Package 'MSUthemes'

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Type Package

Title Michigan State University (MSU) Palettes and Themes

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Description Defines colour palettes and themes for Michigan State University (MSU) publications and presentations. Palettes and themes are supported in both base R and 'ggplot2' graphics, and are intended to provide consistency between those creating documents and presentations.

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Encoding UTF-8

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Imports ggplot2, graphics, grDevices, purrr, showtext, sysfonts, systemfonts

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VignetteBuilder quarto

URL https://github.com/emilioxavier/MSUthemes, https://emilioxavier.github.io/MSUthemes/

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Contents

BigTen *Big Ten Conference Institutional Data (1996-2023)*

Description

A comprehensive dataset containing institutional characteristics, enrollment data, financial information, and demographic composition for all Big Ten Conference member institutions from 1996 to 2023. This dataset tracks the evolution of these universities over nearly three decades, including data for institutions that joined the conference at different times.

Usage

```
BigTen
```

Format

A data frame with 504 rows and 38 variables:

name Character. Institution name (e.g., "MSU", "Michigan", "Ohio State")

Landgrant.tf Logical. Whether the institution is a land-grant university

Public.tf Logical. Whether the institution is public (TRUE) or private (FALSE)

AAU.tf Logical. Whether the institution is a member of the Association of American Universities

entry_term Numeric. Year the data entry corresponds to (1996-2023)

UGDS Integer. Total undergraduate enrollment

ADM_RATE Numeric. Admission rate (proportion of applicants admitted)

C150_4 Numeric. Completion rate for first-time, full-time students (150% of expected time)

PCTPELL Numeric. Percentage of undergraduates receiving Pell grants

n.pell Integer. Number of undergraduates receiving Pell grants

TUITIONFEE_IN Integer. In-state tuition and fees

TUITIONFEE_OUT Integer. Out-of-state tuition and fees

TUITFTE Integer. Net tuition revenue per full-time equivalent student

BOOKSUPPLY Integer. Average cost of books and supplies

ROOMBOARD_ON Integer. Average cost of room and board for on-campus students

OTHEREXPENSE_ON Integer. Other expenses for on-campus students

OTHEREXPENSE_FAM Integer. Other expenses for students living with family

CoA.inState Integer. Total cost of attendance for in-state students

CoA.outState Integer. Total cost of attendance for out-of-state students

otherCosts.tot Integer. Total other costs

fte.tot Integer. Total full-time equivalent tuition plus other costs

fte.in.rat Numeric. Ratio of full-time equivalent tuition plus other costs to in-state to total costs

UGDS_WHITE Numeric. Proportion of white undergraduate students

UGDS_BLACK Numeric. Proportion of Black undergraduate students

UGDS_HISP Numeric. Proportion of Hispanic undergraduate students

UGDS_ASIAN Numeric. Proportion of Asian undergraduate students

UGDS_AIAN Numeric. Proportion of American Indian/Alaska Native undergraduate students

UGDS_NHPI Numeric. Proportion of Native Hawaiian/Pacific Islander undergraduate students

UGDS_2MOR Numeric. Proportion of students of two or more races

UGDS_NRA Numeric. Proportion of non-resident alien undergraduate students

UGDS_UNKN Numeric. Proportion of students with unknown race/ethnicity

UGDS_WHITENH Numeric. Proportion of white non-Hispanic undergraduate students

UGDS_BLACKNH Numeric. Proportion of Black non-Hispanic undergraduate students

UGDS_API Numeric. Proportion of Asian/Pacific Islander undergraduate students

UGDS_AIANOLD Numeric. Proportion of American Indian/Alaska Native students (legacy coding)

UGDS_HISPOLD Numeric. Proportion of Hispanic students (legacy coding)

UGDS_MEN Numeric. Proportion of male undergraduate students

UGDS_WOMEN Numeric. Proportion of female undergraduate students

Details

The dataset includes all 18 current Big Ten Conference members:

- Original members: Illinois, Indiana, Iowa, Michigan, Minnesota, Northwestern, Ohio State, Purdue, Wisconsin
- 1990 addition: MSU (Michigan State University)
- 1993 addition: Penn State
- 2011 addition: Nebraska
- 2014 additions: Maryland, Rutgers
- 2024 additions: UCLA, USoCal (USC), Oregon, Washington

Data availability varies by year and institution. Earlier years (especially 1996-2000) may have limited data for some variables. Financial data and demographic breakdowns became more standardized and complete in later years.

