

Package ‘rectpacker’

December 5, 2024

Type Package

Title Rectangle Packing

Version 1.0.0

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URL <https://github.com/coolbutuseless/rectpacker>

BugReports <https://github.com/coolbutuseless/rectpacker/issues>

Description Rectangle packing is a packing problem where rectangles are placed into a larger rectangular region (without overlapping) in order to maximise the use space. Rectangles are packed using the skyline heuristic as discussed in Lijun et al (2011) 'A Skyline-Based Heuristic for the 2D Rectangular Strip Packing Problem' <[doi:10.1007/978-3-642-21827-9_29](https://doi.org/10.1007/978-3-642-21827-9_29)>. A function is also included for determining a good small-sized box for containing a given set of rectangles.

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Encoding UTF-8

RoxygenNote 7.3.2

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Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation yes

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Repository CRAN

Date/Publication 2024-12-05 19:00:02 UTC

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calc_small_box	<i>Find the dimensions of a small box to store all the given rectangles</i>
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Description

This is a brute force search with a simple heuristic. Is not guaranteed to find the box with the minimum area, but simply a box that snugly fits the rectangles without too much wasted space.

Usage

```
calc_small_box(  
  rect_widths,  
  rect_heights,  
  aspect_ratios = c(1.61803, 1/1.61803),  
  verbosity = 0L  
)
```

Arguments

`rect_widths, rect_heights` widths and heights of the rectangles to pack.

`aspect_ratios` Vector of box aspect ratios to be tested. Aspect ratio is defined here as width / height. Default: `c(1.61803, 1/1.61803)` i.e. golden ratio and its inverse.

`verbosity` Level of debugging output. Default: 0 (no output)

Value

List with 2 elements: width and height of a small box which fits all the rectangles.

Examples

```
# Find a minimal box to fit 10 random rectangles.  
# Search for boxes with aspect ratios in seq(0.5, 2, length.out = 20)  
set.seed(2)  
N <- 10  
rect_widths <- sample(N)  
rect_heights <- sample(N)  
box <- calc_small_box(rect_widths, rect_heights,  
  aspect_ratios = seq(0.5, 2, length.out = 20))  
box  
rects <- pack_rects(box$width, box$height, rect_widths, rect_heights)  
all(rects$packed)
```

pack_rects	<i>Pack rectangles into a box using the skyline algorithm</i>
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Description

This implementation accepts only integer valued sizes and coordinates.

Usage

```
pack_rects(box_width, box_height, rect_widths, rect_heights)
```

Arguments

box_width, box_height
dimensions of the box into which the rectangles will be packed. Integer values.

rect_widths, rect_heights
widths and heights of the rectangles to pack.

Value

data.frame of packing information

idx Integer index of rectangle in the input

w, h Integer dimensions of each rectangle

packed Logical: Was this rectangle packed into the box?

x, y Integer coordinates of packing position of bottom-left of rectangle

Examples

```
# Pack 10 rectangles into a 25x25 box
# Note: All rectangles in the results have 'packed=TRUE' which
# means they all fit into the box
set.seed(1)
N <- 10
rect_widths <- sample(N)
rect_heights <- sample(N)
pack_rects(box_width = 25, box_height = 25, rect_widths, rect_heights)
```

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