Spatial assignment of test sample

December 10, 2016

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 .... 4
    P-values for the k nearest neighbours in Wilcoxon Test .......... 4
    Goodness of fit of test sample: ..................................... 4

Input

Website Identifier: 29

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>Test</td>
<td>-26.9</td>
<td>10.1</td>
<td>18.6</td>
<td>-46.3</td>
<td>10</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: 0.1889986
## Best kernel: triangular
## Best k: 14
Classifier: region
Map of best fitted reference sample

Best fitted reference sample:

- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: -0.082275
- Lon: 14.573353
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>14.57</td>
<td>-0.08</td>
<td>Dem. Rep. Congo</td>
<td>-24.9</td>
<td>10.3</td>
<td>16.4</td>
<td>-49.5</td>
<td>10.0</td>
</tr>
<tr>
<td>15.24</td>
<td>-4.26</td>
<td>Congo (Brazzaville)</td>
<td>-24.9</td>
<td>10.6</td>
<td>19.5</td>
<td>-42.6</td>
<td>5.9</td>
</tr>
<tr>
<td>23.55</td>
<td>-1.35</td>
<td>Dem. Rep. Congo, Moma</td>
<td>-25.6</td>
<td>10.8</td>
<td>16.9</td>
<td>-44.4</td>
<td>5.7</td>
</tr>
<tr>
<td>14.47</td>
<td>-0.01</td>
<td>Dem. Rep. Congo</td>
<td>-25.0</td>
<td>10.2</td>
<td>15.8</td>
<td>-49.9</td>
<td>10.1</td>
</tr>
<tr>
<td>19.00</td>
<td>8.00</td>
<td>Central African Republic</td>
<td>-25.7</td>
<td>12.8</td>
<td>19.8</td>
<td>-36.6</td>
<td>9.0</td>
</tr>
<tr>
<td>21.45</td>
<td>-1.00</td>
<td>Dem. Rep. Congo, Itoko</td>
<td>-24.2</td>
<td>10.2</td>
<td>16.9</td>
<td>-42.9</td>
<td>6.8</td>
</tr>
<tr>
<td>27.37</td>
<td>1.40</td>
<td>Dem. Rep. Congo, Nepoko</td>
<td>-24.3</td>
<td>10.5</td>
<td>18.0</td>
<td>-34.9</td>
<td>7.4</td>
</tr>
<tr>
<td>10.20</td>
<td>3.13</td>
<td>Cameroon, Lokundji</td>
<td>-26.7</td>
<td>11.1</td>
<td>15.5</td>
<td>-51.6</td>
<td>6.8</td>
</tr>
<tr>
<td>11.27</td>
<td>-3.78</td>
<td>Congo, Shot in Southern Congo, on the At</td>
<td>-24.7</td>
<td>11.6</td>
<td>15.8</td>
<td>-48.1</td>
<td>11.0</td>
</tr>
<tr>
<td>17.11</td>
<td>-1.10</td>
<td>Dem. Rep. Congo, Lukolela</td>
<td>-24.8</td>
<td>10.5</td>
<td>15.4</td>
<td>-43.4</td>
<td>8.4</td>
</tr>
<tr>
<td>23.20</td>
<td>-1.00</td>
<td>Dem. Rep. Congo, Tshuapa</td>
<td>-26.4</td>
<td>12.1</td>
<td>16.2</td>
<td>-46.3</td>
<td>5.7</td>
</tr>
<tr>
<td>12.76</td>
<td>-1.18</td>
<td>Gabon</td>
<td>-26.6</td>
<td>10.0</td>
<td>15.0</td>
<td>-56.9</td>
<td>9.9</td>
</tr>
</tbody>
</table>

Region of prediction: Central Africa
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

“0.9809717, 0.0000030, 0.0000004, 0.0000001, 0.0000001, 0.0000001, 0.0000001, 0.0000001, 0.0000001, 0.0000001, 0.0000001, 0.0000001, 0.0000001”

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: “moderate fit”