Dictdiffer is a helper module that helps you to diff and patch dictionaries.
CHAPTER 1

Installation

Dictdiffer is on PyPI so all you need is:

$ pip install dictdiffer
Let's start with an example on how to find the diff between two dictionaries using `diff()` method:

```python
from dictdiffer import diff, patch, swap, revert

first = {
    "title": "hello",
    "fork_count": 20,
    "stargazers": ["/users/20", "/users/30"],
    "settings": {
        "assignees": [100, 101, 201],
    }
}

second = {
    "title": "hellooo",
    "fork_count": 20,
    "stargazers": ["/users/20", "/users/30", "/users/40"],
    "settings": {
        "assignees": [100, 101, 202],
    }
}

result = diff(first, second)

assert list(result) == [
    ('change', ['settings', 'assignees', 2], (201, 202)),
    ('add', 'stargazers', [(2, '/users/40')]),
    ('change', 'title', ('hello', 'hellooo'))
]
```

Now we can apply the diff result with `patch()` method:

```python
result = diff(first, second)
patched = patch(result, first)

assert patched == second
```
Also we can swap the diff result with `swap()` method:

```python
result = diff(first, second)
swapped = swap(result)
assert list(swapped) == [
    ('change', ['settings', 'assignees', 2], (202, 201)),
    ('remove', 'stargazers', [(2, '/users/40')]),
    ('change', 'title', ('hellooo', 'hello'))
]
```

Let’s revert the last changes:

```python
result = diff(first, second)
reverted = revert(result, patched)
assert reverted == first
```

A tolerance can be used to consider closed values as equal. The tolerance parameter only applies for int and float.

Let’s try with a tolerance of 10% with the values 10 and 10.5:

```python
first = {'a': 10.0}
second = {'a': 10.5}
result = diff(first, second, tolerance=0.1)
assert list(result) == []
```

Now with a tolerance of 1%:

```python
result = diff(first, second, tolerance=0.01)
assert list(result) == ('change', 'a', (10.0, 10.5))
```
Dictdiffer is a helper module to diff and patch dictionaries.

```python
from dictdiffer import diff
result = diff({'a': 'b'}, {'a': 'c'})
list(result)
```

The keys can be skipped from difference calculation when they are included in `ignore` argument of type `collections.Container`.

```python
list(diff({'a': 1, 'b': 2}, {'a': 3, 'b': 4}, ignore=set(['a'])))
```

The difference calculation can be limited to certain path:

```python
list(diff({}, {'a': {'b': 'c'}}))
```

```python
from dictdiffer.utils import PathLimit
list(diff({}, {'a': {'b': 'c'}}, path_limit=PathLimit()))
```
```python
>>> from dictdiffer.utils import PathLimit
>>> list(diff({}, {'a': {'b': 'c'}}, path_limit=PathLimit([('a',)])))
[('add', '', [('a', {'b': 'c'})])]
```

```python
>>> from dictdiffer.utils import PathLimit
>>> list(diff({}, {'a': {'b': 'c'}}, path_limit=PathLimit([('a', 'b')])))
[('add', '', [('a', {})]), ('add', 'a', [('b', 'c')])]
```

The patch can be expanded to small units e.g. when adding multiple values:

```python
>>> list(diff({'fruits': []}, {'fruits': ['apple', 'mango']}))
[('add', 'fruits', [(0, 'apple'), (1, 'mango')])]
```

```python
>>> list(diff({'fruits': []}, {'fruits': ['apple', 'mango']}, expand=True))
[('add', 'fruits', [(0, 'apple')]), ('add', 'fruits', [(1, 'mango')])]
```

**Parameters**

- **first** – The original dictionary, list or set.
- **second** – New dictionary, list or set.
- **node** – Key for comparison that can be used in `dot_lookup()`.
- **ignore** – Set of keys that should not be checked.
- **path_limit** – List of path limit tuples or `dictdiffer.utils.PathLimit` object to limit the diff recursion depth.
- **expand** – Expand the patches.
- **tolerance** – Threshold to consider when comparing two float numbers.

Changed in version 0.3: Added `ignore` parameter.

Changed in version 0.4: Arguments `first` and `second` can now contain a set.

Changed in version 0.5: Added `path_limit` parameter. Added `expand` paramter. Added `tolerance` parameter.

Changed in version 0.7: Diff items are deep copies from its corresponding objects. Argument `ignore` is always converted to a set.

`dictdiffer.patch(diff_result, destination, in_place=False)`

Patch the diff result to the destination dictionary.

**Parameters**

- **diff_result** – Changes returned by `diff`.
- **destination** – Structure to apply the changes to.
- **in_place** – By default, destination dictionary is deep copied before applying the patch, and the copy is returned. Setting `in_place=True` means that patch will apply the changes directly to and return the destination structure.

`dictdiffer.swap(diff_result)`

Swap the diff result.

