
CKIPNLP

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OVERVIEW

1	Introduction	1
1.1	CKIP CoreNLP Toolkit	1
1.2	Installation	2
1.3	Detail	3
1.4	License	3
2	Usage	5
2.1	Containers	5
2.2	Drivers	8
2.3	Pipelines	9
3	Tables of Tags	11
3.1	Part-of-Speech Tags	11
3.2	Named Entity Recognition Tags	13
3.3	Constituency Parsing Tags	13
3.4	Constituency Parsing Roles	13
4	ckipnlp package	17
4.1	ckipnlp.container package	17
4.2	ckipnlp.driver package	38
4.3	ckipnlp.pipeline package	42
4.4	ckipnlp.util package	45
5	Index	47
6	Module Index	49
	Python Module Index	51
	Index	53

INTRODUCTION

1.1 CKIP CoreNLP Toolkit

1.1.1 Features

- Sentence Segmentation
- Word Segmentation
- Part-of-Speech Tagging
- Named-Entity Recognition
- Constituency Parsing
- Coreference Resolution

1.1.2 Git

<https://github.com/ckiplab/ckipnlp>

1.1.3 PyPI

<https://pypi.org/project/ckipnlp>

1.1.4 Documentation

<https://ckipnlp.readthedocs.io/>

1.1.5 Online Demo

<https://ckip.iis.sinica.edu.tw/service/corenlp>

1.1.6 Contributors

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1.2 Installation

1.2.1 Requirements

- Python 3.6+
- TreeLib 1.5+
- CkipTagger 0.2.1+ [Optional, Recommended]
- CkipClassic 1.0+ [Optional, Recommended]
- TensorFlow / TensorFlow-GPU 1.13.1+ [Required by CkipTagger]

1.2.2 Driver Requirements

Driver	Built-in	CkipTagger	CkipClassic
Sentence Segmentation	✓		
Word Segmentation†		✓	✓
Part-of-Speech Tagging†		✓	✓
Constituency Parsing			✓
Named-Entity Recognition		✓	
Coreference Resolution‡	✓	✓	✓

- † These drivers require only one of either backends.
- ‡ Coreference implementation does not require any backend, but requires results from word segmentation, part-of-speech tagging, constituency parsing, and named-entity recognition.

1.2.3 Installation via Pip

- No backend (not recommended): `pip install ckipnlp`.
- With CkipTagger backend (recommended): `pip install ckipnlp[tagger]` or `pip install ckipnlp[tagger-gpu]`.
- With CkipClassic Parser Client backend (recommended): `pip install ckipnlp[classic]`.
- With CkipClassic offline backend: Please refer <https://ckip-classic.readthedocs.io/en/latest/main/readme.html#installation> for CkipClassic installation guide.

Attention: To use CkipClassic Parser Client backend, please

1. Register an account at <http://parser.iis.sinica.edu.tw/v1/reg.php>
2. Set the username and password in the pipeline's options:

```
pipeline = CkipPipeline(opts={'con_parser': {'username': YOUR_USERNAME, 'password':  
→ YOUR_PASSWORD}})
```

1.3 Detail

See <https://ckipnlp.readthedocs.io/> for full documentation.

1.4 License



Copyright (c) 2018-2023 CKIP Lab under the GPL-3.0 License.

CkipNLP provides a set of human language technology tools, including

- Sentence Segmentation
- Word Segmentation
- Part-of-Speech Tagging
- Named-Entity Recognition
- Constituency Parsing
- Coreference Resolution

The library is build around three types of classes:

- **Containers** such as *SegParagraph* are the basic data structures for inputs and outputs.
- **Drivers** such as *CkipTaggerWordSegmenter* that apply specific tool on the inputs.
- **Pipelines** such as *CkipPipeline* are collections of drivers that automatically handles the dependencies between inputs and outputs.

2.1 Containers

2.1.1 Containers Prototypes

All the container objects can be convert from/to other formats:

- `from_text()`, `to_text()` for plain-text conversions;
- `from_list()`, `to_list()` for list-like python object conversions;
- `from_dict()`, `to_dict()` for dictionary-like python object (key-value mappings) conversions;
- `from_json()`, `to_json()` for JSON format conversions (based-on dictionary-like format conversions).

Here are the interfaces, where `CONTAINER_CLASS` refers to the container class.

```
obj = CONTAINER_CLASS.from_text(plain_text)
plain_text = obj.to_text()

obj = CONTAINER_CLASS.from_list([ value1, value2 ])
list_obj = obj.to_list()

obj = CONTAINER_CLASS.from_dict({ key: value })
```

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```
dict_obj = obj.to_dict()

obj = CONTAINER_CLASS.from_json(json_str)
json_str = obj.to_json()
```

Note that not all container provide all above conversions. Here is the table of implemented methods. Please refer the documentation of each container for format details.

Container	Item	from/to text	from/to list, dict, json
<i>TextParagraph</i>	<i>str</i>	✓	✓
<i>SegSentence</i>	<i>str</i>	✓	✓
<i>SegParagraph</i>	<i>SegSentence</i>	✓	✓
<i>NerToken</i>			✓
<i>NerSentence</i>	<i>NerToken</i>		✓
<i>NerParagraph</i>	<i>NerSentence</i>		✓
<i>ParseClause</i>		only to	✓
<i>ParseSentence</i>	<i>ParseClause</i>	only to	✓
<i>ParseParagraph</i>	<i>ParseSentence</i>	only to	✓
<i>CorefToken</i>		only to	✓
<i>CorefSentence</i>	<i>CorefToken</i>	only to	✓
<i>CorefParagraph</i>	<i>CorefSentence</i>	only to	✓

2.1.2 WS with POS

There are also conversion routines for word-segmentation and part-of-speech containers jointly. For example, *WsPosToken* provides routines for a word (*str*) with POS-tag (*str*):

```
ws_obj, pos_obj = WsPosToken.from_text('(Na)')
plain_text = WsPosToken.to_text(ws_obj, pos_obj)

ws_obj, pos_obj = WsPosToken.from_list([ '', 'Na' ])
list_obj = WsPosToken.to_list(ws_obj, pos_obj)

ws_obj, pos_obj = WsPosToken.from_dict({ 'word': '', 'pos': 'Na', })
dict_obj = WsPosToken.to_dict(ws_obj, pos_obj)

ws_obj, pos_obj = WsPosToken.from_json(json_str)
json_str = WsPosToken.to_json(ws_obj, pos_obj)
```

Similarly, *WsPosSentence/WsPosParagraph* provides routines for word-segmented and POS sentence/paragraph (*SegSentence/SegParagraph*) respectively.

2.1.3 Parse Tree

In addition to *ParseClause*, there are also tree utilities base on *TreeLib*.

ParseTree is the tree structure of a parse clause. One may use `from_text()` and `to_text()` for plain-text conversion; `from_dict()`, `to_dict()` for dictionary-like object conversion; and also `from_json()`, `to_json()` for JSON string conversion.

ParseTree also provide `from_penn()` and `to_penn()` methods for Penn Treebank conversion. One may use `to_penn()` together with *SvgLing* to generate SVG tree graphs.

ParseTree is a *TreeLib* tree with *ParseNode* as its nodes. The data of these nodes is stored in a *ParseNodeData* (accessed by `node.data`), which is a tuple of `role` (semantic role), `pos` (part-of-speech tagging), `word`.

ParseTree provides useful methods: `get_heads()` finds the head words of the clause; `get_relations()` extracts all relations in the clause; `get_subjects()` returns the subjects of the clause.

