Package ‘utf8’

October 22, 2023

Title Unicode Text Processing
Version 1.2.4
Description Process and print 'UTF-8' encoded international text (Unicode). Input, validate, normalize, encode, format, and display.
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BugReports https://github.com/patperry/r-utf8/issues
Depends R (>= 2.10)
Suggests cli, covr, knitr, rlang, rmarkdown, testthat (>= 3.0.0), withr
VignetteBuilder knitr, rmarkdown
Config/testthat/edition 3
Encoding UTF-8
RoxygenNote 7.2.3
NeedsCompilation yes
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Repository CRAN
Date/Publication 2023-10-22 21:50:02 UTC

R topics documented:

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The utf8 Package

Description

UTF-8 Text Processing

Details

Functions for manipulating and printing UTF-8 encoded text:

- `as_utf8` attempts to convert character data to UTF-8, throwing an error if the data is invalid;
- `utf8_valid` tests whether character data is valid according to its declared encoding;
- `utf8_normalize` converts text to Unicode composed normal form (NFC), optionally applying case-folding and compatibility maps;
- `utf8_encode` encodes a character string, escaping all control characters, so that it can be safely printed to the screen;
- `utf8_format` formats a character vector by truncating to a specified character width limit or by left, right, or center justifying;
- `utf8_print` prints UTF-8 character data to the screen;
- `utf8_width` measures the display width of UTF-8 character strings (many emoji and East Asian characters are twice as wide as other characters);
- `output_ansi` and `output_utf8` test for the output connections capabilities.

For a complete list of functions, use `library(help = "utf8").`

Author(s)

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as_utf8

**UTF-8 Character Encoding**

**Description**

UTF-8 text encoding and validation.

**Usage**

as_utf8(x, normalize = FALSE)

utf8_valid(x)

**Arguments**

- **x** character object.
- **normalize** a logical value indicating whether to convert to Unicode composed normal form (NFC).

**Details**

as_utf8 converts a character object from its declared encoding to a valid UTF-8 character object, or throws an error if no conversion is possible. If `normalize = TRUE`, then the text gets transformed to Unicode composed normal form (NFC) after conversion to UTF-8.

utf8_valid tests whether the elements of a character object can be translated to valid UTF-8 strings.

**Value**

For `as_utf8`, the result is a character object with the same attributes as `x` but with `Encoding` set to "UTF-8".

For `utf8_valid` a logical object with the same names, `dim`, and `dimnames` as `x`.

**See Also**

utf8_normalize, iconv.

**Examples**

```r
# the second element is encoded in latin-1, but declared as UTF-8
x <- c("fa\u00E7ile", "fa\xE7ile", "fa\xC3\xA7ile")
Encoding(x) <- c("UTF-8", "UTF-8", "bytes")

# attempt to convert to UTF-8 (fails)
## Not run: as_utf8(x)

y <- x
Encoding(y[2]) <- "latin1" # mark the correct encoding
```
### Description

Test whether the output connection has ANSI style escape support or UTF-8 support.

### Usage

- `output_ansi()`
- `output_utf8()`

### Details

- **output_ansi** tests whether the output connection supports ANSI style escapes. This is `TRUE` if the connection is a terminal and not the Windows GUI. Otherwise, it is true if running in RStudio 1.1 or later with ANSI escapes enabled, provided `stdout()` has not been redirected to another connection by `sink()`.

- **output_utf8** tests whether the output connection supports UTF-8. For most platforms `l10n_info()` gives this information, but this does not give an accurate result for Windows GUIs. To work around this, we proceed as follows:
  - if the character locale (`LC_CTYPE`) is "C", then the result is `FALSE`;
  - otherwise, if `l10n_info()` returns `TRUE`, then the result is `TRUE`;
  - if running on Windows, then the result is `TRUE`;
  - in all other cases the result is `FALSE`.

Strictly speaking, UTF-8 support is always available on Windows GUI, but only a subset of UTF-8 is available (defined by the current character locale) when the output is redirected by `knitr` or another process. Unfortunately, it is impossible to set the character locale to UTF-8 on Windows. Further, the `utf8` package only handles two character locales: C and UTF-8. To get around this, on Windows, we treat all non-C locales on that platform as UTF-8. This liberal approach means that characters in the user’s locale never get escaped; others will get output as `<U+XXXX>`, with incorrect values for `utf8_width`.

### Value

A logical scalar indicating whether the output connection supports the given capability.

