TUPA Documentation

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For more information about how to use this library, see the *API Documentation*.

CHAPTER 1

Getting Started

To parse text to UCCA passages, download a model file from the latest release, extract it, and use the following code template:

```
from tupa.parse import Parser
from ucca.convert import from_text
parser = Parser("models/ucca_bilstm")
for passage in parser.parse(from_text(...)):
    ...
```

Each passage instantiates the ucca.core.Passage class.

CHAPTER 2

tupa.parse Module

2.1 Functions

average_f1(scores[, eval_type])	
filter_passages_for_bert(passages, args)	
from_text_format(*args, **kwargs)	
generate_and_len(it)	
get_eval_type(scores)	
get_output_converter(out_format[, default])	
glob(pathname, *[, recursive])	Return a list of paths matching a pathname pattern.
main()	
main_generator()	
percents_str(part, total[, infix, fraction])	
print_scores(scores, filename[, prefix, ...])	
read_passages(args, files)	
set_traceback_listener([sig])	
single_to_iter(it)	
to_lower_case(passages)	
train_test(train_passages, dev_passages, ...)	Train and test parser on given passage :param train_passages: passage to train on :param dev_passages: passages to evaluate on every iteration :param test_passages: passages to test on after training :param args: extra argument :param model_suffix: string to append to model filename before file extension :return: generator of Scores objects: dev scores for each training iteration (if given dev), and finally test scores

2.1.1 average_f1

tupa.parse.**average_f1**(*scores*, *eval_type=None*)

2.1.2 filter_passages_for_bert

tupa.parse.**filter_passages_for_bert**(*passages*, *args*)

2.1.3 from_text_format

tupa.parse.**from_text_format**(**args*, ***kwargs*)

2.1.4 generate_and_len

tupa.parse.**generate_and_len**(*it*)

2.1.5 get_eval_type

tupa.parse.**get_eval_type**(*scores*)

2.1.6 get_output_converter

tupa.parse.**get_output_converter**(*out_format*, *default=None*)

2.1.7 main

tupa.parse.**main**()

2.1.8 main_generator

tupa.parse.**main_generator**()

2.1.9 percents_str

tupa.parse.**percents_str**(*part*, *total*, *infix=''*, *fraction=True*)

2.1.10 print_scores

tupa.parse.**print_scores**(*scores*, *filename*, *prefix=None*, *prefix_title=None*)

2.1.11 read_passages

tupa.parse.**read_passages**(*args*, *files*)

2.1.12 single_to_iter

tupa.parse.**single_to_iter**(*it*)

2.1.13 to_lower_case

tupa.parse.**to_lower_case**(*passages*)

2.1.14 train_test

tupa.parse.**train_test**(*train_passages*, *dev_passages*, *test_passages*, *args*, *model_suffix=''*)

Train and test parser on given passage :param train_passages: passage to train on :param dev_passages: passages to evaluate on every iteration :param test_passages: passages to test on after training :param args: extra argument :param model_suffix: string to append to model filename before file extension :return: generator of Scores objects: dev scores for each training iteration (if given dev), and finally test scores

2.2 Classes

AbstractParser(config, models[, training, ...])	
BatchParser(*args, **kwargs)	Parser for a single training iteration or single pass over dev/test passages
ClassifierProperty	An enumeration.
Enum	Generic enumeration.
Iterations(args)	
Model(filename[, config])	
Oracle(passage)	Oracle to produce gold transition parses given UCCA passages To be used for creating training data for a transition-based UCCA parser :param passage gold passage to get the correct edges from
ParseMode	An enumeration.
Parser([model_files, config, beam])	Main class to implement transition-based UCCA parser
ParserException	
PassageParser(passage, *args, **kwargs)	Parser for a single passage, has a state and optionally an oracle
State(passage)	The parser's state, responsible for applying actions and creating the final Passage :param passage: a Passage object to get the tokens from, and everything else if training
defaultdict	defaultdict(default_factory[, ...]) –> dict with default factory
partial	partial(func, *args, **keywords) - new function with partial application of the given arguments and keywords.