```
from ckipnlp.container import ParseClause, ParseTree

#
clause = ParseClause(
    ↪ 'S(goal:NP(possessor:N(head:Nhaa: |Head:DE:)|Head:Nab(DUMMY1:Nab(DUMMY1:Nab: |Head:Caa: |DUMMY2:Naa:)|Hea
    ↪ ')

tree = clause.to_tree()

print('Show Tree')
tree.show()

print('Get Heads of {}'.format(tree[5]))
print('-- Semantic --')
for head in tree.get_heads(5, semantic=True): print(repr(head))
print('-- Syntactic --')
for head in tree.get_heads(5, semantic=False): print(repr(head))
print()

print('Get Relations of {}'.format(tree[0]))
print('-- Semantic --')
for rel in tree.get_relations(0, semantic=True): print(repr(rel))
print('-- Syntactic --')
for rel in tree.get_relations(0, semantic=False): print(repr(rel))
print()

#
tree_text =
    ↪ 'S(theme:NP(DUMMY1:NP(Head:Nhaa:)|Head:Caa: |DUMMY2:NP(Head:Naa:))|evaluation:Dbb: |quantity:Dab: |degre
    ↪ '

tree = ParseTree.from_text(tree_text)

print('Show Tree')
tree.show()

print('Get get_subjects of {}'.format(tree[0]))
print('-- Semantic --')
```

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```

for subject in tree.get_subjects(0, semantic=True): print(repr(subject))
print('-- Syntactic --')
for subject in tree.get_subjects(0, semantic=False): print(repr(subject))
print()

```

2.2 Drivers

class Driver(*, lazy=False, ...)

The prototype of CkipNLP Drivers.

Parameters

lazy (bool) – Lazy initialize the driver. (Call *init()* at the first call of *__call__()* instead.)

driver_type: str

The type of this driver.

driver_family: str

The family of this driver.

driver_inputs: Tuple[str, ...]

The inputs of this driver.

init()

Initialize the driver (by calling the *_init()* function).

__call__(*, ...)

Call the driver (by calling the *_call()* function).

Here are the list of the drivers:

Driver Type \ Family	'default'	'tagger'	'classic'	'classic-client'
Sentence Segmenter	<i>CkipSentenceSegmenter</i>			
Word Segmenter		<i>CkipTaggerWordSegmenter</i>	<i>CkipClassicWordSegmenter</i> †	
Pos Tagger		<i>CkipTaggerPosTagger</i>	<i>CkipClassicWordSegmenter</i> †	
Ner Chunker		<i>CkipTaggerNerChunker</i>		
Constituency Parser			<i>CkipClassicConParser</i>	<i>CkipClassicConParserClient</i> ‡
Coref Chunker	<i>CkipCorefChunker</i>			

- † Not compatible with *CkipCorefPipeline*.
- ‡ Please register an account at <http://parser.iis.sinica.edu.tw/v1/reg.php> and set the environment variables \$CKIPPARSER_USERNAME and \$CKIPPARSER_PASSWORD.

2.3 Pipelines

2.3.1 Kernel Pipeline

The *CkipPipeline* connect *drivers* of sentence segmentation, word segmentation, part-of-speech tagging, named-entity recognition, and sentence parsing.

The *CkipDocument* is the workspace of *CkipPipeline* with input/output data. Note that *CkipPipeline* will store the result into *CkipDocument* in-place.

The *CkipPipeline* will compute all necessary dependencies. For example, if one calls `get_ner()` with only raw-text input, the pipeline will automatically calls `get_text()`, `get_ws()`, `get_pos()`.

```
from ckipnlp.pipeline import CkipPipeline, CkipDocument

pipeline = CkipPipeline()
doc = CkipDocument(raw='')

# Word Segmentation
pipeline.get_ws(doc)
print(doc.ws)
for line in doc.ws:
    print(line.to_text())

# Part-of-Speech Tagging
pipeline.get_pos(doc)
print(doc.pos)
for line in doc.pos:
    print(line.to_text())

# Named-Entity Recognition
pipeline.get_ner(doc)
print(doc.ner)

# Constituency Parsing
pipeline.get_conparse(doc)
print(doc.conparse)

#####

from ckipnlp.container.util.wspos import WsPosParagraph

# Word Segmentation & Part-of-Speech Tagging
for line in WsPosParagraph.to_text(doc.ws, doc.pos):
    print(line)
```

To customize the driver (e.g. disable CUDA in *CkipTaggerWordSegmenter*), you may pass the options to the pipeline:

```
pipeline = CkipPipeline(opts = {'word_segmenter': {'disable_cuda': True}})
```

Please refer each driver's documentation for the extra options.

2.3.2 Co-Reference Pipeline

The *CkipCorefPipeline* is an extension of *CkipPipeline* by providing coreference resolution. The pipeline first does named-entity recognition as *CkipPipeline* does, followed by alignment algorithms to fix the word-segmentation and part-of-speech tagging outputs, and then does coreference resolution based on the sentence parsing result.

The *CkipCorefDocument* is the workspace of *CkipCorefPipeline* with input/output data. Note that *CkipCorefDocument* will store the result into *CkipCorefPipeline*.

```
from ckipnlp.pipeline import CkipCorefPipeline, CkipDocument

pipeline = CkipCorefPipeline()
doc = CkipDocument(raw='')

# Co-Reference
corefdoc = pipeline(doc)
print(corefdoc.coref)
for line in corefdoc.coref:
    print(line.to_text())
```

TABLES OF TAGS

3.1 Part-of-Speech Tags

Tag	Description
A	
Caa	
Cab	
Cba	
Cbb	
D	
Da	
Dfa	
Dfb	
Di	
Dk	
DM	
I	
Na	
Nb	
Nc	
Ncd	
Nd	
Nep	
Neqa	
Neqb	
Nes	
Neu	
Nf	
Ng	
Nh	
Nv	
P	
T	
VA	
VAC	
VB	
VC	
VCL	

continues on next page

Table 1 – continued from previous page

Tag	Description
VD	
VF	
VE	
VG	
VH	
VHC	
VI	
VJ	
VK	
VL	
V_2	
DE	
SHI	
FW	
COLONCATEGORY	
COMMACATEGORY	
DASHCATEGORY	
DOTCATEGORY	
ETCCATEGORY	
EXCLAMATIONCATEGORY	
PARENTHESISCATEGORY	
PAUSECATEGORY	
PERIODCATEGORY	
QUESTIONCATEGORY	
SEMICOLONCATEGORY	
SPCHANGECATEGORY	
WHITESPACE	

3.2 Named Entity Recognition Tags

Tag	Description
CARDINAL	
DATE	
EVENT	
FAC	
GPE	
LANGUAGE	
LAW	
LOC	
MONEY	
NORP	
ORDINAL	
ORG	
PERCENT	
PERSON	
PRODUCT	
QUANTITY	
TIME	
WORK_OF_ART	

3.3 Constituency Parsing Tags

Tag	Description
S	SNP
VP	V
NP	N
GP	NgDUMMY1
PP	PDUMMY
XP	CXXPVVPVNP
DM	

3.4 Constituency Parsing Roles

Role	Description
#	
apposition	
possessor	
predication	
property	
quantifier	
#-	
agent	
benefactor	

continues on next page

Table 2 – continued from previous page

Role	Description
causer	
companion	
comparison	
experiencer	
goal	
range	
source	
target	
theme	
topic	
#–	
aspect	
degree	
deixis	
deontics	
duration	
evaluation	
epistemics	
frequency	
instrument	
interjection	
location	
manner	
negation	
particle	
quantity	
standard	
time	
#–	
addition	
alternative	
avoidance	
complement	
conclusion	
condition	
concession	
contrast	
conversion	
exclusion	
hypothesis	
listing	
purpose	
reason	
rejection	
result	
restriction	
selection	
uncondition	
whatever	

continues on next page

Table 2 – continued from previous page

Role	Description
#	
DUMMY	
DUMMY1	
DUMMY2	
Head	Head
head	
nominal	

CKIPNLP PACKAGE

The Official CKIP CoreNLP Toolkit.

Subpackages

4.1 ckipnlp.container package

This module implements specialized container datatypes for CKIPNLP.

Subpackages

4.1.1 ckipnlp.container.util package

This module implements specialized utilities for CKIPNLP containers.

Submodules

kipnlp.container.util.parse_tree module

This module provides tree containers for parsed sentences.

```
class ckipnlp.container.util.parse_tree.ParseNodeData(role: Optional[str] = None, pos:
                                                    Optional[str] = None, word: Optional[str] =
                                                    None)
```

Bases: *BaseTuple*, *_ParseNodeData*

A parse node.

Variables

- **role** (*str*) – the semantic role.
- **pos** (*str*) – the POS-tag.
- **word** (*str*) – the text term.

Note: This class is an subclass of *tuple*. To change the attribute, please create a new instance instead.

Data Structure Examples

Text format

Used for `from_text()` and `to_text()`.

```
'Head:Na:' # role / POS-tag / text-term
```

List format

Not implemented.

