

# Package: ravepipeline (via r-universe)

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**Type** Package

**Title** Reproducible Pipeline Infrastructure for Neuroscience

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**Language** en-US

**Description** Defines the underlying pipeline structure for reproducible neuroscience, adopted by 'RAVE' (reproducible analysis and visualization of intracranial electroencephalography); provides high-level class definition to build, compile, set, execute, and share analysis pipelines. Both R and 'Python' are supported, with 'Markdown' and 'shiny' dashboard templates for extending and building customized pipelines. See the full documentations at <<https://rave.wiki>>; to cite us, check out our paper by Magnotti, Wang, and Beauchamp (2020, <[doi:10.1016/j.neuroimage.2020.117341](https://doi.org/10.1016/j.neuroimage.2020.117341)>), or run `citation("`ravepipeline")` for details.

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install_modules	<i>Install 'RAVE' modules</i>
-----------------	-------------------------------

---

## Description

Low-level function exported for down-stream 'RAVE' packages.

## Usage

```
install_modules(modules, dependencies = FALSE)
```

**Arguments**

modules	a vector of characters, repository names; default is to automatically determined from a public registry
dependencies	whether to update dependent packages; default is false

**Value**

nothing

---

module_add	<i>Add new 'RAVE' (2.0) module to current project</i>
------------	-------------------------------------------------------

---

**Description**

Creates a 'RAVE' pipeline with additional dashboard module from template.

**Usage**

```

module_add(
  module_id,
  module_label,
  path = ".",
  type = c("default", "bare", "scheduler", "python"),
  ...,
  pipeline_name = module_id,
  overwrite = FALSE
)

```

**Arguments**

module_id	module ID to create, must be unique; users cannot install two modules with identical module ID. We recommend that a module ID follows snake format, starting with lab name, for example, 'beauchamplab_imaging_preprocess', 'karaslab_freez', or 'upenn_ese25_foof'.
module_label	a friendly label to display in the dashboard
path	project root path; default is current directory
type	template to choose, options are 'default' and 'bare'
...	additional configurations to the module such as 'order', 'group', 'badge'
pipeline_name	the pipeline name to create along with the module; default is identical to module_id (strongly recommended); leave it default unless you know what you are doing.
overwrite	whether to overwrite existing module if module with same ID exists; default is false

**Value**

Nothing.

## Examples

```
# For demonstrating this example only
project_root <- tempfile()
dir.create(project_root, showWarnings = FALSE, recursive = TRUE)

# Add a module
module_id <- "mylab_my_first_module"
module_add(
  module_id = module_id,
  module_label = "My Pipeline",
  path = project_root
)

# show the structure
cat(
  list.files(
    project_root,
    recursive = TRUE,
    full.names = FALSE,
    include.dirs = TRUE
  ),
  sep = "\n"
)

unlink(project_root, recursive = TRUE)
```

---

module_registry	<i>'RAVE' module registry</i>
-----------------	-------------------------------

---

## Description

Create, view, or reserve the module registry

## Usage

```
module_registry(
  title,
  repo,
  modules,
  authors,
  url = sprintf("https://github.com/%s", repo)
)

module_registry2(repo, description)
```

```
get_modules_registries(update = NA)
```

```
get_module_description(path)
```

```
add_module_registry(title, repo, modules, authors, url, dry_run = FALSE)
```

### Arguments

title	title of the registry, usually identical to the description title in 'DESCRIPTION' or RAVE-CONFIG file
repo	'Github' repository
modules	characters of module ID, must only contain letters, digits, underscore, dash; must not be duplicated with existing registered modules
authors	a list of module authors; there must be one and only one author with 'cre' role (see <a href="#">person</a> ). This author will be considered maintainer, who will be in charge if editing the registry
url	the web address of the repository
update	whether to force updating the registry
path, description	path to 'DESCRIPTION' or RAVE-CONFIG file
dry_run	whether to generate and preview message content instead of opening an email link

### Details

A 'RAVE' registry contains the following data entries: repository title, name, 'URL', authors, and a list of module IDs. 'RAVE' requires that each module must use a unique module ID. It will cause an issue if two modules share the same ID. Therefore 'RAVE' maintains a public registry list such that the module maintainers can register their own module ID and prevent other people from using it.

To register your own module ID, please use `add_module_registry` to validate and send an email to the 'RAVE' development team.

### Value

a registry object, or a list of registries

### Examples

```
library(ravepipeline)

# create your own registry
module_registry(
  repo = "rave-ieeg/rave-pipelines",
  title = "A Collection of 'RAVE' Builtin Pipelines",
  authors = list(
    list("Zhengjia", "Wang", role = c("cre", "aut")),
```

```

        email = "dipterix@rave.wiki")
    ),
    modules = "brain_viewer"
)

## Not run:

# This example will need access to Github and will open an email link

# get current registries
get_modules_registries(FALSE)

# If your repository is on Github and RAVE-CONFIG file exists
module_registry2("rave-ieeg/rave-pipelines")

# send a request to add your registry
registry <- module_registry2("rave-ieeg/rave-pipelines")
add_module_registry(registry)

## End(Not run)

```

---

pipeline

*Creates 'RAVE' pipeline instance*

---

### Description

Set pipeline inputs, execute, and read pipeline outputs

### Usage

```

pipeline(
  pipeline_name,
  settings_file = "settings.yaml",
  paths = pipeline_root(),
  temporary = FALSE
)

pipeline_from_path(path, settings_file = "settings.yaml")

