Package ‘table.express’

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Title Build 'data.table' Expressions with Data Manipulation Verbs
Description A specialization of 'dplyr' data manipulation verbs that parse and build expressions
which are ultimately evaluated by 'data.table', letting it handle all optimizations. A set of
additional verbs is also provided to facilitate some common operations on a subset of the data.
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Description

A specialization of \texttt{dplyr} verbs, as well as a set of custom ones, that build expressions that can be used within a \texttt{data.table}'s frame.
table.express-package

Note

Note that since version 0.3.0, it is not possible to load `table.express` and `dplyr` at the same time, since they define the same `data.table` methods for many `dplyr` generics.

Bearing in mind that `data.tables` are also `data.frames`, we have to consider that other packages may use `dplyr` internally without importing `data.table`. Since `dplyr`'s methods are generic, calls to these methods in such packages would fail. The functions in this package try to detect when this happens and delegate to the `data.frame` methods with a warning, which can be safely ignored if you know that the error originates from a package that is not meant to work with `data.table`. To avoid the warning, use `options(table.express.warn.cedta = FALSE)`.

This software package was developed independently of any organization or institution that is or has been associated with the author.

Author(s)

Alexis Sarda-Espinosa

See Also

Useful links:

- https://asardaes.github.io/table.express/
- https://github.com/asardaes/table.express
- Report bugs at https://github.com/asardaes/table.express/issues

Examples

```r
require("data.table")
data("mtcars")
DT <- as.data.table(mtcars)

# Simple dplyr-like transformations

DT %>%
group_by(cyl) %>%
  filter(vs == 0, am == 1) %>%
  transmute(mean_mpg = mean(mpg)) %>%
  arrange(-cyl)

# Equivalent to previous
DT %>%
  start_expr %>
  transmute(mean_mpg = mean(mpg)) %>
  where(vs == 0, am == 1) %>
  group_by(cyl) %>
  order_by(-cyl) %>
  end_expr
```
# Modification by reference

```r
DT %>%
  where(gear %% 2 != 0, carb %% 2 == 0) %>%
  mutate(wt_squared = wt ^ 2)
print(DT)
```

# Deletion by reference

```r
DT %>%
  mutate(wt_squared = NULL) %>%
  print
```

# Support for tidyslect helpers

```r
DT %>%
  select(ends_with("t"))
```

# Helpers to transform a subset of data

# Like DT[, (whole) := lapply(.SD, as.integer), .SDcols = whole]

```r
whole <- names(DT)[sapply(DT, function(x) { all(x %% 1 == 0) })]
DT %>%
  mutate_sd(as.integer, .SDcols = whole)
```

# Like DT[, lapply(.SD, fun), .SDcols = ...]

```r
DT %>%
  transmute_sd((.COL - mean(.COL)) / sd(.COL),
               .SDcols = setdiff(names(DT), whole))
```

# Filter several with the same condition

```r
DT %>%
  filter_sd(.COL == 1, .SDcols = c("vs", "am"))
```

# Using secondary indices, i.e. DT[.(4, 5), on = .(cyl, gear)]

```r
DT %>%
  filter_on(cyl = 4, gear = 5) # note we don't use ==
```

```r
scale_undim <- function(...) {
  as.numeric(scale(...)) # remove dimensions
}
```

# Chaining

```r
DT %>%
  start_expr %>%
  mutate_sd(as.integer, .SDcols = whole) %>%
  chain %>%
  filter_sd(.COL == 1, .SDcols = c("vs", "am"), .collapse = `|`) %>%
  transmute_sd(scale_undim, .SDcols = !is.integer(.COL)) %>%
  end_expr
```
# The previous is equivalent to
DT[, (whole) := lapply(.SD, as.integer), .SDcols = whole
] [vs == 1 | am == 1,
  lapply(.SD, scale_undim),
  .SDcols = names(DT)[sapply(DT, Negate(is.integer))]]

# Alternative to keep all columns (copying non-scaled ones)
scale_non_integers <- function(x) {
  if (is.integer(x)) x else scale_undim(x)
}

DT %>%
  filter_sd(.COL == 1, .SDcols = c("vs", "am"), .collapse = `|`) %>%
  transmute_sd(everything(), scale_non_integers)

# Without copying non-scaled
DT %>%
  where(vs == 1 | am == 1) %>%
  mutate_sd(scale, .SDcols = names(DT)[sapply(DT, Negate(is.integer))])

print(DT)

---

**arrange-table.express**  
**Arrange rows**

**Description**

Alias for `order_by-table.express`.

