Spatial assignment of test sample

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Input

Website Identifier: 181

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>-21.6</td>
<td>8.1</td>
<td>16.4</td>
<td>-48</td>
<td>9.1</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
Map of best fitted reference sample

Best fitted reference sample:

- Site: Southern Zambia
- Country: ZM
- Region: Southern Africa
- CITES: Appendix I
- Lat: -11.27
- Lon: 32.32
Assignment of test sample to nearest neighbours

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**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>32.32</td>
<td>-11.27</td>
<td>Southern Zambia</td>
<td>-21.5</td>
<td>7.9</td>
<td>17.4</td>
<td>-51.6</td>
<td>8.3</td>
</tr>
<tr>
<td>25.84</td>
<td>-15.96</td>
<td>Southern Zambia</td>
<td>-21.0</td>
<td>8.6</td>
<td>17.4</td>
<td>-51.4</td>
<td>8.9</td>
</tr>
<tr>
<td>25.93</td>
<td>-15.15</td>
<td>Southern Zambia</td>
<td>-21.1</td>
<td>8.3</td>
<td>17.7</td>
<td>-51.0</td>
<td>9.4</td>
</tr>
<tr>
<td>25.80</td>
<td>-15.99</td>
<td>Southern Zambia</td>
<td>-21.9</td>
<td>8.0</td>
<td>17.2</td>
<td>-54.6</td>
<td>9.7</td>
</tr>
<tr>
<td>25.84</td>
<td>-16.27</td>
<td>Southern Zambia</td>
<td>-21.2</td>
<td>8.4</td>
<td>17.3</td>
<td>-53.5</td>
<td>10.2</td>
</tr>
<tr>
<td>26.71</td>
<td>-14.96</td>
<td>Zambia, Eastern of Kafue National Park</td>
<td>-22.0</td>
<td>7.5</td>
<td>17.3</td>
<td>-54.9</td>
<td>8.4</td>
</tr>
</tbody>
</table>

**Country of prediction: ZM**

**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**

“0.2703, 0.0848, 0.0105, 0.0059, 0.0019, 0.0013”
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”