```

### Arguments

`pipeline_name` the name of the pipeline, usually title field in the 'DESCRIPTION' file, or the pipeline folder name (if description file is missing)

`settings_file` the name of the settings file, usually stores user inputs

paths	the paths to search for the pipeline, usually the parent directory of the pipeline; default is <code>pipeline_root</code> , which only search for pipelines that are installed or in current working directory.
temporary	see <code>pipeline_root</code>
path	the pipeline folder

**Value**

A `PipelineTools` instance

**Examples**

```
library(ravepipeline)

if(interactive()) {

  # ----- Set up a bare minimal example pipeline -----
  root_path <- tempdir()
  pipeline_root_folder <- file.path(root_path, "modules")

  # create pipeline folder
  pipeline_path <- pipeline_create_template(
    root_path = pipeline_root_folder, pipeline_name = "raveio_demo",
    overwrite = TRUE, activate = FALSE, template_type = "rmd-bare")

  # Set initial user inputs
  yaml::write_yaml(
    x = list(
      n = 100,
      pch = 16,
      col = "steelblue"
    ),
    file = file.path(pipeline_path, "settings.yaml")
  )

  # build the pipeline for the first time
  # this is a one-time setup
  pipeline_build(pipeline_path)

  # Temporarily redirect the pipeline project root
  # to `root_path`
  old_opt <- options("raveio.pipeline.project_root" = root_path)
  # Make sure the options are reset
  on.exit({ options(old_opt) })

  # Compile the pipeline document
  pipeline_render(
    module_id = "raveio_demo",
    project_path = root_path
  )

  ## Not run:
```

```
# Open web browser to see compiled report
utils::browseURL(file.path(pipeline_path, "main.html"))

## End(Not run)

# ----- Example starts -----

# Load pipeline
pipeline <- pipeline(
  pipeline_name = "raveio_demo",
  paths = pipeline_root_folder,
  temporary = TRUE
)

# Check which pipeline targets to run
pipeline$target_table

# Run to `plot_data`, RAVE pipeline will automatically
# calculate which up-stream targets need to be updated
# and evaluate these targets
pipeline$run("plot_data")

# Customize settings
pipeline$set_settings(pch = 2)

# Run again with the new inputs, since input_data does not change,
# the pipeline will skip that target automatically
pipeline$run("plot_data")

# Read intermediate data
head(pipeline$read("input_data"))

# or use `[ ]` to get results
pipeline[c("n", "pch", "col")]
pipeline[-c("input_data")]

# Check evaluating status
pipeline$progress("details")

# result summary & cache table
pipeline$result_table

# visualize the target dependency graph
pipeline$visualize(glimpse = TRUE)

# ----- Clean up -----
unlink(pipeline_path, recursive = TRUE)
}
```



---

pipeline-knitr-markdown

*Configure 'rmarkdown' files to build 'RAVE' pipelines*

---

## Description

Allows building 'RAVE' pipelines from 'rmarkdown' files. Please use it in 'rmarkdown' scripts only. Use [pipeline\\_create\\_template](#) to create an example.

## Usage

```
configure_knitr(languages = c("R", "python"))

pipeline_setup_rmd(
  module_id,
  env = parent.frame(),
  collapse = TRUE,
  comment = "#>",
  languages = c("R", "python"),
  project_path = getOption("raveio.pipeline.project_root", default =
    rs_active_project(child_ok = TRUE, shiny_ok = TRUE))
)

pipeline_render(
  module_id,
  ...,
  env = new.env(parent = parent.frame()),
  entry_file = "main.Rmd",
  project_path = getOption("raveio.pipeline.project_root", default =
    rs_active_project(child_ok = TRUE, shiny_ok = TRUE))
)
```

## Arguments

languages	one or more programming languages to support; options are 'R' and 'python'
module_id	the module ID, usually the name of direct parent folder containing the pipeline file
env	environment to set up the pipeline translator
collapse, comment	passed to set method of <a href="#">opts_chunk</a>
project_path	the project path containing all the pipeline folders, usually the active project folder
...	passed to internal function calls
entry_file	the file to compile; default is "main.Rmd"

**Value**

A function that is supposed to be called later that builds the pipeline scripts

**Examples**

```

configure_knitr("R")

## Not run:

# Requires to configure Python
configure_knitr("python")

# This function must be called in an Rmd file setup block
# for example, see
# https://rave.wiki/posts/customize_modules/python_module_01.html

pipeline_setup_rmd("my_module_id")

## End(Not run)

```

---

PipelineResult

*Pipeline result object*


---

**Description**

Pipeline result object

Pipeline result object

**Value**

TRUE if the target is finished, or FALSE if timeout is reached

**Public fields**

`progressor` progress bar object, usually generated a progress instance

`promise` a [promise](#) instance that monitors the pipeline progress

`verbose` whether to print warning messages

`names` names of the pipeline to build

`async_callback` function callback to call in each check loop; only used when the pipeline is running in `async=TRUE` mode

`check_interval` used when `async=TRUE` in [pipeline\\_run](#), interval in seconds to check the progress

**Active bindings**

`variables` target variables of the pipeline

`variable_descriptions` readable descriptions of the target variables

`valid` logical true or false whether the result instance hasn't been invalidated

`status` result status, possible status are 'initialize', 'running', 'finished', 'canceled', and 'errored'. Note that 'finished' only means the pipeline process has been finished.

`process` (read-only) process object if the pipeline is running in 'async' mode, or NULL; see `r_bg`.

