

SeCoRel: Multilingual Discourse Analysis in DISRPT 2025

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Abstract

The work presented here describes our participation in DISRPT 2025 shared task in three tasks, Task1: Discourse Unit Segmentation across Formalisms, Task 2: Discourse Connective Identification across Languages and Task 3: Discourse Relation Classification across Formalisms. We have fine-tuned XLM-RoBERTa, a language model to address these three tasks. We have come up with one single multilingual language model for each task. Our system handles data in both the formats .conllu and .tok and different discourse formalisms. We have obtained encouraging results. The performance on test data in the three tasks is similar to the results obtained for the development data.

1 Introduction

This paper describes our system, used in DISRPT2025 shared task “Discourse Relation Parsing and Treebanking (DISRPT)”. This is a Shared Task on Discourse Segmentation, Connective and Relation Identification across Formalisms. The shared task has the following three tasks: a) Task 1- Discourse Segment Identification, b) Task 2 – Discourse Connective Identification and c) Task 3 – Relation Identification. The organizers have provided data from different languages and annotations on these data follow different discourse formalisms. One of the main goals is that only one language model has to be developed which will apply to all languages and formalisms.

Discourse relations are the coherence relations between two discourse segments or also called as Elementary Discourse Units (EDUs) that can be realized explicitly or implicitly in a text. Discourse connectives play a role in signaling the relations in a discourse. They connect two discourse units, which may be a sentence, clause or multiple sentences. The relations can be intra sentential or inter sentential i.e. within a sentence or across sentences.

Thus the main objective of the work presented here is to develop a single language model for each of the task which will work for all languages and formalisms. The pre-trained XLM-RoBERTa language model was adapted through fine-tuning. In the following sections, we give a detailed description of our system.

2 Data

We train and evaluate our models using all the datasets provided by the shared task organizers.¹ In total, the benchmark is composed of 39 datasets, covering 16 languages and 6 frameworks. These datasets were obtained from the following corpora: the Czech RST Discourse Treebank 1.0 (Poláková et al., 2023), the Potsdam Commentary Corpus (Stede and Neumann, 2014; Bourgonje and Stede, 2020), the COVID-19 Discourse Dependency Treebank (Nishida and Matsumoto, 2022), the Discourse Dependency TreeBank for Scientific Abstracts (Yang and Li, 2018; Yi et al., 2021; Cheng and Li, 2019), the Genre Tests for Linguistic Evaluation corpus (Aoyama et al., 2023), the Georgetown University Multilayer corpus (Zeldes, 2017), the RST Discourse Treebank (Carlson et al., 2001), the Science, Technology, and Society corpus (Potter, 2008), the University of Potsdam Multilayer UNSC Corpus (Zaczynska and Stede, 2024), the Minecraft Structured Dialogue Corpus (Thompson et al., 2024), the Strategic Conversations corpus (Asher et al., 2016), the Basque RST Treebank (Iruskieta et al., 2013), the Persian RST Corpus (Shahmohammadi et al., 2021), the ANNOTation DIScursive corpus (Afantenos et al., 2012), the SUMM-RE corpus (Hunter et al., 2024; Prévot et al., 2025), the Dutch Discourse Treebank (Redeker et al., 2012), the Polish Discourse Corpus (Ogrodniczuk et al., 2024;

¹GitHub: <https://github.com/disrpt/sharedtask2025>, and HuggingFace: <https://huggingface.co/multilingual-discourse-hub>.

Calzolari et al., 2024), the Cross-document Structure Theory News Corpus (Cardoso et al., 2011), the Russian RST Treebank (Toldova et al., 2017), the RST Spanish Treebank (da Cunha et al., 2011), the RST Spanish-Chinese Treebank (Cao et al., 2018), the Georgetown Chinese Discourse Treebank (Peng et al., 2022b,a), the DiscoNaija corpus (Scholman et al., 2025), the Penn Discourse Treebank (Prasad et al., 2014; Webber et al., 2019), the TED-Multilingual Discourse Bank (English) (Zeyrek et al., 2018, 2019), the LUNA Corpus Discourse Data Set (Tonelli et al., 2010; Riccardi et al., 2016), the Portuguese Discourse Bank (Mendes and Lejeune, 2022; Génereux et al., 2012), the Thai Discourse Treebank (Prasertsom et al., 2024), the Turkish Discourse Bank (Zeyrek and Webber, 2008; Zeyrek and Kurfalı, 2017), and the Chinese Discourse Treebank (Zhou et al., 2014).