The dataset is particularly useful for:

- Longitudinal analysis of Big Ten institutions
- Comparative studies across public vs. private institutions
- Analysis of conference expansion impacts
- Demographic trend analysis in higher education
- Cost and accessibility studies

Source

Compiled from multiple institutional and federal data sources including the Integrated Postsecondary Education Data System (IPEDS) and institutional reports. Data spans 1996-2023. The dataset is a subset of the College Scorecard dataset (https://collegescorecard.ed.gov/data/), focusing on Big Ten institutions.

See Also

bigten_colors_primary, bigten_colors_secondary for Big Ten institutional color palettes that correspond to the institutions in this dataset.

Examples

```
# Load the dataset
data(BigTen)

# View structure
str(BigTen)

# Check institutions included
unique(BigTen$name)

# Examine enrollment trends over time
if (require(ggplot2)) {
  library(ggplot2)
  BigTen_recent <- subset(BigTen, entry_term >= 2010 & !is.na(UGDS))
  ggplot(BigTen_recent, aes(x = entry_term, y = UGDS, color = name)) +
    geom_line() +
    scale_color_bigten_d(palette = "primary") +
    theme_MSU() +
    labs(title = "Big Ten Undergraduate Enrollment Trends",
         x = "Year", y = "Undergraduate Enrollment")
}

# Compare public vs private institutions
table(unique(BigTen[c("name", "Public.tf")])$Public.tf)
```

---

bigten_colors_primary *Named vector of Big Ten primary colors for reliable institution matching*

Description

Named vector of Big Ten primary colors for reliable institution matching

Usage

```
bigten_colors_primary
```

Format

An object of class `character` of length 21.

`bigten_colors_secondary` *Named vector of Big Ten secondary colors for reliable institution matching*

Description

Named vector of Big Ten secondary colors for reliable institution matching

Usage

```
bigten_colors_secondary
```

Format

An object of class `character` of length 21.

`get_bigten_colors` *Big Ten Institution Primary & Sceondary Color Palette*

Description

Get Big Ten colors for specific institutions

Usage

```
get_bigten_colors(institutions, type = "primary")
```

Arguments

`institutions`	Character vector of institution names (should match names in bigten_colors_primary)
`type`	Either "primary" or "secondary" colors

Value

Named character vector of hex colors

Examples

```
# Get primary colors for specific institutions
get_bigten_colors(c("Michigan", "Ohio State", "MSU"))

# Get secondary colors
get_bigten_colors(c("Michigan", "Northwestern"), type = "secondary")

# Use in ggplot with scale_fill_manual
library(ggplot2)
my_colors <- get_bigten_colors(c("Michigan", "Ohio State", "MSU"))
BigTenData <- data.frame(
  institution = c("Michigan", "Ohio State", "MSU"),
  value = c(10, 15, 20)
)
ggplot(data=BigTenData) +
  geom_bar(aes(x = institution, y = value, fill = institution),
           stat="identity") +
  scale_fill_manual(values = my_colors)
```

`MSUcols` *Generates the colour palettes*

Description

Generates the colour palettes

Usage

```
MSUcols(palette, n, type = "discrete", direction = 1)
```

Arguments

`palette`	Name of Palette. Run `names(MSUpalettes)` to view options.
`n`	Number of desired colors. If number of requested colors is beyond the scope of the palette, colors are automatically interpolated. If n is not provided, the length of the palette is used.
`type`	Either "continuous" or "discrete". Use continuous if you want to automatically interpolate between colors. Default "discrete"
`direction`	Sets order of colors. Default palette is 1. If direction is -1, palette color order is reversed

Value

A character vector of hex colour codes.

Examples

```
MSUcols("msu_seq")
```

MSUpalettes *MSU palettes and MSU color variables*

Description

This file contains only MSU palettes and MSU colour variables.

