# Package 'evabic'

December 13, 2025

**Title** Evaluation of Binary Classifiers

**Version** 0.1.4

**Description** Evaluates the performance of binary classifiers. Computes confusion measures (TP, TN, FP, FN), derived measures (TPR, FDR, accuracy, F1, DOR, ..), and area under the curve. Outputs are well suited for nested dataframes.

**License** GPL-3

**URL** https://abichat.github.io/evabic/, https://github.com/abichat/evabic

**BugReports** https://github.com/abichat/evabic/issues

**Suggests** testthat (>= 2.1.0)

**Encoding** UTF-8

**Language** en-US

**RoxygenNote** 7.3.3

**NeedsCompilation** no

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**Repository** CRAN

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`add_names` *Add names to a vector*

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## Description

Add names to a vector, with default names.

## Usage

```
add_names(x, names = NULL, prefix = "x")
```

## Arguments

| | |
|---|---|
| `x` | A vector. |
| `names` | Vector of names to add. If `NULL`, default names are added. |
| `prefix` | The prefix to add before default names. Useful only if `names` is set to `NULL`. |

## Value

A named vector

## Examples

```
add_names(month.name)
```

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`ebc_allmeasures` *Available measures*

---

## Description

Available measures in `evabic`

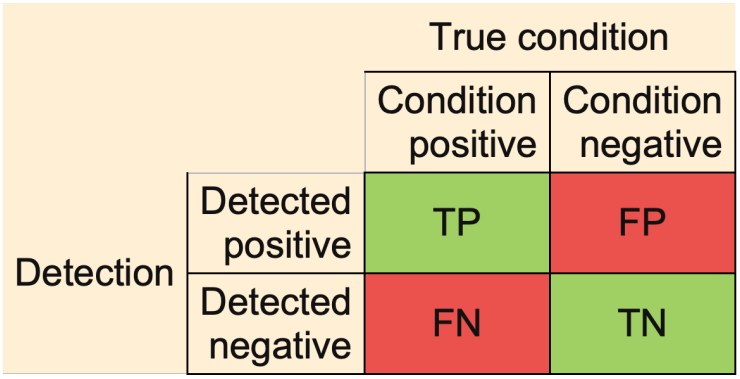
## Usage

```
ebc_allmeasures
```

## Format

An object of class `character` of length 18.

**Details**




**TP** True Positive

**FP** False Positive

**FN** False Negative

**TN** True Negative

**TPR** True Positive Rate or Sensitivity or Recall or Power

$$TPR = \frac{TP}{TP + FN} = 1 - FNR$$

**TNR** True Negative Rate or Specificity

$$TNR = \frac{TN}{FP + TN} = 1 - FPR$$

**PPV** Positive Predictive Value or Precision

$$PPV = \frac{TP}{TP + FP} = 1 - FDR$$

**NPV** Negative Predictive Value

$$NPV = \frac{TN}{TN + FN} = 1 - FOR$$

**FNR** False Negative Rate or Type II Error Rate or Miss Rate

$$FNR = \frac{FN}{TP + FN} = 1 - TPR$$

**FPR** False Positive Rate or Type I Errors Rate or Fall-out

$$FPR = \frac{FP}{FP + TN} = 1 - TNR$$

**FDR** False Discovery Rate

$$FDR = \frac{FP}{FP + TP} = 1 - PPV$$

**FOR** False Omission Rate

$$FOR = \frac{FN}{TN + FN} = 1 - NPV$$

**ACC** Accuracy

$$ACC = \frac{TP + TN}{TP + FP + FN + TN}$$

**BACC** Balanced Accuracy

$$BACC = \frac{\frac{TP}{TP+FN} + \frac{TN}{FP+TN}}{2}$$

**F1** F1 Score

$$F1 = \frac{2TP}{2TP + FP + FN} = \frac{2}{\frac{1}{TPR} + \frac{1}{PPV}}$$

**PLR** Positive Likelihood Ratio or LR+ or Likelihood Ratio for Positive Results

$$PLR = \frac{TPR}{1 - TNR}$$

**NLR** Negative Likelihood Ratio or LR- or Likelihood Ratio for Negative Results

$$NLR = \frac{1 - TPR}{TNR}$$

**DOR** Diagnostic Odds Ratio

$$DOR = \frac{\frac{TP}{FP}}{\frac{FN}{TN}} = \frac{PLR}{NLR}$$

## References

https://en.wikipedia.org/wiki/Evaluation_of_binary_classifiers

## Examples

```
ebc_allmeasures
```

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ebc_AUC *Area under the curve*

---

## Description

Compute the Area Under the Curve for a classification.