**Methods****Public methods:**

- `PipelineResult$validate()`
- `PipelineResult$invalidate()`
- `PipelineResult$get_progress()`
- `PipelineResult$new()`
- `PipelineResult$run()`
- `PipelineResult$await()`
- `PipelineResult$print()`
- `PipelineResult$get_values()`
- `PipelineResult$clone()`

**Method** `validate()`: check if result is valid, raises errors when invalidated

*Usage:*

```
PipelineResult$validate()
```

**Method** `invalidate()`: invalidate the pipeline result

*Usage:*

```
PipelineResult$invalidate()
```

**Method** `get_progress()`: get pipeline progress

*Usage:*

```
PipelineResult$get_progress()
```

**Method** `new()`: constructor (internal)

*Usage:*

```
PipelineResult$new(path = character(0L), verbose = FALSE)
```

*Arguments:*

`path` pipeline path

`verbose` whether to print warnings

**Method** `run()`: run pipeline (internal)

*Usage:*

```

PipelineResult$run(
  expr,
  env = parent.frame(),
  quoted = FALSE,
  async = FALSE,
  process = NULL
)

```

*Arguments:*

expr expression to evaluate

env environment of expr

quoted whether expr has been quoted

async whether the process runs in other sessions

process the process object inherits [process](#), will be inferred from expr if process=NULL, and will raise errors if cannot be found

**Method** `await()`: wait until some targets get finished

*Usage:*

```
PipelineResult$await(names = NULL, timeout = Inf)
```

*Arguments:*

names target names to wait, default is NULL, i.e. to wait for all targets that have been scheduled

timeout maximum waiting time in seconds

**Method** `print()`: print method

*Usage:*

```
PipelineResult$print()
```

**Method** `get_values()`: get results

*Usage:*

```
PipelineResult$get_values(names = NULL, ...)
```

*Arguments:*

names the target names to read

... passed to [pipeline\\_read](#)

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

*Usage:*

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

*Arguments:*

deep Whether to make a deep clone.

---

PipelineTools	<i>Class definition for pipeline tools</i>
---------------	--------------------------------------------

---

**Description**

Class definition for pipeline tools

Class definition for pipeline tools

**Value**

The value of the inputs, or a list if key is missing

The values of the targets

A [PipelineResult](#) instance if `as_promise` or `async` is true; otherwise a list of values for input names

An environment of shared variables

See `type`

A table of the progress

Nothing

ancestor target names (including names)

A new pipeline object based on the path given

A new pipeline object based on the path given

the saved file path

the data if file is found or a default value

A list of key-value pairs

A list of the preferences. If `simplify` is true and `length if keys` is 1, then returns the value of that preference

logical whether the keys exist

**Active bindings**

`description` pipeline description

`settings_path` absolute path to the settings file

`extdata_path` absolute path to the user-defined pipeline data folder

`preference_path` directory to the pipeline preference folder

`target_table` table of target names and their descriptions

`result_table` summary of the results, including signatures of data and commands

`pipeline_path` the absolute path of the pipeline

`pipeline_name` the code name of the pipeline

## Methods

### Public methods:

- PipelineTools\$new()
- PipelineTools\$set\_settings()
- PipelineTools\$get\_settings()
- PipelineTools\$read()
- PipelineTools\$run()
- PipelineTools\$eval()
- PipelineTools\$shared\_env()
- PipelineTools\$python\_module()
- PipelineTools\$progress()
- PipelineTools\$attach()
- PipelineTools\$visualize()
- PipelineTools\$target\_ancestors()
- PipelineTools\$fork()
- PipelineTools\$fork\_to\_subject()
- PipelineTools\$with\_activated()
- PipelineTools\$clean()
- PipelineTools\$save\_data()
- PipelineTools\$load\_data()
- PipelineTools\$set\_preferences()
- PipelineTools\$get\_preferences()
- PipelineTools\$has\_preferences()
- PipelineTools\$clone()

### Method new(): construction function

#### Usage:

```
PipelineTools$new(
  pipeline_name,
  settings_file = "settings.yaml",
  paths = pipeline_root(),
  temporary = FALSE
)
```

#### Arguments:

`pipeline_name` name of the pipeline, usually in the pipeline 'DESCRIPTION' file, or pipeline folder name

`settings_file` the file name of the settings file, where the user inputs are stored

`paths` the paths to find the pipeline, usually the parent folder of the pipeline; default is `pipeline_root()`

`temporary` whether not to save paths to current pipeline root registry. Set this to TRUE when importing pipelines from subject pipeline folders

### Method set\_settings(): set inputs

#### Usage:

```
PipelineTools$set_settings(..., .list = NULL)
```

*Arguments:*

..., .list named list of inputs; all inputs should be named, otherwise errors will be raised

**Method** `get_settings()`: get current inputs

*Usage:*

```
PipelineTools$get_settings(key, default = NULL, constraint)
```

*Arguments:*

key the input name; default is missing, i.e., to get all the settings

default default value if not found

constraint the constraint of the results; if input value is not from constraint, then only the first element of constraint will be returned.

