

Course. Introduction to Machine Learning

Work 1. Clustering Exercise

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1. Clustering exercise

1. Preprocess the data
2. Agglomerative Clustering with sklearn
3. K-Means (your own code)
4. K-Modes (your own code)
5. K-Prototype (your own code)
6. Fuzzy clustering (your own code)
7. Validation techniques (using sklearn validation metrics)



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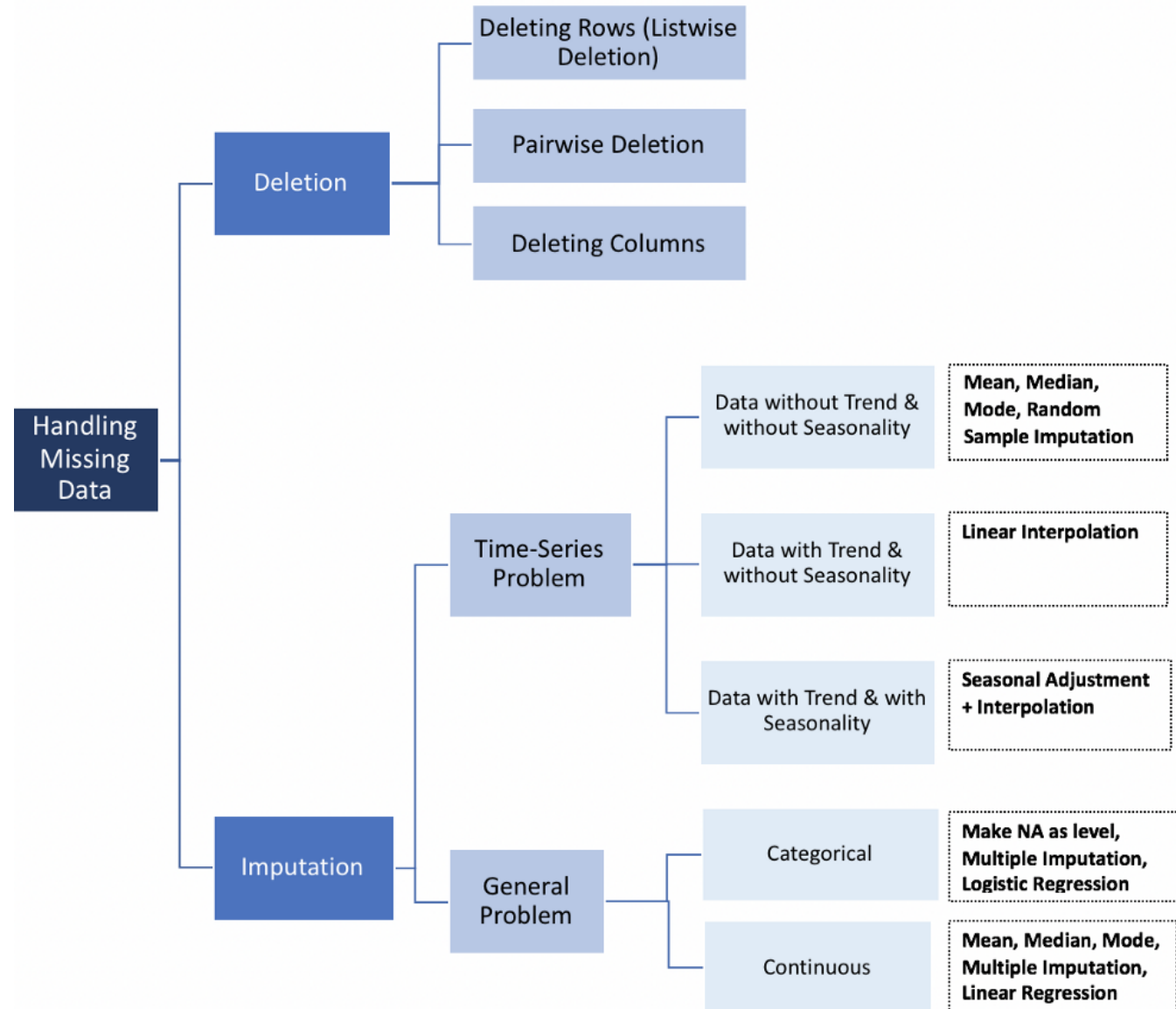
Preprocess the data

- You need to read the .arff file
 - You can implement your own code or use `scipy.io.arff.loadarff`
- Data needs pre-processing
 - Features may contain **different ranges**
 - Normalize or Standardize the machine learning data
 - Features may have **different types**
 - Categorical, Numerical, and mix-type data
 - Data may contain **missing values**
 - Use the median (for example)

- **To deal with different ranges**
 - Normalize or scale features
- **Alternatives**
 - **Standardisation:** Standardisation replaces the values by their Z scores. `sklearn.preprocessing.scale`
 - **Mean normalisation:** This distribution will have values between **-1 and 1** with **$\mu=0$** .
`sklearn.preprocessing.StandardScaler`
 - **Min-Max scaling:** This scaling brings the value between 0 and 1. `sklearn.preprocessing.MinMaxScaler`
 - **Unit vector:** Scaling is done considering the whole feature vector to be of unit length.
`sklearn.preprocessing.Normalizer`

- **To deal with different types**
- **Alternatives**
 - **Label encoding:** convert to a number
`sklearn.preprocessing.LabelEncoder`
 - **One hot encoding:** where a categorical variable is converted into a binary vector, each possible value of the categorical variable becomes the variable itself with default value of zero and the variable which was the value of the categorical variable will have the value 1.
`sklearn.preprocessing.OneHotEncoder`

- To deal with missing values





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Agglomerative Clustering

Using sklearn

Some Videos

- <https://www.youtube.com/watch?v=VMyXc3SiEqs>
- <https://www.youtube.com/watch?v=RdT7bhm1M3E>
- <https://www.youtube.com/watch?v=Cy3ci0Vqs3Y>
- <http://scikit-learn.org/stable/modules/generated/sklearn.cluster.AgglomerativeClustering.html>