## Usage

```
ebc_AUC(
  detection_values,
  true,
  all,
  m = length(all),
  direction = c("<", ">", "<=", ">=")
)

ebc_AUC_from_measures(df_measures)
```

## Arguments

| | |
|---|---|
| detection_values | Values corresponding to elements that are detected. Must be named. |
| true | Vector of element that are supposed to be detected. |
| all | Vector of all elements. |
| m | Total number of elements. |
| direction | With < (default), detected elements are those which are strictly less than the threshold. Could be change to ">", <= or >=. |
| df_measures | A dataframe with TPR and FRP columns. E.g. the output of ebc_tidy_by_threshold. |

## Value

A numeric.

## Examples

```
set.seed(42)
X1 <- rnorm(50)
X2 <- rnorm(50)
X3 <- rnorm(50)
predictors <- paste0("X", 1:3)
df_lm <- data.frame(X1 = X1, X2 = X2, X3 = X3,
                    X4 = X1 + X2 + X3 + rnorm(50, sd = 0.5),
                    X5 = X1 + 3 * X3 + rnorm(50, sd = 0.5),
                    X6 = X2 - 2 * X3 + rnorm(50, sd = 0.5),
                    X7 = X1 - X2 + rnorm(50, sd = 2),
                    Y  = X1 - X2 + 3 * X3 + rnorm(50))
model <- lm(Y ~ ., data = df_lm)
pvalues <- summary(model)$coefficients[-1, 4]
ebc_AUC(pvalues, predictors, m = 7)

df_measures <- ebc_tidy_by_threshold(pvalues, predictors, m = 7)
ebc_AUC_from_measures(df_measures)
```

## ebc_confusion *Confusion matrix*

### Description

Compute the the confusion matrix

### Usage

```
ebc_confusion(detected, true, all, m = length(all), prop = FALSE)
```

### Arguments

| | |
|---|---|
| detected | Vector of elements that are detected. |
| true | Vector of element that are supposed to be detected. |
| all | Vector of all elements. |
| m | Total number of elements. |
| prop | Logical, default to FALSE. Should the matrix sum to one? |

### Details

See ebc_allmeasures for the description of the measures.

### Value

A 2*2 named matrix.

### Examples

```
ebc_confusion(detected = c("A", "C", "D"), true = c("A", "B", "C"), m = 6)
```

## ebc_tidy *Tidy output for measures*

### Description

Construct a single row summary of the classifier.

### Usage

```
ebc_tidy(
  detected,
  true,
  all,
  m = length(all),
  measures = c("TPR", "FPR", "FDR", "ACC", "F1")
)
```

### Arguments

| | |
|---|---|
| `detected` | Vector of elements that are detected. |
| `true` | Vector of element that are supposed to be detected. |
| `all` | Vector of all elements. |
| `m` | Total number of elements. |
| `measures` | Desired measures of performance. |

### Details

See `ebc_allmeasures` for the available measures and their descriptions.

### Value

A single-row data.frame with one column per element in `measures`.

### See Also

`ebc_TP`, `ebc_TPR`, `ebc_allmeasures`

### Examples

```
ebc_tidy(detected = c("A", "C", "D"), true = c("A", "B", "C"),
         all = LETTERS[1:6], measures = c("ACC", "FDR"))
```

---

## `ebc_tidy_by_threshold` *Measures by threshold*

---

### Description

Computes measures according to a moving threshold.

