
configfetch Documentation

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Helper to get values from *configparser* and *argparse*.

CHAPTER 1

Overview

This library helps to build and access configuration data.

It reads specially formatted configuration data, creates `configparser.ConfigParser` object, and keeps corresponding metadata.

The metadata are used for automatic config value conversion, and `argparse.ArgumentParser` building.

All value accesses are done by dot access or `.get()` method.

Commandline arguments and Environment Variables precedes config option values, in that order.

1.1 Installation

It is a single file Python module, with no other external library dependency.

Python 3.6 and above are supported.

```
pip install configfetch
```

1.2 Usage

1.2.1 dict fromat

```
>>> data = {
    'section1': {
        'log': {
            'func': ['bool'],
            'value': 'no',
        },
        'users': {
```

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```

        'func': ['comma'],
        'value': 'Alice, Bob, Charlie',
    },
    'output': {
        'argparse': {
            'help': 'output format when saving data to a file',
            'names': 'o',
            'choices': 'html, csv, text',
            'default': 'html',
        },
        'value': '',
    },
},
}
>>> import configfetch
>>> builder = configfetch.DictOptionBuilder
>>> conf = configfetch.fetch(data, option_builder=builder)
>>> conf.section1.log
False
>>> conf.section1.users
['Alice', 'Bob', 'Charlie']
>>> conf.section1.output
''

```

The library needs special dictionaries, which must have sub-sub-dictionaries as `configparser`'s option value counterparts.

the keys are 'argparse', 'func' and 'value'. 'value' key is required, others are optional.

'value' values are always string, since they become `configparser`'s option values. (INI format values are always string).

'func' values are always list. Each members are, again, string, some built-in function names or ones you created and registered.

'argparse' values are dictionaries. Each key-values can be passed to `argparse.ArgumentParser.add_argument()`. But it is not done automatically. So they are doing nothing for now.

1.2.2 FINI format

Or you can do the same thing, from a kind of INI format file or string.

```

## myapp.ini
[section1]
log=          :: f: bool
               no

users=         :: f: comma
               Alice, Bob, Charlie

output=        : output format
               : when saving data
               : to a file.
               :: names: o
               :: choices: html, csv, text
               :: default: html

```



```
>>> import configfetch
>>> conf = configfetch.fetch('myapp.ini')
>>> conf.section1.log
False
>>> conf.section1.users
['Alice', 'Bob', 'Charlie']
>>> conf.section1.output
''
```

'<something>': is the same as `argparse['help']` key value. For maximum readability it is specially treated.

':: :f <something>': is the same as 'func' key value.

':: <key>: <value>': is the same as other 'argparse' key-value pairs.

Let's call this customized format, as FINI (Fetch-INI) format.

1.2.3 With argparse

1. Create `ConfigFetch` object, providing config files.
2. Create `argparse.ArgumentParser`.
3. `ConfigFetch.build_arguments` (populate `ArgumentParser` with argument definitions).
4. `ArgumentParser.parse_args` etc. (actually parse commandline).
5. `ConfigFetch.set_arguments`, with the new parsed commandline args.

Note: Commandline options may specify where and how config files are loaded, like '`--userdir`' or '`--nouserdir`'. In this case, you have to initialize `ConfigFetch` in two-pass.

In (1) above, just read the canonical (default) config file.

And after (5), read other config files.

```
# myapp.ini
[section1]
log=          : log the program
               :: f: bool
               no

users=        : assign users
               :: f: comma
               Alice, Bob, Charlie

output=       : output format
               : when saving data
               : to a file.
               :: names: o
               :: choices: html, csv, text
               :: default: html
```

```
>>> import configfetch
>>> conf = configfetch.fetch('myapp.ini')
>>> import argparse
```

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```
>>> parser = argparse.ArgumentParser()
>>> parser = conf.build_arguments(argument_parser=parser)
>>> args = parser.parse_args(['--log', '--users', 'Dan, Eve'])
>>> conf.set_arguments(args)
>>> conf.section1.log
True
>>> conf.section1.users
['Dan', 'Eve']
>>> conf.section1.output
'html'
```

1.3 API Overview

The main constructs of this module are:

class ConfigFetch Read config files, and behave as a `conf` data object.

