Package 'xxdi'

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Type Package

Title Calculate Expertise Indices

Version 1.0.0

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Description Institutional performance assessment remains a key challenge to a multitude of stakeholders. Existing indicators such as h-type indicators, g-type indicators, and many others do not reflect expertise of institutions that defines their research portfolio. The package offers functionality to compute and visualise two novel indices: the x-index and the xd-index. The x-index evaluates an institution's scholarly expertise within a specific discipline or field, while the xd-index provides a broader assessment of overall scholarly expertise considering an institution's publication pattern and strengths across coarse thematic areas. These indices offer a nuanced understanding of institutional research capabilities, aiding stakeholders in research management and resource allocation decisions. Lath-

abai, H.H., Nandy, A., and Singh, V.K. (2021) <doi:10.1007/s11192-021-04188-3>. Nandy, A., Lathabai, H.H., and Singh, V.K. (2023) <doi:10.5281/zenodo.8305585>.

License GPL-3

Depends R (>= 4.3.3.0)

Imports agop (>= 0.2.4), ggplot2 (>= 3.5.0), Matrix (>= 1.6.1.1), tidyr (>= 1.3.1), stats (>= 4.3.3)

Encoding UTF-8

RoxygenNote 7.3.0

NeedsCompilation no

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R topics documented:

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xd_index   *xd_index*

Description

This function calculates the xd-index for an institution using bibliometric data from an edge list, with an optional plot visualisation.

Usage

```
xd_index(df, cat, id, cit, dlm = ";", plot = FALSE)
```

Arguments

df	Data frame object containing bibliometric data. This data frame must have at least three columns: one for categories, one for unique IDs, and one for citation counts. Each row in the data frame should represent a document or publication.
cat	Character string specifying the name of the column in "df" that contains categories. Each cell in this column may contain no categories (missing), a single category or multiple categories separated by a specified delimiter.
id	Character string specifying the name of the column in "df" that contains unique identifiers for each document. Each cell in this column must contain a single ID (unless missing) and not multiple IDs.
cit	Character string specifying the name of the column in "df" that contains the number of citations each document has received. Citations must be represented as integers. Each cell in this column should contain a single integer value (unless missing) representing the citation count for the corresponding document.
dlm	Character string specifying the delimiter used in the "cat" column to separate multiple categories within a single cell. The delimiter should be consistent across the entire "cat" column. Common delimiters include ";", "/", ":", and ",". The default delimiter is ";".
plot	Logical value indicating whether to generate and display a plot of the xd-index calculation. Set to TRUE or T to generate the plot, and FALSE or F to skip plot generation. The default is FALSE.

Value

xd-index value and plot for institution.

Examples

```
dat1 <- data.frame(citations = c(0, 1, 1, 2, 3, 5, 8),
                   keywords = c("a; b; c", "b; d", "c", "d", "e; g", "f", "g"),
              id = c("abc123", "bcd234", "def345", "efg456", "fgh567", "ghi678", "hij789"),
                   categories = c("a; d; e", "b", "c", "d; g", "e", "f", "g"))
xd_index(df = dat1, cat = "categories", id = "id", cit = "citations")
```

```
dat2 <- data.frame(citations = c(0, 1, 1, 2, 3, 5, 8),
                   keywords = c("a/ b/ c", "b/ d", "c", "d", "e/ g", "f", "g"),
                   id = c("123", "234", "345", "456", "567", "678", "789"),
                   categories = c("a/ d/ e", "b", "c", "d/ g", "e", "f", "g"))
xd_index(df = dat2, cat = "categories", id = "id", cit = "citations", dlm = "/", plot = FALSE)

dat3 <- data.frame(citations = c(0, 1, 1, 2, 3, 5, 8),
                   keywords = c("a, b, c", "b, d", "c", "d", "e, g", "f", "g"),
                   id = c(123, 234, 345, 456, 567, 678, 789),
                   categories = c("a: d: e", "b", "c", "d: g", "e", "f", "g"))
xd_index(df = dat3, cat = "categories", id = "id", cit = "citations", dlm = ":", plot = TRUE)
```

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x_index   *x_index*

Description

This function calculates the x-index for an institution using bibliometric data from an edge list, with an optional plot visualisation.

Usage

```
x_index(df, kw, id, cit, dlm = ";", plot = FALSE)
```

Arguments

df	Data frame object containing bibliometric data. This data frame must have at least three columns: one for keywords, one for unique IDs, and one for citation counts. Each row in the data frame should represent a document or publication.
kw	Character string specifying the name of the column in "df" that contains keywords. Each cell in this column may contain no keywords (missing), a single keyword or multiple keywords separated by a specified delimiter.
id	Character string specifying the name of the column in "df" that contains unique identifiers for each document. Each cell in this column must contain a single ID (unless missing) and not multiple IDs.
cit	Character string specifying the name of the column in "df" that contains the number of citations each document has received. Citations must be represented as integers. Each cell in this column should contain a single integer value (unless missing) representing the citation count for the corresponding document.
dlm	Character string specifying the delimiter used in the "kw" column to separate multiple keywords within a single cell. The delimiter should be consistent across the entire "kw" column. Common delimiters include ";", "/", ":", and ",". The default delimiter is ";".
plot	Logical value indicating whether to generate and display a plot of the x-index calculation. Set to TRUE or T to generate the plot, and FALSE or F to skip plot generation. The default is FALSE.

Value

x-index value and plot for institution.

Examples

```
dat1 <- data.frame(citations = c(0, 1, 1, 2, 3, 5, 8),
                   keywords = c("a; b; c", "b; d", "c", "d", "e; g", "f", "g"),
             id = c("abc123", "bcd234", "def345", "efg456", "fgh567", "ghi678", "hij789"),
                   categories = c("a; d; e", "b", "c", "d; g", "e", "f", "g"))
x_index(df = dat1, kw = "keywords", id = "id", cit = "citations")


dat2 <- data.frame(citations = c(0, 1, 1, 2, 3, 5, 8),
                   keywords = c("a/ b/ c", "b/ d", "c", "d", "e/ g", "f", "g"),
                   id = c("123", "234", "345", "456", "567", "678", "789"),
                   categories = c("a/ d/ e", "b", "c", "d/ g", "e", "f", "g"))
x_index(df = dat2, kw = "keywords", id = "id", cit = "citations", dlm = "/", plot = FALSE)


dat3 <- data.frame(citations = c(0, 1, 1, 2, 3, 5, 8),
                   keywords = c("a, b, c", "b, d", "c", "d", "e, g", "f", "g"),
                   id = c(123, 234, 345, 456, 567, 678, 789),
                   categories = c("a: d: e", "b", "c", "d: g", "e", "f", "g"))
x_index(df = dat3, kw = "keywords", id = "id", cit = "citations", dlm = ",", plot = TRUE)
```

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