The shared task was held in 2019 (Zeldes et al., 2019), 2021 (Zeldes et al., 2021), 2023 (Braud et al., 2023) and 2025 (), with more information on the data format in (Braud et al., 2024).

3 System Description

Motivated by the works presented in the previous DISRPT 2021 and 2023 workshops, a fine-tuning strategy was chosen. XLM-RoBERTa architecture is considered suitable for multilingual tasks, like question answering, discourse parsing because it employs self-attention mechanisms to effectively capture contextual dependencies within the text.

For discourse relation identification (task 3), the problem is framed as a classification task, in which it will learn to categorize discourse relations between different parts of the text.

Tasks 1 and 2 are handled as a sequence labeling task. This approach aims to identify and label the boundaries of discourse units within a given sequence of text.

XLM-RoBERTa is a transformer network-based model framework which relies on a strong self-attention mechanism to understand and interpret context effectively. This self-attention mechanism allows the model to weigh the significance of different parts of the input sequence, irrespective of their position, leading to a more nuanced understanding of the input data (Conneau et al., 2020).

XLM-RoBERTa-base (XLM-R-B) is a multilingual language model, well-suited for this shared task. XLM-R-B has a relatively smaller parameter size of 2.55B compared to XLMR Large,

which translates to fewer computational resources required for processing. This efficiency makes it a practical choice for the present shared task.

3.1 Hyper-parameter Fine Tuning

In our approach, for fine-tuning XLM-RoBERTa we follow on the work of (Wolf et al., 2019), who offered a thorough framework for training for text classification models with Hugging Face’s Transformers library. Although their configuration provided a strong basis for training the model, we modified it to better fit the discourse datasets provided in the shared task. Increasing the number of epochs from the initial setting to 10 was a crucial change that enabled the model to go through more thorough training and better absorb the subtleties of the data. In order to achieve effective gradient descent during training and maximize the trade-off between stability and quick convergence, we also changed the learning rate. Refining the batch sizes was another important modification. We set the evaluation batch size at 16 and the training batch size at 8. These modifications were designed to ensure adequate data flow for model learning while managing memory limitations on our hardware. In order to avoid over fitting, we also adjusted regularization parameters like the weight decay. The model’s efficiency and generalization were enhanced by these adjusted parameters in conjunction with the monitoring of training and evaluation performance. All these optimizations were same for all three tasks. We were not able to get access to licensed datasets such as pdtb, thus these datasets were trained without words.

4 Results

Evaluation was done on the outputs produced by the system using the evaluation script provided by the organizers. The results are tabulated in the Tables 1, 2, 3, 4 and 5, for each of the tasks on different file formats and languages. Table 1 and 2 display the results obtained for task 1. Table 3 and 4 display the results obtained for task 2, And Table 5 displays the results obtained for task 3.

In task1 and task 2, the major challenge was tokenizing the input data into sentences. The data being multilingual we had to employ a multilingual sentence splitter. We had developed a basic sentence splitter using heuristic rules which handles different language texts. The results for (*.tok) files evidently shows the impact of sentence splitting.

File name	Prec Dev	Prec Test	Rec Dev	Rec Test	F1 Dev	F1 Test
ces.	93.40	89.63	91.40	91.30	92.40	90.46
rst.crdt						
eng.	95.60	91.80	83.00	79.84	88.80	85.40
erst.gum						
eng.	60.30	71.18	89.30	73.51	72.00	72.32
rst.sts						
eng.	88.60	85.02	91.20	90.00	89.80	87.45
sdrt.stac						
fra.	92.13	90.65	82.19	80.00	86.88	85.05
sdrt.annodis						
rus.	90.90	91.99	92.25	92.59	91.60	92.29
rst.rrt						
zho.	93.72	86.69	94.35	97.02	94.03	91.56
dep.scidtb						
deu.	95.63	97.13	93.26	91.86	94.43	94.42
rst.pcc						
eng.	80.00	85.76	97.14	89.99	87.74	87.79
rst.oll						
eng.	87.28	89.73	91.15	85.27	89.17	87.45
rst.umuc						
eus.	92.05	90.71	90.69	89.72	91.36	90.21
rst.ert						
nld.	96.00	96.75	97.95	97.04	96.96	96.89
rst.nldt						
spa.	93.67	90.02	95.46	92.17	94.56	91.08
rst.rststb						
zho.	91.57	93.58	84.52	82.87	87.90	87.90
rst.gcdt						
eng.	96.52	96.49	92.48	92.39	94.46	94.39
dep.scidtb						
eng.	83.37	82.66	83.41	82.73	83.39	82.70
rst.rstdt						
eng.	97.00	96.36	93.97	93.55	95.46	94.94
sdrt.msdc						
fas.	92.79	93.15	93.92	93.43	93.35	93.29
rst.prstc						
por.	91.66	90.96	92.53	95.42	92.10	93.14
rst.cstn						
spa.	78.04	85.20	93.20	85.71	84.95	85.45
rst.sctb						
zho.	49.20	55.71	93.20	89.88	64.42	68.72
rst.sctb						
Mean	88.00	88.00	91.00	89.00	89.00	88.00

