Package ‘agrifeature’

October 12, 2022

Type Package

Title Agriculture Image Feature

Version 1.0.3

Author Chun-Han Lee [aut] <d10621201@ntu.edu.tw>
Li-Yu Daisy Liu [aut] <lyliu@ntu.edu.tw>

Maintainer Chun-Han Lee <d10621201@ntu.edu.tw>

Description Functions to calculate Gray Level Co-occurrence Matrix (GLCM), RGB-based Vegetative Index (RGB VI) and Normalized Difference Vegetation Index (NDVI) family image features. GLCM calculations are based on Haralick (1973) <doi:10.1109/TSMC.1973.4309314>.

License GPL-3

Encoding UTF-8

RoxygenNote 7.1.2

NeedsCompilation no

Repository CRAN

Date/Publication 2021-12-09 09:00:09 UTC

R topics documented:

GLCM .......................... 1
NDVI ........................... 3
RGBVI ........................... 3

Index 5

GLCM

Gray Level Co-occurrence Matrix (GLCM).

Description

This function calculate Gray Level Co-occurrence Matrix (GLCM), which can be used to describe texture of the image. The default parameters is distance = 1, angle = 0, gray level = 8
GLCM

Usage

GLCM(x, d = 1, angle = 0, ngray = 8, grayscale = c(0,255), symmetric = TRUE, prob = FALSE)

Arguments

x A numeric matrix.

d an integer value, the distance between the current pixel, and the pixel to which it is compared.

angle one of "0", "45", "90" or "135", the pixel to which the current pixel is compared.

ngray an integer value, the number of gray levels to use in calculate GLCM.

grayscale a vector which contain c(min,max) to set the range of value , if NULL grayscale will be set into the min and max value in x.

symmetric Logical value, if TRUE (default) the matrix will be turn into a symmetric GLCM.

prob Logical value, if TRUE (default) the matrix will be normalized such that the sum of it's components is 1.

Value

A GLCM with dimension ngray*ngray table. Each column and row represent a gray level in the image matrix.

References


Examples

# generate an image data matrix with range 0~255
set.seed(100)
m <- matrix(sample(0:255,64), nrow=8, ncol=8)

# calculate GLCM with defalut parameters
GLCM.m <- GLCM(m)

# calculate probability GLCM
GLCM.m.p <- GLCM(m,prob = TRUE)
**NDVI**

**Description**

This function calculate NDVI value from input near-infrared (NIR) and red bands images. If change the input from red band into green or red-edge band values, it will return GNDVI or NDRE values.

**Usage**

\[
\text{NDVI}(\text{NIR}, \text{R})
\]

**Arguments**

- **NIR**: a dataframe or matrix contains NIR band values.
- **R**: a dataframe or matrix contains red band values, NIR and R should have same class and dimension.

**Value**

A matrix or dataframe(depending on the class of NIR and R).

**References**


--

**RGBVI**

**RGB based Vegetative Indexes (RGBVI)**

**Description**

This function calculate some useful RGB based vegetative indexes.

**Usage**

\[
\text{RGBVI}(\text{R}, \text{G}, \text{B}, \text{vi} = c(\text{‘RCC’}, \text{‘GCC’}, \text{‘ExG}2\text{’}, \text{‘ExR’}, \text{‘ExGR’}, \text{‘GRVI’}, \text{‘VDVI’}, \text{‘VARI’}, \text{‘MG}R\text{VI’}, \text{‘CIVE’}, \text{‘VEG’}))
\]
Arguments

\( R \)

a dataframe or matrix contains 'red' values, RGB should have same class and dimension.

\( G \)

a dataframe or matrix contains 'green' values, RGB should have same class and dimension.

\( B \)

a dataframe or matrix contains 'blue' values, RGB should have same class and dimension.

\( vi \)

vegetative indexes to be calculated (see Details).

Details

The \( vi \) parameter should be a characteristic vector and include at least one of the following VI: 'RCC','GCC','ExG2','ExR','ExGR','GRVI','VDVI','VARI','MGRVI','CIVE','VEG'. By default, all of the VIs will be calculated.

Value

A list with length(vi). Each elements represent a vegetative index matrix or data frame.

References


Examples

```r
# generate R, G, B matrix with range 0~255
R <- matrix(sample(0:255,25), nrow=5, ncol=5)
G <- matrix(sample(0:255,25), nrow=5, ncol=5)
B <- matrix(sample(0:255,25), nrow=5, ncol=5)

# calculate all available rgb vi
vi.all <- RGBVI(R,G,B)

# calculate RCC,GCC,ExGR,MGRVI
vi.4 <- RGBVI(R,G,B,vi=c('RCC', 'GCC', 'ExGR', 'MGRVI'))
```
Index

GLCM, 1

NDVI, 3

RGBVI, 3