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>-21</td>
<td>6.7</td>
<td>14.5</td>
<td>-65.3</td>
<td>2.3</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: Malawi, Rumpi, Vwasa Marsh Game Reserve
- Country: MW
- Region: Southern Africa
- CITES: Appendix I
- Lat: -11.02
- Lon: 33.45
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>33.45</td>
<td>-11.02</td>
<td>Malawi, Rhumpi, Vwasa Marsh Game Reserve</td>
<td>-20.6</td>
<td>6.6</td>
<td>15.3</td>
<td>-54.3</td>
<td>3.7</td>
</tr>
<tr>
<td>34.10</td>
<td>-12.91</td>
<td>Malawi, Nkota-Kota</td>
<td>-21.6</td>
<td>5.9</td>
<td>14.7</td>
<td>-60.9</td>
<td>6.7</td>
</tr>
<tr>
<td>34.46</td>
<td>-14.19</td>
<td>Malawi, Thuma Forest Reserve / Dedza</td>
<td>-23.1</td>
<td>6.6</td>
<td>14.0</td>
<td>-60.2</td>
<td>5.2</td>
</tr>
<tr>
<td>34.10</td>
<td>-12.91</td>
<td>Malawi, Nkota-Kota</td>
<td>-21.5</td>
<td>6.2</td>
<td>16.3</td>
<td>-52.0</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Country of prediction: MW

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

“0.001906090, 0.000001728, 0.000000490, 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”