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>-20.4</td>
<td>8.6</td>
<td>18.3</td>
<td>-53.3</td>
<td>2.7</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: -11.40573
- Lon: 32.13137
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>32.13</td>
<td>-11.41</td>
<td>Southern Zambia</td>
<td>-20.8</td>
<td>9.1</td>
<td>18.4</td>
<td>-49.1</td>
<td>6.0</td>
</tr>
<tr>
<td>25.95</td>
<td>-16.27</td>
<td>Southern Zambia</td>
<td>-19.4</td>
<td>8.4</td>
<td>17.9</td>
<td>-52.7</td>
<td>6.0</td>
</tr>
<tr>
<td>32.04</td>
<td>-12.05</td>
<td>Southern Zambia</td>
<td>-20.0</td>
<td>8.2</td>
<td>18.5</td>
<td>-48.8</td>
<td>6.8</td>
</tr>
<tr>
<td>32.11</td>
<td>-11.52</td>
<td>Southern Zambia</td>
<td>-21.2</td>
<td>6.1</td>
<td>18.3</td>
<td>-53.4</td>
<td>3.4</td>
</tr>
<tr>
<td>31.40</td>
<td>-12.24</td>
<td>Southern Zambia</td>
<td>-19.9</td>
<td>8.0</td>
<td>18.5</td>
<td>-48.0</td>
<td>7.1</td>
</tr>
<tr>
<td>32.08</td>
<td>-11.40</td>
<td>Southern Zambia</td>
<td>-19.5</td>
<td>8.2</td>
<td>17.2</td>
<td>-57.5</td>
<td>7.0</td>
</tr>
<tr>
<td>32.55</td>
<td>-12.22</td>
<td>East Zambia, east to North Luangwa Natio</td>
<td>-21.3</td>
<td>7.5</td>
<td>18.4</td>
<td>-52.9</td>
<td>7.3</td>
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<tr>
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<td>-12.42</td>
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<td>-20.1</td>
<td>8.0</td>
<td>18.5</td>
<td>-41.9</td>
<td>6.3</td>
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<tr>
<td>32.11</td>
<td>-11.52</td>
<td>Southern Zambia</td>
<td>-21.4</td>
<td>5.9</td>
<td>17.5</td>
<td>-57.2</td>
<td>2.7</td>
</tr>
<tr>
<td>32.09</td>
<td>-11.48</td>
<td>Southern Zambia</td>
<td>-19.9</td>
<td>7.2</td>
<td>17.8</td>
<td>-57.2</td>
<td>7.4</td>
</tr>
<tr>
<td>32.09</td>
<td>-11.48</td>
<td>Southern Zambia</td>
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<td>6.0</td>
<td>18.4</td>
<td>-46.6</td>
<td>1.9</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

“0.590744927, 0.477307012, 0.002262130, 0.000000003, 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: “good fit”