Dict format

Used for `from_dict()` and `to_dict()`.

```
{
  'role': 'Head', # role
  'pos': 'Na',    # POS-tag
  'word': '',     # text term
}
```

classmethod `from_text(data)`

Construct an instance from text format.

Parameters

data (*str*) – text such as 'Head:Na:'.

Note:

- 'Head:Na:' -> **role** = 'Head', **pos** = 'Na', **word** = ''
 - 'Head:Na' -> **role** = 'Head', **pos** = 'Na', **word** = None
 - 'Na' -> **role** = None, **pos** = 'Na', **word** = None
-

class `ckipnlp.container.util.parse_tree.ParseNode`(*tag=None, identifier=None, expanded=True, data=None*)

Bases: `Base`, `Node`

A parse node for tree.

Variables

data (*ParseNodeData*) –

See also:

`treelib.tree.Node`

Please refer <https://treelib.readthedocs.io/> for built-in usages.

Data Structure Examples**Text format**

Not implemented.

List format

Not implemented.

Dict format

Used for `to_dict()`.

```
{
  'role': 'Head',    # role
  'pos': 'Na',       # POS-tag
  'word': '',        # text term
}
```

data_classalias of *ParseNodeData*

class ckipnlp.container.util.parse_tree.**ParseRelation**(*head*: ParseNode, *tail*: ParseNode, *relation*: ParseNode)

Bases: *Base*, *_ParseRelation*

A parse relation.

Variables

- **head** (*ParseNode*) – the head node.
- **tail** (*ParseNode*) – the tail node.
- **relation** (*ParseNode*) – the relation node. (the semantic role of this node is the relation.)

Notes

The parent of the relation node is always the common ancestor of the head node and tail node.

Data Structure Examples**Text format**

Not implemented.

List format

Not implemented.

Dict formatUsed for `to_dict()`.

```
{
  'tail': { 'role': 'Head', 'pos': 'Nab', 'word': '' }, # head node
  'tail': { 'role': 'particle', 'pos': 'Td', 'word': '' }, # tail node
  'relation': 'particle', # relation
}
```

class ckipnlp.container.util.parse_tree.**ParseTree**(*tree*=None, *deep*=False, *node_class*=None, *identifier*=None)

Bases: *Base*, *Tree*

A parse tree.

See also:**treereelib.tree.Tree**Please refer <https://treelib.readthedocs.io/> for built-in usages.

Data Structure Examples**Text format**

Used for *from_text()* and *to_text()*.

```
'S(Head:Nab:|particle:Td:).'
```

List format

Not implemented.

Dict format

Used for *from_dict()* and *to_dict()*. A dictionary such as { 'id': 0, 'data': { ... }, 'children': [...] }, where 'data' is a dictionary with the same format as ParseNodeData. *to_dict()*, and 'children' is a list of dictionaries of subtrees with the same format as this tree.

```
{
  'id': 0,
  'data': {
    'role': None,
    'pos': 'S',
    'word': None,
  },
  'children': [
    {
      'id': 1,
      'data': {
        'role': 'Head',
        'pos': 'Nab',
        'word': '',
      },
      'children': [],
    },
    {
      'id': 2,
      'data': {
        'role': 'particle',
        'pos': 'Td',
        'word': '',
      },
      'children': [],
    },
  ],
}
```

Penn Treebank format

Used for *from_penn()* and *to_penn()*.

```
[
  'S',
  [ 'Head:Nab', '', ],
  [ 'particle:Td', '', ],
]
```

Note: One may use `to_penn()` together with `SvgLing` to generate SVG tree graphs.

node_class

alias of `ParseNode`

classmethod from_text(data)

Construct an instance from text format.

Parameters

data (*str*) – A parse tree in text format (`ParseClause.clause`).

See also:

`ParseClause.to_tree()`.

to_text(node_id=None)

Transform to plain text.

Parameters

node_id (*int*) – Output the plain text format for the subtree under **node_id**.

Returns

str

classmethod from_dict(data)

Construct an instance from python built-in containers.

Parameters

data (*str*) – A parse tree in dictionary format.

to_dict(node_id=None)

Transform to python built-in containers.

Parameters

node_id (*int*) – Output the plain text format for the subtree under **node_id**.

Returns

str

classmethod from_penn(data)

Construct an instance from Penn Treebank format.

to_penn(node_id=None, *, with_role=True, with_word=True, sep=':')

Transform to Penn Treebank format.

Parameters

- **node_id** (*int*) – Output the plain text format for the subtree under **node_id**.
- **with_role** (*bool*) – Contains role-tag or not.
- **with_word** (*bool*) – Contains word or not.
- **sep** (*str*) – The separator between role and POS-tag.

Returns

list

show(*, key=<function ParseTree.<lambda>>, idhidden=False, **kwargs)

Show pretty tree.

get_children(*node_id*, *, *role*)

Get children of a node with given role.

Parameters

- **node_id** (*int*) – ID of target node.
- **role** (*str*) – the target role.

Yields

ParseNode – the children nodes with given role.

get_heads(*root_id=None*, *, *semantic=True*, *deep=True*)

Get all head nodes of a subtree.

Parameters

- **root_id** (*int*) – ID of the root node of target subtree.
- **semantic** (*bool*) – use semantic/syntactic policy. For semantic mode, return DUMMY or head instead of syntactic Head.
- **deep** (*bool*) – find heads recursively.

Yields

ParseNode – the head nodes.

get_relations(*root_id=None*, *, *semantic=True*)

Get all relations of a subtree.

Parameters

- **root_id** (*int*) – ID of the subtree root node.
- **semantic** (*bool*) – please refer *get_heads()* for policy detail.

Yields

ParseRelation – the relations.

get_subjects(*root_id=None*, *, *semantic=True*, *deep=True*)

Get the subject node of a subtree.

Parameters

- **root_id** (*int*) – ID of the root node of target subtree.
- **semantic** (*bool*) – please refer *get_heads()* for policy detail.
- **deep** (*bool*) – please refer *get_heads()* for policy detail.

Yields

ParseNode – the subject node.

Notes

A node can be a subject if either:

1. is a head of *NP*
 2. is a head of a subnode (*N*) of *S* with subject role
 3. is a head of a subnode (*N*) of *S* with neutral role and before the head (*V*) of *S*
-

ckipnlp.container.util.wspos module

This module provides containers for word-segmented sentences with part-of-speech-tags.

class `ckipnlp.container.util.wspos.WsPosToken`(*word: Optional[str] = None, pos: Optional[str] = None*)

Bases: `BaseTuple`, `_WsPosToken`

A word with POS-tag.

Variables

- **word** (*str*) – the word.
- **pos** (*str*) – the POS-tag.

Note: This class is an subclass of *tuple*. To change the attribute, please create a new instance instead.

Data Structure Examples

Text format

Used for `from_text()` and `to_text()`.

```
'(Na)' # word / POS-tag
```

List format

Used for `from_list()` and `to_list()`.

```
[
    '', # word
    'Na', # POS-tag
]
```

Dict format

Used for `from_dict()` and `to_dict()`.

```
{
    'word': '', # word
    'pos': 'Na', # POS-tag
}
```

classmethod `from_text(data)`

Construct an instance from text format.

Parameters

data (*str*) – text such as '(Na)'.

Note:

- '(Na)' -> word = '', pos = 'Na'
 - '' -> word = '', pos = None
-

class ckipnlp.container.util.wspos.WsPosSentence

Bases: object

A helper class for data conversion of word-segmented and part-of-speech sentences.

classmethod **from_text**(data)

Convert text format to word-segmented and part-of-speech sentences.

Parameters

data (*str*) – text such as '(Na)\u3000(T)'.

Returns

- *SegSentence* – the word sentence
- *SegSentence* – the POS-tag sentence.

static **to_text**(word, pos)

Convert text format to word-segmented and part-of-speech sentences.

Parameters

- **word** (*SegSentence*) – the word sentence
- **pos** (*SegSentence*) – the POS-tag sentence.

Returns

str – text such as '(Na)\u3000(T)'.

class ckipnlp.container.util.wspos.WsPosParagraph

Bases: object

A helper class for data conversion of word-segmented and part-of-speech sentence lists.

classmethod **from_text**(data)

Convert text format to word-segmented and part-of-speech sentence lists.

Parameters

data (*Sequence[str]*) – list of sentences such as '(Na)\u3000(T)'.