Table 1: Evaluation Results for Task 1: Discourse Segmentation (for *.tok files)

For some language files such as ita.pdtb.luna, the sentence splitting was not efficient. In general it is observed that the results obtained for *.tok files are better. One probable reason is that for these files our sentence splitting algorithm worked better.

We observe that there are many false positives in zho.rst.sctb and spa.rst.sctb which has led to high recall and low precision. In the dataset eng.rst.umuc, the system has failed to learn segment start which is with-in the sentence. This has affected both recall and precision. Similar problem is observed in eng.rst.rstdt dataset also.

In task 2, the system has identified single word connectives with high precision and recall. It has poorly identified connectives with multiple words and apostrophe such as ‘the same way’, ‘it would be same thing if’, ‘because of that’, ‘years have passed’ etc. Improving the tokenization and contextual learning will boost the accuracy of connective identification.

In the relation identification task (task 3), we observed that the major errors are in the identification of ‘elaboration’ and ‘conjunction’ relation types. ‘Elaboration’ relation type is confused with relation types such as ‘conjunction’, ‘organization’, ‘temporal’ and ‘frame’. Similarly ‘conjunction’ is confused with ‘temporal’, ‘explanation’, ‘frame’ and ‘causal’. We need to address these two relation types for improving the accuracy of the relation identification system. We need to train the system with syntactic features.

5 Conclusion

We have submitted our test runs for all the three tasks of the DISRPT 2025 shared task. We have fine-tuned the XLM-Roberta to handle multilingual and multi-formalism data. The three models and the system runs are available in the following link:

<https://drive.google.com/drive/folders/1g3Rcve50v1EWuqDzr8twiFipP8YLGhC?usp=sharing>

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File name	Prec Dev	Prec Test	Rec Dev	Rec Test	F1 Dev	F1 Test
ces.	93.00	91.93	91.00	91.93	92.00	91.93
rst.crdt						
deu.	96.35	97.13	93.62	91.86	94.96	94.43
rst.pcc						
eng.	96.52	96.50	92.44	92.39	94.44	94.40
dep.scidtb						
eng.	95.85	96.00	83.60	83.89	89.31	89.54
erst.gum						
eng.	81.52	85.62	96.07	88.89	88.20	87.22
rst.oll						
eng.	54.17	54.49	24.59	23.53	33.83	32.87
rst.rstdt						
eng.	63.40	86.09	93.47	88.39	75.56	87.22
rst.sts						
eng.	87.29	90.08	91.15	85.09	89.18	87.51
rst.umuc						
eng.	97.47	96.68	93.12	92.98	95.24	94.80
sdrtr.msdc						
eng.	90.26	88.36	92.74	95.41	91.48	91.75
sdrtr.stac						
eus.	92.46	90.60	90.55	89.86	91.49	90.23
rst.ert						
fas.	92.80	93.16	93.92	93.58	93.36	93.37
rst.prstc						
fra.	91.02	87.35	82.01	80.42	86.28	83.74
sdrtr.annodis						
fra.	61.06	57.22	87.85	89.17	72.05	69.71
sdrtr.summre						
nld.	95.73	96.75	97.96	96.75	96.83	96.75
rst.nldt						
por.	91.67	90.97	92.54	95.42	92.10	93.14
rst.cstn						
rus.	91.26	92.28	92.72	92.65	91.98	92.47
rst.rrt						
spa.	93.43	90.59	94.99	92.17	94.20	91.38
rst.rststb						
spa.	77.42	86.14	93.20	85.12	84.58	85.63
rst.sctb						
zho.	93.73	86.69	94.35	97.02	94.04	91.57
dep.scidtb						
zho.	93.04	93.88	85.31	84.34	89.01	88.86
rst.gcdt						
zho.	49.75	57.14	96.12	95.24	65.56	71.43
rst.sctb						
Mean	85.42	86.62	88.79	87.55	86.17	86.36

