
CENG 463

Natural Language Processing

Fall 2023-2024

Assignment 2

Text Classification

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1 Task 1

1.1 Implementation

The relevant scripts are in "scripts.txt" file, usage: `$ bash scripts.txt`

This script file is for training, validation and testing on provided datasets.

Script does:

- Converting train, val and test sets from ".conllu" format to ".spacy" format.
- running training and validation.
- running test.
- halt.

Related scores are printed on bash as output.

There is also a python file, including my own test samples for "Experiment with your parser" section (1.4 in assignment manual).

1.2 Test Results

Results	
TOK	98.75
UAS	53.26
LAS	38.87
SENT P	96.18
SENT R	98.06
SENT F	97.11
SPEED	8895

LAS (per type)

	P	R	F
obl	25.88	37.18	30.52
root	63.77	60.18	61.93
det	67.20	73.68	70.29
obj	40.49	45.74	42.95
nsubj	37.75	17.48	23.90
flat	42.02	47.31	44.51
amod	39.77	37.52	38.61
compound	35.53	13.50	19.57
nummod	44.07	24.53	31.52
cc	52.29	37.25	43.51
conj	24.89	27.71	26.22
nmod:poss	41.60	55.15	47.43
nmod	21.10	3.53	6.04
acl	31.00	40.80	35.23
cop	25.00	0.75	1.46
case	67.76	45.45	54.41
compound:lvc	40.30	65.06	49.77
advmod	45.28	38.96	41.88
csbj	0.00	0.00	0.00
compound:redup	0.00	0.00	0.00
advmod:emph	72.94	73.81	73.37
dep	0.00	0.00	0.00
fixed	0.00	0.00	0.00
discourse	83.33	20.00	32.26
mark	45.45	29.41	35.71
advcl	0.00	0.00	0.00
ccomp	0.00	0.00	0.00
aux:q	64.86	48.98	55.81
parataxis	0.00	0.00	0.00
appos	0.00	0.00	0.00

- Overall Performance:

Labeled Attachment Score (LAS): 38.87%

Unlabeled Attachment Score (UAS): 53.26%

Remark:

The LAS represents the accuracy of the parser in predicting both the syntactic label and the head of each word.

The UAS measures the accuracy in predicting only the head of each word.

In this experiment, the UAS is higher than the LAS, indicating that the parser is relatively better at predicting the head of words than the syntactic labels.

- Sentence-level Evaluation:

Sentence Precision (SENT P): 96.18%

Sentence Recall (SENT R): 98.06%

Sentence F1 Score (SENT F): 97.11%

Remark:

The high sentence-level precision, recall, and F1 scores indicate that the parser performs well at the sentence level, capturing the overall structure of sentences effectively.

- Speed:

Parsing Speed: 8895 tokens per second

Remark:

The parsing speed is quite impressive, indicating efficient processing of tokens.

- LAS (per Type):

Notable Results:

Highest LAS: "root" (61.93%)

Lowest LAS: Several types with 0.00% LAS

Explanation:

Some syntactic types, such as "root," "det," and "nummod," show relatively higher LAS, suggesting better accuracy in predicting both labels and heads for these types.

Types with 0.00% LAS may indicate areas for improvement in the parser's ability to predict specific syntactic relationships.

- Difference Between LAS and UAS:

Observation:

There is a noticeable difference between LAS and UAS scores.

Explanation:

The difference could be attributed to the challenges associated with accurately predicting syntactic labels, which might be more complex than predicting only the head of a word.

The parser might struggle with specific syntactic constructions or dependencies that contribute to the difference between LAS and UAS.

1.3 My Test Sentences

- Good Results:

– Sentence: Güzel bir günbatımında deniz kıyısında yürüyordum.

token: Güzel - dep: amod - head: günbatımında - head_dep: obl

token: bir - dep: det - head: günbatımında - head_dep: obl

token: günbatımında - dep: obl - head: yürüyordum - head_dep: ROOT

token: deniz - dep: nmod:poss - head: kıyısında - head_dep: obl

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token: kıyısında - dep: obl - head: yürüyordum - head_dep: ROOT
token: yürüyordum - dep: ROOT - head: yürüyordum - head_dep: ROOT
token: . - dep: punct - head: yürüyordum - head_dep: ROOT
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- Sentence: Ankara'da kışın genellikle kar yağar.