Returns

- *SegParagraph* – the word sentence list
- *SegParagraph* – the POS-tag sentence list.

static **to_text**(word, pos)

Convert text format to word-segmented and part-of-speech sentence lists.

Parameters

- **word** (*SegParagraph*) – the word sentence list
- **pos** (*SegParagraph*) – the POS-tag sentence list.

Returns

List[str] – list of sentences such as '(Na)\u3000(T)'.

Submodules

4.1.2 ckipnlp.container.base module

This module provides base containers.

class ckipnlp.container.base.Base

Bases: object

The base CKIPNLP container.

abstract classmethod from_text(*data*)

Construct an instance from text format.

Parameters

data (*str*) –

abstract to_text()

Transform to plain text.

Returns

str

abstract classmethod from_list(*data*)

Construct an instance from python built-in containers.

abstract to_list()

Transform to python built-in containers.

abstract classmethod from_dict(*data*)

Construct an instance from python built-in containers.

abstract to_dict()

Transform to python built-in containers.

classmethod from_json(*data*, ***kwargs*)

Construct an instance from JSON format.

Parameters

data (*str*) – please refer [from_dict\(\)](#) for format details.

to_json(***kwargs*)

Transform to JSON format.

Returns

str

class ckipnlp.container.base.BaseTuple

Bases: [Base](#)

The base CKIPNLP tuple.

classmethod from_list(*data*)

Construct an instance from python built-in containers.

Parameters

data (*list*) –

to_list()

Transform to python built-in containers.

Returns

list

classmethod from_dict(data)

Construct an instance from python built-in containers.

Parameters

data (*dict*) –

to_dict()

Transform to python built-in containers.

Returns

dict

class ckipnlp.container.base.BaseList(*initlist=None*)

Bases: `_BaseList`, `_InterfaceItem`

The base CKIPNLP list.

item_class = Not Implemented

Must be a CKIPNLP container class.

class ckipnlp.container.base.BaseList0(*initlist=None*)

Bases: `_BaseList`, `_InterfaceBuiltInItem`

The base CKIPNLP list with built-in item class.

item_class = Not Implemented

Must be a built-in type.

class ckipnlp.container.base.BaseSentence(*initlist=None*)

Bases: `_BaseSentence`, `_InterfaceItem`

The base CKIPNLP sentence.

item_class = Not Implemented

Must be a CKIPNLP container class.

class ckipnlp.container.base.BaseSentence0(*initlist=None*)

Bases: `_BaseSentence`, `_InterfaceBuiltInItem`

The base CKIPNLP sentence with built-in item class.

item_class = Not Implemented

Must be a built-in type.

4.1.3 ckipnlp.container.coref module

This module provides containers for coreference sentences.

class ckipnlp.container.coref.**CorefToken**(word, coref, idx, ***kwargs*)

Bases: *BaseTuple*, *_CorefToken*

A coreference token.

Variables

- **word** (*str*) – the token word.
- **coref** (*Tuple[int, str]*) – the coreference ID and type. *None* if not a coreference source or target.
- **type**:
 - * *'source'*: coreference source.
 - * *'target'*: coreference target.
 - * *'zero'*: null element coreference target.
- **idx** (*Tuple[int, int]*) – the node indexes (clause index, token index) in parse tree. **idx[1]** = *None* if this node is a null element or the punctuations.

Note: This class is an subclass of *tuple*. To change the attribute, please create a new instance instead.

Data Structure Examples

Text format

Used for *to_text()*.

```
'_0'
```

List format

Used for *from_list()* and *to_list()*.

```
[
    '',          # token word
    (0, 'source'), # coref ID and type
    (2, 2),      # node index
]
```

Dict format

Used for *from_dict()* and *to_dict()*.

```
{
    'word': '',          # token word
    'coref': (0, 'source'), # coref ID and type
    'idx': (2, 2),      # node index
}
```

```
class ckipnlp.container.coref.CorefSentence(initlist=None)
```

Bases: [BaseSentence](#)

A list of coreference sentence.

Data Structure Examples

Text format

Used for `to_text()`.

```
# Token segmented by \u3000 (full-width space)
'_0_0'
```

List format

Used for `from_list()` and `to_list()`.

```
[
  [ '', None, (0, None,), ],
  [ '', None, (1, 0,), ],
  [ '', None, (1, 1,), ],
  [ '', None, (1, None,), ],
  [ '', (0, 'source'), (2, 2,), ],
  [ '', (0, 'target'), (2, 3,), ],
  [ '', None, (2, 4,), ],
]
```

Dict format

Used for `from_dict()` and `to_dict()`.

```
[
  { 'word': '', 'coref': None, 'idx': (0, None,), },
  { 'word': '', 'coref': None, 'idx': (1, 0,), },
  { 'word': '', 'coref': None, 'idx': (1, 1,), },
  { 'word': '', 'coref': None, 'idx': (1, None,), },
  { 'word': '', 'coref': (0, 'source'), 'idx': (2, 2,), },
  { 'word': '', 'coref': (0, 'target'), 'idx': (2, 3,), },
  { 'word': '', 'coref': None, 'idx': (2, 4,), },
]
```

item_class

alias of [CorefToken](#)

```
class ckipnlp.container.coref.CorefParagraph(initlist=None)
```

Bases: [BaseList](#)

A list of coreference sentence.

Data Structure Examples

Text format

Used for `to_text()`.

```
[
  '_0_0', # Sentence 1
```

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(continued from previous page)

```
'None_0', # Sentence 1
]
```

List formatUsed for `from_list()` and `to_list()`.

```
[
  [ # Sentence 1
    [ '', None, (0, None,), ],
    [ '', None, (1, 0,), ],
    [ '', None, (1, 1,), ],
    [ '', None, (1, None,), ],
    [ '', (0, 'source'), (2, 2,), ],
    [ '', (0, 'target'), (2, 3,), ],
    [ '', None, (2, 4,), ],
  ],
  [ # Sentence 2
    [ '', None, (0, 1,), ],
    [ None, (0, 'zero'), (0, None,), ],
    [ '', None, (0, 2,), ],
    [ '', None, (0, 3,), ],
    [ '', None, (0, 5,), ],
  ],
]
```

Dict formatUsed for `from_dict()` and `to_dict()`.

```
[
  [ # Sentence 1
    { 'word': '', 'coref': None, 'idx': (0, None,), },
    { 'word': '', 'coref': None, 'idx': (1, 0,), },
    { 'word': '', 'coref': None, 'idx': (1, 1,), },
    { 'word': '', 'coref': None, 'idx': (1, None,), },
    { 'word': '', 'coref': (0, 'source'), 'idx': (2, 2,), },
    { 'word': '', 'coref': (0, 'target'), 'idx': (2, 3,), },
    { 'word': '', 'coref': None, 'idx': (2, 4,), },
  ],
  [ # Sentence 2
    { 'word': '', 'coref': None, 'idx': (0, 1,), },
    { 'word': None, 'coref': (0, 'zero'), 'idx': (0, None,), },
    { 'word': '', 'coref': None, 'idx': (0, 2,), },
    { 'word': '', 'coref': None, 'idx': (0, 3,), },
    { 'word': '', 'coref': None, 'idx': (0, 5,), },
  ],
]
```

item_classalias of *CorefSentence*

4.1.4 ckipnlp.container.ner module

This module provides containers for NER sentences.

class ckipnlp.container.ner.NerToken(*word, ner, idx, **kwargs*)

Bases: *BaseTuple*, *_NerToken*

A named-entity recognition token.

Variables

- **word** (*str*) – the token word.
- **ner** (*str*) – the NER-tag.
- **idx** (*Tuple[int, int]*) – the starting / ending index.

Note: This class is an subclass of `tuple`. To change the attribute, please create a new instance instead.

Data Structure Examples

Text format

Not implemented

List format

Used for `from_list()` and `to_list()`.

```
[
    '      # token word
    'LANGUAGE', # NER-tag
    (0, 3),    # starting / ending index.
]
```

Dict format

Used for `from_dict()` and `to_dict()`.

```
{
    'word': ' ', # token word
    'ner': 'LANGUAGE', # NER-tag
    'idx': (0, 3), # starting / ending index.
}
```

CkipTagger format

Used for `from_tagger()` and `to_tagger()`.

```
(
    0,          # starting index
    3,          # ending index
    'LANGUAGE', # NER-tag
    ' ',        # token word
)
```

classmethod `from_tagger(data)`

Construct an instance from CkipTagger format.

to_tagger()

Transform to CkipTagger format.

class ckipnlp.container.ner.NerSentence(*initlist=None*)

Bases: *BaseSentence*

A named-entity recognition sentence.

