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 ............. 4
Goodness of fit of test sample: ........................................... 4

Input

Website Identifier:

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>Isotope</td>
<td>-23.1</td>
<td>8.6</td>
<td>18.7</td>
<td>-52.9</td>
<td>4.9</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
Map of best fitted reference sample

Best fitted reference sample:

- Site: South Zambia, East of Kafue National Park
- Country: ZM
- Region: Southern Africa
- CITES: Appendix I
- Lat: -14.964059
- Lon: 26.7110926
Assignment of test sample to nearest neighbours

![Assignment of test sample to nearest neighbours](image)

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>26.71</td>
<td>-14.96</td>
<td>South Zambia, East of Kafue National Park</td>
<td>-21.9</td>
<td>7.7</td>
<td>18.6</td>
<td>-50.8</td>
<td>8.1</td>
</tr>
<tr>
<td>32.55</td>
<td>-12.22</td>
<td>East Zambia, east to North Luangwa Nation</td>
<td>-21.3</td>
<td>7.5</td>
<td>18.4</td>
<td>-52.9</td>
<td>7.3</td>
</tr>
<tr>
<td>25.70</td>
<td>-16.73</td>
<td>Southern Zambia</td>
<td>-22.5</td>
<td>7.6</td>
<td>18.4</td>
<td>-50.8</td>
<td>8.8</td>
</tr>
<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>32.30</td>
<td>-11.10</td>
<td>North Zambia, near Chibesakunda</td>
<td>-22.1</td>
<td>6.7</td>
<td>17.6</td>
<td>-56.4</td>
<td>6.3</td>
</tr>
<tr>
<td>25.70</td>
<td>-16.73</td>
<td>Southern Zambia</td>
<td>-22.1</td>
<td>8.0</td>
<td>18.0</td>
<td>-51.8</td>
<td>9.1</td>
</tr>
<tr>
<td>26.33</td>
<td>-14.73</td>
<td>Southern Zambia</td>
<td>-23.1</td>
<td>7.0</td>
<td>18.8</td>
<td>-53.1</td>
<td>8.9</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>
<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>32.43</td>
<td>-11.16</td>
<td>Southern Zambia</td>
<td>-22.2</td>
<td>8.1</td>
<td>17.4</td>
<td>-55.3</td>
<td>9.1</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

“0.000005070, 0.000000026, 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: “uncertain”