### See Also

- `.Platform`, `isatty`, `l10n_info`, `Sys.getlocale`
utf8_encode

Examples

# test whether ANSI style escapes or UTF-8 output are supported
cat("ANSI:", output_ansi(), "\n")
cat("UTF8:", output_utf8(), "\n")

# switch to C locale
Sys.setlocale("LC_CTYPE", "C")
cat("ANSI:", output_ansi(), "\n")
cat("UTF8:", output_utf8(), "\n")

# switch to native locale
Sys.setlocale("LC_CTYPE", "")

tmp <- tempfile()
sink(tmp) # redirect output to a file
cat("ANSI:", output_ansi(), "\n")
cat("UTF8:", output_utf8(), "\n")
sink() # restore stdout

# inspect the output
readLines(tmp)

utf8_encode

Encode Character Object as for UTF-8 Printing

Description

Escape the strings in a character object, optionally adding quotes or spaces, adjusting the width for display.

Usage

utf8_encode(x, width = 0L, quote = FALSE, justify = "left", escapes = NULL,
    display = FALSE, utf8 = NULL)

Arguments

x character object.
width integer giving the minimum field width; specify NULL or NA for no minimum.
quote logical scalar indicating whether to surround results with double-quotes and escape internal double-quotes.
jUSTify justification; one of "left", "right", "centre", or "none". Can be abbreviated.
escapes a character string specifying the display style for the backslash escapes, as an ANSI SGR parameter string, or NULL for no styling.
display logical scalar indicating whether to optimize the encoding for display, not byte-for-byte data transmission.
utf8

logical scalar indicating whether to encode for a UTF-8 capable display (ASCII-only otherwise), or NULL to encode for output capabilities as determined by output_utf8().

Details

utf8_encode encodes a character object for printing on a UTF-8 device by escaping controls characters and other non-printable characters. When display = TRUE, the function optimizes the encoding for display by removing default ignorable characters (soft hyphens, zero-width spaces, etc.) and placing zero-width spaces after wide emoji. When output_utf8() is FALSE the function escapes all non-ASCII characters and gives the same results on all platforms.

Value

A character object with the same attributes as x but with Encoding set to "UTF-8".

See Also

utf8_print.

Examples

# the second element is encoded in latin-1, but declared as UTF-8
x <- c("fa\u00E7ile", "fa\xE7ile", "fa\xC3\xA7ile")
Encoding(x) <- c("UTF-8", "UTF-8", "bytes")

# encoding
utf8_encode(x)

# add style to the escapes
cat(utf8_encode("hello\nstyled\nworld", escapes = "1"), "\n")
Arguments

- **x**: character object.
- **trim**: logical scalar indicating whether to suppress padding spaces around elements.
- **chars**: integer scalar indicating the maximum number of character units to display. Wide characters like emoji take two character units; combining marks and default ignorables take none. Longer strings get truncated and suffixed or prefixed with an ellipsis ("..." or \u2026, whichever is most appropriate for the current character locale). Set to NULL to limit output to the line width as determined bygetOption("width").
- **justify**: justification; one of "left", "right", "centre", or "none". Can be abbreviated.
- **width**: the minimum field width; set to NULL or 0 for no restriction.
- **na.encode**: logical scalar indicating whether to encode NA values as character strings.
- **quote**: logical scalar indicating whether to format for a context with surrounding double-quotes ("Var") and escaped internal double-quotes.
- **na.print**: character string (or NULL) indicating the encoding for NA values. Ignored when na.encode is FALSE.
- **print.gap**: non-negative integer (or NULL) giving the number of spaces in gaps between columns; set to NULL or 1 for a single space.
- **utf8**: logical scalar indicating whether to format for a UTF-8 capable display (ASCII-only otherwise), or NULL to format for output capabilities as determined by output_utf8().
- **...**: further arguments passed from other methods. Ignored.

Details

`utf8_format` formats a character object for printing, optionally truncating long character strings.

Value

A character object with the same attributes as `x` but with Encoding set to "UTF-8" for elements that can be converted to valid UTF-8 and "bytes" for others.

See Also

`utf8_print`, `utf8_encode`.

Examples

```r
# the second element is encoded in latin-1, but declared as UTF-8
x <- c("fa\u00E7ile", "fa\xE7ile", "fa\xC3\xA7ile")
Encoding(x) <- c("UTF-8", "UTF-8", "bytes")

# formatting
utf8_format(x, chars = 3)
utf8_format(x, chars = 3, justify = "centre", width = 10)
utf8_format(x, chars = 3, justify = "right")
```
utf8_normalize  

Text Normalization

Description

Transform text to normalized form, optionally mapping to lowercase and applying compatibility maps.