Data Structure Examples
Text format

Not implemented

List format

Used for *from_list()* and *to_list()*.

```
[
  [ '', 'GPE', (0, 2), ], # name-entity 1
  [ '', 'ORG', (3, 5), ], # name-entity 2
]
```

Dict format

Used for *from_dict()* and *to_dict()*.

```
[
  { 'word': '', 'ner': 'GPE', 'idx': (0, 2), }, # name-entity 1
  { 'word': '', 'ner': 'ORG', 'idx': (3, 5), }, # name-entity 2
]
```

CkipTagger format

Used for *from_tagger()* and *to_tagger()*.

```
[
  ( 0, 2, 'GPE', '', ), # name-entity 1
  ( 3, 5, 'ORG', '', ), # name-entity 2
]
```

item_class

alias of *NerToken*

classmethod *from_tagger(data)*

Construct an instance from CkipTagger format.

to_tagger()

Transform to CkipTagger format.

class ckipnlp.container.ner.NerParagraph(*initlist=None*)

Bases: *BaseList*

A list of named-entity recognition sentence.

Data Structure Examples
Text format

Not implemented

List format

Used for `from_list()` and `to_list()`.

```
[
  [ # Sentence 1
    [ '', 'LANGUAGE', (0, 3), ],
  ],
  [ # Sentence 2
    [ '', 'GPE', (0, 2), ],
    [ '', 'ORG', (3, 5), ],
  ],
]
```

Dict format

Used for `from_dict()` and `to_dict()`.

```
[
  [ # Sentence 1
    { 'word': '', 'ner': 'LANGUAGE', 'idx': (0, 3), },
  ],
  [ # Sentence 2
    { 'word': '', 'ner': 'GPE', 'idx': (0, 2), },
    { 'word': '', 'ner': 'ORG', 'idx': (3, 5), },
  ],
]
```

CkipTagger format

Used for `from_tagger()` and `to_tagger()`.

```
[
  [ # Sentence 1
    ( 0, 3, 'LANGUAGE', '', ),
  ],
  [ # Sentence 2
    ( 0, 2, 'GPE', '', ),
    ( 3, 5, 'ORG', '', ),
  ],
]
```

item_class

alias of *NerSentence*

classmethod `from_tagger(data)`

Construct an instance from CkipTagger format.

`to_tagger()`

Transform to CkipTagger format.

4.1.5 ckipnlp.container.parse module

This module provides containers for parsed sentences.

class ckipnlp.container.parse.**ParseClause**(*clause: Optional[str] = None, delim: str = ""*)

Bases: *BaseTuple*, *_ParseClause*

A parse clause.

Variables

- **clause** (*str*) – the parse clause.
- **delim** (*str*) – the punctuations after this clause.

Note: This class is an subclass of `tuple`. To change the attribute, please create a new instance instead.

Data Structure Examples

Text format

Used for `to_text()`.

```
'S(Head:Nab:|particle:Td:)' # delim are ignored
```

List format

Used for `from_list()`, and `to_list()`.

```
[
    'S(Head:Nab:|particle:Td:)', # parse clause
    '',                        # punctuations
]
```

Dict format

Used for `from_dict()` and `to_dict()`.

```
{
    'clause': 'S(Head:Nab:|particle:Td:)', # parse clause
    'delim': '',                        # punctuations
}
```

`to_tree()`

Transform to tree format.

Returns

ParseTree – the tree format of this clause. (*None* if **clause** is *None*)

See also:

ParseTree.from_text().

class ckipnlp.container.parse.**ParseSentence**(*initlist=None*)

Bases: *BaseList*

A parse sentence.

Data Structure Examples

Text format

Used for `to_text()`.

```
[ # delim are ignored
  'S(Head:Nab:|particle:Td:)',          # Clause 1
  '%(particle:I:|manner:Dh:|manner:Dh:|time:Dh:)', # Clause 2
]
```

List format

Used for `from_list()`, and `to_list()`.

```
[
  [ # Clause 1
    'S(Head:Nab:|particle:Td:)',
    '',
  ],
  [ # Clause 2
    '%(particle:I:|manner:Dh:|manner:Dh:|time:Dh:)',
    '',
  ],
]
```

Dict format

Used for `from_dict()` and `to_dict()`.

```
[
  { # Clause 1
    'clause': 'S(Head:Nab:|particle:Td:)',
    'delim': '',
  },
  { # Clause 2
    'clause': '%(particle:I:|manner:Dh:|manner:Dh:|time:Dh:)',
    'delim': '',
  },
]
```

item_class

alias of *ParseClause*

class ckipnlp.container.parse.**ParseParagraph**(*initlist=None*)

Bases: *BaseList*

A list of parse sentence.

Data Structure Examples**Text format**

Used for `to_text()`.

```
[ # delim are ignored
  [ # Sentence 1
    'S(Head:Nab:|particle:Td:)',
    '%(particle:I:|manner:Dh:|manner:Dh:|time:Dh:)',
  ],
]
```

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```
[ # Sentence 2
  None,
  'VP(Head:VH11:|particle:Ta:)',
  'S(agent:NP(apposition:Nba:|Head:Nhaa:)|Head:VE2:)',
],
]
```

List formatUsed for `from_list()`, and `to_list()`.

```
[
  [ # Sentence 1
    [
      'S(Head:Nab:|particle:Td:)',
      '',
    ],
    [
      '%(particle:I:|manner:Dh:|manner:Dh:|time:Dh:)',
      '',
    ],
  ],
  [ # Sentence 2
    [
      None,
      '',
    ],
    [
      'VP(Head:VH11:|particle:Ta:)',
      '',
    ],
    [
      'S(agent:NP(apposition:Nba:|Head:Nhaa:)|Head:VE2:)',
      '',
    ],
  ],
]
```

Dict formatUsed for `from_dict()`, and `to_dict()`.

```
[
  [ # Sentence 1
    {
      'clause': 'S(Head:Nab:|particle:Td:)',
      'delim': '',
    },
    {
      'clause': '%(particle:I:|manner:Dh:|manner:Dh:|time:Dh:)',
      'delim': '',
    },
  ],
  [ # Sentence 2
```

(continues on next page)

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```
{
    'clause': None,
    'delim': '',
},
{
    'clause': 'VP(Head:VH11:|particle:Ta:)',
    'delim': '',
},
{
    'clause': 'S(agent:NP(apposition:Nba:|Head:Nhaa:)|Head:VE2:)',
    'delim': '',
},
],
]
```

item_classalias of *ParseSentence*

4.1.6 ckipnlp.container.seg module

This module provides containers for word-segmented sentences.

class ckipnlp.container.seg.SegSentence(*initlist=None*)Bases: *BaseSentence*

A word-segmented sentence.

Data Structure Examples**Text format**Used for `from_text()` and `to_text()`.

```
' ' # Words segmented by \u3000 (full-width space)
```

List/Dict formatUsed for `from_list()`, `to_list()`, `from_dict()`, and `to_dict()`.

```
[ ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ]
```

Note: This class is also used for part-of-speech tagging.

item_classalias of `str`**class** ckipnlp.container.seg.SegParagraph(*initlist=None*)Bases: *BaseList*

A list of word-segmented sentences.

Data Structure Examples

Text format

Used for `from_text()` and `to_text()`.

```
[
    '',          # Sentence 1
    '', # Sentence 2
]
```

List/Dict format

Used for `from_list()`, `to_list()`, `from_dict()`, and `to_dict()`.

```
[
    [ '', '', '', '', '', '', '', ],          # Sentence 1
    [ '', '', '', '', '', '', '', ' ', ], # Sentence 2
]
```

Note: This class is also used for part-of-speech tagging.

item_class

alias of *SegSentence*

4.1.7 ckipnlp.container.text module

This module provides containers for text sentences.

class `ckipnlp.container.text.TextParagraph(initlist=None)`

Bases: *BaseList*

A list of text sentence.