See [API](#) for details.

class Func Keep conversion functions and apply them to values.

See [Builtin Function](#) for included functions.

See [User Functions](#) for customization example.

function fetch Shortcut. Using `ConfigFetch`, return `conf` object.

See [API](#) for details.

1.4 Value Selection

`ArgumentParser` options and environment variable keys (`args` and `envs`) are always global, searched for in every section lookup.

1.4.1 Section

In the first access on `conf`, a section representation object (`SectionProxy`) is returned. `args` and `envs` are not involved.

dot access (`.__getattr__(section)`) raise `NoSectionError`, when the section is not found.

.get (`(section)`) return `None`, when the section is not found.

1.4.2 Option

In the option access (the first access on `SectionProxy`), `args`, `envs`, and the section `section` are searched in order, and the first valid one is *selected* (but not yet *returned*).

If `args` has the key, and the value is not `None`, it is selected (`arg`).

(Note other non-values (`' '`, `[]` or `False`) are selected.)

If `envs` has the key, and the value is not `' '`, it is selected (`env`).

If `section` (or `Default` `section`) has the key, the value is selected (`opt`).

Otherwise:

```
dot access (.__getattr__(option)) raise NoOptionError
.get(option, fallback=_UNSET) raise NoOptionError, when fallback is not provided
(_UNSET). Otherwise, fallback is selected.
```

1.4.3 Nonstring

If the selected value is `arg`, and it is not a string, the value is *returned* as is. (`env` and `opt` are always a string.)

So `ArgumentParser` arguments that convert the value type are just passed through.

1.4.4 ArgumentParser Details

Normally it is better not to supply default argument of `ArgumentParser.add_argument()`. If it is supplied, `arg` is always selected. Either the value in the commandline, or the default value.

Also take note that `store_true` and `store_false` actions default to `False` and `True` respectively. They are always selected, and in their case, always returned. (above `Nonstring` rule).

If this is not desirable, use `store_const` instead. E.g.:

```
parser.add_argument('--log', action='store_const', const='true')
```

Note: Paul Jacobson (hpaulj), active in `argparse` development, discourages `store_true` and `store_false` in a different context. See [a stackoverflow.](#)

In most cases, you can delegate conversion to `conf`, by conforming to the designated `FINI` format. E.g.

```
# myapp.ini
file=    :: f: comma
         a.txt, b.txt, c.txt

# myapp.py
parser.add_argument('--file', action='store')

# terminal
$ myapp.py --file 'a.txt, b.txt, c.txt'
```

instead of:

```
parser.add_argument('--file', action='store', nargs='+')

$ myapp.py --file a.txt b.txt c.txt
```

or:

```
parser.add_argument('--file', action='append')

$ myapp.py --file a.txt --file b.txt --file c.txt
```

1.4.5 Conversion

The selected value is passed to the function conversion check.

If no function is registered, the value is *returned*.

If functions are registered, the value is applied to each function, left to right in order, then the resultant value is *returned*.

1.4.6 Function

Function names are searched in `Func` or a subclass methods.

Functions always have one argument `value`, that is a *selected* value. And they return one value. It either *returns* to the caller as the end result, or is used as the `value` of the next function, if any.

Functions can also access `values`, the original three elements list before selection (`[arg, env, opt]`). Use `Func.values` attribute.

1.4.7 Concatenation

The first function must accept raw string value (initial value) as its `value` argument.

The second function and after may define any value type for its `value` argument.

But what actually comes as `value` is, of course, dependent on the previous function.

So in general users should follow the concatenation rules each function expects.

1.5 Builtin Functions

All builtin functions except `bar`, expect a string as `value`.

`bar` expects a list of strings as `value`.

bool (*value*)

return `True`, `False` or `None`.

'1', 'yes', 'true', 'on' are `True`.

'0', 'no', 'false', 'off' are `False`.

Case insensitive.

As a special case blank string (' ') returns `None`.

