Package ‘munsell’

June 12, 2018

Type Package
Title Utilities for Using Munsell Colours
Version 0.5.0
Author Charlotte Wickham <cwickham@gmail.com>
Maintainer Charlotte Wickham <cwickham@gmail.com>
Description Provides easy access to, and manipulation of, the Munsell colours. Provides a mapping between Munsell’s original notation (e.g. “5R 5/10”) and hexadecimal strings suitable for use directly in R graphics. Also provides utilities to explore slices through the Munsell colour tree, to transform Munsell colours and display colour palettes.
Suggests ggplot2, testthat
Imports colorspace, methods
License MIT + file LICENSE
URL https://cran.r-project.org/package=munsell,
https://github.com/cwickham/munsell/
RoxygenNote 6.0.1
NeedsCompilation no
Repository CRAN
Date/Publication 2018-06-12 04:29:06 UTC

R topics documented:

chroma_slice . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2
complement . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3
complement_slice . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3
darker . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 4
desaturate . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5
hue_slice . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5
hvc2mnsl . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 6
lighter . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7
chroma_slice

Plot all colours with the same chroma

Description
Plots slices of the Munsell colour system where chroma is constant.

Usage
chroma_slice(chroma.name = seq(0, 26, by = 2), back.col = "white")

Arguments
- chroma.name: integer vector of the desired values.
- back.col: colour for the background

Value
ggplot object

Examples
```
chroma_slice(2)
chroma_slice(18)
# Maybe want to delete text and add axis instead
p <- chroma_slice(18)
p$layers[[2]] <- NULL # remove text layer
p + ggplot2::theme(axis.text = ggplot2::element_text(),
                   axis.text.x = ggplot2::element_text(angle = 90, hjust = 1))
# all values
## Not run: chroma_slice(seq(0, 38, by = 2))
```
complement

Find the complement of a munsell colour

Description

Finds the munsell colour with the same chroma and value but on the opposite side of the hue circle. The complement is not defined for greys (hue == "N"), and the function returns the grey untransformed.

Usage

complement(col, ...)

Arguments

col character vector of Munsell colours

... deprecated

Value

character vector of Munsell colours

Examples

complement("SPB 2/4")
cols <- c("SPB 2/4", "SY 7/8")
plot_mnsl(c(cols, complement(cols)))

complement_slice

A vertical slice through the Munsell space

Description

Plot a hue and its complement at all values and chromas

Usage

complement_slice(hue.name, back.col = "white")

Arguments

hue.name character string of the desired hue.

back.col colour for the background
Value

ggplot object

Examples

complement_slice("5PB")
complement_slice("5R")
complement_slice("10G")

darker

Make a munsell colour darker

Description

Decreases the value of the Munsell colour by 1.

Usage

darker(col, steps = 1)

Arguments

col character vector of Munsell colours
steps number of steps to take in decreasing value

Value

character vector of Munsell colours

Examples

darker("5PB 3/4")
cols <- c("5PB 3/4", "5Y 7/8")
p <- plot_mnsl(c(cols, darker(cols), darker(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)
\textbf{desaturate} \hspace{1cm} \textit{Make a munsell colour less saturated}

\textbf{Description}
Decreases the chroma of the Munsell colour by one step steps (multiples of 2).

\textbf{Usage}
desaturate(col, steps = 1)

\textbf{Arguments}
- \texttt{col} character vector of Munsell colours
- \texttt{steps} number of steps to take in decreasing chroma

\textbf{Value}
character vector of Munsell colours

\textbf{Examples}
desaturate("5PB 2/4")
cols <- c("5PB 2/6", "5Y 7/8")
p <- plot_mnsl(c(cols, desaturate(cols), desaturate(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)

\textbf{hue_slice} \hspace{1cm} \textit{Plot all colours with the same hue}

\textbf{Description}
Plots slices of the Munsell colour system where hue is constant.

\textbf{Usage}
hue_slice(hue.name = "all", back.col = "white")

\textbf{Arguments}
- \texttt{hue.name} character vector of the desired hues. Or "all" for all hues.
- \texttt{back.col} colour for the background