Data Structure Examples**Text/List/Dict format**

Used for `from_text()`, `to_text()`, `from_list()`, `to_list()`, `from_dict()`, and `to_dict()`.

```
[
    '',          # Sentence 1
    '', # Sentence 2
]
```

item_class

alias of `str`

4.2 ckipnlp.driver package

This module implements CKIPNLP drivers.

Submodules

4.2.1 ckipnlp.driver.base module

This module provides base drivers.

class ckipnlp.driver.base.DriverRegister

Bases: object

The driver registering utility.

class ckipnlp.driver.base.BaseDriver(*, lazy=False)

Bases: object

The base CKIPNLP driver.

class ckipnlp.driver.base.DummyDriver(*, lazy=False)

Bases: *BaseDriver*

The dummy driver.

4.2.2 ckipnlp.driver.classic module

This module provides drivers with CkipClassic backend.

class ckipnlp.driver.classic.CkipClassicWordSegmenter(*, lazy=False, do_pos=False, lexicons=None)

Bases: *BaseDriver*

The CKIP word segmentation driver with CkipClassic backend.

Parameters

- **lazy** (*bool*) – Lazy initialize the driver.
- **do_pos** (*bool*) – Returns POS-tag or not
- **lexicons** (*Iterable[Tuple[str, str]]*) – A list of the lexicon words and their POS-tags.

__call__ (*, *text*)

Apply word segmentation.

Parameters

text (*TextParagraph*) — The sentences.

Returns

- **ws** (*TextParagraph*) — The word-segmented sentences.
- **pos** (*TextParagraph*) — The part-of-speech sentences. (returns if **do_pos** is set.)

```
class ckipnlp.driver.classic.CkipClassicConParser(* , lazy=False)
```

Bases: `_CkipClassicConParser`

The CKIP constituency parsing driver with CkipClassic backend.

Parameters

lazy (*bool*) – Lazy initialize the driver.

```
__call__(* , ws, pos)
```

Apply constituency parsing.

Parameters

- **ws** (*TextParagraph*) — The word-segmented sentences.
- **pos** (*TextParagraph*) — The part-of-speech sentences.

Returns

conparse (*ParseSentence*) — The constituency-parsing sentences.

```
class ckipnlp.driver.classic.CkipClassicConParserClient(* , lazy=False, **opts)
```

Bases: `_CkipClassicConParser`

The CKIP constituency parsing driver with CkipClassic client backend.

Parameters

- **lazy** (*bool*) – Lazy initialize the driver.
- **username** (*string*) – (*optional*) The username of CkipClassicParserClient.
- **password** (*string*) – (*optional*) The password of CkipClassicParserClient.

Notes

Please register an account at <http://parser.iis.sinica.edu.tw/v1/reg.php> and set the environment variables \$CKIPPARSER_USERNAME and \$CKIPPARSER_PASSWORD.

```
__call__(* , ws, pos)
```

Apply constituency parsing.

Parameters

- **ws** (*TextParagraph*) — The word-segmented sentences.
- **pos** (*TextParagraph*) — The part-of-speech sentences.

Returns

conparse (*ParseSentence*) — The constituency-parsing sentences.

4.2.3 ckipnlp.driver.coref module

This module provides built-in coreference resolution driver.

```
class ckipnlp.driver.coref.CkipCorefChunker(* , lazy=False)
```

Bases: `BaseDriver`

The CKIP coreference resolution driver.

Parameters

lazy (*bool*) – Lazy initialize the driver.

`__call__`(*, *conparse*)

Apply coreference delectionation.

Parameters

conparse (*ParseParagraph*) — The constituency-parsing sentences.

Returns

coref (*CorefParagraph*) — The coreference results.

static transform_ws(*, *text*, *ws*, *ner*)

Transform word-segmented sentence lists (create a new instance).

static transform_pos(*, *ws*, *pos*, *ner*)

Transform pos-tag sentence lists (modify in-place).

4.2.4 ckipnlp.driver.ss module

This module provides built-in sentence segmentation driver.

class ckipnlp.driver.ss.**CkipSentenceSegmenter**(*, *lazy=False*, *delims='\n'*, *keep_delims=False*)

Bases: *BaseDriver*

The CKIP sentence segmentation driver.

Parameters

- **lazy** (*bool*) – Lazy initialize the driver.
- **delims** (*str*) – The delimiters.
- **keep_delims** (*bool*) – Keep the delimiters.

`__call__`(*, *raw*, *keep_all=True*)

Apply sentence segmentation.

Parameters

raw (*str*) — The raw text.

Returns

text (*TextParagraph*) — The sentences.

4.2.5 ckipnlp.driver.tagger module

This module provides drivers with CkipTagger backend.

class ckipnlp.driver.tagger.**CkipTaggerWordSegmenter**(*, *lazy=False*, *disable_cuda=True*,
recommend_lexicons={}, *coerce_lexicons={}*,
***opts*)

Bases: *BaseDriver*

The CKIP word segmentation driver with CkipTagger backend.

Parameters

- **lazy** (*bool*) – Lazy initialize the driver.
- **disable_cuda** (*bool*) – Disable GPU usage.
- **recommend_lexicons** (*Mapping[str, float]*) – A mapping of lexicon words to their relative weights.

- **coerce_lexicons** (*Mapping[str, float]*) – A mapping of lexicon words to their relative weights.
- ****opts** – Extra options for `ckiptagger.WS.__call__()`. (Please refer <https://github.com/ckiplab/ckiptagger#4-run-the-ws-pos-ner-pipeline> for details.)

`__call__(*, text)`

Apply word segmentation.

Parameters

text (*TextParagraph*) — The sentences.

Returns

ws (*TextParagraph*) — The word-segmented sentences.

class `kipnlp.driver.tagger.CkipTaggerPosTagger(*, lazy=False, disable_cuda=True, **opts)`

Bases: *BaseDriver*

The CKIP part-of-speech tagging driver with CkipTagger backend.

Parameters

- **lazy** (*bool*) – Lazy initialize the driver.
- **disable_cuda** (*bool*) – Disable GPU usage.
- ****opts** – Extra options for `ckiptagger.POS.__call__()`. (Please refer <https://github.com/ckiplab/ckiptagger#4-run-the-ws-pos-ner-pipeline> for details.)

`__call__(*, text)`

Apply part-of-speech tagging.

Parameters

ws (*TextParagraph*) — The word-segmented sentences.

Returns

pos (*TextParagraph*) — The part-of-speech sentences.

class `kipnlp.driver.tagger.CkipTaggerNerChunker(*, lazy=False, disable_cuda=True, **opts)`

Bases: *BaseDriver*

The CKIP named-entity recognition driver with CkipTagger backend.

Parameters

- **lazy** (*bool*) – Lazy initialize the driver.
- **disable_cuda** (*bool*) – Disable GPU usage.
- ****opts** – Extra options for `ckiptagger.NER.__call__()`. (Please refer <https://github.com/ckiplab/ckiptagger#4-run-the-ws-pos-ner-pipeline> for details.)

`__call__(*, text)`

Apply named-entity recognition.

Parameters

- **ws** (*TextParagraph*) — The word-segmented sentences.
- **pos** (*TextParagraph*) — The part-of-speech sentences.

Returns

ner (*NerParagraph*) — The named-entity recognition results.

4.3 ckipnlp.pipeline package

This module implements CKIPNLP pipelines.

Submodules

4.3.1 ckipnlp.pipeline.coref module

This module provides coreference resolution pipeline.

class ckipnlp.pipeline.coref.**CkipCorefDocument**(**ws=None, pos=None, conparse=None, coref=None*)

Bases: Mapping

The coreference document.

Variables

- **ws** (*SegParagraph*) – The word-segmented sentences.
- **pos** (*SegParagraph*) – The part-of-speech sentences.
- **conparse** (*ParseParagraph*) – The constituency sentences.
- **coref** (*CorefParagraph*) – The coreference resolution results.

class ckipnlp.pipeline.coref.**CkipCorefPipeline**(**coref_chunker='default', lazy=True, opts={}, **kwargs*)

Bases: *CkipPipeline*

The coreference resolution pipeline.

