Spatial assignment of test sample

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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: 229

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>-22.3</td>
<td>9.9</td>
<td>17.3</td>
<td>-32.4</td>
<td>12.8</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: 0.3765867
## Best kernel: triangular
## Best k: 15
Classifier: country_code
Map of best fitted reference sample

Best fitted reference sample:

- Site: Botswana, Bobonong area
- Country: BW
- Region: Southern Africa
- CITES: Appendix II
- Lat: -22
- Lon: 28.42
Assignment of test sample to nearest neighbours

![Graph showing 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>28.42</td>
<td>-22.00</td>
<td>Botswana, Bobonong area</td>
<td>-22.0</td>
<td>9.6</td>
<td>17.2</td>
<td>-34.2</td>
<td>12.9</td>
</tr>
<tr>
<td>28.42</td>
<td>-22.00</td>
<td>Botswana, Bobonong area</td>
<td>-22.0</td>
<td>9.6</td>
<td>16.3</td>
<td>-34.7</td>
<td>12.2</td>
</tr>
<tr>
<td>27.73</td>
<td>-21.89</td>
<td>Botswana, Mmadinare area</td>
<td>-21.1</td>
<td>10.3</td>
<td>17.1</td>
<td>-27.2</td>
<td>12.8</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-21.6</td>
<td>10.5</td>
<td>16.9</td>
<td>-33.2</td>
<td>10.5</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>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>25.13</td>
<td>-17.84</td>
<td>Botswana, Kasane/Chobe area</td>
<td>-21.0</td>
<td>10.1</td>
<td>16.7</td>
<td>-40.1</td>
<td>12.5</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-21.8</td>
<td>9.3</td>
<td>17.9</td>
<td>-32.1</td>
<td>9.6</td>
</tr>
<tr>
<td>27.57</td>
<td>-21.65</td>
<td>Botswana, Francistown area</td>
<td>-21.0</td>
<td>9.7</td>
<td>16.9</td>
<td>-32.5</td>
<td>10.1</td>
</tr>
<tr>
<td>25.13</td>
<td>-17.84</td>
<td>Botswana, Kasane/Chobe area</td>
<td>-21.8</td>
<td>9.3</td>
<td>18.2</td>
<td>-42.1</td>
<td>12.6</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

“0.715, 0.561, 0.377, 0.310, 0.252, 0.172, 0.085, 0.029, 0.029, 0.020”

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”