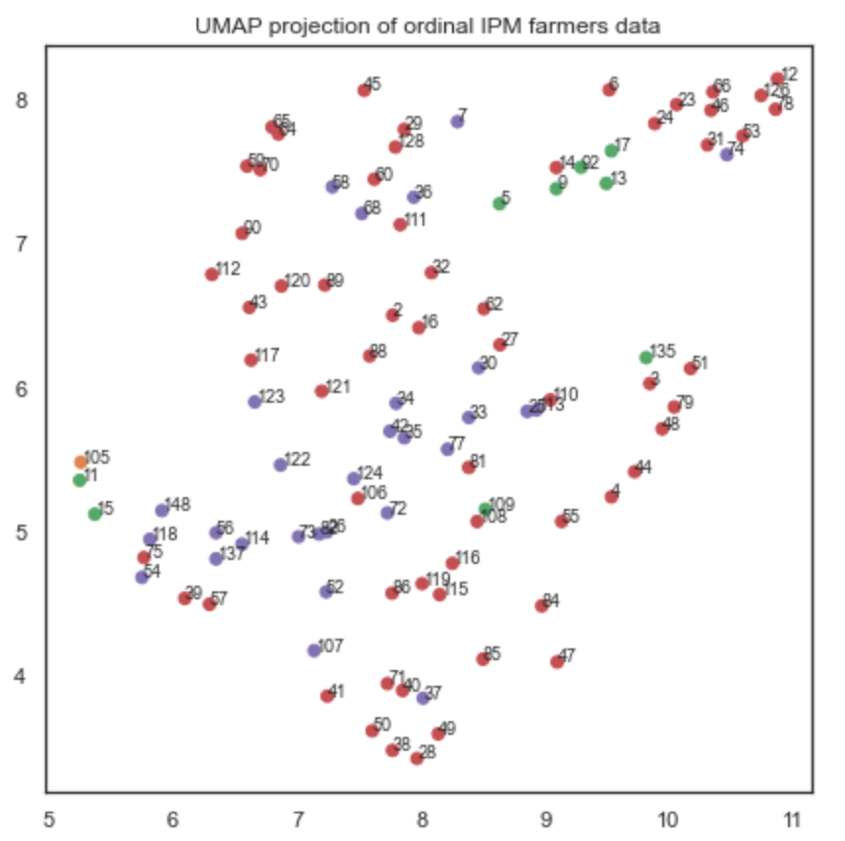
'Manufacturer\_demo\_of\_DSS\_Cat', 'Willing\_to\_try\_new\_products\_Cat'

picture:

* Numbers represent index of instancses
* Color=«DSS\_can\_improve\_your\_productivity\_Cat«

Comment:

* Projection in 2D show disperesed data wtih no clear clusters



### 2D projeciton of nominal features

Nominal attributes: 'Gender\_1male', 'Legislative\_requirements', 'Computer\_at\_home',