2.2.1 AbstractParser

class tupa.parse.**AbstractParser**(*config*, *models*, *training=False*, *evaluation=False*)

Bases: object

Attributes Summary

duration
model

Methods Summary

tokens_per_second()

Attributes Documentation

duration

model

Methods Documentation

tokens_per_second()

2.2.2 BatchParser

class tupa.parse.**BatchParser**(**args*, ***kwargs*)

Bases: *tupa.parse.AbstractParser*

Parser for a single training iteration or single pass over dev/test passages

Methods Summary

add_progress_bar(it[, total, display])
parse(passages[, display, write, accuracies])
summary()
time_per_passage()
update_counts(parser)

Methods Documentation

add_progress_bar(*it*, *total=None*, *display=True*)

parse(*passages*, *display=True*, *write=False*, *accuracies=None*)

summary()

time_per_passage()

update_counts(*parser*)

2.2.3 ParseMode

class tupa.parse.**ParseMode**

Bases: enum.Enum

An enumeration.

Attributes Summary

dev
test
train

Attributes Documentation

dev = 2

test = 3

train = 1

2.2.4 Parser

class tupa.parse.**Parser**(*model_files=()*, *config=None*, *beam=1*)

Bases: *tupa.parse.AbstractParser*

Main class to implement transition-based UCCA parser

Methods Summary

eval(passages, mode, scores_filename[, display])	
eval_and_save([last, finished_epoch])	
init_train()	
parse(passages[, mode, evaluate, display, write])	Parse given passages :param passages: iterable of passages to parse :param mode: ParseMode value.
print_config()	
save(model)	
train([passages, dev, test, iterations])	Train parser on given passages :param passages: iterable of passages to train on :param dev: iterable of passages to tune on :param test: iterable of passages that would be tested on after train finished :param iterations: iterable of Iterations objects whose i attributes are the number of iterations to perform

Methods Documentation

eval(*passages*, *mode*, *scores_filename*, *display=True*)

eval_and_save(*last=False*, *finished_epoch=False*)

init_train()

parse(*passages*, *mode=<ParseMode.test: 3>*, *evaluate=False*, *display=True*, *write=False*)

Parse given passages :param passages: iterable of passages to parse :param mode: ParseMode value.

If train, use oracle to train on given passages. Otherwise, just parse with classifier.

Parameters

- **evaluate** – whether to evaluate parsed passages with respect to given ones. Only possible when given passages are annotated.

- **display** – whether to display information on each parsed passage
- **write** – whether to write output passages to file

Returns generator of parsed passages (or in train mode, the original ones), or, if evaluation=True, of pairs of (Passage, Scores).

print_config()

save(*model*)

train(*passages=None*, *dev=None*, *test=None*, *iterations=1*)
Train parser on given passages :param passages: iterable of passages to train on :param dev: iterable of passages to tune on :param test: iterable of passages that would be tested on after train finished :param iterations: iterable of Iterations objects whose i attributes are the number of iterations to perform

2.2.5 ParserException

exception tupa.parse.**ParserException**

2.2.6 PassageParser

class tupa.parse.**PassageParser**(*passage*, **args*, ***kwargs*)
Bases: *tupa.parse.AbstractParser*

Parser for a single passage, has a state and optionally an oracle

Attributes Summary

accuracy_str
num_tokens

Methods Summary

check_loop()	Check if the current state has already occurred, indicating a loop
choose(true[, axis, name])	
correct(axis, label, pred, scores, true, ...)	
evaluate([mode])	
finish(status[, display, write, accuracies])	
generate_descending(scores)	
get_true_actions()	
get_true_label(node)	
init()	
label_node([action])	
parse([display, write, accuracies])	
parse_internal()	Internal method to parse a single passage.

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Table 9 – continued from previous page

predict(scores, values[, is_valid])	Choose action/label based on classifier Usually the best action/label is valid, so max is enough to choose it in O(n) time Otherwise, sorts all the other scores to choose the best valid one in O(n lg n) :return: valid action/label with maximum probability according to classifier
verify(guessed, ref)	Compare predicted passage to true passage and raise an exception if they differ :param ref: true passage :param guessed: predicted passage to compare