Usage

```
MSUpalettes
```

Format

An object of class `list` of length 11.

msu_black *MSU black hex colour*

Description

MSU black hex colour

Usage

```
msu_black
```

Format

An object of class `character` of length 1.

msu_blue *MSU blue (aka blue-grey or blue-gray) hex colour*

Description

MSU blue (aka blue-grey or blue-gray) hex colour

Usage

```
msu_blue
```

Format

An object of class `character` of length 1.

msu_darkgrey *MSU dark grey hex colour*

Description

MSU dark grey hex colour

Usage

```
msu_darkgrey
```

Format

An object of class `character` of length 1.

msu_Excellence *MSU Excellence Green hex colour*

Description

MSU Excellence Green hex colour

Usage

```
msu_Excellence
```

Format

An object of class `character` of length 1.

msu_green *MSU Spartan Green hex colour*

Description

MSU Spartan Green hex colour

Usage

```
msu_green
```

Format

An object of class `character` of length 1.

msu_grey *MSU grey/gray hex colour*

Description

MSU grey/gray hex colour

Usage

```
msu_grey
```

Format

An object of class `character` of length 1.

msu_Kelly *MSU Kelly Green hex colour*

Description

MSU Kelly Green hex colour

Usage

```
msu_Kelly
```

Format

An object of class `character` of length 1.

msu_Lime *MSU Lime Green hex colour*

Description

MSU Lime Green hex colour

Usage

```
msu_Lime
```

Format

An object of class `character` of length 1.

msu_orange *MSU orange hex colour*

Description

MSU orange hex colour

MSU (burnt) orange hex colour

Usage

```
msu_orange
```

```
msu_orange
```

Format

An object of class `character` of length 1.

An object of class `character` of length 1.

msu_peach *MSU peach hex colour*

Description

MSU peach hex colour

Usage

```
msu_peach
```

Format

An object of class `character` of length 1.

msu_purple *MSU purple hex colour*

Description

MSU purple hex colour

Usage

```
msu_purple
```

Format

An object of class `character` of length 1.

msu_red *MSU red hex colour*

Description

MSU red hex colour

Usage

```
msu_red
```

Format

An object of class `character` of length 1.

msu_Refresh *MSU Refresh Green hex colour*

Description

MSU Refresh Green hex colour

Usage

```
msu_Refresh
```

Format

An object of class `character` of length 1.

msu_splitpea *MSU split pea hex colour*

Description

MSU split pea hex colour

Usage

```
msu_splitpea
```

Format

An object of class `character` of length 1.

msu_teal *MSU teal hex colour*

Description

MSU teal hex colour

Usage

```
msu_teal
```

Format

An object of class `character` of length 1.

msu_white *MSU white hex colour*

Description

MSU white hex colour

Usage

```
msu_white
```

Format

An object of class `character` of length 1.

msu_yellow *MSU yellow (aka yellow-green or grellow) hex colour*

Description

MSU yellow (aka yellow-green or grellow) hex colour

Usage

```
msu_yellow
```

Format

An object of class `character` of length 1.

print.palette *Function for printing palette*

Description

Function for printing palette

Usage

```
## S3 method for class 'palette'
print(x, ...)
```

Arguments

`x`	the object to be printed.
`...`	further arguments to be passed to or from other methods. They are ignored in this function.

Value

A plot of the specified colour palette.

Examples

```
print(MSUcols("msu_qual1"))
```

scale_color_bigten_c *Plotting with Big Ten palettes for colour ggplot2*

Description

Plotting with Big Ten palettes for colour ggplot2

Usage

```
scale_color_bigten_c(palette = "primary", direction = 1, ...)
```

Arguments

palette	Type of palette: "primary" or "secondary"
direction	Sets order of colors. Default is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to scale_color_gradientn

Value

A ggproto object defining a continuous colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = wt)) +
  geom_point() +
  scale_color_bigten_c(palette = "primary")
```

scale_color_bigten_d *Plotting with Big Ten palettes for colour ggplot2*

Description

Plotting with Big Ten palettes for colour ggplot2

Usage

```
scale_color_bigten_d(palette = "primary", direction = 1, ...)
```

Arguments

palette	Type of palette: "primary" or "secondary"
direction	Sets order of colors. Default direction is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to discrete_scale

Value

A ggproto object defining a discrete colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = factor(cyl))) +
  geom_point() +
  scale_color_bigten_d(palette = "primary")
```