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token: Ankara'da - dep: obl - head: yağar - head_dep: ROOT
token: kışın - dep: amod - head: genellikle - head_dep: amod
token: genellikle - dep: amod - head: kar - head_dep: amod
token: kar - dep: amod - head: yağar - head_dep: ROOT
token: yağar - dep: ROOT - head: yağar - head_dep: ROOT
token: . - dep: punct - head: yağar - head_dep: ROOT
-----

```

- Poor Results:

- Sentence: Kardeşimin evleneceğini söylediği günün ertesi günü gördüğüm kırmızı arabayı tekrar görmem sadece on dakika sürdü.

```

token: Kardeşimin - dep: nmod:poss - head: evleneceğini - head_dep: obj
token: evleneceğini - dep: obj - head: görmem - head_dep: obl
token: söylediği - dep: nmod:poss - head: günün - head_dep: nmod:poss
token: günün - dep: nmod:poss - head: günü - head_dep: obj
token: ertesi - dep: nmod:poss - head: günü - head_dep: obj
token: günü - dep: obj - head: gördüğüm - head_dep: acl
token: gördüğüm - dep: acl - head: arabayı - head_dep: obj
token: kırmızı - dep: amod - head: arabayı - head_dep: obj
token: arabayı - dep: obj - head: görmem - head_dep: obl
token: tekrar - dep: amod - head: görmem - head_dep: obl
token: görmem - dep: obl - head: sürdü - head_dep: ROOT
token: sadece - dep: punct - head: görmem - head_dep: obl
token: on - dep: nummod - head: dakika - head_dep: obl
token: dakika - dep: obl - head: sürdü - head_dep: ROOT
token: sürdü - dep: ROOT - head: sürdü - head_dep: ROOT
token: . - dep: punct - head: sürdü - head_dep: ROOT
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```

- Sentence: Geçen gün seni gördüğümde gözlerindeki yaşı anlamış gibi alev atarken hiç de utanmam yoktu.

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token: Geçen - dep: nmod - head: anlamış - head_dep: nmod
token: gün - dep: flat - head: Geçen - head_dep: nmod
token: seni - dep: obj - head: gördüğümde - head_dep: nmod
token: gördüğümde - dep: nmod - head: yaşı - head_dep: obj
token: gözlerindeki - dep: compound - head: gördüğümde - head_dep: nmod
token: yaşı - dep: obj - head: anlamış - head_dep: nmod
token: anlamış - dep: nmod - head: alev - head_dep: obl
token: gibi - dep: case - head: anlamış - head_dep: nmod
token: alev - dep: obl - head: atarken - head_dep: ROOT
token: atarken - dep: ROOT - head: atarken - head_dep: ROOT
token: hiç - dep: advmod - head: utanmam - head_dep: acl

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token: de - dep: advmod:emph - head: hiç - head_dep: advmod
token: utanmam - dep: acl - head: yoktu - head_dep: nsubj
token: yoktu - dep: nsubj - head: atarken - head_dep: ROOT
token: . - dep: punct - head: yoktu - head_dep: nsubj
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COMMENTS: I tried to choose some long sentences with also long dependencies. Turkish Language has a lot of potential for this type of sentences, so it makes it difficult for nlp models to get high accuracy sometimes, especially in these specific cases.

In good results, sentences are relevantly simple and have small distance dependencies between tokens, so the results are better.

In poor results, it is contrary.

In first poor sentence, there is a very long phrase which has a lot of dependencies between tokens, it apparently makes it hard to distinguish heads and their dependencies. In second sentence, I tried to add some prepositions and hoped to push limits of dependency parser. It worked and gave some poor results.

Some wrongs:

from first poor sentence:

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token: sadece - head : görmem
token: söylediği - dep : nmod

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from second poor sentence:

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token: Geçen - head : anlamış - dep : nmod
token: gördüğümde - head : yaş1

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2 Task 2

2.1 Implementation

File_name: task2.py

Brief of Logic: Constructing tf-idf matrix from all corpus, (I decided to use all'em, 3890), it summarizes the given file.

Usage: "summarizer" function gets file_path, eg. "06_1.xml". It both returns and prints the summary of the file with selected 5 sentences. While doing that it uses the whole-collection tf-idf frequencies but just the relevant metrics as selecting the submatrix of that whole matrix (see "extractive_summarization" and "get_file_indices").

2.2 Test Results

- Summary for 06.3.xml:

Sentence 1: The Tribunal said that '[t]here was nothing in the independent evidence to satisfy the Tribunal that the [appellant] will be denied state protection for the reason of her ethnicity, religion or her membership of a particular social group of "ethnic Chinese women in Indonesia".

