

Сравнение моделей

. . ИУ5-22М

```
In [137]: from transformers import pipeline
from evaluate.visualization import radar_plot

import pandas as pd
import spacy
import stanza
import seaborn as sns
import matplotlib.pyplot as plt

%matplotlib inline
sns.set(style="whitegrid")
```

Сравнение качества моделей

```
In [95]: test_results = pd.read_csv("eval_results.csv")
```

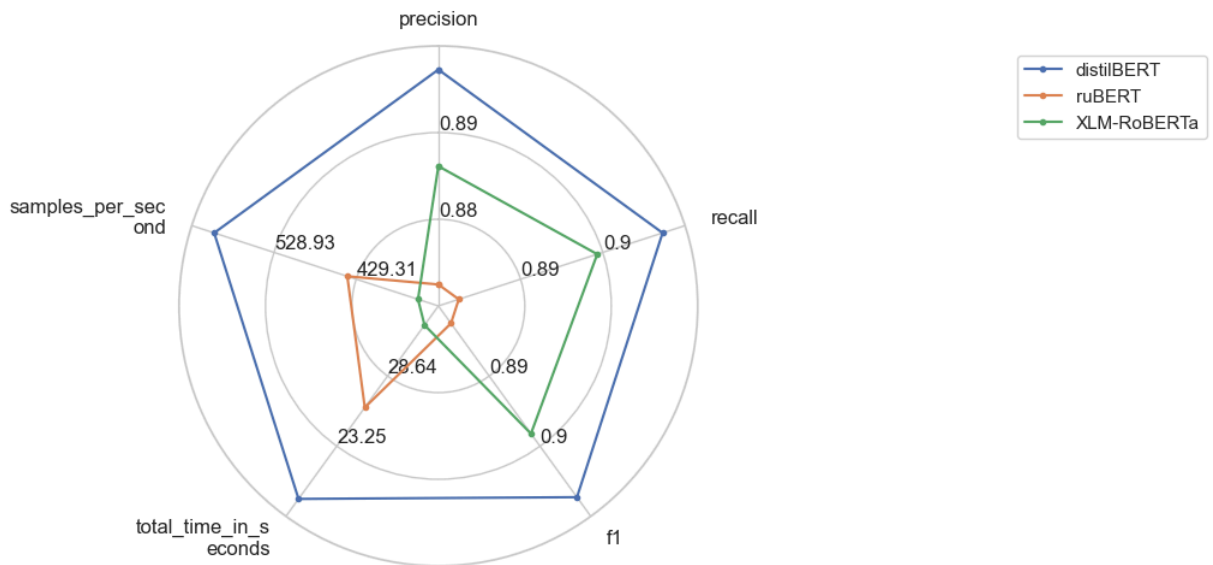
```
In [96]: test_results
```

```
Out[96]:
```

	model	precision	recall	f1	total_time_in_seconds	samples_per_second
0	distilBERT	0.893203	0.912136	0.902570	19.1895	601.372
1	ruBERT	0.878942	0.884734	0.881828	26.2233	440.067
2	XLM-RoBERTa	0.886792	0.903350	0.894995	32.5625	354.395

```
In [99]: plot = radar_plot(
    data=test_results.drop(columns=["model"]),
    model_names=test_results["model"],
    invert_range=["total_time_in_seconds"],
)
plot.show()
```

C:\Users\Михаил\AppData\Local\Temp\ipykernel_24672\3509957139.py:2: UserWarning: FigureCanvasAgg is non-interactive, and thus cannot be shown
plot.show()



Сравнение результатов предсказаний

DistilBERT

```
In [100...] distilNER = pipeline(
    task="token-classification", model="distilBERT/distilBERT_best_model"
)
```

```
In [110...] %time distilNER("Путин президент России. Он работает в Кремле".split(sep="."))
```

CPU times: total: 31.2 ms
Wall time: 22.3 ms

```
Out[110...] [[{'entity': 'B-PER',
                'score': 0.91723853,
                'index': 1,
                'word': 'П',
                'start': 0,
                'end': 1},
              {'entity': 'I-PER',
                'score': 0.5098536,
                'index': 2,
                'word': '##ути',
                'start': 1,
                'end': 4},
              {'entity': 'B-LOC',
                'score': 0.9732949,
                'index': 5,
                'word': 'России',
                'start': 16,
                'end': 22}],
             [{ 'entity': 'B-LOC',
                 'score': 0.9989243,
                 'index': 4,
                 'word': 'К',
                 'start': 15,
                 'end': 16},
              {'entity': 'B-LOC',
                'score': 0.73638284,
                'index': 5,
                'word': '##рем',
                'start': 16,
                'end': 19},
              {'entity': 'I-LOC',
                'score': 0.80140376,
                'index': 6,
                'word': '##ле',
                'start': 19,
                'end': 21}]]
```