**Usage**

```r
## S3 method for class 'ExprBuilder'
arrange(.data, ...)

## S3 method for class 'data.table'
arrange(.data, ...)
```

**Arguments**

- `.data` An instance of `ExprBuilder`.
- `...` See `order_by-table.express`.

**Details**

To see more examples, check the vignette, or the `table.express-package` entry.
### `chain`

**Description**

Build a chain of similar objects/operations.

**Usage**

```r
chain(.data, ..., .parent_env = rlang::caller_env())
```

**Arguments**

- `.data` Object to be chained.
- `...` Arguments for the specific methods.
- `.parent_env` See `end_expr()`.

**Details**

The chaining for `ExprBuilder` is equivalent to calling `end_expr()` followed by `start_expr()`. The ellipsis (`...`) is passed to both functions.

To see more examples, check the vignette, or the `table.express-package` entry.

### `distinct`

**Description**

Rows with distinct combinations of columns

**Usage**

```r
distinct(.data, ..., .keep = TRUE, .n = 1L, .parse = getOption("table.express.parse", FALSE))
```

```r
distinct(.data, ...)"
**EagerExprBuilder**

**Arguments**

- `.data` An instance of ExprBuilder.
- `...` Which columns to use to determine uniqueness.
- `.keep` See details below.
- `.n` Indices of rows to return for each unique combination of the chosen columns. See details.
- `.parse` Logical. Whether to apply \texttt{rlang::parse_expr()} to obtain the expressions.

**Details**

If `.keep = \text{TRUE}` (the default), the columns not mentioned in `...` are also kept. However, if a new column is created in one of the expressions therein, `.keep` can also be set to a character vector containing the names of all the columns that should be in the result in addition to the ones mentioned in `.SD`. See the examples.

The value of `.n` is only relevant when `.keep` is not \text{FALSE}. It is used to subset `.SD` in the built `data.table` expression. For example, we could get 2 rows per combination by setting `.n` to 1:2, or get the last row instead of the first by using `.N`. If more than one index is used, and not enough rows are found, some rows will have \text{NA}. Do note that, at least as of version 1.12.2 of `data.table`, only expressions with single indices are internally optimized.

To see more examples, check the vignette, or the `table.express-package` entry.

**Examples**

```r
data("mtcars")

# compare with `.keep = \text{TRUE}
data.table::as.data.table(mtcars) %>%
  distinct(amvs = am + vs, .keep = names(mtcars))
```

---

**EagerExprBuilder** *Eager frame expression builder*

**Description**

Like \texttt{ExprBuilder}, but eager in some regards. This shouldn’t be used directly.

**Super class**

\texttt{table.express::ExprBuilder} -> \texttt{EagerExprBuilder}
Methods

Public methods:

- `EagerExprBuilder$new()`
- `EagerExprBuilder$chain()`
- `EagerExprBuilder$chain_if_set()`
- `EagerExprBuilder$clone()`

**Method new():** Constructor.

*Usage:*

```
EagerExprBuilder$new(DT, ...)  
```

*Arguments:*

- `DT` A `data.table::data.table`.  
- `...` Ignored.

**Method chain():** Override to abort if chaining is attempted.

*Usage:*

```
EagerExprBuilder$chain(...)  
```

*Arguments:*

- `...` Ignored.

**Method chain_if_set():** Override to abort if chaining is attempted.

*Usage:*

```
EagerExprBuilder$chain_if_set(...)  
```

*Arguments:*

- `...` Ignored.

**Method clone():** The objects of this class are cloneable with this method.

*Usage:*

```
EagerExprBuilder$clone(deep = FALSE)  
```

*Arguments:*

- `deep` Whether to make a deep clone.

---

**Description**

Finish the expression-building process and evaluate it.
Usage