**Method** `read()`: read intermediate variables

*Usage:*

```
PipelineTools$read(var_names, ifnotfound = NULL, ...)
```

*Arguments:*

var\_names the target names, can be obtained via `x$target_table` member; default is missing, i.e., to read all the intermediate variables

ifnotfound variable default value if not found

... other parameters passing to [pipeline\\_read](#)

**Method** `run()`: run the pipeline

*Usage:*

```
PipelineTools$run(
  names = NULL,
  async = FALSE,
  as_promise = async,
  scheduler = c("none", "future", "clustermq"),
  type = c("smart", "callr", "vanilla"),
  envir = new.env(parent = globalenv()),
  callr_function = NULL,
  return_values = TRUE,
  ...
)
```

*Arguments:*

names pipeline variable names to calculate; default is to calculate all the targets

async whether to run asynchronous in another process

as\_promise whether to return a [PipelineResult](#) instance

scheduler, type, envir, callr\_function, return\_values, ... passed to [pipeline\\_run](#) if as\_promise is true, otherwise these arguments will be passed to [pipeline\\_run\\_bare](#)

**Method** `eval()`: run the pipeline in order; unlike `$run()`, this method does not use the targets infrastructure, hence the pipeline results will not be stored, and the order of names will be respected.

*Usage:*

```
PipelineTools$eval(
  names,
  env = parent.frame(),
  shortcut = FALSE,
  clean = TRUE,
  ...
)
```

*Arguments:*

`names` pipeline variable names to calculate; must be specified

`env` environment to evaluate and store the results

`shortcut` logical or characters; default is FALSE, meaning names and all the dependencies (if missing from `env`) will be evaluated; set to TRUE if only names are to be evaluated. When `shortcut` is a character vector, it should be a list of targets (including their ancestors) whose values can be assumed to be up-to-date, and the evaluation of those targets can be skipped.

`clean` whether to evaluate without polluting `env`

... passed to [pipeline\\_eval](#)

**Method** `shared_env()`: run the pipeline shared library in scripts starting with path R/shared

*Usage:*

```
PipelineTools$shared_env(callr_function = callr::r)
```

*Arguments:*

`callr_function` either `callr::r` or NULL; when `callr::r`, the environment will be loaded in isolated R session and serialized back to the main session to avoid contaminating the main session environment; when NULL, the code will be sourced directly in current environment.

**Method** `python_module()`: get 'Python' module embedded in the pipeline

*Usage:*

```
PipelineTools$python_module(
  type = c("info", "module", "shared", "exist"),
  must_work = TRUE
)
```

*Arguments:*

`type` return type, choices are 'info' (get basic information such as module path, default), 'module' (load module and return it), 'shared' (load a shared sub-module from the module, which is shared also in report script), and 'exist' (returns true or false on whether the module exists or not)

`must_work` whether the module needs to be existed or not. If TRUE, the raise errors when the module does not exist; default is TRUE, ignored when type is 'exist'.

**Method** `progress()`: get progress of the pipeline

*Usage:*

```
PipelineTools$progress(method = c("summary", "details"))
```

*Arguments:*



method either 'summary' or 'details'

**Method** `attach()`: attach pipeline tool to environment (internally used)

*Usage:*

```
PipelineTools$attach(env)
```

*Arguments:*

`env` an environment

**Method** `visualize()`: visualize pipeline target dependency graph

*Usage:*

```
PipelineTools$visualize(  
  glimpse = FALSE,  
  aspect_ratio = 2,  
  node_size = 30,  
  label_size = 40,  
  ...  
)
```

*Arguments:*

`glimpse` whether to glimpse the graph network or render the state

`aspect_ratio` controls node spacing

`node_size`, `label_size` size of nodes and node labels

... passed to [pipeline\\_visualize](#)

**Method** `target_ancestors()`: a helper function to get target ancestors

*Usage:*

```
PipelineTools$target_ancestors(names, skip_names = NULL)
```

*Arguments:*

`names` targets whose ancestor targets need to be queried

`skip_names` targets that are assumed to be up-to-date, hence will be excluded, notice this exclusion is recursive, that means not only `skip_names` are excluded, but also their ancestors will be excluded from the result.

**Method** `fork()`: fork (copy) the current pipeline to a new directory

*Usage:*

```
PipelineTools$fork(path, policy = "default")
```

*Arguments:*

`path` path to the new pipeline, a folder will be created there

`policy` fork policy defined by module author, see text file 'fork-policy' under the pipeline directory; if missing, then default to avoid copying `main.html` and `shared` folder

**Method** `fork_to_subject()`: fork (copy) the current pipeline to a 'RAVE' subject

*Usage:*

```
PipelineTools$fork_to_subject(
  subject,
  label = "NA",
  policy = "default",
  delete_old = FALSE,
  sanitize = TRUE
)
```

*Arguments:*

`subject` subject ID or instance in which pipeline will be saved

`label` pipeline label describing the pipeline

`policy` fork policy defined by module author, see text file 'fork-policy' under the pipeline directory; if missing, then default to avoid copying `main.html` and `shared` folder

`delete_old` whether to delete old pipelines with the same label default is false

`sanitize` whether to sanitize the registry at save. This will remove missing folders and import manually copied pipelines to the registry (only for the pipelines with the same name)

**Method** `with_activated()`: run code with pipeline activated, some environment variables and function behaviors might change under such condition (for example, `targets` package functions)

*Usage:*

```
PipelineTools$with_activated(expr, quoted = FALSE, env = parent.frame())
```

*Arguments:*

`expr` expression to evaluate

`quoted` whether `expr` is quoted; default is false

`env` environment to run `expr`

**Method** `clean()`: clean all or part of the data store

*Usage:*

```
PipelineTools$clean(
  destroy = c("all", "cloud", "local", "meta", "process", "preferences", "progress",
    "objects", "scratch", "workspaces"),
  ask = FALSE
)
```

*Arguments:*

`destroy`, `ask` see [tar\\_destroy](#)

