300 ЛЕТ СПбГУ

Продвинутый поиск статей на arxiv.org

Студент 4 курса

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22.Б15-пу

Введение

arXiv — это служба бесплатного распространения и архив с открытым доступом, содержащий около 2,4 миллиона научных статей в области физики, математики, информатики, количественной биологии, количественных финансов, статистики, электротехники и системных наук, а также экономики. Материалы на этом сайте не рецензируются arXiv.

Подробнее тут: https://arxiv.org/

Advanced Search

Search v0.5.6 released 2020-02-24

Simple Search

Search term(s)

Search term... | Title

Add another term+ | Search

Subject

All classifications will be included by default.

- [x] Computer Science (cs)
- [ ] Economics (econ)
- [ ] Electrical Engineering and Systems Science (eess)
- [ ] Mathematics (math)
- [ ] Physics (all)
- [ ] Quantitative Biology (q-bio)
- [ ] Quantitative Finance (q-fin)
- [ ] Statistics (stat)

(•) Include cross-listed papers ( ) Exclude cross-listed papers

Date

( ) All dates
( ) Past 12 months
( ) Specific year YYYY
( ) Date range

From YYYY[-MM[-DD]] to YYYY[-MM[-DD]]

When limiting by date range, the lower bound of the "from" date and the upper bound of the "to" date are used. For example, searching with `From: 2012-02` and `To: 2013` will search for papers submitted from `2012-02-01` to `2013-12-31`.

(•) Submission date (most recent) ( ) Submission date (original) ( ) Announcement date

You may filter on either submission date or announcement date. Note that announcement date supports only year and month granularity.

(•) Show abstracts ( ) Hide abstracts

50 results per page [ ] Include older versions of papers

Searching by Author Name

- Using the **Author(s) field** produces best results for author name searches.
- For the most precise name search, follow **surname(s), forename(s)** or **surname(s), initial(s)** pattern: example Hawking, S or Hawking, Stephen
- For best results on multiple author names, **separate individuals with a ;** (semicolon). Example: Jin, D S; Ye, J
- Author names enclosed in quotes will return only **exact matches**. For example, "Stephen Hawking" will not return matches for Stephen W. Hawking.
- Diacritic character variants are automatically searched in the Author(s) field.
- Queries with no punctuation will treat each term independently.

Searching by subcategory

- To search within a subcategory select **All fields**.
- A subcategory search can be combined with an author or keyword search by clicking on **add another term** in advanced search.

Tips

Wildcards:

- Use ? to replace a single character or * to replace any number of characters.
- Can be used in any field, but not in the first character position. See Journal References tips for exceptions.

Expressions:

- TeX expressions can be searched, enclosed in single $ characters.

Phrases:

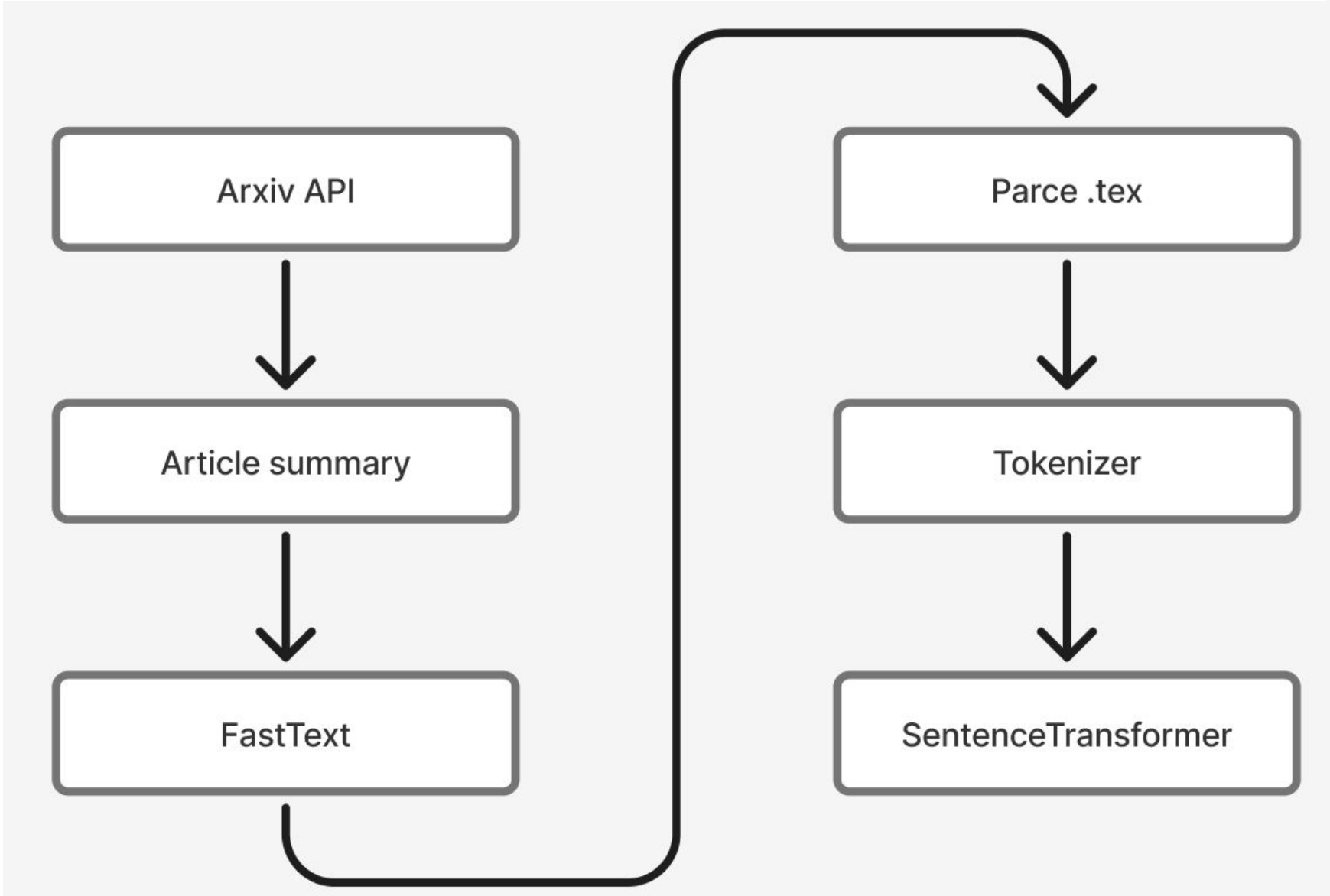
- Enclose phrases in double quotes for exact matches in title, abstract, and comments.

Dates:

- Sorting by announcement date will use the year and month the *original version* (v1) of the paper was announced

Пример тут: https://arxiv.org/search/advanced

Постановка задачи



Arxiv API

http://export.arxiv.org/api/query?
search_query=all:electron+AND+all:proton

```
<?xml version="1.0" encoding="UTF-8"?>
<feed xmlns="http://www.w3.org/2005/Atom">
  <link href="http://arxiv.org/api/query?search_query%3Dall%3Aelectron%20AND%20all%3Aproton%26id_list%3D%26start%3D0%26
  <title type="html">ArXiv Query: search_query=all:electron AND all:proton&amp;id_list=&amp;start=0&amp;max_results=10<
  <id>http://arxiv.org/api/5SM+U4Y158JiJuDXkggxPJF18mw</id>
  <updated>2025-11-07T00:00:00-05:00</updated>
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  <opensearch:startIndex xmlns:opensearch="http://a9.com/-/spec/opensearch/1.1/">0</opensearch:startIndex>
  <opensearch:itemsPerPage xmlns:opensearch="http://a9.com/-/spec/opensearch/1.1/">10</opensearch:itemsPerPage>
  <entry>
    <id>http://arxiv.org/abs/astro-ph/9904306v1</id>
    <updated>1999-04-22T15:54:59Z</updated>
    <published>1999-04-22T15:54:59Z</published>
    <title>Improved scenario of baryogenesis</title>
    <summary>  It is assumed that, in the primordial plasma, at the temperatures above the
mass of electron, fermions are in the neutral state being the superposition of
particle and antiparticle. There exists neutral proton-electron symmetry.
Proton-electron equilibrium is defined by the proton-electron mass difference.
At the temperature equal to the mass of electron, pairs of neutral electrons
annihilate into photons, and pairs of neutral protons and electrons survive as
protons and electrons.
</summary>
```