Other values raise an error.

int (*value*)

return integer from integer number string.

blank string (' ') returns `None`.

float (*value*)

return float number from float number string.

blank string (' ') returns `None`.

comma (*value*)

Return a list using commas as separators. No comma value returns one element list. Blank value returns a blank list (`[]`).

Leading and tailing whitespaces are stripped from each element.

If the previous character is `'\'`, `'`, `'` is a literal comma, not a separator. This `'\'` is discarded.

Any other `'\'` is kept as is.

```
'aa, bb'    ->    ['aa', 'bb']
r'aa\, bb'  ->    ['aa, bb']
r'aa\\, bb' ->    [r'aa\, bb']

r'a\a'      ->    [r'a\a'])
r'a\\a'     ->    [r'a\\a'])
```

line (*value*)

Return a list using line breaks as separators. No line break value returns one element list. Blank value returns a blank list (`[]`).

Leading and tailing whitespaces and *commas* are stripped from each element.

The escaping behavior with `'\'` is the same as `comma`.

bar (*value*)

Concatenate with bar (`'|'`).

Receive a list of strings as *value*, return a string.

One element list returns that element. Blank list returns `' '`.

```
scheme=      :: f: comma, bar
              https?, ftp, mailto
```

```
>>> conf.section1.scheme
'https?|ftp|mailto'
```

cmd (*value*)

Return a list of strings ready to put in `subprocess`.

Users have to write strings as in a terminal (quotes and escapes).

Note `'#'` and after are comments, they are discarded.

Example:

```
command=      :: f: cmd
              echo -e '"I have a dream.", he said.\n'
```

```
>>> conf.section1.command
['echo', '-e', '"I have a dream.", he said.\n']
```

cmds (*value*)

Return a list of list of strings.

List version of `cmd`. The input value is a list of strings, with each item made into a list by `cmd`.

fmt (*value*)

return a string processed by `str.format`, using `fmts` dictionary. E.g.

```
# myapp.ini
css=          :: f: fmt
              {USER}/data/my.css
```

```
# myapp.py
fmts = {'USER': '/home/john'}
```

```
>>> conf.section1.css
'/home/john/data/my.css'
```

plus (*value*)

receive *value* as argument, but actually it doesn't use this, and use values instead (a [arg, env, opt] list before selection).

Let's call an item starting with '+' as *plus item*, one starting with '-' as *minus item*, and others as *normal item*.

It reads each value in values in order, and:

- 1) It makes a list using the same mechanism as `comma`.
- 2) If items in the list are all *normal items*, then the list overwrites the previous list.
- 3) If they consist only of *plus items* or *minus items*, then it adds *plus items* to, and subtracts *minus items* from, the previous list.
- 4) Otherwise (mixing cases), it raises error.

Adding existing items, or subtracting nonexistent items doesn't cause errors. It just ignores them.

Example:

```
'Alice, Bob, Charlie'  --> ['Alice', 'Bob', 'Charlie']
'-Alice, +Dave'        --> ['Bob', 'Charlie', 'Dave']
'+Bob'                 --> ['Bob', 'Charlie', 'Dave']
'-Xavier'              --> ['Bob', 'Charlie', 'Dave']
'Judy, Malloy, Niaj'   --> ['Judy', 'Malloy', 'Niaj']
```

1.6 User Functions

When registering user functions,

- 1) add them in a `Func` subclass
- 2) put `register()` decorator above the function
- 3) and call `ConfigFetch` with that subclass.

Example:

```
## myapp.ini
[section1]
search=      :: f: glob
              python
```

```
## myapp.py
import configfetch
```

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```
class MyFunc(configfetch.Func):

    @configfetch.register
    def glob(self, value):
        if not value.startswith('*'):
            value = '*' + value
        if not value.endswith('*'):
            value = value + '*'
        return value

conf = configfetch.fetch('myapp.ini', Func=MyFunc)
```

```
# terminal
>>> import myapp
>>> conf = myapp.conf
>>> conf.section1.search
'*python*'
```

1.7 FINI Syntax

FINI uses `' : '` and `' :: '` as keywords, designating metadata line (a space is required). It is configurable on subclasses.

All metadata types are optional, but must follow the predetermined order.