**Method** `save_data()`: save data to pipeline data folder

*Usage:*

```
PipelineTools$save_data(
  data,
  name,
  format = c("json", "yaml", "csv", "fst", "rds"),
  overwrite = FALSE,
  ...
)
```

*Arguments:*

data R object  
 name the name of the data to save, must start with letters  
 format serialize format, choices are 'json', 'yaml', 'csv', 'fst', 'rds'; default is 'json'.  
 To save arbitrary objects such as functions or environments, use 'rds'  
 overwrite whether to overwrite existing files; default is no  
 ... passed to saver functions

**Method** `load_data()`: load data from pipeline data folder

*Usage:*

```
PipelineTools$load_data(
  name,
  error_if_missing = TRUE,
  default_if_missing = NULL,
  format = c("auto", "json", "yaml", "csv", "fst", "rds"),
  ...
)
```

*Arguments:*

name the name of the data  
 error\_if\_missing whether to raise errors if the name is missing  
 default\_if\_missing default values to return if the name is missing  
 format the format of the data, default is automatically obtained from the file extension  
 ... passed to loader functions

**Method** `set_preferences()`: set persistent preferences from the pipeline. The preferences should not affect how pipeline is working, hence usually stores minor variables such as graphic options. Changing preferences will not invalidate pipeline cache.

*Usage:*

```
PipelineTools$set_preferences(..., .list = NULL)
```

*Arguments:*

..., .list key-value pairs of initial preference values. The keys must start with 'global' or the module ID, followed by dot and preference type and names. For example 'global.graphics.continuous\_palette' for setting palette colors for continuous heat-map; "global" means the settings should be applied to all 'RAVE' modules. The module-level preference, 'power\_explorer.export.default\_format' sets the default format for power-explorer export dialogue.  
 name preference name, must contain only letters, digits, underscore, and hyphen, will be coerced to lower case (case-insensitive)

**Method** `get_preferences()`: get persistent preferences from the pipeline.

*Usage:*

```
PipelineTools$get_preferences(
  keys,
  simplify = TRUE,
  ifnotfound = NULL,
  validator = NULL,
  ...
)
```

*Arguments:*

keys characters to get the preferences  
 simplify whether to simplify the results when length of key is 1; default is true; set to false to always return a list of preferences  
 ifnotfound default value when the key is missing  
 validator NULL or function to validate the values; see 'Examples'  
 ... passed to validator if validator is a function

*Examples:*

```
library(ravepipeline)
if(interactive() && length(pipeline_list()) > 0) {
  pipeline <- pipeline("power_explorer")

  # set dummy preference
  pipeline$set_preferences("global.example.dummy_preference" = 1:3)

  # get preference
  pipeline$get_preferences("global.example.dummy_preference")

  # get preference with validator to ensure the value length to be 1
  pipeline$get_preferences(
    "global.example.dummy_preference",
    validator = function(value) {
      stopifnot(length(value) == 1)
    },
    ifnotfound = 100
  )

  pipeline$has_preferences("global.example.dummy_preference")
}
```

**Method** `has_preferences()`: whether pipeline has preference keys

*Usage:*

```
PipelineTools$has_preferences(keys, ...)
```

*Arguments:*

keys characters name of the preferences  
 ... passed to internal methods

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

*Usage:*

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

*Arguments:*

deep Whether to make a deep clone.

**See Also**

[pipeline](#)

**Examples**

```
## -----
## Method `PipelineTools$get_preferences`
## -----

library(ravepipeline)
if(interactive() && length(pipeline_list()) > 0) {
  pipeline <- pipeline("power_explorer")

  # set dummy preference
  pipeline$set_preferences("global.example.dummy_preference" = 1:3)

  # get preference
  pipeline$get_preferences("global.example.dummy_preference")

  # get preference with validator to ensure the value length to be 1
  pipeline$get_preferences(
    "global.example.dummy_preference",
    validator = function(value) {
      stopifnot(length(value) == 1)
    },
    ifnotfound = 100
  )

  pipeline$has_preferences("global.example.dummy_preference")
}
```

---

pipeline\_install      *Install 'RAVE' pipelines*

---

**Description**

Install 'RAVE' pipelines

**Usage**

```
pipeline_install_local(
  src,
  to = c("default", "custom", "workdir", "tempdir"),
  upgrade = FALSE,
  force = FALSE,
  set_default = NA,
  ...
)

pipeline_install_github(
  repo,
```

```

    to = c("default", "custom", "workdir", "tempdir"),
    upgrade = FALSE,
    force = FALSE,
    set_default = NA,
    ...
)

```

### Arguments

src	pipeline directory
to	installation path; choices are 'default', 'custom', 'workdir', and 'tempdir'. Please specify pipeline root path via <a href="#">pipeline_root</a> when 'custom' is used.
upgrade	whether to upgrade the dependence; default is FALSE for stability, however, it is highly recommended to upgrade your dependencies
force	whether to force installing the pipelines
set_default	whether to set current pipeline module folder as the default, will be automatically set when the pipeline is from the official 'Github' repository.
...	other parameters not used
repo	'Github' repository in user-repository combination, for example, 'rave-ieeg/rave-pipeline'

### Value

nothing

### Examples

```

## Not run:

pipeline_install_github("rave-ieeg/pipelines")

# or download github.com/rave-ieeg/pipelines repository, extract
# to a folder, and call
pipeline_install_local("path/to/pipeline/folder")

## End(Not run)

