R documentation

of 'regrid.Rd'

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regrid *Change raster image resolution and extent*

Description

General function to change parameters of cells under the same geographical projection. It is implemented via raster resampling to the new grid.

Usage

```
regrid(x, ...)

## non-public
.regrid(grid = NULL, mul = NA, res = NA, resx = NA, resy = NA, bbox = NA,
        expand = NA, minx = NA, miny = NA, maxx = NA, maxy = NA, cut = NA,
       proj4 = NA, border = 0, zero = c("keep", "node", "center"), raster = FALSE,
        tolerance = 1e-11, verbose = FALSE, ...)
```

Arguments

x	Object of class rmapRaster.
...	1. Arguments, which are passed to non-public .regrid to define parameters of new grid. 2. Set of arguments, which are recognized via their names (using regular expressions) and classes: ^reset(Grid)* Logical. Whether new grid will be defined as a sessional parameter? If TRUE then returned raster defines new sessional grid. If FALSE then session grid is not changed. Default is TRUE. resample Logical or positive numeric. The range of aggregation in the units of cell area. If 0 or FALSE then "nearest neighbor" value is used. The resample>0 defines the side of rectangular area in proportion to cell size; and aggregation of adjacent cells is weighted in proportion to overlapping parts of cells. Default is 1 (or, equally, TRUE); it means that value of output cell is weighted mean of values of overlapped input cells in proportion of overlapping of output cell by input cells.

cover Positive numeric in the range [0, 1]. The maximal fraction of NA values in adjusted input cells for the rule to write NA value to the output cell. Default is 0.499.

cascade Logical. Option to get more smooth results. If TRUE and resample>2 then resize function is applied sequentially with argument resample<=2.

verb(ose)* Logical. Value TRUE may provide some additional information on console. Default is FALSE.

grid	Reference rmapGrid or rmapRaster object. If missing then reference grid is obtained from sessional grid session.grid()
mul	numeric of length 1. Multiplication for changing image size by means of changing of cell size (1/mul). mul>1 decreases cell size, mul<1 increases cell size
res	numeric of length 1 or 2. New grid size by horizontal and vertical axes. If length is 1 then the same grid size for both axes.
resx	Positive numeric of length 1. New grid size by horizontal axis.
resy	Positive numeric of length 1. New grid size by vertical axis.
bbox	numeric of length 4. New spatial extension (boundary box) in the notation c(minx,miny,maxx,maxy)
minx	numeric of length 1. New value for left boundary.
miny	numeric of length 1. New value for bottom boundary.
maxx	numeric of length 1. New value for right boundary.
maxy	numeric of length 1. New value for top boundary.
cut	numeric of length 4. Vector (left, bottom, right, top) in CRS units for extent expand.
border	numeric of length 1 or 4. If length 4, then vector (bottom, left, top, right) in cells for extent expand. If length <4, then value is repeated for length 4.
proj4	character of length 1. New projection string in the PROJ.4 notation
expand	numeric of length 1. Multiplier of boundary box.
raster	logical. Should return blank rmapRaster object instead of rmapGrid object? See 'Value' section
zero	character. Define central cell position relative to zero coordinates. If value is "keep", then central cell position is without changes. If value is "node", then zero coordinates are on the crossing of cell borders. If value is "center", then zero coordinates are in the center of central cell. *Currently is not implemented. If grid is consistent, then value "keep" is used, else "node".*
tolerance	numeric. Threshold for comparison float point numerics. Required for internal check of grid consistence. Default is 1e-11.
verbose	Reporting via message about violation and restoration of coordinate grid regilarity after non-consistence usage of paramaters.

Details

Generally, argument resample sets a rectangular region. The area of this region is in proportion to area of output cell. Argument resample is the value of this proportion. Each cell is interpeted as a set of adjoining rectangular figures. The value of output cells is a weighted mean of that input cells, which fall into rectangular region. The weights are defined as an partial area inside of rectangular region.

Function implements "nearest neighbor" resampling method if argument `resample=0` (or, `resample=FALSE`). If `resample=1` (or, `resample=TRUE`) and both input and output rasters have the same cell size, then resampling method is "bilinear interpolation".

