Spatial assignment of test sample

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Input

Website Identifier:

Isotope values of test sample

Table 1: Isotope values of test sample

<table>
<thead>
<tr>
<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>-24.9</td>
<td>12.9</td>
<td>20.1</td>
<td>-45.2</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Output

Model

## Call:
## train.kknn(formula = fmla, data = ivory.train, kmax = 15, distance = 2, kernel = kn1)

## Type of response variable: nominal
## Minimal misclassification: 0.3765867
## Best kernel: triangular
## Best k: 15

Classifier: country_code
Map of best fitted reference sample

Best fitted reference sample:

- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: 1.52
- Lon: 26.23
Assignment of test sample to nearest neighbours

![Graph showing Euclidian distance and weight of k-NN for test sample assignments]

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>27.18</td>
<td>2.25</td>
<td>Dem. Rep. Congo, Medje</td>
<td>-24.2</td>
<td>11.9</td>
<td>17.4</td>
<td>-37.8</td>
<td>6.8</td>
</tr>
<tr>
<td>29.29</td>
<td>0.29</td>
<td>Dem. Rep. Congo, Beni</td>
<td>-24.7</td>
<td>11.4</td>
<td>17.1</td>
<td>-37.3</td>
<td>5.3</td>
</tr>
<tr>
<td>23.55</td>
<td>-1.35</td>
<td>Dem. Rep. Congo, Moma</td>
<td>-25.6</td>
<td>10.8</td>
<td>16.9</td>
<td>-44.4</td>
<td>5.7</td>
</tr>
<tr>
<td>25.09</td>
<td>-0.28</td>
<td>Dem. Rep. Congo, Loyo</td>
<td>-24.6</td>
<td>10.7</td>
<td>16.8</td>
<td>-42.7</td>
<td>5.1</td>
</tr>
<tr>
<td>27.37</td>
<td>1.40</td>
<td>Dem. Rep. Congo, Nepoko</td>
<td>-24.3</td>
<td>10.5</td>
<td>18.0</td>
<td>-34.9</td>
<td>7.4</td>
</tr>
<tr>
<td>29.09</td>
<td>3.40</td>
<td>Dem. Rep. Congo, Gangala na Bodio</td>
<td>-24.4</td>
<td>11.7</td>
<td>17.6</td>
<td>-29.7</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Country of prediction: CD

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

“0.000017612, 0.000000103, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026”

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: “uncertain”