### Usage

```
ebc_tidy_by_threshold(
  detection_values,
  true,
  all,
  m = length(all),
  measures = c("TPR", "FPR", "FDR", "ACC", "F1"),
  direction = c("<", ">", "<=", ">=")
)
```

## Arguments

| | |
|---|---|
| detection_values | Values corresponding to elements that are detected. Must be named. |
| true | Vector of element that are supposed to be detected. |
| all | Vector of all elements. |
| m | Total number of elements. |
| measures | Desired measures of performance. |
| direction | With < (default), detected elements are those which are strictly less than the threshold. Could be change to ">", <= or >=. |

## Details

See ebc_allmeasures for the available measures and their descriptions.

## Value

A dataframe with one column called threshold and other corresponding to those specified in measures.

## Examples

```
set.seed(42)
X1 <- rnorm(50)
X2 <- rnorm(50)
X3 <- rnorm(50)
predictors <- paste0("X", 1:3)
df_lm <- data.frame(X1 = X1, X2 = X2, X3 = X3,
                    X4 = X1 + X2 + X3 + rnorm(50, sd = 0.5),
                    X5 = X1 + 3 * X3 + rnorm(50, sd = 0.5),
                    X6 = X2 - 2 * X3 + rnorm(50, sd = 0.5),
                    X7 = X1 - X2 + rnorm(50, sd = 2),
                    Y  = X1 - X2 + 3 * X3 + rnorm(50))
model <- lm(Y ~ ., data = df_lm)
pvalues <- summary(model)$coefficients[-1, 4]
ebc_tidy_by_threshold(pvalues, predictors, m = 7)
```

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# ebc_TP *Confusion measures.*

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## Description

Basic measures from the confusion matrix.

## Usage

```
ebc_TP(detected, true)

ebc_FP(detected, true)

ebc_FN(detected, true)

ebc_TN(detected, true, all, m = length(all))
```

## Arguments

| | |
|---|---|
| detected | Vector of elements that are detected. |
| true | Vector of element that are supposed to be detected. |
| all | Vector of all elements. |
| m | Total number of elements. |

## Details

See ebc_allmeasures for the description of the measures.

## Value

An integer.

## See Also

ebc_TPR, ebc_tidy, ebc_allmeasures

## Examples

```
ebc_TP(detected = c("A", "C", "D"), true = c("A", "B", "C"))
ebc_FP(detected = c("A", "C", "D"), true = c("A", "B", "C"))
ebc_FN(detected = c("A", "C", "D"), true = c("A", "B", "C"))
ebc_TN(detected = c("A", "C", "D"), true = c("A", "B", "C"),
       all = LETTERS[1:6])
ebc_TN(detected = c("A", "C", "D"), true = c("A", "B", "C"), m = 6)
```

---

# ebc_TPR *Derived measures.*

---

## Description

Measures derived from confusion matrix.

## Usage

```
ebc_TPR(detected, true)

ebc_TNR(detected, true, all, m = length(all))

ebc_PPV(detected, true)

ebc_NPV(detected, true, all, m = length(all))

ebc_FNR(detected, true)

ebc_FPR(detected, true, all, m = length(all))

ebc_FDR(detected, true)

ebc_FOR(detected, true, all, m = length(all))

ebc_ACC(detected, true, all, m = length(all))

ebc_BACC(detected, true, all, m = length(all))

ebc_F1(detected, true)

ebc_PLR(detected, true, all, m = length(all))

ebc_NLR(detected, true, all, m = length(all))

ebc_DOR(detected, true, all, m = length(all))
```

## Arguments

| | |
|---|---|
| `detected` | Vector of elements that are detected. |
| `true` | Vector of element that are supposed to be detected. |
| `all` | Vector of all elements. |
| `m` | Total number of elements. |

## Details

See `ebc_allmeasures` for the description of the measures.

## Value

A numeric.

## See Also

`ebc_TP`, `ebc_tidy`, `ebc_allmeasures`

## Examples

```
ebc_TPR(detected = c("A", "C", "D"), true = c("A", "B", "C"))
ebc_ACC(detected = c("A", "C", "D"), true = c("A", "B", "C"),
        all = LETTERS[1:5])
```

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