```r
end_expr(.data, ...)
```

## S3 method for class 'ExprBuilder'
end_expr(.data, ..., .by_ref = TRUE, .parent_env)

Arguments

- `.data` The expression.
- `...` Arguments for the specific methods.
- `.by_ref` If `FALSE`, `data.table::copy()` is used before evaluation.
- `.parent_env` Optionally, the `enclosing` environment of the expression’s evaluation environment. Defaults to the caller environment.

Details

The `ExprBuilder` method returns a `data.table::data.table`.
To see more examples, check the `vignette`, or the `table.express-package` entry.

---

**ExprBuilder**

*Frame expression builder*

Description

Build an expression that will be used inside a `data.table::data.table`’s frame. This shouldn’t be used directly.

Value

In general, a modified `self` with extended expression.

Active bindings

- `append` Extra expressions that go at the end.
- `expr` The final expression that can be evaluated with `base::eval()` or `rlang::eval_bare()`.

Methods

**Public methods:**

- `ExprBuilder$new()`
- `ExprBuilder$set_i()`
- `ExprBuilder$set_j()`
- `ExprBuilder$set_by()`
- `ExprBuilder$chain()`
- `ExprBuilder$chain_if_set()`
• `ExprBuilder$seek_and_nestroy()`
• `ExprBuilder$eval()`
• `ExprBuilder$tidy_select()`
• `ExprBuilder$print()`
• `ExprBuilder$clone()`

**Method** `new()`: Constructor.

*Usage:*
```
ExprBuilder$new(
  DT,
  dt_pronouns = list(),
  nested = list(),
  verbose = getOption("table.express.verbose", FALSE)
)
```

*Arguments:*
- **DT** A `data.table::data.table`.
- **dt_pronouns**, **nested** Internal parameters for joins.
- **verbose** Print more information during the process of building expressions.

**Method** `set_i()`: Set the i clause expression(s), starting a new frame if the current one already has said expression set.

*Usage:*
```
ExprBuilder$set_i(value, chain_if_needed)
```

*Arguments:*
- **value** A captured expression.
- **chain_if_needed** Whether chaining is allowed during this step.

**Method** `set_j()`: Like set_i but for the j clause.

*Usage:*
```
ExprBuilder$set_j(value, chain_if_needed)
```

*Arguments:*
- **value** A captured expression.
- **chain_if_needed** Whether chaining is allowed during this step.

**Method** `set_by()`: Set the by clause expression.

*Usage:*
```
ExprBuilder$set_by(value, chain_if_needed)
```

*Arguments:*
- **value** A captured expression.
- **chain_if_needed** Whether chaining is allowed during this step.

**Method** `chain()`: By default, start a new expression with the current one as its parent. If type = "pronoun", `dt` is used to start a new expression that joins the current one.

*Usage:*
```
```
ExprBuilder$chain(type = "frame", next_dt, parent_env, to_eager = FALSE)

Arguments:
  type One of "frame", "pronoun".
  next_dt Next data table when chaining pronoun.
  parent_env Where to evaluate current expression when chaining pronoun.
  to_eager Whether or not to use an ExprBuilder in the new chain

Method chain_if_set(): Chain if any clause values are already set.
  Usage:
  ExprBuilder$chain_if_set(...)  
  Arguments:
  ... Clause values.

Method seek_and_nestroy(): Helper for nest_expr.
  Usage:
  ExprBuilder$seek_and_nestroy(.exprs)
  Arguments:
  .exprs List of expressions.

Method eval(): Evaluate the final expression with parent_env as the enclosing environment. If by_ref = FALSE, data.table::copy() is called before. The ellipsis’ contents are assigned to the expression’s evaluation environment.
  Usage:
  ExprBuilder$eval(parent_env, by_ref, ...)
  Arguments:
  parent_env Enclosing environment.
  by_ref Flag to control deep copies.
  ... Additional variables for the evaluation environment.

Method tidy_select(): Evaluate a tidyselect call using the currently captured table.
  Usage:
  ExprBuilder$tidy_select(select_expr)
  Arguments:
  select_expr The selection expression.

Method print(): Prints the built expr.
  Usage:
  ExprBuilder$print(...)
  Arguments:
  ... Ignored.

Method clone(): The objects of this class are cloneable with this method.
  Usage:
  ExprBuilder$clone(deep = FALSE)
  Arguments:
  deep Whether to make a deep clone.
extrema_by

Find rows with extrema in specific columns

Description
Find rows with maxima/minima in given columns.

Usage
max_by(.data, .col, ...)

## S3 method for class 'ExprBuilder'
max_by(
  .data,
  .col,
  ...,  
  .some = FALSE,
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'data.table'
max_by(.data, .col, ..., .expr = FALSE)

min_by(.data, .col, ...)

## S3 method for class 'ExprBuilder'
min_by(
  .data,
  .col,
  ...,  
  .some = FALSE,
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'data.table'
min_by(.data, .col, ..., .expr = FALSE)

Arguments
.data An instance of ExprBuilder.
.col A character vector indicating the columns that will be searched for extrema.
... Optionally, columns to group by, either as characters or symbols.
.some If TRUE the rows where any of the columns specified in .col have extrema are returned.
.chain Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?
If the input is a `data.table` and `.expr` is `TRUE`, an instance of `EagerExprBuilder` will be returned. Useful if you want to add clauses to `j`, e.g. with `mutate-table.express`.

Details

These verbs implement the idiom shown here by leveraging `nest_expr()`. The whole nested expression is assigned to `i` in the `data.table`'s frame. It is probably a good idea to use this on a frame that has no other frames preceding it in the current expression, given that `nest_expr()` uses the captured `data.table`, so consider using `chain()` when needed.

Several columns can be specified in `.col`, and depending on the value of `.some`, the rows with all or some extrema are returned, using `&` or `|` respectively. Depending on your data, using more than one column might not make sense, resulting in an empty `data.table`.

Examples

data("mtcars")
data.table::as.data.table(mtcars) %>%
  max_by("mpg", "vs")
Details

The ExprBuilder method is an alias for where-table.express.
The data.table::data.table method works eagerly like dplyr::filter().
To see more examples, check the vignette, or the table.express-package entry.

---

filter_on

Filter with secondary indices

Description

Helper to filter specifying the on part of the data.table::data.table query.

Usage

filter_on(.data, ...)

## S3 method for class 'ExprBuilder'
filter_on(
  .data,
  ..., 
  which = FALSE,
  nomatch = getOption("datatable.nomatch"),
  mult = "all",
  .negate = FALSE,
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'data.table'
filter_on(.data, ..., .expr = FALSE)

Arguments

.data An instance of ExprBuilder.
...

Key-value pairs, maybe with empty keys if the data.table already has them. See details.

which, nomatch, mult

See data.table::data.table.

.negate Whether to negate the expression and search only for rows that don’t contain the given values.

.chain Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?

.expr If the input is a data.table and .expr is TRUE, an instance of EagerExprBuilder will be returned. Useful if you want to add clauses to j, e.g. with mutate-table.express.
filter_sd

Details

The key-value pairs in '...' are processed as follows:

- The names are used as on in the data.table frame. If any name is empty, on is left missing.
- The values are packed in a list and used as i in the data.table frame.

To see more examples, check the vignette, or the table.express-package entry.

Examples

data("mtcars")

data.table::as.data.table(mtcars) %>%
  filter_on(cyl = 4, gear = 5)

filter_sd

Filter subset of data

Description

Helper to filter rows with the same condition applied to a subset of the data.

Usage

filter_sd(.data, .SDcols, .how = Negate(is.na), ...)

## S3 method for class 'ExprBuilder'
filter_sd(
  .data,
  .SDcols,
  .how = Negate(is.na),
  ..., 
  which,
  .collapse = `&`,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE),
  .caller_env_n = 1L
)

## S3 method for class 'data.table'
filter_sd(.data, ..., .expr = FALSE)

Arguments

.data  An instance of ExprBuilder.
.SDcols See data.table::data.table and the details here.
.how  The filtering function or predicate.
...  Possibly more arguments for .how.
.which Passed to data.table::data.table.
collapse See where-table.express.
.parse Logical. Whether to apply rlang::parse_expr() to obtain the expressions.
.chain Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?
caller_env_n Internal. Passed to rlang::caller_env() to find the function specified in .how and standardize its call.
.expr If the input is a data.table and .expr is TRUE, an instance of EagerExprBuilder will be returned. Useful if you want to add clauses to j, e.g. with mutate-table.express.

Details

This function adds/chains an i expression that will be evaluated by data.table::data.table, and it supports the .COL pronoun and lambdas as formulas. The .how condition is applied to all .SDcols.

Additionally, .SDcols supports:

- tidyselect::select_helpers
- A predicate using the .COL pronoun that should return a single logical when .COL is replaced by a column of the data.
- A formula using . or .x instead of the aforementioned .COL.

The caveat is that the expression is evaluated eagerly, i.e. with the currently captured data.table. Consider using chain() to explicitly capture intermediate results as actual data.tables.

To see more examples, check the vignette, or the table.express-package entry.

Examples

data("mtcars")
data.table::as.data.table(mtcars) %>%
  filter_sd(c("vs", "am"), ~ .x == 1)
frame_append

Append expressions to the frame

Description

Add named expressions for the `data.table::data.table` frame.

Usage

