

# Proximity measures in the `proxy` package for R

David Meyer

January 4, 2018

## 1 Similarities

Aliases: Jaccard, binary, Reysac, Roux

Type : binary

Formula:  $a / (a + b + c)$

Aliases: Kulczynski1

Type : binary

Formula:  $a / (b + c)$

Aliases: Kulczynski2

Type : binary

Formula:  $[a / (a + b) + a / (a + c)] / 2$

Aliases: Mountford

Type : binary

Formula:  $2a / (ab + ac + 2bc)$

Aliases: Fager, McGowan

Type : binary

Formula:  $a / \sqrt{(a + b)(a + c)} - \sqrt{a + c} / 2$

Aliases: Russel, Rao

Type : binary

Formula:  $a / n$

Aliases: simple matching, Sokal/Michener

Type : binary

Formula:  $(a + d) / n$

Aliases: Hamman

Type : binary

Formula:  $([a + d] - [b + c]) / n$

Aliases: Faith

Type : binary  
Formula:  $(a + d/2) / n$

Aliases: Tanimoto, Rogers  
Type : binary  
Formula:  $(a + d) / (a + 2b + 2c + d)$

Aliases: Dice, Czekanowski, Sorensen  
Type : binary  
Formula:  $2a / (2a + b + c)$

Aliases: Phi  
Type : binary  
Formula:  $(ad - bc) / \sqrt{(a + b)(c + d)(a + c)(b + d)}$

Aliases: Stiles  
Type : binary  
Formula:  $\log(n(|ad-bc| - 0.5n)^2 / [(a + b)(c + d)(a + c)(b + d)])$

Aliases: Michael  
Type : binary  
Formula:  $4(ad - bc) / [(a + d)^2 + (b + c)^2]$

Aliases: Mozley, Margalef  
Type : binary  
Formula:  $an / (a + b)(a + c)$

Aliases: Yule  
Type : binary  
Formula:  $(ad - bc) / (ad + bc)$

Aliases: Yule2  
Type : binary  
Formula:  $(\sqrt{ad} - \sqrt{bc}) / (\sqrt{ad} + \sqrt{bc})$

Aliases: Ochiai  
Type : binary  
Formula:  $a / \sqrt{(a + b)(a + c)}$

Aliases: Simpson  
Type : binary  
Formula:  $a / \min\{(a + b), (a + c)\}$

Aliases: Braun-Blanquet  
Type : binary  
Formula:  $a / \max\{(a + b), (a + c)\}$

Aliases: cosine, angular  
Type : metric  
Formula:  $xy / \sqrt{xx * yy}$

Aliases: eJaccard, extended\_Jaccard  
Type : metric  
Formula:  $xy / (xx + yy - xy)$

Aliases: eDice, extended\_Dice, eSorensen  
Type : metric  
Formula:  $2xy / (xx + yy)$

Aliases: correlation  
Type : metric  
Formula:  $xy / \sqrt{xx * yy}$  for centered x,y

Aliases: Chi-squared  
Type : nominal  
Formula:  $\sum_{ij} (o_{ij} - e_{ij})^2 / e_{ij}$

Aliases: Phi-squared  
Type : nominal  
Formula:  $[\sum_{ij} (o_{ij} - e_{ij})^2 / e_{ij}] / n$

Aliases: Tschuprow  
Type : nominal  
Formula:  $\sqrt{[\sum_{ij} (o_{ij} - e_{ij})^2 / e_{ij}] / n / \sqrt{(p - 1)(q - 1)}}$

Aliases: Cramer  
Type : nominal  
Formula:  $\sqrt{[\text{Chi} / n]} / \min[(p - 1), (q - 1)]$

Aliases: Pearson, contingency  
Type : nominal  
Formula:  $\sqrt{\text{Chi} / (n + \text{Chi})}$

Aliases: Gower  
Type : NA  
Formula:  $\text{Sum}_k (s_{ijk} * w_k) / \text{Sum}_k (d_{ijk} * w_k)$

## 2 Dissimilarities

Aliases: Euclidean, L2  
Type : metric

Formula:  $\sqrt{\sum_i (x_i - y_i)^2}$

Aliases: Mahalanobis

Type : metric

Formula:  $\sqrt{(x - y) \Sigma^{-1} (x - y)}$

Aliases: Bhattacharyya

Type : metric

Formula:  $\sqrt{\sum_i (\sqrt{x_i} - \sqrt{y_i})^2}$

Aliases: Manhattan, City-Block, L1, taxi

Type : metric

Formula:  $\sum_i |x_i - y_i|$

Aliases: supremum, max, maximum, Tschebyscheff, Chebyshev

Type : metric

Formula:  $\max_i |x_i - y_i|$

Aliases: Minkowski, Lp

Type : metric

Formula:  $(\sum_i (x_i - y_i)^p)^{1/p}$

Aliases: Canberra

Type : metric

Formula:  $\sum_i |x_i - y_i| / |x_i + y_i|$

Aliases: Wave, Hedges

Type : metric

Formula:  $\sum_i (1 - \min(x_i, y_i) / \max(x_i, y_i))$

Aliases: divergence

Type : metric

Formula:  $\sum_i (x_i - y_i)^2 / (x_i + y_i)^2$

Aliases: Kullback, Leibler

Type : metric

Formula:  $\sum_i [x_i * \log((x_i / \sum_j x_j) / (y_i / \sum_j y_j)) / \sum_j x_j]$

Aliases: Bray, Curtis

Type : metric

Formula:  $\sum_i |x_i - y_i| / \sum_i (x_i + y_i)$

Aliases: Soergel

Type : metric

Formula:  $\sum_i |x_i - y_i| / \sum_i \max\{x_i, y_i\}$

Aliases: Levenshtein  
Type : other  
Formula: Number of insertions, edits, and deletions between to strings

Aliases: Podani, discordance  
Type : metric  
Formula:  $1 - 2 * (a - b + c - d) / (n * (n - 1))$

Aliases: Chord  
Type : metric  
Formula:  $\sqrt{2 * (1 - xy / \sqrt{xx * yy})}$

Aliases: Geodesic  
Type : metric  
Formula:  $\arccos(xy / \sqrt{xx * yy})$

Aliases: Whittaker  
Type : metric  
Formula:  $\sum_i |x_i / \sum_i x - y_i / \sum_i y| / 2$

Aliases: Hellinger  
Type : metric  
Formula:  $\sqrt{\sum_i (\sqrt{x_i / \sum_i x} - \sqrt{y_i / \sum_i y})^2}$

Aliases: fJaccard, fuzzy\_Jaccard  
Type : metric  
Formula:  $\sum_i (\min\{x_i, y_i\} / \max\{x_i, y_i\})$