stpipe

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CHAPTER

ONE

API

1.1 stpipe API

1.1.1 stpipe Package

Classes

Pipeline(*args, **kwargs)	A Pipeline is a way of combining a number of steps together.
Step([name, parent, config_file, _validate_kwds])	

Pipeline

class stpipe.**Pipeline**(**args*, ***kwargs*)

Bases: *Step*

A Pipeline is a way of combining a number of steps together.

See *Step.__init__* for the parameters.

Attributes Summary

reference_file_types	Collect the list of all reftypes for child Steps that are not skipped.
spec	
step_defs	

Methods Summary

get_config_from_reference(dataset[, ...])	Retrieve step parameters from reference database
get_pars([full_spec])	Retrieve the configuration parameters of a pipeline
get_ref_override(reference_file_type)	Return any override for *reference_file_type* for any of the steps in Pipeline *self*.
load_spec_file([preserve_comments])	
merge_config(config, config_file)	
merge_pipeline_config(refcfg, ref_file)	Merge the config parameters from a pipeline config reference file into the config obtained from each step
set_input_filename(path)	

Attributes Documentation

reference_file_types: ClassVar

Collect the list of all reftypes for child Steps that are not skipped. Overridden reftypes are included but handled normally later by the Pipeline version of the get_ref_override() method defined below.

spec = '\n '

step_defs: ClassVar = {}

Methods Documentation

classmethod get_config_from_reference(*dataset*, *disable=None*, *crds_observatory=None*)

Retrieve step parameters from reference database

Parameters

cls
[*jwst.stpipe.step.Step*] Either a class or instance of a class derived from *Step*.

dataset
[*jwst.datamodels.ModelBase*] A model of the input file. Metadata on this input file will be used by the CRDS "bestref" algorithm to obtain a reference file.

disable: bool or None
Do not retrieve parameters from CRDS. If None, check global settings.

crds_observatory
[str] Observatory name ('jwst' or 'roman').

Returns

step_parameters
[configobj] The parameters as retrieved from CRDS. If there is an issue, log as such and return an empty config obj.

get_pars(*full_spec=True*)

Retrieve the configuration parameters of a pipeline

Parameters are retrieved for the pipeline and all of its component steps.

Parameters

full_spec
[bool] Return all parameters, including parent-specified parameters. If *False*, return only parameters specific to the pipeline and steps.

Returns

pars
[dict] Keys are the parameters and values are the values.

`get_ref_override`(*reference_file_type*)

Return any override for *reference_file_type* for any of the steps in Pipeline *self*. OVERRIDES Step.

Returns

override_filepath or None.

`classmethod load_spec_file`(*preserve_comments=<stpipe.utilities._NotSet object>*)

`classmethod merge_config`(*config*, *config_file*)

`classmethod merge_pipeline_config`(*refcfg*, *ref_file*)

Merge the config parameters from a pipeline config reference file into the config obtained from each step

Parameters

cls
[jwst.stpipe.pipeline.Pipeline class] The pipeline class

refcfg
[ConfigObj object] The ConfigObj created from crds cfg files from each of the steps in the pipeline

ref_file
[string] The name of the pipeline crds step config file

Returns

ConfigObj of the merged parameters, with those from the pipeline cfg having precedence over those from the individual steps

`set_input_filename`(*path*)

Step

`class stpipe.Step`(*name=None*, *parent=None*, *config_file=None*, *_validate_kwds=True*, ***kws*)

Bases: `object`

Create a *Step* instance.

Parameters

name
[str, optional] The name of the Step instance. Used in logging messages and in cache filenames. If not provided, one will be generated based on the class name.

parent
[Step instance, optional] The parent step of this step. Used to determine a fully-qualified name for this step, and to determine the mode in which to run this step.

config_file
[str or pathlib.Path, optional] The path to the config file that this step was initialized with. Use to determine relative path names of other config files.

