Package 'imanr'

February 12, 2025

Type Package

Title Identify the Racial Complex of Native Corns from Mexico

Version 2.0.0

Maintainer Rafael Nieves-Alvarez <nievesalvarez1618@gmail.com>

Description A model that provides researchers with a powerful tool for the classification
and study of native corn by aiding in the identification of racial complexes
which are fundamental to Mexico's agriculture and culture. This package has been
developed based on data collected by ``Proyecto Global de Maíces Nativos México'',
which has conducted exhaustive surveys across the country to document the
qualitative and quantitative characteristics of different types of native maize.
The trained model uses a robust and diverse dataset, enabling it to achieve an
80% accuracy in classifying maize racial complexes. The characteristics included
in the analysis comprise geographic location, grain and cob colors, as well as
various physical measurements, such as lengths and widths.

License GPL (>= 3)

Encoding UTF-8

LazyData true

LazyDataCompression xz

RoxygenNote 7.3.1

Imports missForest, dplyr, parallel, doParallel, foreach, bundle,
tidymodels, xgboost

Suggests testthat (>= 3.0.0), knitr, rmarkdown

Config/testthat/edition 3

VignetteBuilder knitr

Depends R (>= 4.1.0)

NeedsCompilation no

Author Rafael Nieves-Alvarez [aut, cre]
(<https://orcid.org/0009-0002-8016-1412>),
Arturo Sanchez-Porras [aut, cph]
(<https://orcid.org/0000-0002-1691-286X>),
Aline Romero-Natale [aut] (<https://orcid.org/0000-0003-4267-1913>),

Otilio Arturo Acevedo-Sandoval [aut]
  (<https://orcid.org/0000-0003-0475-7003>)

Contents

---

data24 *Data to show the functioning of imanr functions*

Description

Dataset of characteristics of native Mexican corn cobs obtained from the "Proyecto Global de Maíces Nativos" considering the most relevant variables and a subset of observations for the examples.

Usage

```
data("data24")
```

Format

A data frame with 24 observations and 61 variables.

Source

Data available on the website: <https://biodiversidad.gob.mx/diversidad/proyectoMaices>.

References

CONABIO. 2011. Proyecto Global de Maíces Nativos. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad; Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias; Instituto Nacional de Ecología y cambio Climático. México. https://biodiversidad.gob.mx/diversidad/proyectoMaices.

Examples

```
data(data24)                    # lazy loading
str(data24)
```

---

data31 *Data to show the functioning of imanr functions*

Description

Dataset of characteristics of native Mexican corn cobs obtained from the "Proyecto Global de Maíces Nativos" considering the most relevant variables and a subset of observations for the examples.

Usage

```
data("data31")
```

Format

A data frame with 31 observations and 61 variables.

Source

Data available on the website: <https://biodiversidad.gob.mx/diversidad/proyectoMaices>.

References

CONABIO. 2011. Proyecto Global de Maíces Nativos. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad; Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias; Instituto Nacional de Ecología y cambio Climático. México. https://biodiversidad.gob.mx/diversidad/proyectoMaices.

Examples

```
data(data31)                    # lazy loading
str(data31)
```

---

find_racial_complex *Identify the Racial Complex of native corn from Mexico*

Description

Identify the Racial Complex of native corn from Mexico

Usage

```
find_racial_complex(data)
```

Arguments

data   A dataset that contains qualitative and quantitative characteristics of a corn ear
                    or series of ears. The selected characteristics are related to colors, some mea-
                    surements and the locations in which the corn was grown. A template for what
                    has to be filled is included in the GitHub repo of the project.

Value

findraciacomplex() returns a racial complex classification for the dataset or single observation
that the user entered

Author(s)

Rafael Nieves-Alvarez (<nievesalvarez1618@gmail.com>), Arturo Sanchez-Porras, Aline Romero-
Natale, Otilio Arturo Acevedo-Sandoval

References

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An introduction to statistical learning:
With applications in R (1st ed.). Springer.\ Kuhn, M., & Johnson, K. (2013). Applied predictive
modeling (1st ed.). Springer.\ Monroy, L. G. D. (2007). Estadística Multivariada: Inferencia y
Métodos. Univ. Nacional.

See Also

[impute_data()]

Examples

```
## Not run:
find_racial_complex(data24)#'

## End(Not run)
```

---

impute_data   *Impute the data implementing random forest for native corn data.*

Description

Impute and prepare a dataframe to apply the find_racialcomplex() function, in case the dataframe
has missing values. The imputation is done with random forests. The database must have the same
variables as those in bdMaiz.rds in this same package.

Usage

```
impute_data(data, useParallel = FALSE)
```

Arguments

data   An incomplete dataset that contains qualitative and quantitative characteristics of a corn or series of corns. The selected characteristics are related to colors, some measurements, and the locations in which the corn was grown. A template for what has to be filled will be included on the GitHub page of the project.

useParallel   Logical. Perform the analysis in parallel? Defaults to FALSE.

Value

`impute_data()`returns an imputed dataset that can be used with `find_racialcomplex()`.

Author(s)

Rafael Nieves-Alvarez (`<nievesalvarez1618@gmail.com>`), Arturo Sanchez-Porras, Aline Romero-Natale, Otilio Arturo Acevedo-Sandoval

References

Báez Vergara, K. J. Estimación de datos faltantes a través de redes neuronales, una comparación con métodos simples y múltiples (Doctoral dissertation, Universidad Santo Tomás).

See Also

[find_racialcomplex()]

Examples

```
df <- data24[17,]

df_imp <- impute_data(df, useParallel = FALSE)
df_imp
```

Index