Sentence 2: There was nothing in the independent evidence to satisfy the Tribunal that the [appellant] will be denied state protection for the reason of her ethnicity, religion or her membership of a particular social group of "ethnic Chinese women in Indonesia".

Sentence 3: Second, and perhaps more importantly, that the validity of the intended ground of the appellant's appeal is immaterial, given that the Tribunal concluded that the essential and significant reason for the future harm feared by the appellant was not related to a Convention reason but was personal: she fears that she will be harmed again by her attacker in revenge for her father's complaint to the police.

Sentence 4: The appellant argued that the Tribunal's reasoning reveals no consideration of whether effective state protection was available to the appellant 'on the ground' or at a 'micro' level, as was required: the question was, what would be available as a practical matter to a woman in the position of the appellant?

Sentence 5: 32 The appellant submitted that, had the Tribunal really questioned whether there was an effective and impartial police force and a reasonably impartial system of justice, as required by S152, it would have dealt with the suggestion by the appellant's father that the police had not responded to his complaint of his daughter's rape because she is Chinese, and that the appellant was raped again after the complaint.

My selection

Sentence 1: The second sexual assault was carried out by the same attacker and an
Sentence 2: Further, or in the alternative to 1(c) above, that the Tribunal failed
Sentence 3: The appellant argued that a party should be permitted to raise an arg
Sentence 4: The Tribunal accepted that riots which took place in Indonesia in 199
Sentence 5: The international community is not under an obligation to provide pro

- Summary for 07.963.xml:

Sentence 1: 20 The gravamen of ASIC's case is that for the exclusion of the fiduciary relationship in the mandate letter to be effective, it was incumbent upon Citigroup to draw Toll's attention expressly, to the effect of the exclusion, that is, that it permitted Citigroup to trade in Patrick shares on its own account, in potential conflict with the interests of Toll.

Sentence 2: 378 In fact, Mr Chatfield's evidence was that "nothing really turned on the Patrick price at 19 August", that there was no difference between trading in Patrick shares by Citigroup or anyone else in the market, and that even if Citigroup

had been trading in Patrick shares, it had no obligation to tell Toll it had done so, and it would not have made any difference to Toll's decisions on the day.

Sentence 3: I have already held that Mr Darwell did not communicate to Mr Manchee the information which was the subject of the second insider trading claim, namely that Citigroup was acting for Toll and that Toll would launch a bid for Patrick in the near future.

Sentence 4: Whether the terms of the mandate letter were so precise in the regulation what Citigroup could do, that there was no scope for the creation of any fiduciary duty by Citigroup to Toll.

Sentence 5: 411 Citigroup is then said to have breached its fiduciary duty to Toll because it was in a position where there was a real and substantial risk of a conflict between Citigroup's interest in the price at which Patrick's shares were trading and its duty to provide disinterested and loyal advice to Toll.

My selection

Sentence 1: Mr Manchee followed the letter of the instruction but not long after
Sentence 2: ASIC contends that as a fiduciary, Citigroup was obliged not to allow
Sentence 3: There appear to have been two telephone conversations between Mr Bart
Sentence 4: The fact that Citigroup had engaged in proprietary trading, with the p
Sentence 5: Core assumptions of the analysis included an offer premium range of 2

- Summary for 07.1872.xml:

Sentence 1: 34 Ms Davies' opinions are to the effect that the principle of confidentiality stated in the SCAG Procedures, the COAG Compendium and the Policy Paper should be enforced in order to protect the elements of the public interest set out above.

Sentence 2: 40 The confidentiality policy agreed to in the Policy Paper on 26-27 July 2007 confirmed the principle which already applied to SCAG censorship discussions and documents under clause 5(e) of the SCAG Procedures and principle 14 of the COAG Compendium.

Sentence 3: It seems to me that a fair reading of the SCAG Procedures, the COAG Compendium and the Policy Paper suggests the confidentiality arrangements between the responsible Ministers were put in place to achieve cooperation between all of the governments on a matter of national importance.

Sentence 4: The application was supported by an affidavit the gravamen of which was that the Standing Committee of Attorneys-General (SCAG) is responsible for administering the cooperative legislative scheme for censorship in Australia and that there are arrangements in place between the SCAG Ministers to ensure the confidentiality of deliberations at their meetings.

Sentence 5: The principle of confidentiality, as contained in the COAG Compendium and the SCAG Procedures, is one of the mechanisms to regulate the release of discussions and decisions reached between the Commonwealth, States and Territories.

