DS

Effect of discretization, continuation, Normalization, Randomization on the data

September 22, 2021

Using Orange I learned about discretization, continuation, Normalization, Randomization

Discretization

Discretization replaces continuous features with the corresponding categorical features:

```
import Orange
iris = Orange.data.Table("titanic.tab")
disc = Orange.preprocess.Discretize()
disc.method = Orange.preprocess.discretize.EqualFreq(n=4)
d_iris = disc(iris)
print("Original dataset:")
for e in iris[:4]:
print(e)
print("Discretized dataset:")
for e in d_iris[:4]:
print(e)
```

```
>>>
Running script:
Original dataset:
[first, adult, male | yes]
[first, adult, male | yes]
[first, adult, male | yes]
[first, adult, male | yes]
Discretized dataset:
[first, adult, male | yes]
[first, adult, male | yes]
[first, adult, male | yes]
```

```
[first, adult, male | yes]
```

Continuation

Given a data table, return a new table in which the discretize attributes are replaced with continuous or removed.

- binary variables are transformed into 0.0/1.0 or -1.0/1.0 indicator variables, depending upon the argument `zero_based`.
- multinomial variables are treated according to the argument `multinomial_treatment`.
- discrete attributes with only one possible value are removed;

```
import Orange
titanic = Orange.data.Table("titanic.tab")
continuizer = Orange.preprocess.Continuize()
titanic1 = continuizer(titanic)
titanic.domain
titanic1.domain
print(titanic[15])
print(titanic1[15])
continuizer.multinomial_treatment = continuizer.FirstAsBase
continuizer(titanic).domain
continuizer.multinomial_treatment = continuizer.AsOrdinal
titanic1 = continuizer(titanic)
print(titanic[700])
print(titanic1[700])
continuizer.multinomial_treatment =
continuizer.AsNormalizedOrdinal
titanic1 = continuizer(titanic)
print(titanic1[700])
print(titanic1[15])
```

```
>>>
Running script:
[first, adult, male | yes]
```

```
[0, 1, 0, 0, 1, 0, 0, 1 | yes]
[third, adult, male | no]
[3, 0, 1 | no]
[1, 0, 1 | no]
[0.333333, 0, 1 | yes]
>>>
```

Normalization

Normalization is a technique often applied as part of data preparation for machine learning. The goal of normalization is **to change the values of numeric columns in the dataset to a common scale**, without distorting differences in the ranges of values. For machine learning, every dataset does not require normalization.

```
from Orange.data import Table
from Orange.preprocess import Normalize
data = Table("iris")
normalizer = Normalize(norm_type=Normalize.NormalizeBySpan)
normalized_data = normalizer(data)
print(normalized_data)
```

```
[0.3889, 0.3750, 0.5424, 0.50 | Iris-versicolor],
[0.5278, 0.3750, 0.5593, 0.50 | Iris-versicolor],
[0.2222, 0.2083, 0.3390, 0.4167 | Iris-versicolor],
[0.3889, 0.3333, 0.5254, 0.50 | Iris-versicolor],
[0.5556, 0.5417, 0.8475, 1.00 | Iris-virginica],
[0.4167, 0.2917, 0.6949, 0.75 | Iris-virginica],
[0.7778, 0.4167, 0.8305, 0.8333 | Iris-virginica],
[0.5556, 0.3750, 0.7797, 0.7083 | Iris-virginica],
[0.6111, 0.4167, 0.8136, 0.8750 | Iris-virginica],
[0.9167, 0.4167, 0.9492, 0.8333 | Iris-virginica],
[0.1667, 0.2083, 0.5932, 0.6667 | Iris-virginica],
[0.8333, 0.3750, 0.8983, 0.7083 | Iris-virginica],
[0.6667, 0.2083, 0.8136, 0.7083 | Iris-virginica],
[0.8056, 0.6667, 0.8644, 1.00 | Iris-virginica],
[0.6111, 0.50, 0.6949, 0.7917 | Iris-virginica],
[0.5833, 0.2917, 0.7288, 0.75 | Iris-virginica],
[0.6944, 0.4167, 0.7627, 0.8333 | Iris-virginica],
```

Randomization

Randomization in an experiment is **where you choose your experimental participants randomly**. For example, you might use simple random sampling, where participants' names are drawn randomly from a pool where everyone has an even probability of being chosen.

```
from Orange.data import Table
from Orange.preprocess import Randomize
data = Table("iris")
randomizer = Randomize(Randomize.RandomizeClasses)
randomized_data = randomizer(data)
print(randomized_data)
```

```
[6.1, 2.6, 5.6, 1.4 | Iris-versicolor],
[7.7, 3.0, 6.1, 2.3 | Iris-virginica],
[6.3, 3.4, 5.6, 2.4 | Iris-setosa],
[6.4, 3.1, 5.5, 1.8 | Iris-versicolor],
[6.0, 3.0, 4.8, 1.8 | Iris-setosa],
[6.9, 3.1, 5.4, 2.1 | Iris-virginica],
[6.7, 3.1, 5.6, 2.4 | Iris-setosa],
[6.9, 3.1, 5.1, 2.3 | Iris-virginica],
[5.8, 2.7, 5.1, 1.9 | Iris-setosa],
[6.8, 3.2, 5.9, 2.3 | Iris-virginica],
[6.7, 3.3, 5.7, 2.5 | Iris-versicolor],
[6.7, 3.0, 5.2, 2.3 | Iris-virginica],
[6.3, 2.5, 5.0, 1.9 | Iris-setosa],
[6.5, 3.0, 5.2, 2.0 | Iris-setosa],
[6.2, 3.4, 5.4, 2.3 | Iris-versicolor],
[5.9, 3.0, 5.1, 1.8 | Iris-setosa]]
```

Thank You.

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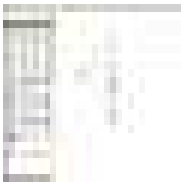

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