Package: rgbIndices (via r-universe)

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Type Package

Title RGB Visible Indices for Image Analysis

Version 0.1.1

Description Computes RGB-based vegetation, color, and spectral indices from digital images for applications in agriculture, crop phenotyping, and remote sensing. The methods are based on digital image processing and plant phenotyping approaches (Singh et al. (2023) <doi:10.1080/10106049.2022.2160831>).

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Encoding UTF-8

Imports raster, tibble

Suggests knitr, rmarkdown

VignetteBuilder knitr

RoxygenNote 7.3.3

NeedsCompilation no

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Config/pak/sysreqs libgdal-dev gdal-bin libgeos-dev libproj-dev libsqlite3-dev

Repository https://santosharathod.r-universe.dev

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RemoteUrl https://github.com/cran/rgbIndices

RemoteRef HEAD

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Contents

`rgb_basic` *Basic RGB indices*

Description

Computes basic RGB indices including normalized red (r), green (g), blue (b), and intensity (INT) from an RGB image.

Usage

```
rgb_basic(image)
```

Arguments

`image`	A RasterBrick or RasterStack object with three bands (R, G, B).

Value

A RasterStack object with seven layers:

- R, G, B: Original red, green, and blue bands
- r, g, b: Normalized RGB indices
- INT: Intensity component (mean of R, G, B)

Examples

```
set.seed(123)
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
rgb_basic(img)
```

rgb_color *RGB color indices*

Description

Computes multiple RGB-based color indices from a three-band RGB image.

Usage

```
rgb_color(image)
```

Arguments

image	A RasterBrick or RasterStack object with three bands (R, G, B).

Value

A RasterStack object where each layer represents a specific RGB-based color index, including Grey, BI, HI, RI, SI, CI, CIVE, VEG, IPCA, GLAI, SAT, OHI, TCVI, COM1, and COM2.

Examples

```
set.seed(123)
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
rgb_color(img)
```

rgb_diff *RGB difference indices*

Description

Computes difference-based RGB indices from a three-band RGB image.

Usage

```
rgb_diff(image)
```

Arguments

image	A RasterBrick or RasterStack object with three bands (R, G, B).

Value

A RasterStack object where each layer represents a difference between RGB bands: GRD (G - R), BGD (B - G), RGD (R - G), RBD (R - B), GBD (G - B), and BRD (B - R).

Examples

```
set.seed(123)
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
rgb_diff(img)
```

---

rgb_example *Load example RGB image*

Description

Provides the file path to an example RGB image included in the package. Optionally allows saving the image to a user-specified location.

Usage

```
rgb_example(save_path = NULL)
```

Arguments

save_path	Optional file path to save the example image.

Value

A character string representing the file path to the example RGB image.

Examples

```
# Get example image path
img_path <- rgb_example()
img_path

# Save image to temporary location
rgb_example(tempfile(fileext = ".jpg"))
```

rgb_indices_to_mean *Mean RGB indices*

Description

Computes the mean values of RGB-based indices from a RasterBrick or RasterStack object.

Usage

```
rgb_indices_to_mean(x)
```

Arguments

x	A RasterBrick or RasterStack object containing RGB indices.

Details

The function calculates the mean of each layer in the input raster object using `raster::cellStats`. The output provides a summary of the indices for the entire image.

Value

A tibble (data frame) with a single row where each column represents the mean value of an RGB index computed across all pixels.

Examples

```
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
x <- rgb_basic(img)

rgb_indices_to_mean(x)
```

rgb_indices_to_tbl *Convert RGB indices to tibble*

Description

Converts a RasterBrick or RasterStack object of RGB indices into a tibble.

Usage

```
rgb_indices_to_tbl(x)
```

Arguments

x	A RasterBrick or RasterStack object containing RGB indices.

Details

The function converts raster layers into a tabular format using `raster::as.data.frame`, preserving layer names as column names.

Value

A tibble where each column corresponds to an RGB index and each row represents a pixel from the input raster.

Examples

```
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
x <- rgb_basic(img)

rgb_indices_to_tbl(x)
```

---

rgb_normdiff *RGB normalized difference indices*

Description

Computes normalized difference indices from a three-band RGB image.

Usage

```
rgb_normdiff(image)
```

Arguments

image	A RasterBrick or RasterStack object with three bands (R, G, B).

Value

A RasterStack object where each layer represents a normalized difference between RGB bands: NRGDI ((R - G)/(R + G + B)), NRBDI ((R - B)/(R + G + B)), NGBDI ((G - B)/(R + G + B)), NGRDI ((G - R)/(R + G + B)), NBGDI ((B - G)/(R + G + B)), and NBRDI ((B - R)/(R + G + B)).

Examples

```
set.seed(123)
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
rgb_normdiff(img)
```

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rgb_ratio *RGB ratio indices*

Description

Computes ratio-based indices from a three-band RGB image.

Usage

```
rgb_ratio(image)
```

Arguments

image	A RasterBrick or RasterStack object with three bands (R, G, B).

Value

A RasterStack object where each layer represents a ratio between RGB bands: GRRI (G/R), GBRI (G/B), RBRI (R/B), RGRI (R/G), BGRI (B/G), and BRRI (B/R).

Examples

```
set.seed(123)
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
rgb_ratio(img)
```

rgb_veg *RGB vegetation indices*

Description

Computes vegetation-related indices from a three-band RGB image.

Usage

```
rgb_veg(image)
```

Arguments

image	A RasterBrick or RasterStack object with three bands (R, G, B).

Value

A RasterStack object containing multiple vegetation indices derived from RGB bands. Each layer corresponds to a specific vegetation index, including: WI, GRVI, IKAW, NDTI, GBI, GLI, VARI, NDI, ExG, ExR, ExGR, MxEG, ExB, and RGBVI.

Examples

```
set.seed(123)
r <- raster::raster(matrix(runif(50*50), 50, 50))
g <- raster::raster(matrix(runif(50*50), 50, 50))
b <- raster::raster(matrix(runif(50*50), 50, 50))
img <- raster::stack(r, g, b)
rgb_veg(img)
```

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