Spatial assignment of test sample

December 09, 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 ................. 3
Goodness of fit of test sample: ................................................ 3

Input
Website Identifier: 005p562-34

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>-25.6</td>
<td>11.2</td>
<td>14.5</td>
<td>-49.6</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Output

Model

## Call:

```r
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:

- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: -0.006244
- Lon: 14.471917
Assignment of test sample to nearest neighbours

Euclidian distance

Weight of k−NN

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>14.47</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>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>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>

Country of prediction: CD

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

“0.000003584, 0.000000490, 0.000000490, 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”