My selection

Sentence 1: The documents were then released to them on the basis of those undertaken.
Sentence 2: The principle of confidentiality, as contained in the COAG Compendium
Sentence 3: Legitimate expectations of confidentiality "as to private and confidential
Sentence 4: Weight may be given only to "legitimate claims": see for example Paris
Sentence 5: Conclusion and Orders

54 It follows that I propose to dismiss the application to revoke the Orders which I make.

- Summary for 09_554.xml:

Sentence 1: The Minister contends that that is not a correct construction of the relevant provisions of the Act, and that at least in the circumstances of a decision of a Tribunal member having been quashed and remitted to the Tribunal to be heard according to law, the Principal Member may appoint or direct that a different member should constitute the Tribunal for the purposes of the review thereafter.

Sentence 2: The applicant's contention is that, in the circumstances, the Principal Member did not have power to reconstitute the Tribunal so that a member other than Member Muling could constitute the Tribunal for the purposes of the rehearing of the review of the applicant.

Sentence 3: That is, I consider that the remittal of the review to the Tribunal entitled the Principal Member to re-exercise the power under s 421 of directing a member of the Tribunal to conduct it.

Sentence 4: In the light of that conclusion, I do not need to consider the alternative contention of the Minister that, in any event, s 422 applies as the circumstances enable the Tribunal to be reconstituted because the initial member is not, or is no longer "available" for the purpose of the review.

Sentence 5: In that context, where (as here) the decision of the Tribunal as first constituted has been quashed and the Tribunal is directed "to determine the matter the subject of the decision according to law", there is no reason to regard the process of the review from at least the point of designating a member to conduct it as having commenced.

My selection

Sentence 1: The Tribunal affirmed a decision of a delegate of the Minister made on
Sentence 2: In the course of that conclusion, the delegate noted as follows: I accept
Sentence 3: A failure to undertake national service as required would produce a person
Sentence 4:

(2) However, the Principal Member must not give such a direction unless:

- (a) the Tribunal's decision on the review has not been recorded in writing or given orally;
- (b) the Principal Member has consulted:

- (i) the member constituting the Tribunal; and
- ...

Sentence 5: CONCLUSION

For those reasons, I direct that the decision of the Tribunal given on 7 July 2008 be

- Summary for 09_1598.xml:

Sentence 1: The interests of the holders of policies issued in the course of that part of the business of a foreign general insurer, such as Westport, SRI and SRC, that is carried on outside Australia are based on liabilities of the foreign general insurer arising under contracts of insurance made outside Australia.

Sentence 2: In Mercantile & General Reinsurance Company of Australia Ltd, above, for example, Emmett J referred to the effect of a scheme on the Australian branch policyholders of the transferee foreign general insurer, and not the policyholders of its overseas branches.

Sentence 3: It is a mistake, in my view, to read para (a) of s 17F(1A) as indicating that the interests of all policyholders of a body corporate that is a party to a scheme are necessarily to be treated as potentially affected by the scheme.

Sentence 4: Accordingly, in the present case it is the policyholders of Westport who are "affected policyholders" for the purposes of s 17C of the Act.

Sentence 5: There is to be no change to the terms of any of Westport's insurance or reinsurance policies other than the substitution of SRI or SRC as the insurer liable.

My selection

Sentence 1: On 17 December 2009 I made the orders that appear at the front of the

Sentence 2: Prudential Standards require foreign general insurers to maintain assets

Sentence 3: Preconditions to making an application

Steps required to be taken prior to the "making" of an application need only be taken

Sentence 4: Notwithstanding the conclusion that I have reached, I respectfully submit

Sentence 5: CONCLUSION

As indicated earlier, it was for the Earlier Reasons and those set out above that I made

Comments

I chose sentences according to the some phrases which indicates the overall summary, like conjunctions and phrases. For example; Conclusion indicates the end of the document. Some long and descriptive sentences are also indicator of the begging of the document and There are informative details at the middle of the files generally which gives the "development" of the narrative of whole document. My selections are focused on these types of features. On the other hand, the model uses frequencies of tokens, and use statistical methods.

In a bigger and less focused corpus, The model can easily outperform me, and in this experiment I tried to focus on these 5 documents so I relatively more successful. However, as a human, I'm not capable of memorizing, following, and summarizing lots of data.

Some example comments on model's selections:

For 06_3: Sentence 3 starts with "Second", it seems irrelevant to summarize a doc with

For 07_1872: It is a good example. Almost all sentences summarized docs in a well stru

For 09_1598: Sentence 2 is a very poor selection, very bad explanation.

This task may be extended to some Medicine areas, using statistical corpus's to summarize :