```
(help)
(args)
(func)
value
```

`args` means here, arguments for `argparse.ArgumentParser.add_argument`. `help` is actually one of them, but specially treated.

help: Following string from `' : '` is help. You can repeat help on several lines. Strings are joined with newlines.

args: `' :: <name>: <value>'` is parsed into a dictionary item, with some value type conversion, if `<name>` is not `'f'`.

`<name>` should be key for the argument (nargs, choices, etc.). special `<name> 'names'` is used for [name or flags](#), with the option name added to the last.

(E.g. `'output'` option in the [Usage example](#) of the document top has `' :: names: o'`, so argument names becomes `['-o', '--output']`).

func: Following string from `' :: f: '` is comma separated function names to process the option value.

value: actual option value.

1.8 Configuring Arguments

Excluding Environment Variables, there are three kinds of option types.

1. Config-only options

2. Commandline-only options
3. Common options (to commandline and config file)

1.8.1 For FINI format (FiniOptionBuilder)

1:

If you don't provide 'help' option line to an option, it is not exposed for building process. So that makes 1. config-only options.

2:

If you can ignore the config option (separating it in a specially chosen section, say, '[_command_only]'), it veritably makes 2. commandline-only options.

For this, since it is unrelated to the INI format limitations, you can use any `add_argument` arguments.

But data types have to be guessed from INI string values none the less, only simple cases are feasible (E.g. In ' : : const: 1', is '1' int or str?).

See source code (`FiniOptionBuilder._convert_arg`) for details.

3:

For all common options:

- As already said, help is required.
- You can always add names.

They are divided in two: boolean options and non-boolean options.

- For non-boolean options:

They are all treated as `action='store', nargs=None`, which is `argparse` default. Optionally you can only add choices.

- For boolean options:

If it has `bool` in `func`, it is a boolean option, and the option is interpreted as flag (with no `option_argument`).

`action` is always `store_const`, `const` is 'yes' (which will be converted to `True` when getting value).

```
log=      : log events
          :: f: bool
          yes
```

becomes:

```
[...].add_argument('--log', action='store_const', const='yes')
```

If there is `dest` argument, it is interpreted as opposite flag. `const` becomes 'no' (converted to `False`).

```
no_log=   : do not log events
          :: dest: log
          :: f: bool
          no
```

becomes:


```
[...].add_argument('--no-log', action='store_const', const='no', dest='log')
```

1.8.2 For dictionary (DictOptionBuilder)

1:

If you don't provide 'argparse' key to an option, it is not exposed for building process. So that makes 1. config-only options.

—

Otherwise, DictOptionBuilder enforces no rules, and provide no smart argument adjustments (exactly as you provided).

Although, using in the same restrictions as FINI format is generally presupposed and recommended.

1.9 API

1.9.1 ConfigFetch

```
class configfetch.ConfigFetch(*, fmts=None, args=None, envs=None, Func=<class
                                'configfetch.Func'>, option_builder=<class
                                'configfetch.FiniOptionBuilder'>, parser=<class
                                'configfetch.ConfigParser'>, **kwargs)
```

A custom Configuration object.

It keeps a ConfigParser object (_config) and a correspondent option-name-to-metadata map (_ctx).

It also has argparse.Namespace object (args), and Environment variable dictionary (envs).

If the option name counterpart is defined in args or envs, their value precedes the config value.

So most config option names must be global, since args and envs do not have section namespace.

E.g. if a config has 'foo' section and 'bar' option in it, args, and envs just check the name 'bar', ignoring section hierarchy.

The metadata includes function list specific to the option name. Option access gets value from arg, envs or config, and returns a functions-applied-value.

The class __init__ should accept all ConfigParser.__init__ keyword arguments.

Additional arguments are:

Parameters

- **fmts** – dictionary Func.__fmt uses
- **args** – argparse.Namespace object
- **envs** – dictionary with option name and Environment Variable name as key and value
- **Func** – Func or subclasses, worker to keep and look-up functions
- **option_builder** – DictOptionBuilder or FiniOptionBuilder, worker to build value and metadata from data input
- **parser** – ConfigParser or a subclass, keep actual config values

fetch (*input_*)

Read input and build config data and metadata.

Note type of input entirely depends on `option_builder`. `DictOptionBuilder` accepts only python dictionary object. `FiniOptionBuilder` accepts only opened file object or string.

build_arguments (*argument_parser, sections=None*)

Run `argument_parser.add_argument` according to config metadata.

Parameters

- **argument_parser** – `argparse.ArgumentParser` or a subclass, either blank or with some arguments already defined
- **sections** – a section name (string) or section list to filter sections, default (`None`) is for all sections

Returns `argument_parser`

set_arguments (*namespace*)

Set `_args` attribute.

Parameters **namespace** – `argparse.Namespace` object

It manually sets `_args` again, after initialization.

1.9.2 fetch