****kws**
[dict] Additional parameters to set. These will be set as member variables on the new Step instance.

Attributes Summary

class_alias	
correction_pars	
input_dir	
log_records	Retrieve logs from the most recent run of this step.
make_output_path	Return function that creates the output path
name_format	
prefetch_references	
reference_file_types	
spec	
use_correction_pars	

Methods Summary

__call__(*args)	Run handles the generic setup and teardown that happens with the running of each step.
build_config(input, **kwargs)	Build the ConfigObj to initialize a Step
call(*args, **kwargs)	Creates and runs a new instance of the class.
closeout([to_close, to_del])	Close out step processing
default_output_file([input_file])	Create a default filename based on the input name
default_suffix()	Return a default suffix based on the step
export_config(filename[, include_metadata])	Export this step's parameters to an ASDF config file.
finalize_result(result, reference_files_used)	Hook that allows subclasses to set mission-specific metadata on each step result before that result is saved.
from_cmdline(args)	Create a step from a configuration file.
from_config_file(config_file[, parent, name])	Create a step from a configuration file.
from_config_section(config[, parent, name, ...])	Create a step from a configuration file fragment.
get_config_from_reference(dataset[, ...])	Retrieve step parameters from reference database
get_config_reftype()	Get the CRDS reftype for this step's config reference.
get_pars([full_spec])	Retrieve the configuration parameters of a step
get_ref_override(reference_file_type)	Determine and return any override for *reference_file_type*.

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Table 1 – continued from previous page

get_reference_file(input_file, ...)	Get a reference file from CRDS.
load_spec_file([preserve_comments])	
make_input_path(file_path)	Create an input path for a given file path
merge_config(config, config_file)	
open_model(init, **kwargs)	Open a datamodel
prefetch(*args)	Prefetch reference files, nominally called when self.prefetch_references is True.
print_configspec()	
process(*args)	This is where real work happens.
reference_uri_to_cache_path(reference_uri, ...)	Convert an abstract CRDS reference URI to an absolute file path in the CRDS cache.
remove_suffix(name)	Remove a known Step filename suffix from a filename (if present).
resolve_file_name(file_name)	Resolve a file name expressed relative to this Step's configuration file.
run(*args)	Run handles the generic setup and teardown that happens with the running of each step.
save_model(model[, suffix, idx, ...])	Saves the given model using the step/pipeline's naming scheme
search_attr(attribute[, default, parent_first])	Return first non-None attribute in step hierarchy
set_primary_input(obj[, exclusive])	Sets the name of the master input file and input directory.
update_pars(parameters)	Update step parameters

Attributes Documentation

class_alias = None

correction_pars = None

input_dir

log_records

Retrieve logs from the most recent run of this step.

Returns

list of logging.LogRecord

make_output_path

Return function that creates the output path

name_format = None

prefetch_references = True

reference_file_types: ClassVar = []

```
spec = '\n pre_hooks = list(default=list()) # List of Step classes to run before
step\n post_hooks = list(default=list()) # List of Step classes to run after step\n
output_file = output_file(default=None) # File to save output to.\n output_dir =
string(default=None) # Directory path for output files\n output_ext = string() #
Default type of output\n output_use_model = boolean(default=False) # When saving use
`DataModel.meta.filename`\n output_use_index = boolean(default=True) # Append
index.\n save_results = boolean(default=False) # Force save results\n skip =
boolean(default=False) # Skip this step\n suffix = string(default=None) # Default
suffix for output files\n search_output_file = boolean(default=True) # Use
outputfile define in parent step\n input_dir = string(default=None) # Input
directory\n '

use_correction_pars = False
```

Methods Documentation

__call__(**args*)

Run handles the generic setup and teardown that happens with the running of each step. The real work that is unique to each step type is done in the *process* method.

classmethod build_config(*input*, ***kwargs*)

Build the ConfigObj to initialize a Step

A Step config is built in the following order:

- CRDS parameter reference file
- Local parameter reference file
- Step keyword arguments

Parameters

input
[str or None] Input file

kwargs
[dict] Keyword arguments that specify Step parameters.

Returns

config, config_file
[ConfigObj, str] The configuration and the config filename.

classmethod call(**args*, ***kwargs*)

Creates and runs a new instance of the class.

Gets a config file from CRDS if one is available

To set configuration parameters, pass a *config_file* path or keyword arguments. Keyword arguments override those in the specified *config_file*.

Any positional **args* will be passed along to the step's *process* method.

Note: this method creates a new instance of *Step* with the given *config_file* if supplied, plus any extra **args* and ***kwargs*. If you create an instance of a Step, set parameters, and then use this *call()* method, it will ignore previously-set parameters, as it creates a new instance of the class with only the *config_file*, **args* and ***kwargs* passed to the *call()* method.