```r
frame_append(.data, ..., .parse = getOption("table.express.parse", FALSE))
```

Arguments

- `.data`: An instance of `ExprBuilder`.
- `...`: Expressions to add to the frame.
- `.parse`: Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.

Examples

```r
data.table::data.table() %>%
  start_expr %>%
  frame_append(anything = "goes")
```

group_by-table.express

Grouping clauses

Description

Grouping by columns of a `data.table::data.table`.

Usage

```r
## S3 method for class 'ExprBuilder'
group_by(
  .data,
  ..., .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'data.table'
group_by(.data, ...)
```
**Arguments**

- `.data` An instance of `ExprBuilder`.
- `...` Clause for grouping on columns. The by inside the data.table’s frame.
- `.parse` Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.
- `.chain` Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?

**Details**

Everything in ... will be wrapped in a call to list.

To see more examples, check the vignette, or the table.express-package entry.

**Examples**

```r
data("mtcars")
data.table::as.data.table(mtcars) %>%
    start_expr %>%
    group_by(cyl, gear)
```

<table>
<thead>
<tr>
<th>joins</th>
<th>Joining verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description**

Two-table joins. Check the "Joining verbs" vignette for more information.

**Usage**

```r
## S3 method for class 'ExprBuilder'
anti_join(x, y, ...)