Attributes Documentation

accuracy_str

num_tokens

Methods Documentation

check_loop()
Check if the current state has already occurred, indicating a loop

choose(*true*, *axis=None*, *name='action'*)

correct(*axis*, *label*, *pred*, *scores*, *true*, *true_keys*)

evaluate(*mode=<ParseMode.test: 3>*)

finish(*status*, *display=True*, *write=False*, *accuracies=None*)

static generate_descending(*scores*)

get_true_actions()

get_true_label(*node*)

init()

label_node(*action=None*)

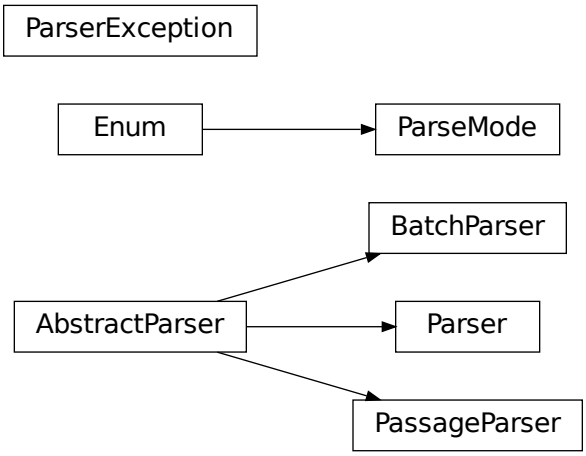
parse(*display=True*, *write=False*, *accuracies=None*)

parse_internal()
Internal method to parse a single passage. If training, use oracle to train on given passages. Otherwise just parse with classifier.

static predict(*scores*, *values*, *is_valid=None*)
Choose action/label based on classifier Usually the best action/label is valid, so max is enough to choose it in O(n) time Otherwise, sorts all the other scores to choose the best valid one in O(n lg n) :return: valid action/label with maximum probability according to classifier

verify(*guessed*, *ref*)
Compare predicted passage to true passage and raise an exception if they differ :param ref: true passage :param guessed: predicted passage to compare

2.3 Class Inheritance Diagram



CHAPTER 3

tupa.action Module

3.1 Classes

Action(action_type[, tag, orig_edge, ...])	
Actions([actions, size])	
Labels(size)	

3.1.1 Action

class tupa.action.**Action**(*action_type*, *tag=None*, *orig_edge=None*, *orig_node=None*, *oracle=None*, *id_=None*)

Bases: dict

Attributes Summary

is_swap	
remote	
type_to_id	

Methods Summary

__call__(*args, **kwargs)	Call self as a function.
apply()	
is_type(*others)	

Attributes Documentation

is_swap

remote

type_to_id = {'FINISH': 11, 'IMPLICIT': 3, 'LABEL': 4, 'LEFT-EDGE': 6, 'LEFT-REMOTE':

Methods Documentation

__call__(**args*, ***kwargs*)
Call self as a function.

apply()

is_type(**others*)

3.1.2 Actions

class tupa.action.**Actions**(*actions=None*, *size=None*)
Bases: *tupa.labels.Labels*

Attributes Summary

Finish
Implicit
Label
LeftEdge
LeftRemote
Node
Reduce
RemoteNode
RightEdge
RightRemote
Shift
Swap
all
ids

Methods Summary

generate_id(action[, create])
init()

Attributes Documentation

Finish = {'action_type': 'FINISH', 'tag': None}

Implicit = {'action_type': 'IMPLICIT', 'tag': None}

Label = {'action_type': 'LABEL', 'tag': None}

LeftEdge = {'action_type': 'LEFT-EDGE', 'tag': None}

LeftRemote = {'action_type': 'LEFT-REMOTE', 'tag': None}

Node = {'action_type': 'NODE', 'tag': None}

Reduce = {'action_type': 'REDUCE', 'tag': None}

RemoteNode = {'action_type': 'REMOTE-NODE', 'tag': None}

RightEdge = {'action_type': 'RIGHT-EDGE', 'tag': None}

RightRemote = {'action_type': 'RIGHT-REMOTE', 'tag': None}

Shift = {'action_type': 'SHIFT', 'tag': None}

Swap = {'action_type': 'SWAP', 'tag': None}

all

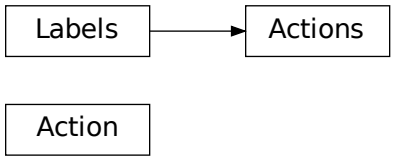
ids

Methods Documentation

generate_id(*action*, *create=True*)

init()