\textbf{Value}
ggplot object
Examples

hvc2mnsl

## not run: hue_slice("all")

---

```r
hvc2mnsl

Converts a hue, chroma and value to a Munsell colour

Description

Takes separate specifications of hue, value and chroma and returns the text specification of that colour.

Usage

hvc2mnsl(hue, value = NULL, chroma = NULL, ...)

Arguments

- **hue**: a character vector of Munsell hues, or a 3 column data frame containing the hue value and chroma levels
- **value**: a numeric vector of values
- **chroma**: a numeric vector of chromas
- **...**: passed on to `check_mnsl`. Use `fix = TRUE` to fix "bad" colours

Details

Munsell colours are specified by hue, value and chroma. They take a form like "5PB 5/10" where the first characters represent the hue, followed by a space then the value and chroma separated by a "/". In this package value should be an integer in 0:10 and chroma an even number at most 24. Note that not all possible specifications result in representable colours. Regular recycling rules apply.

Value

- **a character string specification of a hex colour**

See Also

- `check_mnsl`, `mns12hex`

Examples

hvc2mnsl("5PB", 5, 10)
# All values of 5PB with chroma 10
hvc2mnsl("5PB", 1:9, 10) # note some are undefined
plot_mnsl(hvc2mnsl("5PB", 1:9, 10))
lighter

Make a munsell colour lighter

Description

Increases the value of the Munsell colour.

Usage

lighter(col, steps = 1)

Arguments

col character vector of Munsell colours
steps number of steps to take in increasing value

Value

character vector of Munsell colours

Examples

lighter("5PB 2/4")
cols <- c("5PB 2/4", "SY 6/8")
p <- plot_mnsl(c(cols, lighter(cols), lighter(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)
# lighter and darker are usually reversible
lighter(darker("5PB 2/4"))
# unless you try to pass though white or black
lighter(darker("5PB 1/4"))

mnsl

Converts a Munsell colour to hex

Description

Take a character string representation of a Munsell colour and returns the hex specification of that colour

Usage

mnsl(col, ...)

Arguments

col a character string representing a Munsell colour.
... passed on to in_gamut. Use fix = TRUE to fix "bad" colours
Details

Munsell colours are specified by hue, value and chroma. They take a form like "5PB 5/10" where the first characters represent the hue, followed by a space then the value and chroma separated by a "/". In this package value should be an integer in 0:10 and chroma an even number at most 24. Note that not all possible specifications result in representable colours.

Value

a character string specification of a hex colour

See Also

check_mnsl, in_gamut, hvc2mnsl

Examples

mnsl2hex("5PB 5/10")
# use a munsell colour in a plot
plot.new()
rect(0, 0, 1,1 , col = mnsl("5R 5/10"))

---

\texttt{\texttt{mnsl2hvc}} \hspace{1cm} \textit{Converts a Munsell colour to a hue, chroma and value triplet}

Description

Takes a text specification of a Munsell colour and returns the hue, chroma and value triplet.

Usage

\texttt{mnsl2hvc}(\texttt{col, ...})

Arguments

\begin{itemize}
  \item \texttt{col} \hspace{1cm} a character vector of Munsell colours
  \item \texttt{...} \hspace{1cm} passed on to \texttt{check_mnsl}. Use \texttt{fix = TRUE} to fix "bad" colours
\end{itemize}

Details

Munsell colours are specified by hue, value and chroma. They take a form like "5PB 5/10" where the first characters represent the hue, followed by a space then the value and chroma separated by a "/". In this package value should be an integer in 0:10 and chroma an even number at most 24. Note that not all possible specifications result in representable colours.

Value

a data frame with named columns hue, value and chroma containing the hue, value and chroma levels.
\textit{mnsl\_hues}

\textbf{See Also}
\begin{verbatim}
  check\_mns1, hvc2mns1
\end{verbatim}

\textbf{Examples}
\begin{verbatim}
  mns12hvc("5PB 5/10")
  hvc2mns1(mns12hvc("5PB 5/10"))
\end{verbatim}

\textbf{Description}

Returns a character vector of the Munsell hues in hue order starting at 2.5R and excluding grey ("N").

\textbf{Usage}

\begin{verbatim}
  mns1\_hues()
\end{verbatim}

\textbf{Value}

a character vector containing the hue values.

\textbf{Examples}

\begin{verbatim}
  mns1\_hues()
\end{verbatim}

\textbf{munsell} \hspace{1cm} \textit{Munsell colour system.}

\textbf{Description}

This package makes it easy to access and manipulate the colours in the munsell colour system. The conversion from munsell specifications to sRGB based on the renotation data from \url{http://www.cis.rit.edu/mcs1/online/munsell.php} which is a digitization of Table 1 in Newhall, Nickerson & Judd (1943). The code for conversion can be found in the package directory in inst/raw/getmunsellmap.r

\textbf{References}


Munsell Renotation Data, RIT Munsell Color Science Laboratory. \url{http://www.cis.rit.edu/mcs1/online/munsell.php}
### pbgyr

**Change the hue of a munsell colour**

**Description**

Moves the hue of a munsell colour in the direction purple->blue->green->yellow->red->purple

**Usage**

```r
pbgyr(col, steps = 1)
```

**Arguments**

- `col`: character vector of Munsell colours
- `steps`: number of hue steps to take

**Value**

character vector of Munsell colours

**Examples**

```r
my_red <- "2.5R 4/8"
pbgyr(my_red)
plot_mnsl(c(my_red, pbgyr(my_red, 2), pbgyr(my_red, 4)))
```

---

### plot_closest

**Plot closest Munsell colour to an sRGB colour**

**Description**

Take an sRGB colour and plots it along with the closest Munsell colour (using `rgb2mns1` to find it)

**Usage**