## S3 method for class 'data.table'
anti_join(x, ..., .expr = FALSE)

## S3 method for class 'ExprBuilder'
full_join(x, y, ..., sort = TRUE, allow = TRUE, .parent_env)

## S3 method for class 'data.table'
full_join(x, ...)

## S3 method for class 'ExprBuilder'
inner_join(x, y, ...)
```
## S3 method for class 'data.table'
inner_join(x, ..., .expr = FALSE)

## S3 method for class 'ExprBuilder'
left_join(
  x,
  y,
  ..., nomatch, mult, roll, rollends, .parent_env, .to_eager = FALSE
)

## S3 method for class 'data.table'
left_join(x, y, ..., allow = FALSE, .expr = FALSE)

mutate_join(x, y, ...)

## S3 method for class 'ExprBuilder'
mutate_join(
  x,
  y,
  ..., .SDcols, mult, roll, rollends, allow = FALSE, .by_each = NULL, .parent_env
)

## S3 method for class 'EagerExprBuilder'
mutate_join(x, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
mutate_join(x, y, ...)

## S3 method for class 'ExprBuilder'
right_join(
  x,
  y,
  ..., allow = FALSE, which,
nomatch,
mult,
roll,
rollends,
.selecting,
.framing
)

## S3 method for class 'data.table'
right_join(x, y, ..., allow = FALSE, .expr = FALSE, .selecting, .framing)

## S3 method for class 'ExprBuilder'
semi_join(x, y, ..., allow = FALSE, .eager = FALSE)

## S3 method for class 'data.table'
semi_join(x, y, ..., allow = FALSE, .eager = FALSE)

Arguments

x An ExprBuilder instance.

y A data.table::data.table or, for some verbs (see details), a call to nest_expr().

... Expressions for the on part of the join.

.expr If the input is a data.table and .expr is TRUE, an instance of EagerExprBuilder will be returned. Useful if you want to add clauses to j, e.g. with mutate.table.express.

sort Passed to data.table::merge.

allow Passed as data.table’s allow.cartesian.

.parent_env See end_expr().

.nomatch, .mult, .roll, .rollends
See data.table::data.table.

.to_eager Internal, should be left as FALSE in all external calls.

.SDcols For mutate_join. See the details below.

.by_each For mutate_join. See the details below.

.which If TRUE, return the row numbers that matched in x instead of the result of the join.

.selecting One or more expressions, possibly contained in a call to list or .., that will be added to j in the same frame as the join.

.framing Similar to .selecting, but added to the frame with frame_append().

.eager For semi_join. If TRUE, it uses nest_expr() to build an expression like this instead of the default one. This uses the captured data.table eagerly, so use chain() when needed. The default is lazy.
Details

The following joins support `nest_expr()` in y:

- anti_join
- inner_join
- right_join

The `full_join` method is really a wrapper for `data.table::merge` that specifies `all = TRUE`. The expression in x gets evaluated, merged with y, and the result is captured in a new `ExprBuilder`. Useful in case you want to keep building expressions after the merge.

Mutating join

The `ExprBuilder` method for `mutate_join` implements the idiom described in this link. The columns specified in `.SDcols` are those that will be added to x from y. The specification can be done by:

- Using `tidyselect::select_helpers`.
- Passing a character vector. If the character is named, the names are taken as the new column names for the values added to x.
- A list, using `base::list()` or `.()`, containing:
  - Column names, either as characters or symbols.
  - Named calls expressing how the column should be summarized/modifed before adding it to x.

The last case mentioned above is useful when the join returns many rows from y for each row in x, so they can be summarized while joining. The value of by in the join depends on what is passed to `.by_each`:

- If NULL (the default), by is set to .EACHI if a call is detected in any of the expressions from the list in `.SDcols`
- If TRUE, by is always set to .EACHI
- If FALSE, by is never set to .EACHI

See Also

`data.table::data.table`, `dplyr::join`

Examples

