Spatial assignment of test sample

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Contents

Input ............................... 1
   Isotope values of test sample ...................................... 1

Output .................................. 1
   Model ........................................ 1
   Map of best fitted reference sample .................................. 2
   Best fitted reference entries .......................................... 3
   Testing robustness of assignment: Wilcoxon signed rank test .......... 3
      P-values for the k nearest neighbours in Wilcoxon Test ........... 4
   Goodness of fit of test sample: ..................................... 4

Input

Website Identifier: 112

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>-22.5</td>
<td>7.9</td>
<td>14.8</td>
<td>-34.5</td>
<td>11.9</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: Mozambique, Lugenda south bank (block C)
- Country: MZ
- Region: Southern Africa
- CITES: Appendix I
- Lat: -12.18
- Lon: 38.22
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>38.22</td>
<td>-12.18</td>
<td>Mozambique, Lugenda south bank (block C)</td>
<td>-22.0</td>
<td>7.8</td>
<td>15.5</td>
<td>-39.5</td>
<td>10.1</td>
</tr>
<tr>
<td>37.84</td>
<td>-12.00</td>
<td>Mozambique, Kambako (block L8) area</td>
<td>-23.4</td>
<td>8.1</td>
<td>15.2</td>
<td>-35.8</td>
<td>9.3</td>
</tr>
<tr>
<td>36.86</td>
<td>-11.90</td>
<td>Mozambique, Chipuputa area (block L5)</td>
<td>-21.7</td>
<td>7.0</td>
<td>15.9</td>
<td>-39.0</td>
<td>10.3</td>
</tr>
<tr>
<td>38.52</td>
<td>-12.00</td>
<td>Mozambique, Kambako (block L8) - Salt Sp</td>
<td>-21.9</td>
<td>9.0</td>
<td>13.7</td>
<td>-38.2</td>
<td>9.6</td>
</tr>
<tr>
<td>37.85</td>
<td>-11.32</td>
<td>Mozambique, Chipupa / Rovuma</td>
<td>-22.0</td>
<td>6.9</td>
<td>16.7</td>
<td>-37.7</td>
<td>10.5</td>
</tr>
<tr>
<td>38.52</td>
<td>-12.00</td>
<td>Mozambique, Kambako block - L8</td>
<td>-23.4</td>
<td>8.7</td>
<td>16.6</td>
<td>-35.4</td>
<td>10.0</td>
</tr>
<tr>
<td>38.42</td>
<td>-11.55</td>
<td>Mozambique, Lugenda north bank - Chipopu</td>
<td>-22.5</td>
<td>6.9</td>
<td>15.7</td>
<td>-35.8</td>
<td>8.4</td>
</tr>
<tr>
<td>32.10</td>
<td>-14.70</td>
<td>Mozambique, Kambako block - L8</td>
<td>-21.5</td>
<td>7.1</td>
<td>16.2</td>
<td>-42.3</td>
<td>10.8</td>
</tr>
<tr>
<td>37.84</td>
<td>-12.30</td>
<td>Mozambique, Block L7 - Lugenda south ban</td>
<td>-22.0</td>
<td>7.5</td>
<td>15.5</td>
<td>-41.6</td>
<td>8.4</td>
</tr>
<tr>
<td>38.51</td>
<td>-12.00</td>
<td>Mozambique, Kambako block - L8</td>
<td>-23.5</td>
<td>8.6</td>
<td>16.5</td>
<td>-30.4</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Country of prediction: MZ

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

“0.94862324, 0.12252401, 0.09321572, 0.02292252, 0.00027569, 0.00000250, 0.00000173, 0.00000049, 0.00000031, 0.00000018”

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”