Spatial assignment of test sample

December 13, 2016

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Input

Website Identifier: 142

Isotope values of test sample

Table 1: Isotope values of test sample

<table>
<thead>
<tr>
<th></th>
<th>13C/12C</th>
<th>15N/14N</th>
<th>18O/16O</th>
<th>2H/1H</th>
<th>34S/32S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-21.2</td>
<td>6.7</td>
<td>18.3</td>
<td>-38.3</td>
<td>10.5</td>
</tr>
</tbody>
</table>

Output

Model

## Call:
```
train.kknn(formula = fmla, data = ivory.train, kmax = 15, distance = 2,
            kernel = knl)
```

## Type of response variable: nominal
## Minimal misclassification: 0.3765867
## Best kernel: triangular
## Best k: 15
Classifier: country_code
Best fitted reference sample:

- Site: South Africa, Ithala
- Country: ZA
- Region: Southern Africa
- CITES: Appendix II
- Lat: -27.51
- Lon: 31.29
Assignment of test sample to nearest neighbours

Best fitted reference entries

Table 2: Details of best fitted reference entry (row 1) and other fitted entries within best classifier

<table>
<thead>
<tr>
<th>lon</th>
<th>lat</th>
<th>location</th>
<th>13C/12C</th>
<th>15N/14N</th>
<th>18O/16O</th>
<th>2H/1H</th>
<th>34S/32S</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.29</td>
<td>-27.51</td>
<td>South Africa, Ithala</td>
<td>-21.4</td>
<td>7.1</td>
<td>18.3</td>
<td>-39.9</td>
<td>11.8</td>
</tr>
<tr>
<td>31.29</td>
<td>-27.51</td>
<td>South Africa, Ithala</td>
<td>-22.1</td>
<td>6.5</td>
<td>17.9</td>
<td>-37.8</td>
<td>10.7</td>
</tr>
<tr>
<td>31.29</td>
<td>-27.51</td>
<td>South Africa, Ithala</td>
<td>-21.2</td>
<td>7.0</td>
<td>17.7</td>
<td>-42.2</td>
<td>11.1</td>
</tr>
<tr>
<td>31.29</td>
<td>-27.51</td>
<td>South Africa, Ithala</td>
<td>-21.8</td>
<td>6.6</td>
<td>18.1</td>
<td>-42.4</td>
<td>10.0</td>
</tr>
<tr>
<td>31.29</td>
<td>-27.51</td>
<td>South Africa, Ithala</td>
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<td>11.1</td>
</tr>
<tr>
<td>31.29</td>
<td>-27.51</td>
<td>South Africa, Ithala</td>
<td>-21.4</td>
<td>7.1</td>
<td>16.9</td>
<td>-41.0</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Country of prediction: ZA

Testing robustness of assignment: Wilcoxon signed rank test

If p-value > 0.05, the test concludes that the isotope signature of the test sample is similar to the respective nearest neighbour reference sample.

P-values for the k nearest neighbours in Wilcoxon Test

“0.880, 0.813, 0.715, 0.621, 0.331, 0.033”
Goodness of fit of test sample:

- good fit: if $p > 0.05$ for at least two tested nearest neighbour reference samples;
- moderate fit: if $p > 0.05$ for at least one tested nearest neighbour reference samples;
- uncertain: if $p > 0.05$ for none of the tested nearest neighbour reference samples.

Assumption: At least two nearest reference samples are available.

Overall goodness of fit of test sample: “good fit”