```r
lhs <- data.table::data.table(x = rep(c("b", "a", "c"), each = 3),
                              y = c(1, 3, 6),
                              v = 1:9)

rhs <- data.table::data.table(x = c("c", "b"),
                               v = 8:7,
                               foo = c(4, 2))
```
rhs %>%
  anti_join(lhs, x, v)

lhs %>%
  inner_join(rhs, x)

# creates new data.table
lhs %>%
  left_join(rhs, x)

# would modify lhs by reference
lhs %>%
  start_expr %>%
  mutate_join(rhs, x, .SDcols = c("foo", rhs.v = "v"))

# would modify rhs by reference, summarizing 'y' before adding it.
rhs %>%
  start_expr %>%
  mutate_join(lhs, x, .SDcols = .(y = mean(y)))

# creates new data.table
lhs %>%
  right_join(rhs, x)

# keep only columns from lhs
lhs %>%
  semi_join(rhs, x)

---

**key_by**

**Set key to group by**

---

**Description**

Group by setting key of the input.

**Usage**

```
key_by(.data, ...)
```

## S3 method for class 'ExprBuilder'

```
key_by(
  .data,
  ...
)
```

```r
.parse = getOption("table.express.parse", FALSE),
```
.chain = getOption("table.express.chain", TRUE)

## S3 method for class 'data.table'
key_by(.data, ...)

### Arguments

- `.data` Object to be grouped and subsequently keyed.
- `...` Arguments for the specific methods.
- `.parse` Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.
- `.chain` Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?

### Details

Everything in ... will be wrapped in a call to `list`. Its contents work like Clauses for grouping on columns. The `keyby` inside the `data.table::data.table` frame.

To see more examples, check the vignette, or the `table.express-package` entry.

### Examples

```r

data("mtcars")

data.table::as.data.table(mtcars) %>%
  start_expr %>%
  key_by(cyl, gear)
```

mutate-table.express  Add or update columns

### Description

Add or update columns of a `data.table::data.table`, possibly by reference using `:=`.

### Usage

```r

## S3 method for class 'ExprBuilder'
mutate(
  .data,
  ...
)
```

```
  .sequential = FALSE,
  .unquote_names = TRUE,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
```
## S3 method for class 'EagerExprBuilder'
mutable(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
mutable(.data, ...)

### Arguments

- **.data**
  - An instance of `ExprBuilder`.
- **...**
  - Mutation clauses.
- **.sequential**
  - If TRUE, each expression in ... is assigned to a nested body within curly braces to allow them to use variables created by previous expressions. The default is FALSE because enabling this may turn off some `data.table` optimizations.
- **.unquote_names**
  - Passed to `rlang::enexprs()`. Set to FALSE if you want to pass the single := expression.
- **.parse**
  - Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.
- **.chain**
  - Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?
- **.parent_env**
  - See `end_expr()`

### Details

To see more examples, check the vignette, or the table.express-package entry.

### Examples

```r
data("mtcars")
data.table::as.data.table(mtcars) %>%
  start_expr %>%
  mutable(mpg_squared = mpg ^ 2)
```

---

<table>
<thead>
<tr>
<th>mutate_sd</th>
<th>Mutate subset of data</th>
</tr>
</thead>
</table>

### Description

Like `mutate-table.express` but possibly recycling calls.
mutate_sd

Usage

mutate_sd(.data, .SDcols, .how = identity, ...)

## S3 method for class 'ExprBuilder'
mutate_sd(
  .data,
  .SDcols,
  .how = identity,
  ..., .parent_env = rlang::caller_env()
)

## S3 method for class 'EagerExprBuilder'
mutate_sd(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
mutate_sd(.data, ...)

Arguments

.data
  An instance of ExprBuilder.

.SDcols
  See data.table::data.table and the details here.

.how
  The function(s) or function call(s) that will perform the transformation. If many, a list should be used, either with list() or .(). If the list is named, the names will be used for the new columns’ names. Lambdas specified as formulas are supported.

... Possibly more arguments for all functions/calls in .how.

.pairwise
  If FALSE, each function in .how is applied to each column in .SDcols (like a cartesian product).

.prefix, .suffix
  Only relevant when .how is a function: add a prefix or suffix to the new column’s name. If neither is missing, .prefix has preference.

.parse
  Logical. Whether to apply rlang::parse_expr() to obtain the expressions.

.chain
  Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?

.parent_env
  See end_expr()

Details

This function works similar to transmute_sd() but keeps all columns and can modify by reference, like mutate-table.express. It can serve like dplyr's scoped mutation variants depending on what’s given to .SDcols.

Additionally, .SDcols supports:
• tidyselect::select_helpers

• A predicate using the .COL pronoun that should return a single logical when .COL is replaced by a column of the data.

• A formula using . or .x instead of the aforementioned .COL.

The caveat is that the expression is evaluated eagerly, i.e. with the currently captured data.table. Consider using chain() to explicitly capture intermediate results as actual data.tables.

To see more examples, check the vignette, or the table.express-package entry.

Examples

data("mtcars")

data.table::as.data.table(mtcars) %>%
  start_expr %>%
  mutate_sd(c("mpg", "cyl"), ~ .x * 2)

Description

Nest expressions as a functional chain

Usage

nest_expr(
  ..., .start = TRUE,
  .end = .start,
  .parse = getOption("table.express.parse", FALSE)
)

Arguments

... Expressions that will be part of the functional chain.
.start Whether to add a start_expr() call at the beginning of the chain.
.end Whether to add an end_expr() call at the end of the chain.
.parse Logical. Whether to apply rlang::parse_expr() to obtain the expressions.
Details

All expressions in ... are "collapsed" with `%>%`, passing the ExprBuilder's captured data.table as the initial parameter. Names are silently dropped.

The chain is evaluated eagerly and saved in the ExprBuilder instance to be used during final expression evaluation.

To see more examples, check the vignette, or the table.express-package entry.

Description

Clause for ordering rows.

Usage

order_by(.data, ...)

## S3 method for class 'ExprBuilder'
order_by(
  .data,
  ..., .collapse,
  .parse = gotOption("table.express.parse", FALSE),
  .chain = gotOption("table.express.chain", TRUE)
)

## S3 method for class 'data.table'
order_by(.data, ...)

Arguments

.data The input data.
... Arguments for the specific methods.
.collapse Ignored. See details.
.parse Logical. Whether to apply rlang::parse_expr() to obtain the expressions.
.chain Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?

Details

The ExprBuilder method dispatches to where-table.express, but doesn't forward the .collapse argument.

To see more examples, check the vignette, or the table.express-package entry.
Examples