```

---

`pipeline_settings_get_set`*Get or change pipeline input parameter settings*

---

## Description

Get or change pipeline input parameter settings

## Usage

```
pipeline_settings_set(  
  ...,  
  pipeline_path = Sys.getenv("RAVE_PIPELINE", "."),  
  pipeline_settings_path = file.path(pipeline_path, "settings.yaml")  
)  
  
pipeline_settings_get(  
  key,  
  default = NULL,  
  constraint = NULL,  
  pipeline_path = Sys.getenv("RAVE_PIPELINE", "."),  
  pipeline_settings_path = file.path(pipeline_path, "settings.yaml")  
)
```

## Arguments

<code>pipeline_path</code>	the root directory of the pipeline
<code>pipeline_settings_path</code>	the settings file of the pipeline, must be a 'yaml' file; default is 'settings.yaml' in the current pipeline
<code>key, ...</code>	the character key(s) to get or set
<code>default</code>	the default value is key is missing
<code>constraint</code>	the constraint of the resulting value; if not NULL, then result must be within the constraint values, otherwise the first element of constraint will be returned. This is useful to make sure the results stay within given options

## Value

`pipeline_settings_set` returns a list of all the settings. `pipeline_settings_get` returns the value of given key.

## Examples

```
root_path <- tempfile()
```

```
pipeline_root_folder <- file.path(root_path, "modules")

# create pipeline folder
pipeline_path <- pipeline_create_template(
  root_path = pipeline_root_folder, pipeline_name = "raveio_demo",
  overwrite = TRUE, activate = FALSE, template_type = "rmd-bare")

# Set initial user inputs
yaml::write_yaml(
  x = list(
    n = 100,
    pch = 16,
    col = "steelblue"
  ),
  file = file.path(pipeline_path, "settings.yaml")
)

# build the pipeline for the first time
# this is a one-time setup
pipeline_build(pipeline_path)

# get pipeline settings
pipeline_settings_get(
  key = "n",
  pipeline_path = pipeline_path
)

# get variable with default if missing
pipeline_settings_get(
  key = "missing_variable",
  default = "missing",
  pipeline_path = pipeline_path
)

pipeline_settings_set(
  missing_variable = "A",
  pipeline_path = pipeline_path
)

pipeline_settings_get(
  key = "missing_variable",
  default = "missing",
  pipeline_path = pipeline_path
)

unlink(root_path, recursive = TRUE)
```



## Description

Utility functions for 'RAVE' pipelines, currently designed for internal development use. The infrastructure will be deployed to 'RAVE' in the future to facilitate the "self-expanding" aim. Please check the official 'RAVE' website.

## Usage

```
pipeline_root(root_path, temporary = FALSE)

pipeline_list(root_path = pipeline_root())

pipeline_find(name, root_path = pipeline_root())

pipeline_attach(name, root_path = pipeline_root())

pipeline_run(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  scheduler = c("none", "future", "clustermq"),
  type = c("smart", "callr", "vanilla"),
  envir = new.env(parent = globalenv()),
  callr_function = NULL,
  names = NULL,
  async = FALSE,
  check_interval = 0.5,
  progress_quiet = !async,
  progress_max = NA,
  progress_title = "Running pipeline",
  return_values = TRUE,
  ...
)

pipeline_clean(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  destroy = c("all", "cloud", "local", "meta", "process", "preferences", "progress",
    "objects", "scratch", "workspaces"),
  ask = FALSE
)

pipeline_run_bare(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  scheduler = c("none", "future", "clustermq"),
  type = c("smart", "callr", "vanilla"),
  envir = new.env(parent = globalenv()),
  callr_function = NULL,
  names = NULL,
  return_values = TRUE,
  ...
)
```

```
load_targets(..., env = NULL)

pipeline_target_names(pipe_dir = Sys.getenv("RAVE_PIPELINE", "."))

pipeline_debug(
  quick = TRUE,
  env = parent.frame(),
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  skip_names
)

pipeline_dep_targets(
  names,
  skip_names = NULL,
  pipe_dir = Sys.getenv("RAVE_PIPELINE", ".")
)

pipeline_eval(
  names,
  env = new.env(parent = parent.frame()),
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  settings_path = file.path(pipe_dir, "settings.yaml"),
  shortcut = FALSE
)

pipeline_visualize(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  glimpse = FALSE,
  targets_only = TRUE,
  shortcut = FALSE,
  zoom_speed = 0.1,
  ...
)

pipeline_progress(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  method = c("summary", "details", "custom"),
  func = targets::tar_progress_summary
)

pipeline_fork(
  src = Sys.getenv("RAVE_PIPELINE", "."),
  dest = tempfile(pattern = "rave_pipeline_"),
  policy = "default",
  activate = FALSE,
  ...
)
```

```
pipeline_build(pipe_dir = Sys.getenv("RAVE_PIPELINE", "."))

pipeline_read(
  var_names,
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  branches = NULL,
  ifnotfound = NULL,
  dependencies = c("none", "ancestors_only", "all"),
  simplify = TRUE,
  ...
)

pipeline_vartable(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  targets_only = TRUE,
  complete_only = FALSE,
  ...
)

pipeline_hasname(var_names, pipe_dir = Sys.getenv("RAVE_PIPELINE", "."))

pipeline_watch(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  targets_only = TRUE,
  ...
)

pipeline_create_template(
  root_path,
  pipeline_name,
  overwrite = FALSE,
  activate = TRUE,
  template_type = c("rmd", "r", "rmd-bare", "rmd-scheduler", "rmd-python")
)

pipeline_create_subject_pipeline(
  subject,
  pipeline_name,
  overwrite = FALSE,
  activate = TRUE,
  template_type = c("rmd", "r", "rmd-python")
)

pipeline_description(file)

pipeline_load_extdata(
  name,
```

```

    format = c("auto", "json", "yaml", "csv", "fst", "rds"),
    error_if_missing = TRUE,
    default_if_missing = NULL,
    pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
    ...
)

pipeline_save_extdata(
  data,
  name,
  format = c("json", "yaml", "csv", "fst", "rds"),
  overwrite = FALSE,
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  ...
)

pipeline_shared(
  pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  callr_function = callr::r
)

pipeline_set_preferences(
  ...,
  .list = NULL,
  .pipe_dir = Sys.getenv("RAVE_PIPELINE", "."),
  .preference_instance = NULL
)

pipeline_get_preferences(
  keys,
  simplify = TRUE,
  ifnotfound = NULL,
  validator = NULL,
  ...,
  .preference_instance = NULL
)

pipeline_has_preferences(keys, ..., .preference_instance = NULL)