Parameters

- **sentence_segmenter** (*str*) – The type of sentence segmenter.
- **word_segmenter** (*str*) – The type of word segmenter.
- **pos_tagger** (*str*) – The type of part-of-speech tagger.
- **ner_chunker** (*str*) – The type of named-entity recognition chunker.
- **con_parser** (*str*) – The type of constituency parser.
- **coref_chunker** (*str*) – The type of coreference resolution chunker.
- **lazy** (*bool*) – Lazy initialize the drivers.
- **opts** (*Dict[str, Dict]*) – The driver options. Key: driver name (e.g. 'sentence_segmenter'); Value: a dictionary of options.

__call__ (*doc*)

Apply coreference delectation.

Parameters

doc (*CkipDocument*) – The input document.

Returns

corefdoc (*CkipCorefDocument*) – The coreference document.

Note: **doc** is also modified if necessary dependencies (**ws**, **pos**, **ner**) is not computed yet.

get_coref(*doc*, *corefdoc*)

Apply coreference delectionation.

Parameters

- **doc** (*CkipDocument*) – The input document.
- **corefdoc** (*CkipCorefDocument*) – The input document for coreference.

Returns

corefdoc.coref (*CorefParagraph*) – The coreference results.

Note: This routine modify **corefdoc** inplace.

doc is also modified if necessary dependencies (**ws**, **pos**, **ner**) is not computed yet.

4.3.2 ckipnlp.pipeline.kernel module

This module provides kernel CKIPNLP pipeline.

```
class ckipnlp.pipeline.kernel.CkipDocument(*,raw=None, text=None, ws=None, pos=None, ner=None, conparse=None)
```

Bases: Mapping

The kernel document.

Variables

- **raw** (*str*) – The unsegmented text input.
- **text** (*TextParagraph*) – The sentences.
- **ws** (*SegParagraph*) – The word-segmented sentences.
- **pos** (*SegParagraph*) – The part-of-speech sentences.
- **ner** (*NerParagraph*) – The named-entity recognition results.
- **conparse** (*ParseParagraph*) – The constituency-parsing sentences.

```
class ckipnlp.pipeline.kernel.CkipPipeline(*,sentence_segmenter='default', word_segmenter='tagger', pos_tagger='tagger', con_parser='classic-client', ner_chunker='tagger', lazy=True, opts={})
```

Bases: object

The kernel pipeline.

Parameters

- **sentence_segmenter** (*str*) – The type of sentence segmenter.
- **word_segmenter** (*str*) – The type of word segmenter.
- **pos_tagger** (*str*) – The type of part-of-speech tagger.
- **ner_chunker** (*str*) – The type of named-entity recognition chunker.
- **con_parser** (*str*) – The type of constituency parser.
- **lazy** (*bool*) – Lazy initialize the drivers.
- **opts** (*Dict[str, Dict]*) – The driver options. Key: driver name (e.g. 'sentence_segmenter'); Value: a dictionary of options.

get_text(*doc*)

Apply sentence segmentation.

Parameters

doc (*CkipDocument*) – The input document.

Returns

doc.text (*TextParagraph*) – The sentences.

Note: This routine modify **doc** inplace.

get_ws(*doc*)

Apply word segmentation.

Parameters

doc (*CkipDocument*) – The input document.

Returns

doc.ws (*SegParagraph*) – The word-segmented sentences.

Note: This routine modify **doc** inplace.

get_pos(*doc*)

Apply part-of-speech tagging.

Parameters

doc (*CkipDocument*) – The input document.

Returns

doc.pos (*SegParagraph*) – The part-of-speech sentences.

Note: This routine modify **doc** inplace.

get_ner(*doc*)

Apply named-entity recognition.

Parameters

doc (*CkipDocument*) – The input document.

Returns

doc.ner (*NerParagraph*) – The named-entity recognition results.

Note: This routine modify **doc** inplace.

get_conparse(*doc*)

Apply constituency parsing.

Parameters

doc (*CkipDocument*) – The input document.

Returns

doc.conparse (*ParseParagraph*) – The constituency parsing sentences.

Note: This routine modify **doc** inplace.

4.4 ckipnlp.util package

This module implements extra utilities for CKIPNLP.

Submodules

4.4.1 ckipnlp.util.data module

This module implements data loading utilities for CKIPNLP.

`ckipnlp.util.data.get_tagger_data()`

Get CkipTagger data directory.

`ckipnlp.util.data.install_tagger_data(src_dir, *, copy=False)`

Link/Copy CkipTagger data directory.

`ckipnlp.util.data.download_tagger_data()`

Download CkipTagger data directory.

4.4.2 ckipnlp.util.logger module

This module implements logging utilities for CKIPNLP.

`ckipnlp.util.logger.get_logger()`

Get the CKIPNLP logger.

**CHAPTER
FIVE**

INDEX

MODULE INDEX

PYTHON MODULE INDEX

C

- `ckipnlp`, 17
- `ckipnlp.container`, 17
 - `ckipnlp.container.base`, 25
 - `ckipnlp.container.coref`, 27
 - `ckipnlp.container.ner`, 30
 - `ckipnlp.container.parse`, 33
 - `ckipnlp.container.seg`, 36
 - `ckipnlp.container.text`, 37
 - `ckipnlp.container.util`, 17
 - `ckipnlp.container.util.parse_tree`, 17
 - `ckipnlp.container.util.wspos`, 23
- `ckipnlp.driver`, 38
 - `ckipnlp.driver.base`, 38
 - `ckipnlp.driver.classic`, 38
 - `ckipnlp.driver.coref`, 39
 - `ckipnlp.driver.ss`, 40
 - `ckipnlp.driver.tagger`, 40
- `ckipnlp.pipeline`, 42
 - `ckipnlp.pipeline.coref`, 42
 - `ckipnlp.pipeline.kernel`, 43
- `ckipnlp.util`, 45
 - `ckipnlp.util.data`, 45
 - `ckipnlp.util.logger`, 45

Symbols

`__call__()` (Driver method), 8

`__call__()` (*ckipnlp.driver.classic.CkipClassicConParser* method), 39

`__call__()` (*ckipnlp.driver.classic.CkipClassicConParserClient* method), 39

`__call__()` (*ckipnlp.driver.classic.CkipClassicWordSegmenter* method), 38

`__call__()` (*ckipnlp.driver.coref.CkipCorefChunker* method), 39

`__call__()` (*ckipnlp.driver.ss.CkipSentenceSegmenter* method), 40

`__call__()` (*ckipnlp.driver.tagger.CkipTaggerNerChunker* method), 41

`__call__()` (*ckipnlp.driver.tagger.CkipTaggerPosTagger* method), 41

`__call__()` (*ckipnlp.driver.tagger.CkipTaggerWordSegmenter* method), 41

`__call__()` (*ckipnlp.pipeline.coref.CkipCorefPipeline* method), 42

B

Base (class in *ckipnlp.container.base*), 25

BaseDriver (class in *ckipnlp.driver.base*), 38

BaseList (class in *ckipnlp.container.base*), 26

BaseList0 (class in *ckipnlp.container.base*), 26

BaseSentence (class in *ckipnlp.container.base*), 26

BaseSentence0 (class in *ckipnlp.container.base*), 26

BaseTuple (class in *ckipnlp.container.base*), 25

C

CkipClassicConParser (class in *ckipnlp.driver.classic*), 38

CkipClassicConParserClient (class in *ckipnlp.driver.classic*), 39

CkipClassicWordSegmenter (class in *ckipnlp.driver.classic*), 38

CkipCorefChunker (class in *ckipnlp.driver.coref*), 39

CkipCorefDocument (class in *ckipnlp.pipeline.coref*), 42

CkipCorefPipeline (class in *ckipnlp.pipeline.coref*), 42

CkipDocument (class in *ckipnlp.pipeline.kernel*), 43

ckipnlp

module, 17

ckipnlp.container

module, 17

ckipnlp.container.base

module, 25

ckipnlp.container.coref

module, 27

ckipnlp.container.ner

module, 30

ckipnlp.container.parse

module, 33

ckipnlp.container.seg

module, 36

ckipnlp.container.text

module, 37

ckipnlp.container.util

module, 17

ckipnlp.container.util.parse_tree

module, 17

ckipnlp.container.util.wspos

module, 23

ckipnlp.driver

module, 38

ckipnlp.driver.base

module, 38

ckipnlp.driver.classic

module, 38

ckipnlp.driver.coref

module, 39

ckipnlp.driver.ss

module, 40

ckipnlp.driver.tagger

module, 40

ckipnlp.pipeline

module, 42

ckipnlp.pipeline.coref

module, 42

ckipnlp.pipeline.kernel

module, 43

ckipnlp.util

module, 45
 ckipnlp.util.data
 module, 45
 ckipnlp.util.logger
 module, 45
 CkipPipeline (class in ckipnlp.pipeline.kernel), 43
 CkipSentenceSegmenter (class in ckipnlp.driver.ss), 40
 CkipTaggerNerChunker (class in ck-
 ipnlp.driver.tagger), 41
 CkipTaggerPosTagger (class in ckipnlp.driver.tagger),
 41
 CkipTaggerWordSegmenter (class in ck-
 ipnlp.driver.tagger), 40
 CorefParagraph (class in ckipnlp.container.coref), 28
 CorefSentence (class in ckipnlp.container.coref), 27
 CorefToken (class in ckipnlp.container.coref), 27