RuBERT

```
In [108...] ruBERTNER = pipeline(task="token-classification", model="ruBERT/ruBERT_best_model")
```

```
In [111...] %time ruBERTNER("Путин президент России. Он работает в Кремле".split(sep="."))
```

CPU times: total: 46.9 ms

Wall time: 41.3 ms

```
Out[111...] [[{'entity': 'B-PER',
  'score': 0.9872185,
  'index': 1,
  'word': 'путин',
  'start': 0,
  'end': 5},
 {'entity': 'B-LOC',
  'score': 0.8746196,
  'index': 3,
  'word': 'россии',
  'start': 16,
  'end': 22}],
 [{'entity': 'B-LOC',
  'score': 0.8413622,
  'index': 4,
  'word': 'кремле',
  'start': 15,
  'end': 21}]]
```

XLM-RoBERTa

```
In [112...] RoBERTaNER = pipeline(
    task="token-classification", model="XLM-RoBERTa/XLM-RoBERTa_best_model"
)
```

```
In [113...] %time RoBERTaNER("Путин президент России. Он работает в Кремле".split(sep="."))
```

CPU times: total: 31.2 ms

Wall time: 42.4 ms

```
Out[113...] [[{'entity': 'B-LOC',
  'score': 0.99616575,
  'index': 3,
  'word': '_России',
  'start': 16,
  'end': 22}],
 [{'entity': 'B-LOC',
  'score': 0.75023603,
  'index': 4,
  'word': '_Крем',
  'start': 15,
  'end': 19},
 {'entity': 'I-ORG',
  'score': 0.56308204,
  'index': 5,
  'word': 'ле',
  'start': 19,
  'end': 21}]]
```

Stanza

```
In [151...] stanza.download("ru")
nlp = stanza.Pipeline("ru")
doc = nlp("Путин президент России. Он работает в Кремле")
```

```

Downloading https://raw.githubusercontent.com/stanfordnlp/stanza-resources/main/resources_1.8.0.json: 0%| ...
2024-06-07 00:37:53 INFO: Downloaded file to C:\Users\Михаил\stanza_resources\resources.json
2024-06-07 00:37:53 INFO: Downloading default packages for language: ru (Russian)
...
2024-06-07 00:37:53 INFO: File exists: C:\Users\Михаил\stanza_resources\ru\default.zip
2024-06-07 00:37:57 INFO: Finished downloading models and saved to C:\Users\Михаил\stanza_resources
2024-06-07 00:37:57 INFO: Checking for updates to resources.json in case models have been updated. Note: this behavior can be turned off with download_method=None or download_method=DownloadMethod.REUSE_RESOURCES
Downloading https://raw.githubusercontent.com/stanfordnlp/stanza-resources/main/resources_1.8.0.json: 0%| ...
2024-06-07 00:37:57 INFO: Downloaded file to C:\Users\Михаил\stanza_resources\resources.json
2024-06-07 00:37:58 INFO: Loading these models for language: ru (Russian):
=====
| Processor | Package |
-----
| tokenize | syntagrus |
| pos      | syntagrus_charlm |
| lemma    | syntagrus_nocharlm |
| depparse | syntagrus_charlm |
| ner      | wikiner |
=====

2024-06-07 00:37:58 INFO: Using device: cuda
2024-06-07 00:37:58 INFO: Loading: tokenize
2024-06-07 00:37:58 INFO: Loading: pos
2024-06-07 00:37:59 INFO: Loading: lemma
2024-06-07 00:37:59 INFO: Loading: depparse
2024-06-07 00:37:59 INFO: Loading: ner
2024-06-07 00:38:00 INFO: Done loading processors!

```

In [153...

```

print(
    *[
        f"entity: {ent.text}\ttype: {ent.type}"
        for sent in doc.sentences
        for ent in sent.ents
    ],
    sep="\n",
)

```

```

entity: Путин президент России type: MISC
entity: Кремле type: LOC

```

spaCy

In [135...

```

nlp = spacy.load("ru_core_news_sm")
doc = nlp("Путин президент России. Он работает в Кремле")

```

In [136...

```

for token in doc:

```

```
print(token.text, token.ent_type_)
```

Путин PER
президент
России LOC
.
Он
работает
в
Кремле LOC

Вывод

Все обученные LLM показали отличное качество распознавания и не уступают библиотечным решениям. Лучше всего себя показала модель DistilBERT и по качеству, и по времени вывода.