Подробнее тут: https://info.arxiv.org/help/api/user-manual.html#arxiv-api-users-manual

Article summary

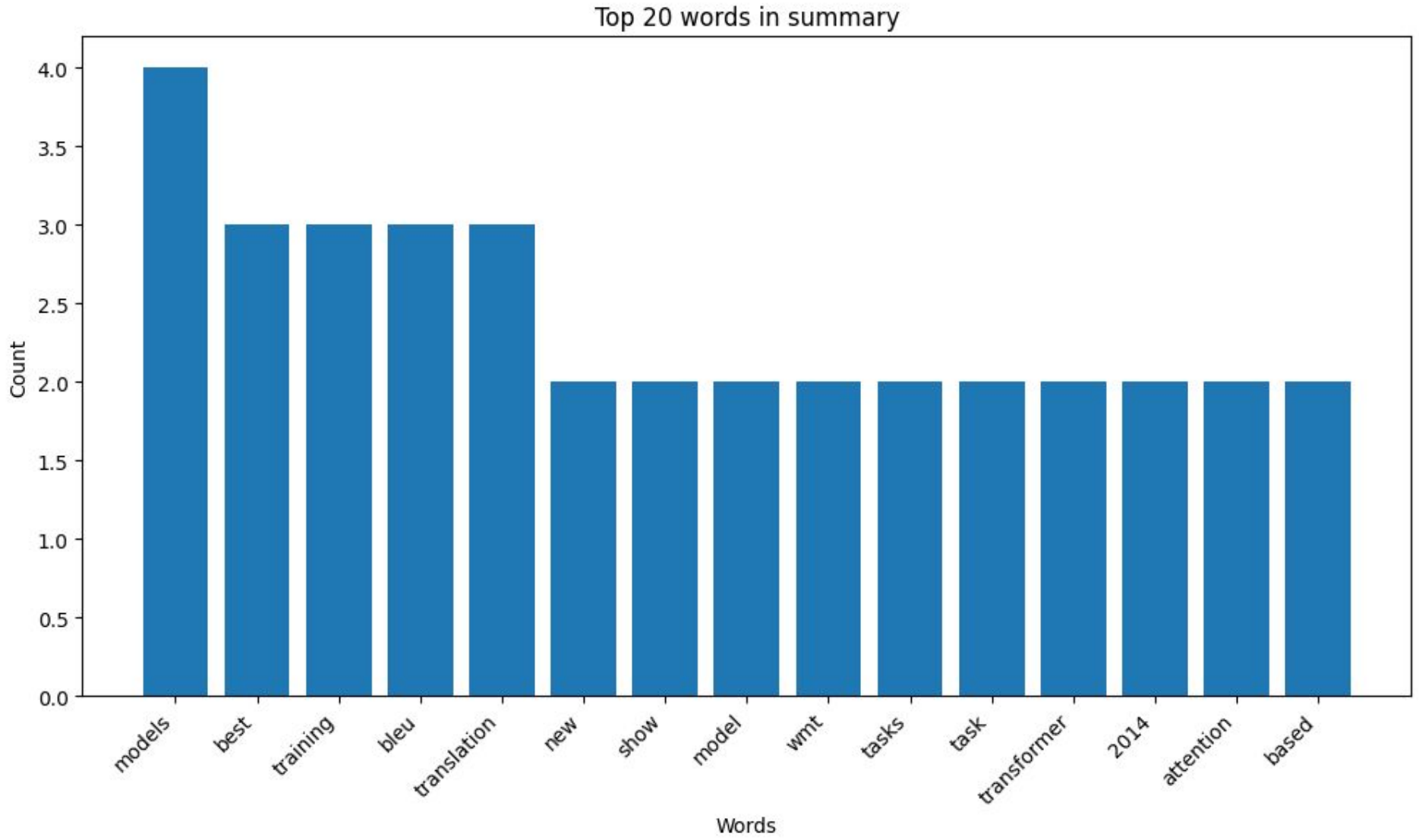
Attention Is All You Need

Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.

