Spatial assignment of test sample

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Input

Website Identifier: 356

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>-19.9</td>
<td>6.3</td>
<td>15.7</td>
<td>-41.9</td>
<td>11</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:
- Site: Malawi, Kasungu
- Country: MW
- Region: Southern Africa
- CITES: Appendix I
- Lat: -12.91
- Lon: 33.13
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>33.13</td>
<td>-12.91</td>
<td>Malawi, Kasungu</td>
<td>-20.2</td>
<td>6.3</td>
<td>16.3</td>
<td>-47.3</td>
<td>11.3</td>
</tr>
<tr>
<td>33.13</td>
<td>-12.91</td>
<td>Malawi, Kasungu</td>
<td>-19.0</td>
<td>5.7</td>
<td>16.5</td>
<td>-46.2</td>
<td>11.0</td>
</tr>
<tr>
<td>33.13</td>
<td>-12.91</td>
<td>Malawi, Kasungu</td>
<td>-20.3</td>
<td>6.2</td>
<td>15.8</td>
<td>-51.9</td>
<td>11.4</td>
</tr>
<tr>
<td>33.13</td>
<td>-12.91</td>
<td>Malawi, Kasungu</td>
<td>-20.4</td>
<td>6.4</td>
<td>14.9</td>
<td>-51.0</td>
<td>10.1</td>
</tr>
<tr>
<td>33.13</td>
<td>-12.91</td>
<td>Malawi, Kasungu</td>
<td>-20.2</td>
<td>6.6</td>
<td>16.9</td>
<td>-51.4</td>
<td>10.4</td>
</tr>
<tr>
<td>35.33</td>
<td>-14.95</td>
<td>Malawi, Liwonde National Park</td>
<td>-19.7</td>
<td>8.1</td>
<td>15.6</td>
<td>-48.5</td>
<td>10.7</td>
</tr>
</tbody>
</table>

Country of prediction: MW

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

"0.17179, 0.15831, 0.05677, 0.00683, 0.00028, 0.00028"
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”