'Already\_used\_DSS', 'Price\_important\_factor', ~~'Region\_central\_EU',~~

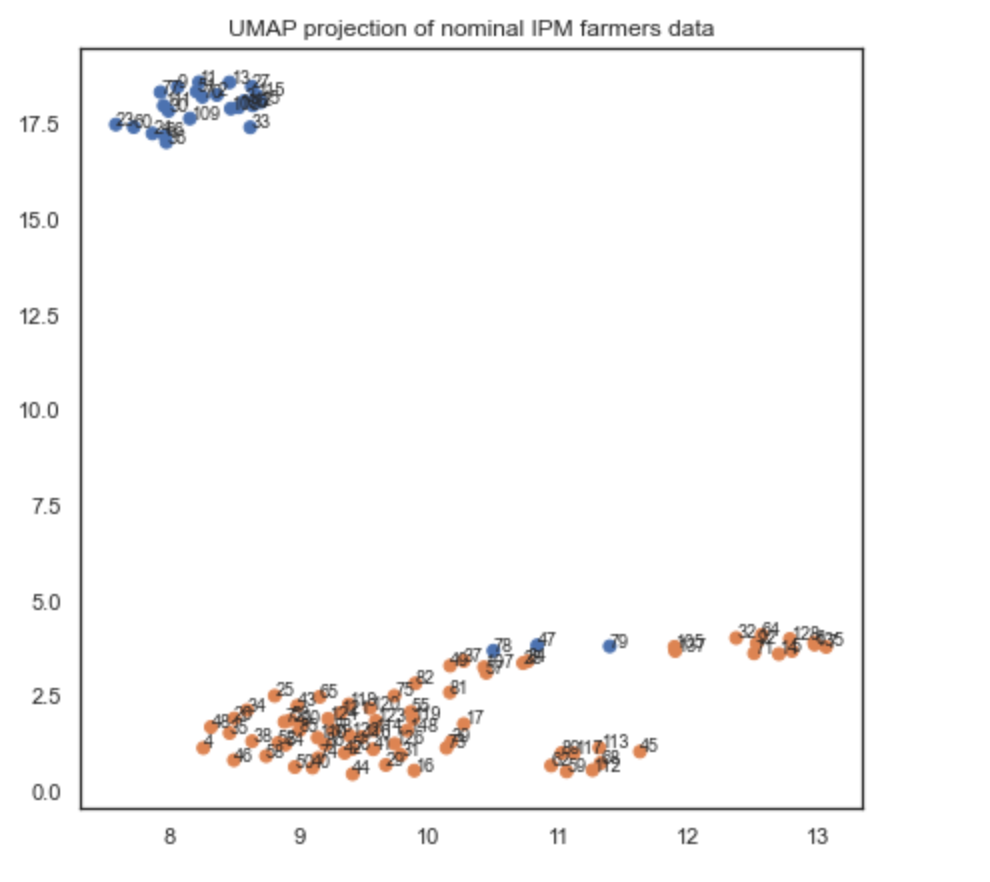
~~'Region\_north\_EU', 'Region\_south\_EU'~~

Picture:

* Numbers represent index of instancses
* Colors:
  + Orange=1
  + Blue=0

Comment:

* Projection in 2D shows 2 clear clusters, which are prettly clearly devided in respect to attribute »Already\_used\_DSS«.
* 3 instnaces (index: 78, 47, 79) are outliers as they are positioned in the other cluster as they maj-ority of instance with the same value. (instances in blue); Would be worthwhile to check what is different about them; perhaps try to model and see how they are classified.



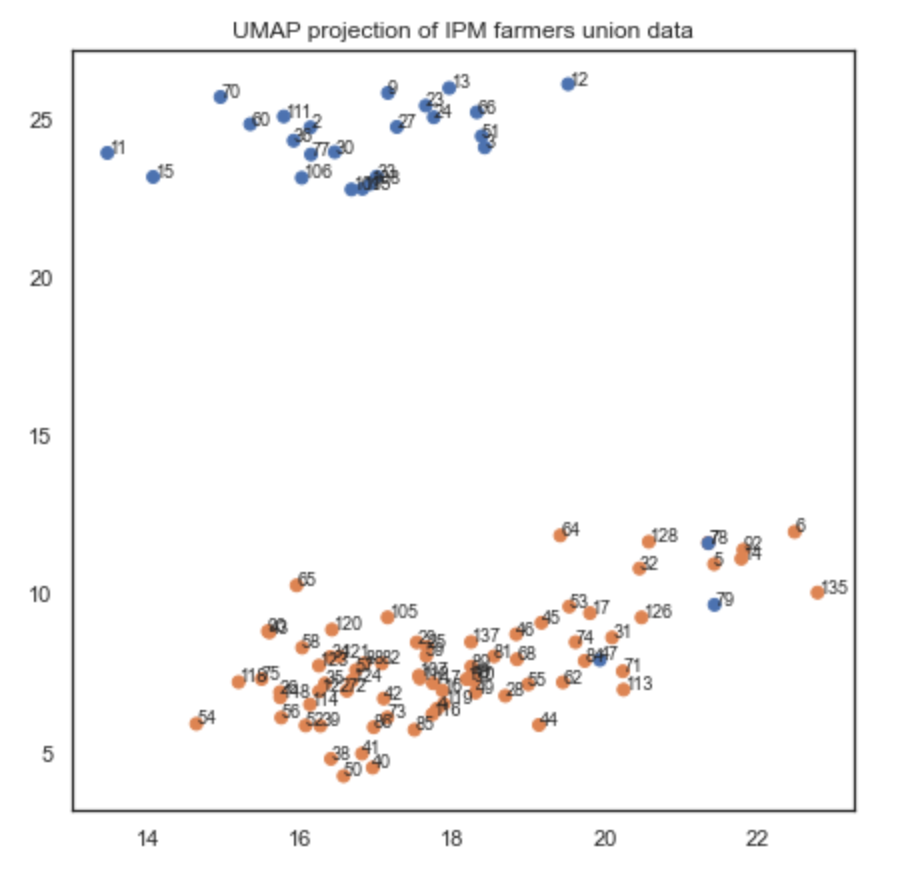
### 2D projeciton of Union of nominal and ordinal features

