Package 'JSDNE'

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Title Estimating the Age using Auricular Surface by DNE

Version 4.3.2

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Description The age is estimated by calculating the Dirichlet Normal Energy (DNE) on the whole auricular surface and the apex of the auricular surface. It involves three estimation methods: principal component discriminant analysis (PCQDA), principal component regression analysis (PCR), and principal component logistic regression analysis (PCLR) methods. The package is created with the data from the Louis Lopes Collection in Lisbon, the 21st Century Identified Human Remains Collection in Coimbra, and the CAL Milano Cemetery Skeletal Collection in Milan.

License GPL-3

Encoding UTF-8

RoxygenNote 7.3.1

Depends R (>= 2.10)

LazyData true

Imports dplyr, MASS, molaR, nnet, Rvcg

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

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Apex *Surface mesh of apex of auricular surface.*

Description

Surface mesh of apex of auricular surface.

Usage

```
data(Apex)
```

Format

An object of class mesh3d of length 4.

Examples

```
PCQDA_output <- PCQDA_result(WholeSurface,Apex)
PCR_output <- PCR_result(WholeSurface,Apex)
PCLR_output <- PCLR_result(WholeSurface,Apex)
```

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data_PCLR *Database to create DNE_PCLR method*

Description

data_PCLR with 6 variables: Cluster, Total DNE/Total Polygon Faces, Mean value of DNE on Apex, IQR of DNE on Whole surface, Median value of DNE on Whole surface, Mean value of DNE on Convex surface

Usage

```
data_PCLR
```

Format

An object of class data.frame with 716 rows and 6 columns.

Details

The database was obtained by calculating the DNE on the auricular surface from European collections. The specimens are belongs to the Louis Lopes Collection in Lisbon, the 21st Century Identified Human Remains Collection in Coimbra, and the CAL Milano Cemetery Skeletal Collection in Milan.

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data_PCQDA   *Databases to create DNE_PCQDA method.*

Description

data_PCQDA with 5 variables: Cluster, Proportion having DNE under 0.0001, Proportion having DNE over 0.6, Mean value of DNE on Apex, Total DNE/Total Polygon Faces

Usage

data_PCQDA

Format

An object of class data.frame with 728 rows and 5 columns.

Details

The databases was obtained by calculating the DNE on the auricular surface from European collections. The specimens are belongs to the Louis Lopes Collection in Lisbon, the 21st Century Identified Human Remains Collection in Coimbra, and the CAL Milano Cemetery Skeletal Collection in Milan.

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data_PCR   *Database to create DNE_PCR method*

Description

data_PCR with 6 variables: Age,Total DNE/Total Polygon Faces, Mean value of DNE on Apex, IQR of DNE on Apex, Mean value of DNE on Convex surface, Proportion having DNE under 0.0001

Usage

data_PCR

Format

An object of class data.frame with 558 rows and 6 columns.

Details

The database was obtained by calculating the DNE on the auricular surface from European collections. The specimens are belongs to the Louis Lopes Collection in Lisbon, the 21st Century Identified Human Remains Collection in Coimbra, and the CAL Milano Cemetery Skeletal Collection in Milan.

PCLR_result   *Estimating the age using DNE_PCLR method*

Description

DNE_PCLR method is the principal component logistic regression analysis (PCLR) method using the Dirichlet Normal Energy (DNE). This method involves 2 age groups to distinguish if the specimen is over 63 or under 67. The function automatically calculates the DNE on the auricular surface. It provides the estimated age group and age range of the estimated age group.

Usage

```
PCLR_result(x, y)
```

Arguments

x	the name of inputted ply file of the whole auricular surface
y	the name of inputted ply file of the apex of the auricular surface

Value

estimated result gets printed to the console

PCQDA_result   *Estimating the age using DNE_PCQDA method*

Description

DNE_PCQDA method is the principal component quadratic discriminant analysis (PCQDA) method using the Dirichlet Normal Energy (DNE). This method involves 4 age groups. The function automatically calculates the DNE on the auricular surface. It provides the estimated age group and age range of the estimated age group.

Usage

```
PCQDA_result(x, y)
```

Arguments

x	the name of inputted ply file of the whole auricular surface
y	the name of inputted ply file of the apex of the auricular surface

Value

estimated result gets printed to the console

PCR_result   *Estimating the age using PCR method*

Description

DNE_PCR method is the principal component linear regression analysis (PCR) method using the Dirichlet Normal Energy (DNE). The function automatically calculates the DNE on the auricular surface It provides the estimated age and standard errors (SE).

Usage

```
PCR_result(x, y)
```

Arguments

x   the name of inputted ply file of the whole auricular surface

y   the name of inputted ply file of the apex of the auricular surface

Value

estimated result gets printed to the console

WholeSurface   *Surface mesh of whole auricular surface.*

Description

Surface mesh of whole auricular surface.

Usage

```
data(WholeSurface)
```

Format

An object of class mesh3d of length 4.

Examples

```
PCQDA_output <- PCQDA_result(WholeSurface,Apex)
PCR_output <- PCR_result(WholeSurface,Apex)
PCLR_output <- PCLR_result(WholeSurface,Apex)
```

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