If not used with a *config_file* or specific **args* and ***kwargs*, it would be better to use the *run* method, which does not create a new instance but simply runs the existing instance of the *Step* class.

`closeout`(*to_close=None*, *to_del=None*)

Close out step processing

Parameters

to_close
[[object(, ...)]] List of objects with a *close* method to execute The objects will also be deleted

to_del
[[object(, ...)]] List of objects to simply delete

Notes

Other operations, such as forced garbage collection will also be done.

`default_output_file`(*input_file=None*)

Create a default filename based on the input name

`default_suffix`()

Return a default suffix based on the step

`export_config`(*filename*, *include_metadata=False*)

Export this step's parameters to an ASDF config file.

Parameters

filename
[str or pathlib.Path] Path to config file.

include_metadata
[bool, optional] Set to True to include metadata that is required for submission to CRDS.

`finalize_result`(*result*, *reference_files_used*)

Hook that allows subclasses to set mission-specific metadata on each step result before that result is saved.

Parameters

result
[a datamodel that is an instance of AbstractDataModel or] collections.abc.Sequence One step result (potentially of many).

reference_files_used
[list of tuple] List of reference files used when running the step, each a tuple in the form (str reference type, str reference URI).

`static from_cmdline`(*args*)

Create a step from a configuration file.

Parameters

args
[list of str] Commandline arguments

Returns

step
[Step instance] If the config file has a *class* parameter, the return value will be as instance of that class.

Any parameters found in the config file will be set as member variables on the returned *Step* instance.

`classmethod from_config_file`(*config_file*, *parent=None*, *name=None*)

Create a step from a configuration file.

Parameters

config_file
[path or readable file-like object] The config file to load parameters from

parent
[Step instance, optional] The parent step of this step. Used to determine a fully-qualified name for this step, and to determine the mode in which to run this step.

name
[str, optional] If provided, use that name for the returned instance. If not provided, the following are tried (in order): - The *name* parameter in the config file - The filename of the config file - The name of returned class

Returns

step
[Step instance] If the config file has a *class* parameter, the return value will be as instance of that class. The *class* parameter in the config file must specify a subclass of *cls*. If the configuration file has no *class* parameter, then an instance of *cls* is returned.

Any parameters found in the config file will be set as member variables on the returned *Step* instance.

`classmethod from_config_section`(*config*, *parent=None*, *name=None*, *config_file=None*)

Create a step from a configuration file fragment.

Parameters

config
[configobj.Section instance] The config file fragment containing parameters for this step only.

parent
[Step instance, optional] The parent step of this step. Used to determine a fully-qualified name for this step, and to determine the mode in which to run this step.

name
[str, optional] If provided, use that name for the returned instance. If not provided, try the following (in order): - The `name` parameter in the config file fragment - The name of returned class

config_file
[str or pathlib.Path, optional] The path to the config file that created this step, if any. This is used to resolve relative file name parameters in the config file.

Returns

step
[instance of cls] Any parameters found in the config file fragment will be set as member variables on the returned *Step* instance.

classmethod get_config_from_reference(*dataset*, *disable=None*, *crds_observatory=None*)

Retrieve step parameters from reference database

Parameters

cls
[stpipe.Step] Either a class or instance of a class derived from *Step*.

dataset
[A datamodel that is an instance of AbstractDataModel] A model of the input file. Metadata on this input file will be used by the CRDS "bestref" algorithm to obtain a reference file.

disable: bool or None
Do not retrieve parameters from CRDS. If None, check global settings.

crds_observatory
[str] Observatory name ('jwst' or 'roman').

Returns

step_parameters
[configobj] The parameters as retrieved from CRDS. If there is an issue, log as such and return an empty config obj.

classmethod get_config_reftype()

Get the CRDS reftype for this step's config reference.

Returns

str

get_pars(*full_spec=True*)

Retrieve the configuration parameters of a step

Parameters

full_spec
[bool] Return all parameters, including parent-specified parameters. If *False*, return only parameters specific to the step.

Returns

dict
Keys are the parameters and values are the values.

get_ref_override(*reference_file_type*)

Determine and return any override for *reference_file_type*.

Returns

override_filepath or None.

get_reference_file(*input_file*, *reference_file_type*)

Get a reference file from CRDS.

If the configuration file or commandline parameters override the reference file, it will be automatically used when calling this function.

