

Package ‘piiR’

May 7, 2025

Type Package

Title Predictive Information Index ('PII')

Version 0.2.1

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Description A simple implementation of the Predictive Information Index ('PII') using mutual information and entropy from the 'infotheo' package.
For related methodology, see Wells (2025) <<https://github.com/TheotherDrWells/piiR>>.

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Encoding UTF-8

Imports stats (>= 3.6.0), infotheo (>= 1.2.0), pROC (>= 1.18.0)

VignetteBuilder knitr

Suggests knitr, rmarkdown

RoxygenNote 7.3.2

NeedsCompilation no

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Repository CRAN

Date/Publication 2025-05-07 18:10:02 UTC

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compare_scores	<i>Compare Multiple Scoring Methods</i>
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Description

Compare Multiple Scoring Methods

Usage

```
compare_scores(outcome, scores, bins = 10)
```

Arguments

outcome	Vector of outcomes
scores	Named list of score vectors
bins	Number of bins

Value

Data frame with PII and RMSE

pii	<i>Predictive Information Index (PII)</i>
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Description

Computes the Predictive Information Index using one of three methods: "r2" (R-squared ratio), "rm" (RMSE-based), or "v" (variance ratio).

Usage

```
pii(y, score_pred, full_pred = NULL, type = c("r2", "rm", "v"))
```

Arguments

y	Observed outcome vector.
score_pred	Predictions from score-based model.
full_pred	Predictions from the full model.
type	Character. One of "r2", "rm", or "v".

Value

A numeric value between 0 and 1.

Examples

```
set.seed(1)
y      <- rnorm(100)
full   <- y + rnorm(100, sd = 0.3)
score  <- y + rnorm(100, sd = 0.5)
pii(y, score, full, type = "r2")
pii(y, score, full, type = "rm")
pii(y, score, full, type = "v")
```

pii_batch

*Compute PII for Multiple Scores***Description**

Evaluates PII and RMSE for multiple predictors

Usage

```
pii_batch(formula, data, bins = 10)
```

Arguments

formula	A formula with multiple predictors (e.g., outcome ~ x1 + x2 + x3)
data	A data.frame
bins	Number of bins for discretization

Value

A data.frame of PII and RMSE for each predictor

pii_classification

*PII for Classification Outcomes with Metrics***Description**

PII for Classification Outcomes with Metrics

Usage

```
pii_classification(score, outcome, bins = 10)
```

Arguments

score	Predicted numeric score
outcome	Binary factor outcome
bins	Number of bins for discretization

Value

List with PII, AUC, accuracy, confusion matrix

pii_compare	<i>Compare PII and RMSE Across Multiple Scores</i>
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Description

Compare PII and RMSE Across Multiple Scores

Usage

```
pii_compare(outcome, scores, bins = 10)
```

Arguments

- | | |
|---------|-------------------------------|
| outcome | A numeric outcome vector |
| scores | A named list of score vectors |
| bins | Number of bins for PII |

Value

A data.frame of comparison metrics

pii_plot	<i>Plot Score vs Outcome for Visual PII Insight</i>
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Description

Plot Score vs Outcome for Visual PII Insight

Usage

```
pii_plot(score, outcome, bins = 10)
```

Arguments

- | | |
|---------|-----------------------------------|
| score | Numeric score vector |
| outcome | Numeric outcome vector |
| bins | Number of bins for discretization |

Value

A base R plot

pii_test	<i>Permutation Test for PII</i>
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Description

Permutation Test for PII

Usage

```
pii_test(score, outcome, bins = 10, n_perm = 1000)
```

Arguments

score	Numeric score vector
outcome	Outcome vector
bins	Number of bins for discretization
n_perm	Number of permutations

Value

List with observed PII, p-value, and null distribution

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