Expand raster `x` to 3 times with cell repeating: `regrid(x,mul=3,resample=FALSE) ## nearest neighbor`; Expand raster `x` to 3 times with cell aggregation: `regrid(x,mul=3,resample=TRUE) ## bilinear interpolation`; Contract raster `x` to 3 times without cell aggregation: `regrid(x,mul=1/3,resample=FALSE) ## nearest neighbor`; Contract raster `x` to 3 times with cell aggregation: `regrid(x,mul=1/3,resample=TRUE) ## weighted mean`; Low-pass filtering by `3 x 3` window size: `regrid(x,resample=3*3) ## see focal.mean`

However, simple contraction `regrid(x,mul=1/2,resample=FALSE)` is implemented as contration with aggregation (`regrid(x,mul=1/2,resample=FALSE)`), because centers or output cells are located in the nodes (crossing of boundaries of input cells).

It seems that for categorical rasters parameter `resample=0` is more suitable, because nearest neigboring does not introduce new values to output raster, excepting coincidence of input cells' nodes and output cell centers.

Usage of `proj4` argument specifiles only desirable PROJ.4 string and does not do reprojection.

The violation of grid regualarity is due to columns and rows of image should be integer. The restoration of grid regularity is realized by spatial extension (boundary box) expansion.

Value

`regrid` returns object of class `rmapRaster`.

Return value of non-public function `.regrid` depends on logical value of `raster` argument. If `raster=FALSE` then `.regrid` returns new grid without any change of sessional grid. If `raster=TRUE` then `.regrid` returns blank image and changes sessional grid.

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See Also

regrid, focal.mean

Examples

```
session.grid(NULL)
print(g1 <- session.grid())
print(g2 <- regrid(g1,mul=2))
print(g3 <- regrid(g1,res=50000,lim=c(-1200000,-1400000,1600000,1800000)))
print(g4 <- regrid(g1,res=50000,lim=c(-1200100,-1400900,1600900,1800100),verbose=TRUE))
print(g5 <- regrid(g1,mul=1/4))
print(g6 <- regrid(g1,mul=1/4,cut=c(-1,-2,3,4)*25000))
print(g7 <- regrid(g1,mul=1/4,expand=1.05)
print(session.grid()) ## equal to 'g1'
print(a <- regrid(g1,mul=1/4,border=3,raster=TRUE))
print(session.grid()) ## not equal to 'g1'

session.grid(NULL)
'.makeRaster' <- function(nc=6,nr=8) {
   as.rmap(t(matrix(runif(nc*nr,min=0,max=255),ncol=nc,nrow=nr)))
}
session.grid(NULL)
a <- .makeRaster(12,18)
```

```
expand <- 1/3
a1 <- regrid(regrid(a,mul=expand,resample=FALSE),a,resample=FALSE)
a2 <- regrid(regrid(a,mul=expand,resample=TRUE),a,resample=FALSE)
b <- c('source'=a,'contract'=a1,'aggregation'=a2)
print(b)
display.brick(b,grid=TRUE
             ,grid.lon=(seq(ncol(a)*expand+1)-1)/expand
             ,grid.lat=(seq(nrow(a)*expand+1)-1)/expand)
session.grid(NULL)
a <- .makeRaster(6,8)
expand <- 3
b <- c("source"=regrid(a,mul=expand,resample=FALSE,resetGrid=FALSE)
      ,"simple"=regrid(a,mul=expand,cascade=TRUE,resetGrid=FALSE)
      ,"cascaded"=regrid(a,mul=expand,cascade=FALSE,resetGrid=FALSE))
print(b)
display.brick(b)
session.grid(a)
eps <- 1e-4
r <- c(0,expand^(-2)-eps,expand^(-2)+eps,1,expand^0.5
      ,(expand+2/3)^2-eps,(expand+2/3)^2+eps,99)
g2 <- regrid(mul=expand)
session.grid(g2)
b <- rmap.new(bandname=sprintf("Resample=%.4f",r))
for (i in seq(b))
   b[i] <- regrid(a,g2,resample=r[i])
print(b)
display.brick(b,layout=c(2,NA)
             ,grid=TRUE,grid.lon=seq(ncol(a)+1)-1,grid.lat=seq(nrow(a)+1)-1)
```

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