Parameters

input_file
[a datamodel that is an instance of AbstractDataModel] A model of the input file. Metadata on this input file will be used by the CRDS "bestref" algorithm to obtain a reference file.

reference_file_type
[string] The type of reference file to retrieve. For example, to retrieve a flat field reference file, this would be 'flat'.

Returns

reference_file
[path of reference file, a string]

classmethod load_spec_file(*preserve_comments=<stpipe.utilities._NotSet object>*)

make_input_path(*file_path*)

Create an input path for a given file path

If *file_path* has no directory path, use *self.input_dir* as the directory path.

Parameters

file_path
[str or obj] The supplied file path to check and modify. If anything other than *str*, the object is simply passed back.

Returns

full_path
[str or obj] File path using *input_dir* if the input had no directory path.

classmethod merge_config(*config*, *config_file*)

open_model(*init*, ***kwargs*)

Open a datamodel

Primarily a wrapper around *DataModel.open* to handle *Step* peculiarities

Parameters

init
[object] The object to open

Returns

datamodel
[instance of AbstractDataModel] Object opened as a datamodel

prefetch(**args*)

Prefetch reference files, nominally called when self.prefetch_references is True. Can be called explicitly when self.prefetch_refences is False.

classmethod print_configspec()

process(**args*)

This is where real work happens. Every Step subclass has to override this method. The default behaviour is to raise a NotImplementedError exception.

classmethod reference_uri_to_cache_path(*reference_uri*, *observatory*)

Convert an abstract CRDS reference URI to an absolute file path in the CRDS cache. Reference URI's are typically output to dataset headers to record the reference files used.

e.g. 'crds://jwst_miri_flat_0177.fits' –>
'/grp/crds/cache/references/jwst/jwst_miri_flat_0177.fits'

The CRDS cache is typically located relative to env var CRDS_PATH with default value /grp/crds/cache. See also https://jwst-crds.stsci.edu

`static remove_suffix(name)`

Remove a known Step filename suffix from a filename (if present).

Parameters

name
[str] Filename.

Returns

str
Filename with any known suffix removed.

str
Separator that delimited the original suffix.

`resolve_file_name(file_name)`

Resolve a file name expressed relative to this Step's configuration file.

`run(*args)`

Run handles the generic setup and teardown that happens with the running of each step. The real work that is unique to each step type is done in the *process* method.

`save_model(model, suffix=None, idx=None, output_file=None, force=False, format=None, **components)`

Saves the given model using the step/pipeline's naming scheme

Parameters

model
[a instance of AbstractDataModel] The model to save.

suffix
[str] The suffix to add to the filename.

idx
[object] Index identifier.

output_file
[str] Use this file name instead of what the Step default would be.

force
[bool] Regardless of whether *save_results* is *False* and no *output_file* is specified, try saving.

format
[str] The format of the file name. This is a format string that defines where *suffix* and the other components go in the file name. If False, it will be presumed *output_file* will have all the necessary formatting.

components
[dict] Other components to add to the file name.

Returns

output_paths
[[str[, ...]]] List of output file paths the model(s) were saved in.

`search_attr(attribute, default=None, parent_first=False)`

Return first non-None attribute in step hierarchy

Parameters

attribute
[str] The attribute to retrieve

default
[obj] If attribute is not found, the value to use

parent_first
[bool] If *True*, allow parent definition to override step version

Returns

value
[obj] Attribute value or *default* if not found

`set_primary_input`(*obj*, *exclusive=True*)

Sets the name of the master input file and input directory. Used to generate output file names.

Parameters

obj
[str, pathlib.Path, or instance of AbstractDataModel] The object to base the name on. If a datamodel, use Datamodel.meta.filename.

exclusive
[bool] If True, only set if an input name is not already used by a parent Step. Otherwise, always set.

`update_pars`(*parameters*)

Update step parameters

Only existing parameters are updated. Otherwise, new keys found in *parameters* are ignored.

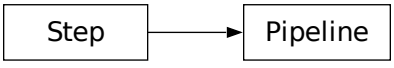
Parameters

parameters
[dict] Parameters to update.

Notes

parameters is presumed to have been produced by the *Step.get_pars* method. As such, the "steps" key is treated special in that it is a dict whose keys are the steps assigned directly as parameters to the current step. This is standard practice for *Pipeline*-based steps.

Class Inheritance Diagram



CHAPTER

TWO

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