Usage

```
utf8_normalize(x, map_case = FALSE, map_compat = FALSE,
               map_quote = FALSE, remove_ignorable = FALSE)
```

Arguments

- `x`: character object.
- `map_case`: a logical value indicating whether to apply Unicode case mapping to the text. For most languages, this transformation changes uppercase characters to their lowercase equivalents.
- `map_compat`: a logical value indicating whether to apply Unicode compatibility mappings to the characters, those required for NFKC and NFKD normal forms.
- `map_quote`: a logical value indicating whether to replace curly single quotes and Unicode apostrophe characters with ASCII apostrophe (U+0027).
- `remove_ignorable`: a logical value indicating whether to remove Unicode "default ignorable" characters like zero-width spaces and soft hyphens.

Details

`utf8_normalize` converts the elements of a character object to Unicode normalized composed form (NFC) while applying the character maps specified by the `map_case`, `map_compat`, `map_quote`, and `remove_ignorable` arguments.

Value

The result is a character object with the same attributes as `x` but with Encoding set to "UTF-8".

See Also

- `as_utf8`

Examples

```
angstrom <- c("\u00c5", "\u0041\u030a", "\212b")
utf8_normalize(angstrom) == "\u00c5"
```
**utf8_print**  

*Print UTF-8 Text*

**Description**

Print a UTF-8 character object.

**Usage**

```r
utf8_print(x, chars = NULL, quote = TRUE, na.print = NULL,  
           print.gap = NULL, right = FALSE, max = NULL,  
           names = NULL, rownames = NULL, escapes = NULL,  
           display = TRUE, style = TRUE, utf8 = NULL, ...)  
```

**Arguments**

- **x**: character object.
- **chars**: integer scalar indicating the maximum number of character units to display. Wide characters like emoji take two character units; combining marks and default ignorables take none. Longer strings get truncated and suffixed or prefixed with an ellipsis ("..." in C locale, "\u2026" in others). Set to NULL to limit output to the line width as determined by `getOption("width")`.
- **quote**: logical scalar indicating whether to put surrounding double-quotes (""") around character strings and escape internal double-quotes.
- **na.print**: character string (or NULL) indicating the encoding for NA values. Ignored when na.encode is FALSE.
- **print.gap**: non-negative integer (or NULL) giving the number of spaces in gaps between columns; set to NULL or 1 for a single space.
- **right**: logical scalar indicating whether to right-justify character strings.
- **max**: non-negative integer (or NULL) indicating the maximum number of elements to print; set to `getOption("max.print")` if argument is NULL.
- **names**: a character string specifying the display style for the (column) names, as an ANSI SGR parameter string.
- **rownames**: a character string specifying the display style for the row names, as an ANSI SGR parameter string.
- **escapes**: a character string specifying the display style for the backslash escapes, as an ANSI SGR parameter string.
- **display**: logical scalar indicating whether to optimize the encoding for display, not byte-for-byte data transmission.
- **style**: logical scalar indicating whether to apply ANSI terminal escape codes to style the output. Ignored when `output Ansi()` is FALSE.
- **utf8**: logical scalar indicating whether to optimize results for a UTF-8 capable display, or NULL to set as the result of `output_utf8()`. Ignored when `output_utf8()` is FALSE.
- **...**: further arguments passed from other methods. Ignored.
utf8_width

Measure the Character String Width

Description

Compute the display widths of the elements of a character object.

Usage

utf8_width(x, encode = TRUE, quote = FALSE, utf8 = NULL)
**Arguments**

- **x**: character object.
- **encode**: whether to encode the object before measuring its width.
- **quote**: whether to quote the object before measuring its width.
- **utf8**: logical scalar indicating whether to determine widths assuming a UTF-8 capable display (ASCII-only otherwise), or NULL to format for output capabilities as determined by `output_utf8()`.

**Details**

`utf8_width` returns the printed widths of the elements of a character object on a UTF-8 device (or on an ASCII device when `output_utf8()` is FALSE), when printed with `utf8_print`. If the string is not printable on the device, for example if it contains a control code like "\n", then the result is NA. If `encode = TRUE`, the default, then the function returns the widths of the encoded elements via `utf8_encode`; otherwise, the function returns the widths of the original elements.

**Value**

An integer object, with the same names, dim, and dimnames as `x`.

**See Also**

`utf8_print`.

**Examples**

```r
# the second element is encoded in latin-1, but declared as UTF-8
x <- c("fa\u00E7ile", "fa\xE7ile", "fa\xC3\xA7ile")
Encoding(x) <- c("UTF-8", "UTF-8", "bytes")

# get widths
utf8_width(x)
utf8_width(x, encode = FALSE)
utf8_width("")
utf8_width("", quote = TRUE)
```
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