

Package ‘CMMs’

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Type Package

Title Compositional Mediation Model

Version 1.0.0

Description

A compositional mediation model for continuous outcome and binary outcomes to deal with mediators that are compositional data. Lin, Ziqiang et al. (2022) <[doi:10.1016/j.jad.2021.12.019](https://doi.org/10.1016/j.jad.2021.12.019)>.

Depends R (>= 3.5.0)

License GPL-3

Encoding UTF-8

Imports fastDummies,survey,robCompositions,ggplot2,forcats,dplyr

LazyData true

RoxygenNote 7.1.2

NeedsCompilation no

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CMMs

*Compositional Mediation Model***Description**

A compositional mediation model for continuous outcome and binary outcomes to deal with mediators that are compositional data

Usage

```
CMMs(data, outcome, med, pred, cov_con=NULL, cov_cat=NULL,
      weight=NULL, family="identity", boot=5000)
```

Arguments

| | |
|----------------------|--|
| <code>data</code> | an input dataframe |
| <code>outcome</code> | column number that locate continuous or binary outcome variable in data |
| <code>med</code> | a vector of column numbers that locate the compositional mediators in data |
| <code>pred</code> | column number that locate continuous or binary exposure in data |
| <code>cov_con</code> | a vector of column numbers that locate the continuous covariates in data (default NULL). |
| <code>cov_cat</code> | a vector of column numbers that locate the categorical covariates in data (default NULL). |
| <code>weight</code> | column number that locate weights in data (default NULL). |
| <code>family</code> | If your outcome variable is continuous, then <code>family="identity"</code> ; if your outcome variable is binary, then <code>family="logistic"</code> (default "identity") |
| <code>boot</code> | Number of bootstrap (default 5000) |

Details

This code can be used to model with a situation when the mediators are compositional data.

Value

An object of class CMM, which is a list with the following components:

| | |
|------------------------------|---|
| <code>Indirect.effect</code> | Indirect effects of exposure on an outcome variable (with 95% bootstrap confidence intervals) |
| <code>Direct.effect</code> | Direct effects of exposure on an outcome variable (with 95% bootstrap confidence intervals) |
| <code>Total.effect</code> | Total effects of exposure on an outcome variable (with 95% bootstrap confidence intervals) |

Mediation.effect.plot

A plot shows mediation effect of exposure on an outcome variables (mediation effect with with 95% bootstrap confidence intervals)

Relative.Effects.plot

A plot shows relative effect of exposure on an outcome variables (relative effect with with 95% bootstrap confidence intervals)

References

Lin Z, Zhu S, Cheng J, Lin Q, Lawrence WR, Zhang W, Huang Y, Chen Y, Gao Y. The mediating effect of engagement in physical activity over a 24-hour period on chronic disease and depression: using compositional mediation model. *J Affect Disord.* 2021 Dec 10:S0165-0327(21)01337-9. doi: 10.1016/j.jad.2021.12.019.

Examples

```
data(CMM_test_data)
result=CMMs(CMM_test_data,1,3:22,2,cov_con=23:24,cov_cat=NULL,weight=NULL,boot=100)
```

CMM_test_data

Test Data

Description

Contains artificial 100 samples with a continuous outcome variable y , a continuous treatment tr , 20 compositional mediators M and 2 covariates X . The true direct and indirect effects of treatment on the outcome both are 1.00. The true component-wise indirect effects ($M1$ - $M20$) are 0.693, -0.425, 0.135, -0.057, -0.268, 0.970, -0.843, 0.805, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000.

Usage

```
data(CMM_test_data)
```

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