Package ‘accept’

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Title The Acute COPD Exacerbation Prediction Tool (ACCEPT)

Version 0.7.1

Description Allows clinicians to predict the rate and severity of future acute exacerbation in Chronic Obstructive Pulmonary Disease (COPD) patients, based on the clinical prediction model published in Adibi et al. (2020) <doi:10.1016/S2213-2600(19)30397-2>.

Depends R (>= 3.4.0)

License GPL-3

Encoding UTF-8

LazyData true

Imports stats, MASS, dplyr, stringr, extrafont, plotly, viridis

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NeedsCompilation no

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plotExacerbations  

*Creates bar graph comparing no treatment with azithromycin treatment*

**Description**

Creates bar graph comparing no treatment with azithromycin treatment

**Usage**

```r
plotExacerbations(
  patientResults,
  type = "rate",
  interval = "CI",
  colors = c("#007bff", "rgb(204,204,204)")
)
```

**Arguments**

- **patientResults**: patient results vector, produced by predictAccept.
- **type**: string: either "probability" or "rate"
- **interval**: string: either "CI" or "PI" PI = Predicted Interval CI = Confidence Interval
- **colors**: vector: a vector of colors to be used in the graph must be length 2 can use hexadecimal, rgb, or R color codes

**Value**

a bar graph

**Examples**

```r
results <- predictACCEP(samplePatients[1,, random_distribution_iteration = 5000)
plotExacerbations(results)
```

plotHeatMap

*Creates heatmap of number of exacerbations*

**Description**

Creates heatmap of number of exacerbations

**Usage**

```r
plotHeatMap(patientResults, n = 10, shortened = TRUE)
```
### predictACCEPT

**Arguments**

- patientResults: patient results vector, produced by predictAccept.
- n: how many exacerbations to consider
- shortened: boolean

**Value**

A heatmap

**Examples**

```r
results <- predictACCEPT(samplePatients[1,], random_distribution_iteration = 5000)
plotHeatMap(results)
```

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#### Description

Predicts COPD exacerbation rate by severity level

#### Usage

```r
predictACCEPT(
  patientData,
  random_sampling_N = 1000,
  random_distribution_iteration = 20000,
  calculate_CIs = TRUE
)
```

**Arguments**

- patientData: patient data matrix. Can have one or many patients in it
- random_sampling_N: number of random sampling. Default is 1000.
- random_distribution_iteration: default is $2 \times 10^4$
- calculate_CIs: whether to calculate confidence interval of the mean

**Value**

patientData with prediction

**Examples**

```r
results <- predictACCEPT(samplePatients, random_distribution_iteration = 5000)
```
predictCountProb  \hspace{1cm} Predicts probability of observing n exacerbations in the next year

Description

Predicts probability of observing n exacerbations in the next year

Usage

predictCountProb(patientResults, n = 10, shortened = TRUE)

Arguments

  patientResults  \hspace{1cm} patient results vector, produced by predictAccept.
  n              \hspace{1cm} how many exacerbations
  shortened      \hspace{1cm} boolean: Shortened results groups into 0, 1, 2, and 3 or more exacerbations

Value

a matrix of probabilities with the number of exacerbations as rows and number of severe exacerbations as columns

Examples

results <- predictACCEPT(samplePatients[1,], random_distribution_iteration = 5000)
predictCountProb(results)

samplePatients  \hspace{1cm} Sample Patient Characteristics Inputs

Description

A dataset containing sample patient characteristics to run the prediction model variables are as follows:

Format

A data frame with 2 rows and 19 variables
Details

- ID. A unique character string identifying a patient
- male. whether the patient is male (0,1)
- age. the age of the patient (40–90)
- smoker. whether the patient is currently a smoker (0,1)
- oxygen. whether the patient has had supplemental oxygen therapy within the past year (0,1)
- FEV1. forced expiratory volume in 1 second in L (0–5)
- BMI. body mass index (10–60)
- SGRQ. St. George’s Respiratory Questionnaire score (0–100)
- statin. whether the patient is taking statins due to cardiovascular conditions (0,1)
- LAMA. whether the patient is on long acting muscarinic antagonist (0,1)
- LABA. whether the patient is on long acting beta agonist (0,1)
- ICS. whether the patient is on inhaled corticosteroids (0,1)
- randomizedLAMA. whether the patient was randomized to receive long acting muscarinic antagonist. Should be 0 for prediction (0,1)
- randomizedLABA. whether the patient was randomized to receive on long acting beta agonist. Should be 0 for prediction (0,1)
- randomizedICS. whether the patient was randomized to receive on inhaled corticosteroids. Should be 0 for prediction (0,1)
- randomizedAzithromycin. whether the patient was randomized to receive long-term azithromycin therapy. Should be 0 for prediction (0,1)
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