`scale_color_msu_c` *Plotting with MSU palettes for colour ggplot2*

Description

Plotting with MSU palettes for colour ggplot2

Usage

```
scale_color_msu_c(palette, direction = 1, ...)
```

Arguments

`palette`	name of palette. Run `names(MSUpalettes)` to view options.
`direction`	Sets order of colors. Default palette_choice is 1. If direction is -1, palette_choice color order is reversed
`...`	Other arguments passed on to `scale_color_gradientn`

Value

A ggproto object defining a continuous colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = wt)) +
  geom_point() +
  scale_color_msu_c(palette = "msu_seq")
```

scale_color_msu_d *Plotting with MSU palettes for colour ggplot2*

Description

Plotting with MSU palettes for colour ggplot2

Usage

```
scale_color_msu_d(palette, direction = 1, ...)
```

Arguments

palette	Name of Palette. Run `palettes(MSUpalettes)` to view options.
direction	Sets order of colors. Default direction is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to `discrete_scale`

Value

A ggproto object defining a discrete colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = factor(cyl))) +
  geom_point() +
  scale_color_msu_d(palette = "msu_qual1")
```

scale_colour_bigten_c *Plotting with Big Ten palettes for colour ggplot2 (British spelling)*

Description

Plotting with Big Ten palettes for colour ggplot2 (British spelling)

Usage

```
scale_colour_bigten_c(palette = "primary", direction = 1, ...)
```

Arguments

palette	Type of palette: "primary" or "secondary"
direction	Sets order of colors. Default is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to `scale_color_gradientn`

Value

A ggproto object defining a continuous colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, colour = wt)) +
  geom_point() +
  scale_colour_bigten_c(palette = "primary")
```

---

scale_colour_bigten_d *Plotting with Big Ten palettes for colour ggplot2 (British spelling)*

Description

Plotting with Big Ten palettes for colour ggplot2 (British spelling)

Usage

```
scale_colour_bigten_d(palette = "primary", direction = 1, ...)
```

Arguments

palette	Type of palette: "primary" or "secondary"
direction	Sets order of colors. Default direction is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to discrete_scale

Value

A ggproto object defining a discrete colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, colour = factor(cyl))) +
  geom_point() +
  scale_colour_bigten_d(palette = "primary")
```

scale_colour_msu_c *Plotting with MSU palettes for colour ggplot2*

Description

Plotting with MSU palettes for colour ggplot2

Usage

```
scale_colour_msu_c(palette, direction = 1, ...)
```

Arguments

palette	name of palette. Run `names(MSUpalettes)` to view options.
direction	Sets order of colors. Default palette_choice is 1. If direction is -1, palette_choice color order is reversed
...	Other arguments passed on to `scale_color_gradientn`

Value

A ggproto object defining a continuous colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = wt)) +
  geom_point() +
  scale_colour_msu_c(palette = "msu_seq")
```

scale_colour_msu_d *Plotting with MSU palettes for colour ggplot2*

Description

Plotting with MSU palettes for colour ggplot2

Usage

```
scale_colour_msu_d(palette, direction = 1, ...)
```

Arguments

palette	Name of Palette. Run `names(MSUpalettes)` to view options.
direction	Sets order of colors. Default direction is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to `discrete_scale`

Value

A ggproto object defining a discrete colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = factor(cyl))) +
  geom_point() +
  scale_colour_msu_d(palette = "msu_qual1")
```

`scale_fill_bigten_c` *Plotting with Big Ten palettes for fill ggplot2*

Description

Plotting with Big Ten palettes for fill ggplot2

Usage

```
scale_fill_bigten_c(palette = "primary", direction = 1, ...)
```

Arguments

`palette`	Type of palette: "primary" or "secondary"
`direction`	Sets order of colors. Default is 1. If direction is -1, palette color order is reversed
`...`	Other arguments passed on to `scale_fill_gradientn`

Value

A ggproto object defining a continuous fill scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, fill = wt)) +
  geom_point(shape = 21) +
  scale_fill_bigten_c(palette = "primary")
```

scale_fill_bigten_d *Plotting with Big Ten palettes for fill ggplot2*

Description

Plotting with Big Ten palettes for fill ggplot2

Usage