```r
data("mtcars")

data.table::as.data.table(mtcars) %>%
  order_by(-cyl, gear)
```

Description

Select columns of a `data.table::data.table`.

Usage

```r
## S3 method for class 'ExprBuilder'
select(
  .data,
  ..., .negate = FALSE,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'EagerExprBuilder'
select(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
select(.data, ...)
```

Arguments

- `.data`: An instance of `ExprBuilder`.
- `...`: Clause for selecting columns. For `j` inside the `data.table`'s frame.
- `.negate`: Whether to negate the selection semantics and keep only columns that do not match what's given in `...`.
- `.parse`: Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.
- `.chain`: Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?
- `.parent_env`: See `end_expr()`

Details

The expressions in `...` support `tidyselect::select_helpers`.
To see more examples, check the `vignette`, or the `table.express-package` entry.
### Examples

```r
data("mtcars")
data.table::as.data.table(mtcars) %>%
  select(mpg:cyl)
```

### Description

Start building an expression.

### Usage

```r
start_expr(.data, ...)
```

```r
## S3 method for class 'data.table'
start_expr(.data, ..., .verbose = getOption("table.express.verbose", FALSE))
```

### Arguments

- `.data` Optionally, something to capture for the expression.
- `...` Arguments for the specific methods.
- `.verbose` Whether to print more information during the expression-building process.

### Details

The `data.table::data.table` method returns an `ExprBuilder` instance.

To see more examples, check the vignette, or the `table.express-package` entry.

### summarize-table.express

```
Summarize columns
```

### Description

Compute summaries for columns, perhaps by group.
Usage

```r
## S3 method for class '.ExprBuilder'
summarize(
  .data,
  ..., 
  .assume_optimized = NULL,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'ExprBuilder'
summarise(
  .data,
  ..., 
  .assume_optimized = NULL,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'EagerExprBuilder'
summarize(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'EagerExprBuilder'
summarise(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
summarize(.data, ...)

## S3 method for class 'data.table'
summarise(.data, ...)
```

Arguments

- `.data` An instance of `ExprBuilder`.
- `...` Clauses for transmuting columns. For j inside the `data.table`'s frame.
- `.assume_optimized` An optional character vector with function names that you know `data.table` can optimize. This will be added to this set of known names: min, max, mean, median, var, sd, sum, prod, first, last. Note that using those functions (and only those in a given call to this function) will prevent the expressions from using variables created by previous expressions.
- `.parse` Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.
- `.chain` Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?
- `.parent_env` See `end_expr()`
Details
The built expression is similar to what transmute builds, but the function also checks that the results have length 1.
To see more examples, check the vignette, or the table.express-package entry.

Description
Compute and keep only new columns.

Usage
```r
## S3 method for class 'ExprBuilder'
transmute(.data,
  ..., .enlist = TRUE,
  .sequential = FALSE,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'EagerExprBuilder'
transmute(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
transmute(.data, ...)
```

Arguments
- `.data` An instance of `ExprBuilder`.
- `...` Clauses for transmuting columns. For j inside the data.table’s frame.
- `.enlist` See details.
- `.sequential` If TRUE, each expression in ... is assigned to a nested body within curly braces to allow them to use variables created by previous expressions. The default is FALSE because enabling this may turn off some data.table optimizations.
- `.parse` Logical. Whether to apply `rlang::parse_expr()` to obtain the expressions.
- `.chain` Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?
- `.parent_env` See `end_expr()`
Details

Everything in ... is wrapped in a call to list by default. If only one expression is given, you can set .enlist to FALSE to skip the call to list.

To see more examples, check the vignette, or the table.express-package entry.

Examples