```

### Arguments

<code>root_path</code>	the root directory for pipeline templates
<code>temporary</code>	whether not to save paths to current pipeline root registry. Set this to TRUE when importing pipelines from subject pipeline folders
<code>name, pipeline_name</code>	the pipeline name to create; usually also the folder
<code>pipe_dir, .pipe_dir</code>	where the pipeline directory is; can be set via system environment <code>Sys.setenv("RAVE_PIPELINE"=...)</code>

scheduler	how to schedule the target jobs: default is 'none', which is sequential. If you have multiple heavy-weighted jobs that can be scheduled at the same time, you can choose 'future' or 'clustermq'
type	how the pipeline should be executed; current choices are "smart" to enable 'future' package if possible, 'callr' to use <a href="#">r</a> , or 'vanilla' to run everything sequentially in the main session.
callr_function	function that will be passed to <a href="#">tar_make</a> ; will be forced to be NULL if type='vanilla', or <a href="#">r</a> if type='callr'
names	the names of pipeline targets that are to be executed; default is NULL, which runs all targets; use <code>pipeline_target_names</code> to check all your available target names.
async	whether to run pipeline without blocking the main session
check_interval	when running in background (non-blocking mode), how often to check the pipeline
progress_title, progress_max, progress_quiet	control the progress
return_values	whether to return pipeline target values; default is true; only works in <code>pipeline_run_bare</code> and will be ignored by <code>pipeline_run</code>
..., .list	other parameters, targets, etc.
destroy	what part of data repository needs to be cleaned
ask	whether to ask
env, envir	environment to execute the pipeline
quick	whether to skip finished targets to save time
skip_names	hint of target names to fast skip provided they are up-to-date; only used when <code>quick=TRUE</code> . If missing, then <code>skip_names</code> will be automatically determined
settings_path	path to settings file name within subject's pipeline path
shortcut	whether to display shortcut targets
glimpse	whether to hide network status when visualizing the pipelines
targets_only	whether to return the variable table for targets only; default is true
zoom_speed	zoom speed when visualizing the pipeline dependence
method	how the progress should be presented; choices are "summary", "details", "custom". If custom method is chosen, then <code>func</code> will be called
func	function to call when reading customized pipeline progress; default is <a href="#">tar_progress_summary</a>
src, dest	pipeline folder to copy the pipeline script from and to
policy	fork policy defined by module author, see text file 'fork-policy' under the pipeline directory; if missing, then default to avoid copying <code>main.html</code> and <code>shared</code> folder
activate	whether to activate the new pipeline folder from <code>dest</code> ; default is false
var_names	variable name to fetch or to check
branches	branch to read from; see <a href="#">tar_read</a>
ifnotfound	default values to return if variable is not found

dependencies	whether to load dependent targets, choices are 'none' (default, only load targets specified by names), 'ancestors_only' (load all but the ancestors targets), and 'all' (both targets and ancestors)
simplify	whether to simplify the output
complete_only	whether only to show completed and up-to-date target variables; default is false
overwrite	whether to overwrite existing pipeline; default is false so users can double-check; if true, then existing pipeline, including the data will be erased
template_type	which template type to create; choices are 'r' or 'rmd'
subject	character indicating valid 'RAVE' subject ID, or a RAVESubject instance
file	path to the 'DESCRIPTION' file under the pipeline folder, or pipeline collection folder that contains the pipeline information, structures, dependencies, etc.
format	format of the extended data, default is 'json', other choices are 'yaml', 'fst', 'csv', 'rds'
error_if_missing, default_if_missing	what to do if the extended data is not found
data	extended data to be saved
.preference_instance	internally used
keys	preference keys
validator	NULL or function to validate values

### Value

pipeline_root	the root directories of the pipelines
pipeline_list	the available pipeline names under pipeline_root
pipeline_find	the path to the pipeline
pipeline_run	a <a href="#">PipelineResult</a> instance
load_targets	a list of targets to build
pipeline_target_names	a vector of characters indicating the pipeline target names
pipeline_visualize	a widget visualizing the target dependence structure
pipeline_progress	a table of building progress
pipeline_fork	a normalized path of the forked pipeline directory
pipeline_read	the value of corresponding var_names, or a named list if var_names has more than one element
pipeline_vartable	a table of summaries of the variables; can raise errors if pipeline has never been executed
pipeline_hasname	logical, whether the pipeline has variable built
pipeline_watch	a basic shiny application to monitor the progress
pipeline_description	the list of descriptions of the pipeline or pipeline collection