Picture:

* Numbers represent index of instancses
* Colors:
  + Orange=1
  + Blue=0

Comment:

* Projection of union of ordinal and nominal dim reducitons in 2D still points to »2 clusters«, which are clearly separated in respect to attribute »Already\_used\_DSS«.
* Again, 3 instnaces (index: 78, 47, 79) are outliers as before (see above)



# Clustering [without region attributes]

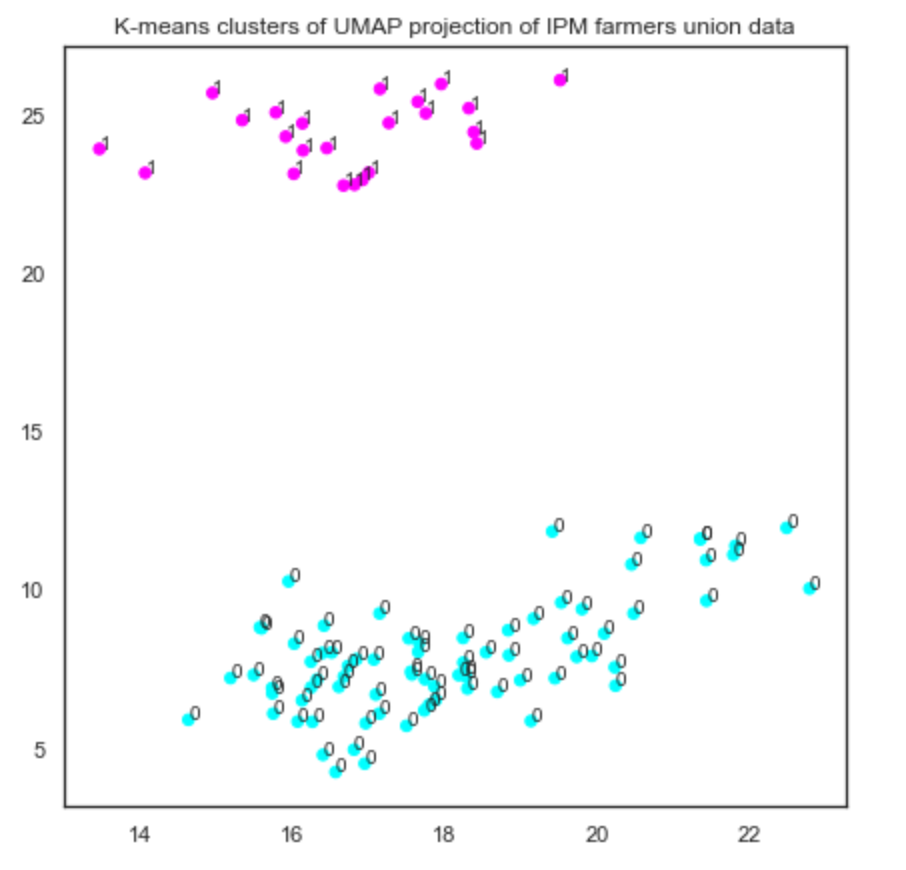
## HDBSCAN clustering

Picture:

* Numbers/colors represent clusters

Comment:

* Projection of union of ordinal and nominal dim reducitons in 2D still points to »2 clusters«, which are clearly separated in respect to attribute »Already\_used\_DSS«.



Clusters: [0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 1, 1, 0,

1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1,

1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 1, 1, 1, 1, 0, 1, 1,

1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 1, 0, 1, 1,

1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]

For modelling see CSV file (includes clusters): »IPM\_farmers-data\_clusters\_question1.csv«