Spatial assignment of test sample

November 24, 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 ................. 3
P-values for the k nearest neighbours in Wilcoxon Test ............................ 4
Goodness of fit of test sample: ............................................................... 4

Input

Website Identifier: Blind 18_BW

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>-21.8</td>
<td>9.8</td>
<td>19.3</td>
<td>-31.9</td>
<td>13.2</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: Botswana, Francistown area
- Country: BW
- Region: Southern Africa
- CITES: Appendix II
- Lat: -21.65
- Lon: 27.57
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>27.57</td>
<td>-21.65</td>
<td>Botswana, Francistown area</td>
<td>-21.3</td>
<td>9.5</td>
<td>19.4</td>
<td>-30.5</td>
<td>14.2</td>
</tr>
<tr>
<td>25.13</td>
<td>-17.84</td>
<td>Botswana, Kasane/Chobe area</td>
<td>-21.8</td>
<td>10.2</td>
<td>18.7</td>
<td>-36.8</td>
<td>11.8</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-20.8</td>
<td>10.3</td>
<td>19.7</td>
<td>-29.1</td>
<td>14.4</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-21.6</td>
<td>10.6</td>
<td>19.7</td>
<td>-33.6</td>
<td>15.4</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-20.7</td>
<td>10.9</td>
<td>19.5</td>
<td>-34.4</td>
<td>14.0</td>
</tr>
<tr>
<td>21.93</td>
<td>-21.72</td>
<td>Botswana, Ghanzi area</td>
<td>-20.9</td>
<td>10.0</td>
<td>17.9</td>
<td>-35.0</td>
<td>13.9</td>
</tr>
<tr>
<td>23.34</td>
<td>-19.80</td>
<td>Botswana, Maun area</td>
<td>-21.8</td>
<td>11.1</td>
<td>18.6</td>
<td>-37.0</td>
<td>14.9</td>
</tr>
<tr>
<td>27.57</td>
<td>-21.65</td>
<td>Botswana, Francistown area</td>
<td>-20.2</td>
<td>8.9</td>
<td>19.6</td>
<td>-28.3</td>
<td>12.9</td>
</tr>
<tr>
<td>28.42</td>
<td>-22.00</td>
<td>Botswana, Bobonong area</td>
<td>-21.4</td>
<td>8.7</td>
<td>18.5</td>
<td>-35.0</td>
<td>10.7</td>
</tr>
<tr>
<td>28.42</td>
<td>-22.00</td>
<td>Botswana, Bobonong area</td>
<td>-20.7</td>
<td>9.2</td>
<td>18.7</td>
<td>-38.0</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Country of prediction: BW

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

“0.91448, 0.88048, 0.77999, 0.65162, 0.50454, 0.33140, 0.08476, 0.00911, 0.00268, 0.00014”

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”