Table 2: Evaluation Results for Task 1: Discourse Segmentation (for *.conllu files)

File name	Prec Dev	Prec Test	Rec Dev	Rec Test	F1 Dev	F1 Test
deu.	80.85	81.31	86.36	78.72	83.51	79.99
pdtb.pcc						
eng.	87.64	87.89	92.69	86.00	90.10	86.93
pdtb.gum						
eng.	79.00	83.41	71.81	76.19	75.23	79.63
pdtb.tedm						
ita.	81.37	68.29	59.71	53.63	68.87	60.08
pdtb.luna						
pcm.	64.48	74.09	56.09	73.71	60.00	73.90
pdtb.disconaija						
pol.	71.20	70.20	57.66	63.61	63.72	66.74
iso.pdc						
por.	82.95	81.62	76.81	71.87	79.76	76.44
pdtb.crpc						
por.	75.49	77.40	75.49	79.31	75.49	78.34
pdtb.tedm						
tha.	-	-	-	-	-	-
pdtb.tdtb						
tur.	78.33	78.43	34.81	32.38	48.20	45.84
pdtb.tedm						
Zho.	78.54	-	82.68	-	80.56	-
pdtb.ted						
Mean	77.98	78.08	69.41	68.38	72.54	71.98

Table 3: : Evaluation Results for Task 2: Discourse Connective Identification (for .tok files)

File name	Prec Dev	Prec Test	Rec Dev	Rec Test	F1 Dev	F1 Test
deu.pdtb.pcc	80.00	81.32	86.36	78.72	83.06	79.99
eng.pdtb.gum	86.55	90.65	83.43	82.23	84.96	86.23
eng.pdtb.tedm	79.00	83.89	71.82	76.62	75.24	80.09
ita.pdtb.luna	78.49	64.11	52.51	51.34	62.93	57.02
pcm.pdtb.dis-conaija	61.89	70.47	47.97	65.21	54.04	67.74
pol.iso.pdc	71.28	71.39	57.88	65.02	63.88	68.06
por.pdtb.crpc	83.24	81.42	76.81	71.69	79.89	76.25
por.pdtb.tedm	74.76	76.92	75.49	78.82	75.12	77.86
tha.pdtb.tdtb	75.27	77.15	84.23	86.16	79.49	81.40
tur.pdtb.tedm	76.27	78.43	33.33	32.39	46.39	45.84
zho.pdtb.ted	78.67	69.10	82.68	82.03	80.62	75.02
Mean	76.86	76.80	68.41	70.02	71.42	72.32

Table 4: : Evaluation Results for Task 2: Discourse Connective Identification (for .conllu files)

File name	Dev Data Accuracy	Test Data Accuracy
ces.rst.crdt	39.02	42.57
deu.pdtb.pcc	54.17	59.28
deu.rst.pcc	42.31	45.05
eng.dep.covdtb	66.28	68.10
eng.dep.scidtb	81.27	79.84
eng.erst.gentle	-	44.95
eng.erst.gum	43.61	46.89
eng.pdtb.gentle	-	46.31
eng.pdtb.gum	49.23	49.58
eng.pdtb.pdtb	28.29	26.92
eng.pdtb.tedm	49.44	53.28
eng.rst.oll	53.23	41.33
eng.rst.rstdt	10.12	10.90
eng.rst.sts	40.80	35.06
eng.rst.umuc	58.10	59.09
eng.sdrst.msdc	85.80	84.86
eng.sdrst.stac	65.88	67.64
eus.rst.ert	51.30	54.64
fas.rst.prstc	52.10	51.52
fra.sdrst.annodis	59.27	51.85
ita.pdtb.luna	60.68	65.07
nld.rst.nldt	51.06	55.69
pcm.pdtb.discon	54.47	56.54
pol.iso.pdc	47.89	50.07
por.pdtb.crpc	69.11	73.88
por.pdtb.tedm	58.42	64.29
por.rst.cstn	61.78	61.40
rus.rst.rrt	60.11	62.70
spa.rst.rststb	69.19	57.98
spa.rst.sctb	65.96	65.41
tha.pdtb.tdtb	95.66	96.21
tur.pdtb.tdb	25.40	24.94
tur.pdtb.tedm	50.71	49.04
zho.dep.scidtb	65.48	67.44
zho.pdtb.cdtb	60.81	58.92
zho.pdtb.ted	59.74	59.92
zho.rst.gcdt	60.44	55.93
zho.rst.sctb	52.13	55.97
Average	52.61	55.29

Table 5: Evaluation for Task 3 Discourse Relation Classification

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