It uses following mapping:

- remove -> add
• add -> remove

In addition, swap the changed values for change flag.

```python
>>> from dictdiffer import swap
>>> swapped = swap([{'add', 'a.b.c', [('a', 'b'), ('c', 'd')]}])
>>> next(swapped)
('remove', 'a.b.c', [('c', 'd'), ('a', 'b')])

>>> swapped = swap([{'change', 'a.b.c', ('a', 'b')}
```

```python
toolkit revert (diff_result, destination, in_place=False)
Call swap function to revert patched dictionary object.

Usage example:

```python
>>> from dictdiffer import diff, revert
>>> first = {'a': 'b'}
>>> second = {'a': 'c'}
>>> revert(diff(first, second), second)
{'a': 'b'}
```

**Parameters**

- **diff_result** – Changes returned by `diff`.
- **destination** – Structure to apply the changes to.
- **in_place** – By default, destination dictionary is deep copied before being reverted, and the copy is returned. Setting `in_place=True` means that revert will apply the changes directly to and return the destination structure.

```python
toolkit dot_lookup (source, lookup, parent=False)
Allow you to reach dictionary items with string or list lookup.

Recursively find value by lookup key split by ‘.’.

```python
>>> from dictdiffer import diff, revert
>>> first = {'a': 'b'}
>>> second = {'a': 'c'}
>>> revert(diff(first, second), second)
{'a': 'b'}
```

**Parameters**

- **source** – Dictionary to search.
- **lookup** – Key to look up.
- **parent** – If True, returns the parent node of matched object.

```python
>>> dot_lookup({'a': {'b': 'hello'}}, 'a.b')
'hello'
```

If parent argument is True, returns the parent node of matched object.

```python
>>> dot_lookup({'a': {'b': 'hello'}}, 'a.b', parent=True)
{'b': 'hello'}
```

If node is empty value, returns the whole dictionary object.

```python
>>> dot_lookup({'a': {'b': 'hello'}}, '')
{'a': {'b': 'hello'}}
```
Changes

Version 0.7.1 (released 2018-05-04)
  • Resolves issue with keys containing dots. (#101)

Version 0.7.0 (released 2017-10-16)
  • Fixes problem with diff results that reference the original structure by introduction of \textit{deepcopy} for all possibly unhashable items. Thus the diff does not change later when the diffed structures change.
  • Adds new option for patching and reverting patches in-place.
  • Adds Python 3.6 to test matrix.
  • Fixes the \textit{ignore} argument when it contains a unicode value.

Version 0.6.1 (released 2016-11-22)
  • Changes order of items for REMOVE section of generated patches when \textit{swap} is called so the list items are removed from the end. (#85)
  • Improves API documentation for \textit{ignore} argument in \textit{diff} function. (#79)
  • Executes doctests during PyTest invocation.

Version 0.6.0 (released 2016-06-22)
  • Adds support for comparing NumPy arrays. (#68)
  • Adds support for comparing mutable mappings, sequences and sets from \textit{collections.abs} module. (#67)
  • Updates package structure, sorts imports and runs doctests.
  • Fixes order in which handled conflicts are unified so that the Merger’s \textit{unified\_patches} can be always applied.

Version 0.5.0 (released 2016-01-04)
  • Adds tolerance parameter used when user wants to treat closed values as equals
  • Adds support for comparing numerical values and NaN. (#54) (#55)

Version 0.4.0 (released 2015-03-11)
• Adds support for diffing and patching of sets. (#44)
• New tests for diff on the same lists. (#48)
• Fix for exception when dict has unicode keys and ignore parameter is provided. (#50)
• PEP8 improvements.

Version 0.3.0 (released 2014-11-05)
• Adds ignore argument to diff function that allows skipping check on specified keys. (#34 #35)
• Fix for diffing of dict or list subclasses. (#37)
• Better instance checking of diffing objects. (#39)

Version 0.2.0 (released 2014-09-29)
• Fix for empty list instructions. (#30)
• Regression test for empty list instructions.

Version 0.1.0 (released 2014-09-01)
• Fix for list removal issues during patching caused by wrong iteration. (#10)
• Fix for issues with multiple value types for the same key. (#10)
• Fix for issues with strings handled as iterables. (#6)
• Fix for integer keys. (#12)
• Regression test for complex dictionaries. (#4)
• Better testing with Travis CI, tox, pytest, code coverage. (#10)
• Initial release of documentation on ReadTheDocs. (#21 #24)
• Support for Python 3. (#15)

Version 0.0.4 (released 2014-01-04)
• List diff behavior treats lists as lists instead of sets. (#3)
• Differed typed objects are flagged as changed now.
• Swap function refactored.

Version 0.0.3 (released 2013-05-26)
• Initial public release on PyPI.
Contributing

Bug reports, feature requests, and other contributions are welcome. If you find a demonstrable problem that is caused by the code of this library, please:

1. Search for already reported problems.
2. Check if the issue has been fixed or is still reproducible on the latest master branch.
3. Create an issue with a test case.

If you create a feature branch, you can run the tests to ensure everything is operating correctly:

```bash
$ ./run-tests.sh
...
Name Stmts Miss Cover Missing
-------------------------------
dictdiffer/__init__    88    0  100%          
dictdiffer/version     2    0  100%          
-------------------------------
TOTAL                 90    0  100%          
...
52 passed, 2 skipped in 0.44 seconds
```
Dictdiffer is free software; you can redistribute it and/or modify it under the terms of the MIT License quoted below.

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