```
configfetch.fetch(input_, *, encoding=None, fmts=None, args=None, envs=None, Func=<class  
'configfetch.Func'>, parser=<class 'configparser.ConfigParser'>, op-  
tion_builder=<class 'configfetch.FiniOptionBuilder'>, **kwargs)
```

Fetch `ConfigFetch` object.

It is a convenience function for the basic use of the library. Most arguments are the same as `ConfigFetch.__init__`.

the specific arguments are:

Parameters

- **input** – dict, file obj or string according to `option_builder`. Additionally, if the input is string and in system path, it tries to open to make file object
- **encoding** – encoding to use when opening the input

1.9.3 Double

```
class configfetch.Double(sec, parent_sec)
```

Supply a parent section fallback, before 'DEFAULT'.

An accessory helper class, not so related to this module's main concern.

Default section is a useful feature of INI format, but it is always global and unconditional. Sometimes more fine-tuned one is needed.

Parameters

- **sec** – `SectionProxy` object
- **parent_sec** – `SectionProxy` object to fallback

Example:

```
conf.japanese = Double(conf.japanese, conf.asian)
```

When the option is not found even in the parent section, DEFAULT section lookup is performed, or NoOptionError, according to the underlined ConfigParser object (`conf._config`).

1.9.4 minusadapter

`configfetch.minusadapter` (*parser, matcher=None, args=None*)

Edit `option_arguments` with leading dashes.

An accessory helper function. It unites two arguments to one, if the second argument starts with '- '.

The reason is that `argparse` cannot parse this particular pattern.

<https://bugs.python.org/issue9334>

<https://stackoverflow.com/a/21894384>

And `_plus` uses this type of arguments frequently.

Parameters

- **parser** – ArgumentParser object, already actions registered
- **matcher** – regex string to match options, to narrow the targets (`None` means to process all arguments)
- **args** – arguments list to parse, defaults to `sys.argv[1:]` (the same as `argparse` default)

Conditions:

- `prefix_chars` is exactly '- '
- The argument is a registered argument
- It's action is either `store` or `append`
- It's `nargs` is 1 or `None`
- The next argument starts with '- '

Process:

- long option is combined with the next argument with =
- short option is concatenated with the next argument

```
[ '--file', '-myfile.txt' ] --> [ '--file=-myfile.txt' ]
[ '-f', '-myfile.txt' ] --> [ '-f-m myfile.txt' ]
```

Example:

```
# myapp.py
import argparse
import configfetch
parser = argparse.ArgumentParser()
parser.add_argument('--file')
args = configfetch.minusadapter(parser)
```

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```
args = parser.parse_args(args)
print(args)
```

```
$ myapp.py --file -myfile.txt
Namespace(file='-myfile.txt')
```

1.9.5 ConfigPrinter

class configfetch.**ConfigPrinter**(*conf*, *sections=None*, *width=4*, *print=<built-in function print>*)

Print dictionary or INI format strings from configuration.

Parameters

- **conf** – ConfigFetch object, with `_config` and `_ctx` attributes
- **sections** – list of section names to print, all sections if `None`
- **width** – indent unit width
- **print** – any function with one string argument, to customize printout behavior

print_dict()

Print dictionary string.

print_ini()

Print INI format string.

CHAPTER 2

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