3.2 Class Inheritance Diagram



CHAPTER 4

tupa.config Module

4.1 Functions

add_param_arguments([ap, arg_default])	
deepcopy(x[, memo, _nil])	Deep copy operation on arbitrary Python objects.
load_enum(filename)	

4.1.1 add_param_arguments

tupa.config.**add_param_arguments**(*ap=None*, *arg_default=None*)

4.2 Classes

CategoricalParameter(values, string)	
Hyperparams(parent[, shared])	
HyperparamsInitializer([name])	
Iterations(args)	

4.2.1 Hyperparams

class tupa.config.**Hyperparams**(*parent*, *shared=None*, ***kwargs*)

Bases: object

Methods Summary

items()

Methods Documentation

items()

4.2.2 HyperparamsInitializer

class tupa.config.**HyperparamsInitializer**(*name=None*, **args*, ***kwargs*)
Bases: object

Methods Summary

action(args)

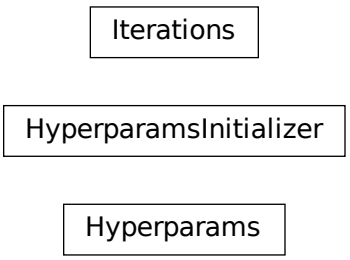
Methods Documentation

classmethod action(*args*)

4.2.3 Iterations

class tupa.config.**Iterations**(*args*)
Bases: object

4.3 Class Inheritance Diagram



CHAPTER 5

tupa.labels Module

5.1 Classes

Labels(size)

5.1.1 Labels

class tupa.labels.**Labels**(*size*)

Bases: object

Attributes Summary

all

Methods Summary

load(all_size)
save([skip])

Attributes Documentation

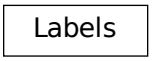
all

Methods Documentation

load(*all_size*)

save(*skip=False*)

5.2 Class Inheritance Diagram



CHAPTER 6

tupa.model Module

6.1 Functions

load_json(filename)	Load dictionary from JSON file :param filename: file to read from
remove_backup(*filenames)	
save_json(filename, d)	Save dictionary to JSON file :param filename: file to write to :param d: dictionary to save

6.1.1 load_json

tupa.model.**load_json**(*filename*)

Load dictionary from JSON file :param filename: file to read from

6.1.2 remove_backup

tupa.model.**remove_backup**(**filenames*)

6.1.3 save_json

tupa.model.**save_json**(*filename*, *d*)

Save dictionary to JSON file :param filename: file to write to :param d: dictionary to save

6.2 Classes

Actions([actions, size])	

Continued on next page

Table 2 – continued from previous page

AutoIncrementDict([size, keys, d, unknown])	DefaultOrderedDict that returns an auto-incrementing index for new keys
Classifier(config, labels[, input_params])	Interface for classifier used by the parser.
ClassifierProperty	An enumeration.
Enum	Generic enumeration.
FeatureParameters(suffix, dim, size[, ...])	
Model(filename[, config])	
OrderedDict	Dictionary that remembers insertion order
ParameterDefinition(args, name, attr_to_arg)	
UnknownDict([d])	DefaultOrderedDict that has a single default value for missing keys

6.2.1 AutoIncrementDict

class tupa.model.**AutoIncrementDict**(*size=None*, *keys=()*, *d=None*, *unknown=0*)

Bases: *tupa.model_util.DefaultOrderedDict*

DefaultOrderedDict that returns an auto-incrementing index for new keys

Methods Summary

first_items([n])	

Methods Documentation

first_items(*n=3*)

6.2.2 ClassifierProperty

class tupa.model.**ClassifierProperty**

Bases: enum.Enum

An enumeration.