```r
plot_closest(R, G = NULL, B = NULL, back.col = "white")
```

**Arguments**

- `R`: a numeric vector of red values or a 3 column matrix with the proportions R, G, B in the columns.
- `G`: numeric vector of green values
- `B`: numeric vector of blue values
- `back.col`: colour for the background
plot_hex

Value

ggplot object

See Also

rgb2mns1

Examples

plot_closest(0.1, 0.1, 0.3)
plot_closest(matrix(c(.1, .2, .4, .5, .6, .8), ncol = 3))

plot_hex(hexNcolour, backNcol = "white")

Arguments

hex.colour character vector specifying colours in hex form
back.col specification of background colour of display

Value

A ggplot object

Examples

plot_hex("#000000")
plot_hex(c("#000000","FFFFFF"))
**plot_mnsl**

*Plot a munsell colour*

**Description**

Takes munsell text specifications and plots colour squares of them.

**Usage**

```r
plot_mnsl(cols, back.col = "white", ...)
```

**Arguments**

- `cols`: character vector specifying colours in Munsell form
- `back.col`: specification of background colour of display
- `...`: passed to `check_mnsl`. Add fix = TRUE to fix "bad" colours()

**Value**

A ggplot object

**Examples**

```r
plot_mnsl("5R 5/6")
plot_mnsl("5R 5/6", back.col = "grey40")
p <- plot_mnsl(c("5R 6/6", "5Y 6/6", "5G 6/6", "5B 6/6", "5P 6/6"),
    back.col = "grey40")
p
# returned object is a ggplot object so we can alter the layout
summary(p)
p + ggplot2::facet_wrap(~ num, nrow = 1)
```

---

**rgb2mns1**

*Converts an sRGB colour to Munsell*

**Description**

Finds the closest Munsell colour (in LUV space) to the specified sRGB colour

**Usage**

```r
rgb2mns1(R, G = NULL, B = NULL)
```
### Arguments

- **R**
  - a numeric vector of red values or a 3 column matrix with the proportions R, G, B in the columns.

- **G**
  - numeric vector of green values

- **B**
  - numeric vector of blue values

### See Also

- `plot_closest`

### Examples

```r
gb2mns1(0.1, 0.1, 0.3)
gb2mns1(matrix(c(0.1, 0.2, 0.4, 0.5, 0.6, 0.8), ncol = 3))
plot_closest(matrix(c(0.1, 0.2, 0.4, 0.5, 0.6, 0.8), ncol = 3))
```

---

### rygbp

**Change the hue of a munsell colour**

### Description

Moves the hue of a munsell colour in the direction red->yellow->green->blue->purple->red

### Usage

```r
rygbp(col, steps = 1)
```

### Arguments

- **col**
  - character vector of Munsell colours

- **steps**
  - number of hue steps to take

### Value

character vector of Munsell colours

### Examples

```r
my_red <- "10R 4/8"
rygbp(my_red)
plot_mns1(c(my_red, rygbp(my_red, 2), rygbp(my_red, 4)))
```
saturate  
*Make a munsell colour more saturated*

**Description**

Increases the chroma of the Munsell colour by step steps (multiples of 2).

**Usage**

```r
saturate(col, steps = 1)
```

**Arguments**

- `col` character vector of Munsell colours
- `steps` number of steps to take in increasing chroma

**Value**

character vector of Munsell colours

**Examples**

```r
saturate("5PB 2/4")
cols <- c("5PB 2/2", "5Y 7/6")
p <- plot_mnsl(c(cols, saturate(cols), saturate(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)
```

seq_mns1  
*Generate a sequence of Munsell colours*

**Description**

Generates a sequence of Munsell colours. The sequence is generated by finding the closest munsell colours to a equidistant sequence of colours in `LUV` space.

**Usage**

```r
seq_mns1(from, to, n, fix = FALSE)
```

**Arguments**

- `from` character string of first Munsell colour
- `to` character string of last Munsell colour
- `n` number of colours in sequence
- `fix` Should colours outside of the gamut be fixed? Passed on to `fix_mns1`
value_slice

Value
character vector of Munsell colours

Examples
seq_mnsl("5R 2/4", "5R 5/16", 4)
plot_mnsl(seq_mnsl("5R 2/4", "5R 5/16", 4))
plot_mnsl(seq_mnsl("5R 5/6",
    complement("5R 5/6"), 5))

value_slice

Plot all colours with the same value

Description
Plots slices of the Munsell colour system where value is constant.

Usage
value_slice(value.name = 1:10, back.col = "white")

Arguments
value.name integer vector of the desired values.
back.col colour for the background

Value
ggplot object

Examples
value_slice(2)
value_slice(c(2, 4))
# all values
## Not run: value_slice(1:10)
Index

check_mnsl, 6, 8, 9, 12
chroma_slice, 2
complement, 3
complement_slice, 3
darker, 4
desaturate, 5
fix_mnsl, 14
hue_slice, 5
hvc2mnsl, 6, 8, 9
in_gamut, 7, 8
lighter, 7
mnsl, 7
mnsl2hex, 6
mnsl2hex (mnsl), 7
mnsl2hvc, 8
mnsl_hues, 9
munsell, 9
munsell-package (munsell), 9
package-munsell (munsell), 9
pbgyr, 10
plot_closest, 10, 13
plot_hex, 11
plot_mnsl, 12
rgb2mnsl, 10, 11, 12
rygbp, 13
saturate, 14
seq_mnsl, 14
value_slice, 15