---

rave-snippet	'RAVE' code snippets
--------------	----------------------

---

**Description**

Run snippet code

**Usage**

```
update_local_snippet(force = TRUE)
install_snippet(path)
list_snippets()
load_snippet(topic, local = TRUE)
```

**Arguments**

force	whether to force updating the snippets; default is true
path	for installing code snippets locally only; can be an R script, a zip file, or a directory
topic	snippet topic
local	whether to use local snippets first before requesting online repository

**Value**

load\_snippet returns snippet as a function, others return nothing

**Examples**

```
# This example script requires running in an interactive session
if(interactive()){
# ---- Example 1: Install built-in pipeline snippets -----
update_local_snippet(force = TRUE)

# ---- Example 2: Install customized pipeline snippets -----
snippets <- file.path(
  "https://github.com/rave-ieeg/rave-gists",
  "archive/refs/heads/main.zip",
  fsep = "/"
)
tempf <- tempfile(fileext = ".zip")
utils::download.file(url = snippets, destfile = tempf)

install_snippet(tempf)
```

```

}

# ---- List snippets -----

# list all topics
list_snippets()

# ---- Run snippets as functions -----

topic <- "image-burn-contacts-to-t1"

# check whether this example can run
# This snippet requires installing package `raveio`
# which is currently not on CRAN (soon it will)

condition_met <- topic %in% list_snippets() &&
  (system.file(package = "raveio") != "")

if( interactive() && condition_met ) {

  snippet <- load_snippet(topic)

  # Read snippet documentation
  print(snippet)

  results <- snippet(
    subject_code = "DemoSubject",
    project_name = "demo",
    save_path = NA,
    blank_underlay = FALSE
  )

  plot(results)
}

```

---

raveio-option

*Set/Get 'RAVE' option*


---

### Description

Persist settings on local configuration file

### Usage

```
raveio_setopt(key, value, .save = TRUE)
```



```

raveio_resetopt(all = FALSE)

raveio_getopt(key, default = NA, temp = TRUE)

raveio_confpath(cfile = "settings.yaml")

```

### Arguments

key	character, option name
value	character or logical of length 1, option value
.save	whether to save to local drive, internally used to temporary change option. Not recommended to use it directly.
all	whether to reset all non-default keys
default	is key not found, return default value
temp	when saving, whether the key-value pair should be considered temporary, a temporary settings will be ignored when saving; when getting options, setting temp to false will reveal the actual settings.
cfile	file name in configuration path

### Details

`raveio_setopt` stores key-value pair in local path. The values are persistent and shared across multiple sessions. There are some read-only keys such as "session\_string". Trying to set those keys will result in error.

The following keys are reserved by 'RAVE':

`data_dir` Directory path, where processed data are stored; default is at home directory, folder `~/rave_data/data_dir`

`raw_data_dir` Directory path, where raw data files are stored, mainly the original signal files and imaging files; default is at home directory, folder `~/rave_data/raw_dir`

`max_worker` Maximum number of CPU cores to use; default is one less than the total number of CPU cores

`mni_template_root` Directory path, where 'MNI' templates are stored

`raveio_getopt` returns value corresponding to the keys. If key is missing, the whole option will be returned.

If set `all=TRUE`, `raveio_resetopt` resets all keys including non-standard ones. However "session\_string" will never reset.

### Value

`raveio_setopt` returns modified value; `raveio_resetopt` returns current settings as a list; `raveio_confpath` returns absolute path for the settings file; `raveio_getopt` returns the settings value to the given key, or `default` if not found.

### Side-Effects

The following options will alter other packages and might cause changes in behaviors:

'disable\_fork\_clusters' This option will change the `options` 'dipsaus.no.fork' and 'dipsaus.cluster.backup', which handles the parallel computing

'threeBrain\_template\_subject' This option will set and persist option 'threeBrain.template\_subject', which changes the default group-level template brain.

### See Also

R\_user\_dir

### Examples

```
# get one RAVE option
ncore <- raveio_getopt("max_worker")
print(ncore)

# get all options
raveio_getopt()

# set option
raveio_setopt("disable_fork_clusters", FALSE)
```

---

ravepipeline-constants

*Constant variables used in 'RAVE' pipeline*

---

### Description

Regular expression PIPELINE\_FORK\_PATTERN defines the file matching rules when forking a pipeline; see [pipeline\\_fork](#) for details.

### Usage

```
PIPELINE_FORK_PATTERN
```

### Format

An object of class character of length 1.

---

`ravepipeline_finalize_installation`*Download 'RAVE' built-in pipelines and code snippets*

---

**Description**

The official built-in pipeline repository is located at <https://github.com/rave-ieeg/rave-pipelines>;  
The code snippet repository is located at <https://github.com/rave-ieeg/rave-gists>.

**Usage**

```
ravepipeline_finalize_installation(  
  upgrade = c("ask", "always", "never", "config-only", "data-only"),  
  async = FALSE,  
  ...  
)
```

**Arguments**

<code>upgrade</code>	rules to upgrade dependencies; default is to ask if needed
<code>async</code>	whether to run in the background; ignore for now
<code>...</code>	ignored; reserved for external calls.

**Value**

A list built-in pipelines will be installed, the function itself returns nothing.

**Examples**

```
## Not run:  
  
# This function requires connection to the Github, and must run  
# under interactive session since an user prompt will be displayed  
  
ravepipeline_finalize_installation()  
  
## End(Not run)
```

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