Spatial assignment of test sample

December 09, 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: 005p562-39

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></td>
<td>-25.7</td>
<td>11.4</td>
<td>13.5</td>
<td>-54.7</td>
<td>13.8</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:
- Site: Cameroon, near Ebolowa
- Country: CM
- Region: Central Africa
- CITES: Appendix I
- Lat: 2.86
- Lon: 11.15
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>11.15</td>
<td>2.86</td>
<td>Cameroon, near Ebolowa</td>
<td>-25.0</td>
<td>11.7</td>
<td>15.0</td>
<td>-52.0</td>
<td>10.1</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>
<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>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>11.64</td>
<td>-4.13</td>
<td>Congo, Shot in Southern Congo, 50km from</td>
<td>-25.0</td>
<td>8.5</td>
<td>14.7</td>
<td>-49.4</td>
<td>11.9</td>
</tr>
<tr>
<td>12.79</td>
<td>-3.01</td>
<td>Congo, Litsandou village, 8km southeast</td>
<td>-23.5</td>
<td>10.2</td>
<td>13.3</td>
<td>-64.6</td>
<td>10.8</td>
</tr>
<tr>
<td>12.76</td>
<td>-1.18</td>
<td>Gabon</td>
<td>-26.6</td>
<td>10.4</td>
<td>14.9</td>
<td>-57.1</td>
<td>8.2</td>
</tr>
<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>20.96</td>
<td>-1.44</td>
<td>Congo</td>
<td>-23.7</td>
<td>9.2</td>
<td>13.6</td>
<td>-62.2</td>
<td>9.8</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>
</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

“0.1278587, 0.0004189, 0.0000067, 0.0000030, 0.0000019, 0.0000019, 0.0000012, 0.000001, 0.000001, 0.000001”

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”