Attributes Summary

require_init_features	
trainable_after_saving	
update_only_on_error	

Attributes Documentation

require_init_features = 2

trainable_after_saving = 3

update_only_on_error = 1

6.2.3 Model

class tupa.model.**Model**(*filename*, *config=None*, **args*, ***kwargs*)
Bases: object

Attributes Summary

actions
classifier_properties
formats
is_neural_network
is_retrainable

Methods Summary

all_params()	
finalize(finished_epoch)	Copy model, finalizing features (new values will not be added during subsequent use) and classifier (update it) :param finished_epoch: whether this is the end of an epoch (or just intermediate checkpoint), for bookkeeping :return: a copy of this model with a new feature extractor and classifier (actually classifier may be the same)
init_actions()	
init_features(state, train)	
init_model([axis, lang, init_params])	
init_node_labels()	
init_param(key)	
load([is_finalized])	Load the feature and classifier parameters from files :param is_finalized: whether loaded model should be finalized, or allow feature values to be added subsequently
load_labels()	Copy classifier's labels to create new Actions/Labels objects Restoring from a model that was just loaded from file, or called by restore()
node_label_param_def([args])	
param_defs([args, only_node_labels])	
restore(model[, feature_extractor, . . .])	Set all attributes to a reference to existing model, except labels, which will be copied.
save([save_init])	Save feature and classifier parameters to files
score(state, axis)	
set_axis(axis, lang)	

Attributes Documentation

actions

classifier_properties

formats

is_neural_network

is_retrainable

Methods Documentation

all_params()

finalize(*finished_epoch*)
Copy model, finalizing features (new values will not be added during subsequent use) and classifier (update it) :param finished_epoch: whether this is the end of an epoch (or just intermediate checkpoint), for bookkeeping :return: a copy of this model with a new feature extractor and classifier (actually classifier may be the same)

init_actions()

init_features(*state*, *train*)

init_model(*axis=None*, *lang=None*, *init_params=True*)

init_node_labels()

init_param(*key*)

load(*is_finalized=True*)
Load the feature and classifier parameters from files :param is_finalized: whether loaded model should be finalized, or allow feature values to be added subsequently

load_labels()
Copy classifier's labels to create new Actions/Labels objects Restoring from a model that was just loaded from file, or called by restore()

node_label_param_def(*args=None*)

param_defs(*args=None*, *only_node_labels=False*)

restore(*model*, *feature_extractor=None*, *classifier=None*, *is_finalized=None*)
Set all attributes to a reference to existing model, except labels, which will be copied. :param model: Model to restore :param feature_extractor: optional FeatureExtractor to restore instead of model's :param classifier: optional Classifier to restore instead of model's :param is_finalized: whether the restored model is finalized

save(*save_init=False*)
Save feature and classifier parameters to files

score(*state*, *axis*)

set_axis(*axis*, *lang*)

6.2.4 ParameterDefinition

class tupa.model.**ParameterDefinition**(*args*, *name*, *attr_to_arg*, *attr_to_val=None*)
Bases: object

Attributes Summary

dim_arg
enabled
lang_specific

Continued on next page

Table 7 – continued from previous page

size_arg

Methods Summary

all_langs(params)
create_from_config([lang])
get_args(lang)
key([lang])
load_to_config(params)

Attributes Documentation

dim_arg

enabled

lang_specific

size_arg

Methods Documentation

all_langs(*params*)

create_from_config(*lang=None*)

get_args(*lang*)

key(*lang=None*)

load_to_config(*params*)

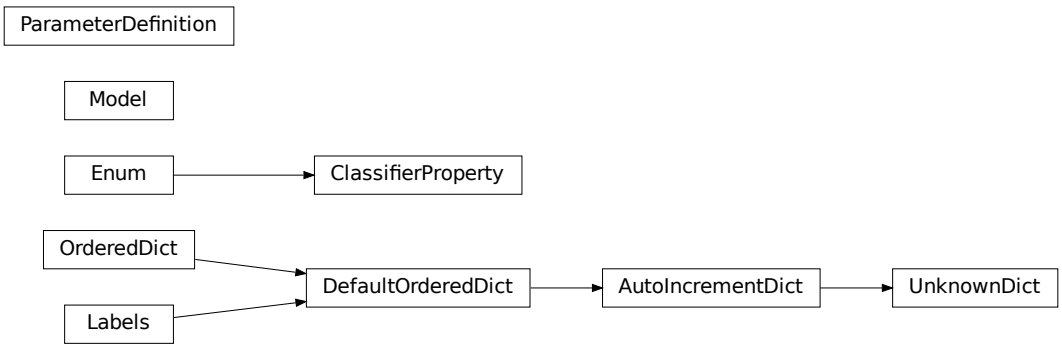
6.2.5 UnknownDict

class tupa.model.**UnknownDict**(*d=None*)