```
scale_fill_bigten_d(palette = "primary", direction = 1, ...)
```

Arguments

palette	Type of palette: "primary" or "secondary"
direction	Sets order of colors. Default direction is 1. If direction is -1, palette color order is reversed
...	Other arguments passed on to discrete_scale

Value

A ggproto object defining a discrete fill scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, fill = factor(cyl))) +
  geom_point(shape = 21) +
  scale_fill_bigten_d(palette = "primary")
```

scale_fill_msu_c *Plotting with MSU palettes for fill with ggplot2*

Description

Plotting with MSU palettes for fill with ggplot2

Usage

```
scale_fill_msu_c(palette, direction = 1, ...)
```

Arguments

palette	name of palette. Run names(MSUpalettes) to view options.
direction	Sets order of colors. Default palette_choice is 1. If direction is -1, palette_choice color order is reversed
...	Other arguments passed on to scale_fill_gradientn

Value

A ggproto object defining a continuous colour scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = cyl, y = disp, fill = cyl)) +
  geom_col() +
  scale_fill_msu_c(palette = "msu_seq")
```

`scale_fill_msu_d` *Plotting with MSU palettes for fill colour ggplot2*

Description

Plotting with MSU palettes for fill colour ggplot2

Usage

```
scale_fill_msu_d(palette, direction = 1, ...)
```

Arguments

`palette`	name of palette. Run `names(MSUpalettes)` to view options.
`direction`	Sets order of colors. Default direction is 1. If direction is -1, palette_choice color order is reversed
`...`	Other arguments passed on to `discrete_scale`

Value

A ggproto object defining a discrete fill scale for use with ggplot2.

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = cyl, y = disp, fill = factor(cyl))) +
  geom_col() +
  scale_fill_msu_d(palette = "msu_qual1")
```

set_msu_palette *Set MSU base R plotting palette*

Description

Set MSU base R plotting palette

Usage

```
set_msu_palette(palette)
```

Arguments

palette	Name of palette. See `names(MSUthemes::MSUpalettes)`.

Value

Returns a character vector giving the colors from the palette which was in effect. This is invisible unless the argument is omitted.

Examples

```
set_msu_palette("msu_qual1")
```

set_msu_par *Set MSUthemes base R graphical parameters*

Description

Set MSUthemes base R graphical parameters

Usage

```
set_msu_par(
  family = "Metropolis",
  adj = 0,
  mar = c(5, 3, 3, 2.5),
  bty = "n",
  ...
)
```

Arguments

family	Font used for all text elements. Default "Metropolis".
adj	Alignment of text for title. Default 0.
mar	Margins. Default c(5, 3, 3, 2.5).
bty	Axis lines. Default "n".
...	Additional arguments passed to par

Value

Returns an invisible named list.

Examples

```
# save user's current par values that this function will change
oldpar <- par("family", "adj", "mar", "bty")
set_msu_par()
plot(1:4, 1:4, col=1:4, main = "Title")
par(oldpar)
```

---

theme_MSU *Michigan State University (MSU) Theme*

Description

Custom ggplot2 theme

Usage

```
theme_MSU(
  base_size = 11,
  base_family = "Metropolis",
  header_family = NULL,
  base_line_size = base_size/22,
  base_rect_size = base_size/22,
  rel_small = 12/14,
  rel_tiny = 11/14,
  rel_large = 16/14,
  ink = "black",
  paper = "white",
  accent = "#3366FF"
)
```

Arguments

base_size	Base font size for text elements. Default 12.
base_family	Font used for all text elements. Default "Metropolis".
header_family	Font family for titles and headers. The default, NULL, uses theme inheritance to set the font. This setting affects axis titles, legend titles, the plot title and tag text.
base_line_size	Base line size is base_size/22
base_rect_size	Base rectangle size is base_size/22
rel_small	Relative size of small text (e.g., axis tick labels)
rel_tiny	Relative size of tiny text (e.g., caption)
rel_large	Relative size of large text (e.g., title)
ink	Text colour. Default "black".
paper	Background colour. Default "white".
accent	Accent colour. Default bright blue, "#3366FF"

Value

A ggplot2 theme

Examples

```
library(ggplot2)
ggplot(data = mtcars, aes(x = mpg, y = disp, color = wt)) +
  geom_point() +
  theme_MSU()
```

---

view_all_palettes *Prints all available colour palettes*

Description

Prints all available colour palettes

Usage

```
view_all_palettes()
```

Value

A plot of all colour palettes available in the package.

Examples

```
view_all_palettes()
```

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