D

data_class (ckipnlp.container.util.parse_tree.ParseNode
 attribute), 19
 download_tagger_data() (in module ck-
 ipnlp.util.data), 45
 driver_family (Driver attribute), 8
 driver_inputs (Driver attribute), 8
 driver_type (Driver attribute), 8
 DriverRegister (class in ckipnlp.driver.base), 38
 DummyDriver (class in ckipnlp.driver.base), 38

F

from_dict() (ckipnlp.container.base.Base class
 method), 25
 from_dict() (ckipnlp.container.base.BaseTuple class
 method), 26
 from_dict() (ckipnlp.container.util.parse_tree.ParseTree
 class method), 21
 from_json() (ckipnlp.container.base.Base class
 method), 25
 from_list() (ckipnlp.container.base.Base class
 method), 25
 from_list() (ckipnlp.container.base.BaseTuple class
 method), 25
 from_penn() (ckipnlp.container.util.parse_tree.ParseTree
 class method), 21
 from_tagger() (ckipnlp.container.ner.NerParagraph
 class method), 32
 from_tagger() (ckipnlp.container.ner.NerSentence
 class method), 31
 from_tagger() (ckipnlp.container.ner.NerToken class
 method), 30
 from_text() (ckipnlp.container.base.Base class
 method), 25
 from_text() (ckipnlp.container.util.parse_tree.ParseNodeData
 class method), 18

from_text() (ckipnlp.container.util.parse_tree.ParseTree
 class method), 21
 from_text() (ckipnlp.container.util.wspos.WsPosParagraph
 class method), 24
 from_text() (ckipnlp.container.util.wspos.WsPosSentence
 class method), 24
 from_text() (ckipnlp.container.util.wspos.WsPosToken
 class method), 23

G

get_children() (ckipnlp.container.util.parse_tree.ParseTree
 method), 21
 get_conparse() (ckipnlp.pipeline.kernel.CkipPipeline
 method), 44
 get_coref() (ckipnlp.pipeline.coref.CkipCorefPipeline
 method), 42
 get_heads() (ckipnlp.container.util.parse_tree.ParseTree
 method), 22
 get_logger() (in module ckipnlp.util.logger), 45
 get_ner() (ckipnlp.pipeline.kernel.CkipPipeline
 method), 44
 get_pos() (ckipnlp.pipeline.kernel.CkipPipeline
 method), 44
 get_relations() (ck-
 ipnlp.container.util.parse_tree.ParseTree
 method), 22
 get_subjects() (ckipnlp.container.util.parse_tree.ParseTree
 method), 22
 get_tagger_data() (in module ckipnlp.util.data), 45
 get_text() (ckipnlp.pipeline.kernel.CkipPipeline
 method), 44
 get_ws() (ckipnlp.pipeline.kernel.CkipPipeline
 method), 44

I

init() (Driver method), 8
 install_tagger_data() (in module ckipnlp.util.data),
 45
 item_class (ckipnlp.container.base.BaseList attribute),
 26
 item_class (ckipnlp.container.base.BaseList0 at-
 tribute), 26
 item_class (ckipnlp.container.base.BaseSentence at-
 tribute), 26
 item_class (ckipnlp.container.base.BaseSentence0 at-
 tribute), 26
 item_class (ckipnlp.container.coref.CorefParagraph at-
 tribute), 29
 item_class (ckipnlp.container.coref.CorefSentence at-
 tribute), 28
 item_class (ckipnlp.container.ner.NerParagraph
 attribute), 32
 item_class (ckipnlp.container.ner.NerSentence at-
 tribute), 31

item_class (ckipnlp.container.parse.ParseParagraph attribute), 36
 item_class (ckipnlp.container.parse.ParseSentence attribute), 34
 item_class (ckipnlp.container.seg.SegParagraph attribute), 37
 item_class (ckipnlp.container.seg.SegSentence attribute), 36
 item_class (ckipnlp.container.text.TextParagraph attribute), 37

M

module
 ckipnlp, 17
 ckipnlp.container, 17
 ckipnlp.container.base, 25
 ckipnlp.container.coref, 27
 ckipnlp.container.ner, 30
 ckipnlp.container.parse, 33
 ckipnlp.container.seg, 36
 ckipnlp.container.text, 37
 ckipnlp.container.util, 17
 ckipnlp.container.util.parse_tree, 17
 ckipnlp.container.util.wspos, 23
 ckipnlp.driver, 38
 ckipnlp.driver.base, 38
 ckipnlp.driver.classic, 38
 ckipnlp.driver.coref, 39
 ckipnlp.driver.ss, 40
 ckipnlp.driver.tagger, 40
 ckipnlp.pipeline, 42
 ckipnlp.pipeline.coref, 42
 ckipnlp.pipeline.kernel, 43
 ckipnlp.util, 45
 ckipnlp.util.data, 45
 ckipnlp.util.logger, 45

N

NerParagraph (class in ckipnlp.container.ner), 31
 NerSentence (class in ckipnlp.container.ner), 31
 NerToken (class in ckipnlp.container.ner), 30
 node_class (ckipnlp.container.util.parse_tree.ParseTree attribute), 21

P

ParseClause (class in ckipnlp.container.parse), 33
 ParseNode (class in ckipnlp.container.util.parse_tree), 18
 ParseNodeData (class in ckipnlp.container.util.parse_tree), 17
 ParseParagraph (class in ckipnlp.container.parse), 34
 ParseRelation (class in ckipnlp.container.util.parse_tree), 19
 ParseSentence (class in ckipnlp.container.parse), 33
 ParseTree (class in ckipnlp.container.util.parse_tree), 19

S

SegParagraph (class in ckipnlp.container.seg), 36
 SegSentence (class in ckipnlp.container.seg), 36
 show() (ckipnlp.container.util.parse_tree.ParseTree method), 21

T

TextParagraph (class in ckipnlp.container.text), 37
 to_dict() (ckipnlp.container.base.Base method), 25
 to_dict() (ckipnlp.container.base.BaseTuple method), 26
 to_dict() (ckipnlp.container.util.parse_tree.ParseTree method), 21
 to_json() (ckipnlp.container.base.Base method), 25
 to_list() (ckipnlp.container.base.Base method), 25
 to_list() (ckipnlp.container.base.BaseTuple method), 25
 to_penn() (ckipnlp.container.util.parse_tree.ParseTree method), 21
 to_tagger() (ckipnlp.container.ner.NerParagraph method), 32
 to_tagger() (ckipnlp.container.ner.NerSentence method), 31
 to_tagger() (ckipnlp.container.ner.NerToken method), 30
 to_text() (ckipnlp.container.base.Base method), 25
 to_text() (ckipnlp.container.util.parse_tree.ParseTree method), 21
 to_text() (ckipnlp.container.util.wspos.WsPosParagraph static method), 24
 to_text() (ckipnlp.container.util.wspos.WsPosSentence static method), 24
 to_tree() (ckipnlp.container.parse.ParseClause method), 33
 transform_pos() (ckipnlp.driver.coref.CkipCorefChunker static method), 40
 transform_ws() (ckipnlp.driver.coref.CkipCorefChunker static method), 40

W

WsPosParagraph (class in ckipnlp.container.util.wspos), 24
 WsPosSentence (class in ckipnlp.container.util.wspos), 23
 WsPosToken (class in ckipnlp.container.util.wspos), 23