Bases: *tupa.model_util.AutoIncrementDict*

DefaultOrderedDict that has a single default value for missing keys

6.3 Class Inheritance Diagram



CHAPTER 7

tupa.model_util Module

7.1 Functions

glob(pathname, *[, recursive])	Return a list of paths matching a pathname pattern.
jsonify(o)	
load_dict(filename)	Load dictionary from Pickle file :param filename: file to read from
load_enum(filename)	
load_json(filename)	Load dictionary from JSON file :param filename: file to read from
remove_backup(*filenames)	
remove_existing(*filenames)	
save_dict(filename, d)	Save dictionary to Pickle file :param filename: file to write to :param d: dictionary to save
save_json(filename, d)	Save dictionary to JSON file :param filename: file to write to :param d: dictionary to save

7.1.1 jsonify

tupa.model_util.**jsonify**(*o*)

7.1.2 load_dict

tupa.model_util.**load_dict**(*filename*)

Load dictionary from Pickle file :param filename: file to read from

7.1.3 load_enum

tupa.model_util.**load_enum**(*filename*)

7.1.4 load_json

tupa.model_util.**load_json**(*filename*)
Load dictionary from JSON file :param filename: file to read from

7.1.5 remove_backup

tupa.model_util.**remove_backup**(**filenames*)

7.1.6 remove_existing

tupa.model_util.**remove_existing**(**filenames*)

7.1.7 save_dict

tupa.model_util.**save_dict**(*filename*, *d*)
Save dictionary to Pickle file :param filename: file to write to :param d: dictionary to save

7.1.8 save_json

tupa.model_util.**save_json**(*filename*, *d*)
Save dictionary to JSON file :param filename: file to write to :param d: dictionary to save

7.2 Classes

AutoIncrementDict([size, keys, d, unknown])	DefaultOrderedDict that returns an auto-incrementing index for new keys
Counter(**kwds)	Dict subclass for counting hashable items.
DefaultOrderedDict([default_factory, size])	
DropoutDict([d, dropout, size, keys, min_count])	UnknownDict that sometimes returns the unknown value even for existing keys
IdentityVocab()	
KeyBasedDefaultDict	
Labels(size)	
Lexeme(index, text)	
OrderedDict	Dictionary that remembers insertion order
Strings(vocab)	
UnknownDict([d])	DefaultOrderedDict that has a single default value for missing keys
Vocab(tuples)	
defaultdict	defaultdict(default_factory[, ...]) –> dict with default factory
itemgetter	itemgetter(item, ...) –> itemgetter object

7.2.1 AutoIncrementDict

class tupa.model_util.**AutoIncrementDict**(*size=None*, *keys=()*, *d=None*, *unknown=0*)
Bases: *tupa.model_util.DefaultOrderedDict*

DefaultOrderedDict that returns an auto-incrementing index for new keys

Methods Summary

first_items([n])

Methods Documentation

first_items(*n=3*)

7.2.2 DefaultOrderedDict

class tupa.model_util.**DefaultOrderedDict**(*default_factory=None*, **args*, *size=None*, ***kwargs*)
Bases: collections.OrderedDict, *tupa.labels.Labels*

Attributes Summary

all

Methods Summary

copy()

Attributes Documentation

all

Methods Documentation

copy() → a shallow copy of od

7.2.3 DropoutDict

class tupa.model_util.**DropoutDict**(*d=None*, *dropout=0*, *size=None*, *keys=()*, *min_count=1*)
Bases: *tupa.model_util.AutoIncrementDict*