```r
data("mtcars")

data.table::as.data.table(mtcars) %>%
  transmute(ans = mpg * 2)
```

Description

Like transmute-table.express but for a single call and maybe specifying .SDcols.

Usage

```r
transmute_sd(.data, .SDcols = everything(), .how = identity, ...)
```

## S3 method for class 'ExprBuilder'
transmute_sd(
  .data,
  .SDcols = everything(),
  .how = identity,
  ...
)

## S3 method for class 'EagerExprBuilder'
transmute_sd(.data, ..., .parent_env = rlang::caller_env())

## S3 method for class 'data.table'
transmute_sd(.data, ...)

Arguments

- `.data` An instance of ExprBuilder.
- `.SDcols` See data.table::data.table and the details here.
### where-table.express

<table>
<thead>
<tr>
<th>.how</th>
<th>The function(s) or function call(s) that will perform the transformation. If many, a list should be used, either with <code>list()</code> or <code>.()</code>. If the list is named, the names will be used for the new columns’ names. Lambdas specified as formulas are supported.</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>Possibly more arguments for all functions/calls in <code>.how</code>.</td>
</tr>
<tr>
<td>.parse</td>
<td>Logical. Whether to apply <code>rlang::parse_expr()</code> to obtain the expressions.</td>
</tr>
<tr>
<td>.chain</td>
<td>Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?</td>
</tr>
<tr>
<td>.parent_env</td>
<td>See <code>end_expr()</code></td>
</tr>
</tbody>
</table>

### Details

Like `transmute-table.express`, this function never modifies the input by reference. This function adds/chains a select expression that will be evaluated by `data.table::data.table`, possibly specifying the helper function `.transmute_matching`, which is assigned to the final expression’s evaluation environment when calling `end_expr()` (i.e., ExprBuilder’s `eval` method).

Said function supports two pronouns that can be used by `.how` and `.SDcols`:

- `.COL`: the actual values of the column.
- `.COLNAME`: the name of the column currently being evaluated.

Additionally, lambdas specified as formulas are also supported. In those cases, `.x` is equivalent to `.COL` and `.y` to `.COLNAME`.

Unlike a call like `DT[, (vars) := expr]`, `.SDcols` can be created dynamically with an expression that evaluates to something that would be used in place of `vars` without eagerly using the captured `data.table`. See the examples here or in `table.express-package`.

### Examples

```r
data("mtcars")

data.table::as.data.table(mtcars) %>%
  transmute_sd(~ grepl("^d", .y), ~ .x * 2)

data.table::as.data.table(mtcars) %>%
  transmute_sd(~ is.numeric(.x), ~ .x * 2)
```

### Where clause

Clause for subsetting rows.
where-table.express

Usage

where(.data, ...)

## S3 method for class 'ExprBuilder'
where(
  .data,
  ..., 
  which,
  .collapse = `&`,
  .parse = getOption("table.express.parse", FALSE),
  .chain = getOption("table.express.chain", TRUE)
)

## S3 method for class 'data.table'
where(.data, ...)

Arguments

.data The input data.
... Arguments for the specific methods.
which Passed to data.table::data.table.
.collapse A boolean function which will be used to "concatenate" all conditions in ....
.parse Logical. Whether to apply rlang::parse_expr() to obtain the expressions.
.chain Logical. Should a new frame be automatically chained to the expression if the clause being set already exists?

Details

For ExprBuilder, the expressions in ... can call nest_expr(), and are eagerly nested if they do.
The data.table::data.table method is lazy, so it expects another verb to follow afterwards.
To see more examples, check the vignette, or the table.express-package entry.

Examples

data("mtcars")

data.table::as.data.table(mtcars) %>%
  start_expr %>%
  where(vs == 0, am == 1)

data.table::as.data.table(mtcars) %>%
  where(vs == 0) %>%
  transmute(mpg = round(mpg))
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