Package 'MariNET'

March 21, 2025

Title Build Network Based on Linear Mixed Models from EHRs

Version 1.0.0

Description Analyzing longitudinal clinical data from Electronic Health Records (EHRs) using linear mixed models (LMM) and visualizing the results as networks. It includes functions for fitting LMM, normalizing adjacency matrices, and comparing networks. The package is designed for researchers in clinical and biomedical fields who need to model longitudinal data and explore relationships between variables For more details see Bates et al. (2015) <doi:10.18637/jss.v067.i01>.

License GPL-3

Imports dplyr, lme4, qgraph

Encoding UTF-8

RoxygenNote 7.3.2

Suggests knitr, rmarkdown, BiocStyle

VignetteBuilder knitr

Depends R (>= 3.5)

LazyData true

NeedsCompilation no

Author Vargas-Fernández Marina [aut, cre],
Martorell-Marugán Jordi [aut],
Carmona-Sáez Pedro [aut]

Maintainer Vargas-Fernández Marina <marina.vargas@genyo.es>

Repository CRAN

Date/Publication 2025-03-21 16:00:06 UTC

Contents

---

differentiation *Subtract Two Adjacency Matrices*

Description

This function returns difference matrix between two networks. It is useful for comparing two networks represented by adjacency matrices.

Usage

```
differentiation(matrix1, matrix2)
```

Arguments

matrix1   The first adjacency matrix.

matrix2   The second adjacency matrix.

Value

a normalized matrix containing values between 0 and 1.

---

example_data *Example Dataset: Psychological and Behavioral Responses*

Description

This dataset contains self-reported psychological and behavioral responses from individuals.

Usage

```
example_data
```

Format

A data frame with multiple rows and 17 variables:

id Unique participant identifier (integer).

Relax Self-reported relaxation level (integer scale).

Irritable Self-reported irritability level (integer scale).

Worry Level of worry experienced (integer scale).

Nervous Self-reported nervousness (integer scale).

Future Concerns about the future (integer scale).

Anhedonia Self-reported lack of enjoyment (integer scale).

Tired Level of tiredness (integer scale).

Hungry Self-reported hunger level (integer scale).

Alone Feeling of loneliness (integer scale).

Angry Level of anger experienced (integer scale).

Social_offline Offline social interactions (integer scale).

Social_online Online social interactions (integer scale).

Music Time spent listening to music (integer scale).

Procrastinate Self-reported procrastination (integer scale).

Outdoors Time spent outdoors (integer scale).

C19_occupied Engagement in activities during COVID-19 (integer scale).

C19_worry Level of worry related to COVID-19 (integer scale).

Home Time spent at home (integer scale).

day Day number of the study (integer).

beep Moment within the day when data was collected (integer).

conc Self-reported concentration level (integer scale).

Details

This dataset was collected from a study examining psychological and behavioral responses to various daily experiences. Each row represents a unique moment of self-reporting.

Source

Reproducible figure for Nature Methods primer paper, Borsboom et al. 2021. This examples contains a *subset* of variables collected and modeled in our covid19 paper. This paper, with full data is available on https://journals.sagepub.com/doi/10.1177/21677026211017839. Eiko Fried, March 14 2021

Examples

```
data(example_data)
head(example_data)
```

---

lmm_analysis   *Perform Longitudinal Analysis with Linear Mixed Models (LMM)*

Description

This function automates the analysis of longitudinal clinical data using linear mixed models. It models clinical variables and returns a weighted matrix of model coefficient scores.

Usage

```
lmm_analysis(
  clinical_data,
  variables_to_scale,
  random_effects = "(1 | participant_id)"
)
```

Arguments

clinical_data   Dataframe containing clinical and metadata for participants, including identifier
                  as `participant_id`.

variables_to_scale
                  Character vector of variable names to be analyzed.

random_effects   A character string specifying the random effects formula (default: "(1 | partici-
                  pant_id)").

Value

A matrix of model coefficient scores, where rows represent dependent variables and columns represent independent variables.

---

normalization   *Normalization of weighted linear mixed model network matrix.*

Description

This function normalizes weighted adjacency matrix derived from lmm.

Usage

```
normalization(matrix)
```

Arguments

matrix   The adjacency matrix (to be normalized).

Value

a normalized matrix containing values between 0 and 1.

---

score_matrix	*Compute Score Matrix*

Description

This function adjusts an original matrix by copying the lower triangular part from a shifted matrix.

Usage

```
score_matrix(original_matrix, shifted_matrix)
```

Arguments

original_matrix

> A numeric matrix representing the original data.

shifted_matrix A numeric matrix that has been transformed using `shift_matrix()`.

Value

A new matrix with adjusted values in the lower triangular part.

---

shift_matrix	*Shifted Matrix Transformation*

Description

This function modifies the shape of a model weights matrix by shifting its elements.

Usage

```
shift_matrix(mat)
```

Arguments

mat   A numeric matrix to be transformed.

Value

A shifted version of the input matrix.

Index