UnknownDict that sometimes returns the unknown value even for existing keys

7.2.4 IdentityVocab

class tupa.model_util.**IdentityVocab**
Bases: *tupa.model_util.Vocab*

7.2.5 KeyBasedDefaultDict

class tupa.model_util.**KeyBasedDefaultDict**
Bases: collections.defaultdict

7.2.6 Lexeme

class tupa.model_util.**Lexeme**(*index*, *text*)
Bases: object

7.2.7 Strings

class tupa.model_util.**Strings**(*vocab*)
Bases: object

7.2.8 UnknownDict

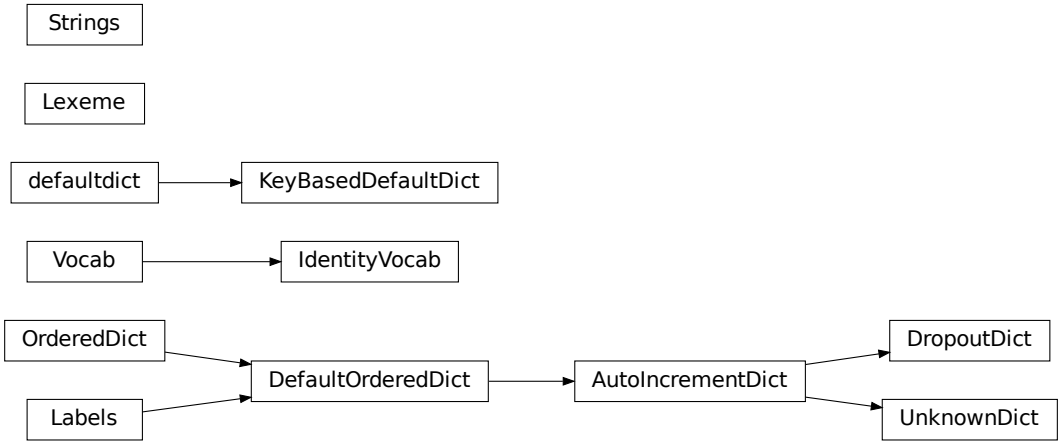
class tupa.model_util.**UnknownDict**(*d=None*)
Bases: *tupa.model_util.AutoIncrementDict*

DefaultOrderedDict that has a single default value for missing keys

7.2.9 Vocab

class tupa.model_util.**Vocab**(*tuples*)
Bases: dict

7.3 Class Inheritance Diagram



CHAPTER 8

tupa.oracle Module

8.1 Functions

is_implicit_node(node)	
is_remote_edge(edge)	
is_terminal_edge(edge)	

8.1.1 is_implicit_node

tupa.oracle.**is_implicit_node**(*node*)

8.1.2 is_remote_edge

tupa.oracle.**is_remote_edge**(*edge*)

8.1.3 is_terminal_edge

tupa.oracle.**is_terminal_edge**(*edge*)

8.2 Classes

Actions([actions, size])	
InvalidActionError(*args[, is_type])	

Continued on next page

Table 2 – continued from previous page

Oracle(passage)	Oracle to produce gold transition parses given UCCA passages To be used for creating training data for a transition-based UCCA parser :param passage gold passage to get the correct edges from

8.2.1 Oracle

class tupa.oracle.**Oracle**(*passage*)

Bases: object

Oracle to produce gold transition parses given UCCA passages To be used for creating training data for a transition-based UCCA parser :param passage gold passage to get the correct edges from

Methods Summary

action(edge[, kind, direction])	
generate_actions(state)	Determine all zero-cost action according to current state :param state: current State of the parser :return: generator of Action items to perform
generate_log(invalid, state)	
get_actions(state, all_actions[, create])	Determine all zero-cost action according to current state Asserts that the returned action is valid before returning :param state: current State of the parser :param all_actions: Actions object used to map actions to IDs :param create: whether to create new actions if they do not exist yet :return: dict of action ID to Action
get_label(state, node)	
need_label(node)	
remove(edge[, node])	
str(sep)	

Methods Documentation

action(*edge*, *kind=None*, *direction=None*)

generate_actions(*state*)

Determine all zero-cost action according to current state :param state: current State of the parser :return: generator of Action items to perform

generate_log(*invalid*, *state*)

get_actions(*state*, *all_actions*, *create=True*)

Determine all zero-cost action according to current state Asserts that the returned action is valid before returning :param state: current State of the parser :param all_actions: Actions object used to map actions to IDs :param create: whether to create new actions if they do not exist yet :return: dict of action ID to Action

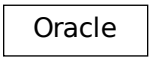
get_label(*state*, *node*)

need_label(*node*)

remove(*edge*, *node=None*)

str(*sep*)

8.3 Class Inheritance Diagram



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