Spatial assignment of test sample
November 24, 2016

Contents

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

Output
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 ..................... 3
Goodness of fit of test sample: .................................................. 3

Input
Website Identifier: 123-C

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>-21.4</td>
<td>8.4</td>
<td>18.4</td>
<td>-32.6</td>
<td>8.7</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: Dem. Rep. Congo, Bas Uele
- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: 4
- Lon: 23
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>23.00</td>
<td>4.00</td>
<td>Dem. Rep. Congo, Bas Uele</td>
<td>-20.8</td>
<td>7.9</td>
<td>18.0</td>
<td>-35.6</td>
<td>8.8</td>
</tr>
<tr>
<td>29.31</td>
<td>3.45</td>
<td>Dem. Rep. Congo, Dungu</td>
<td>-20.5</td>
<td>7.9</td>
<td>18.3</td>
<td>-37.8</td>
<td>8.7</td>
</tr>
<tr>
<td>29.09</td>
<td>3.40</td>
<td>Dem. Rep. Congo, Gangara na Bodio</td>
<td>-22.1</td>
<td>8.0</td>
<td>18.3</td>
<td>-36.0</td>
<td>6.2</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

“0.50454, 0.37659, 0.00052”

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"