Статья тут: https://arxiv.org/pdf/1706.03762v7

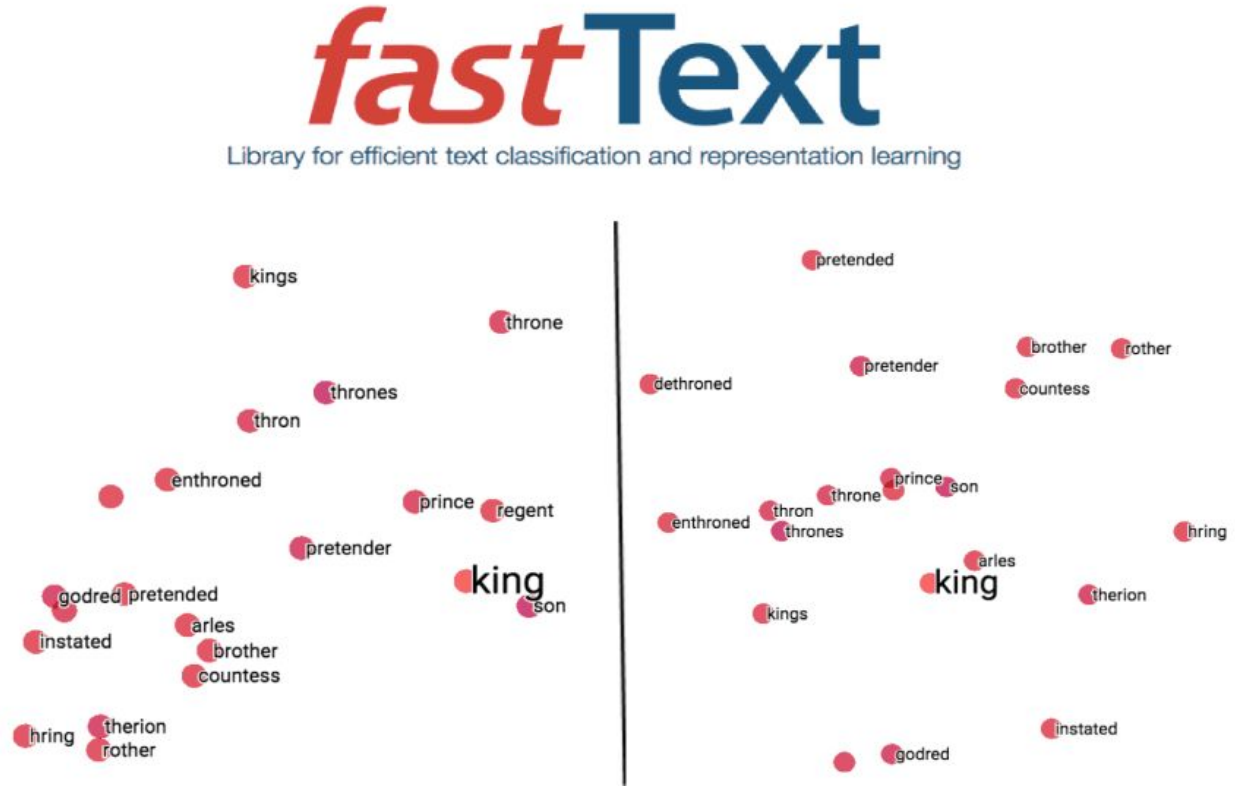
Article summary



Статья тут: https://arxiv.org/pdf/1706.03762v7

FastText

FastText – создает векторные представления слов (word embeddings) на основе их контекста.



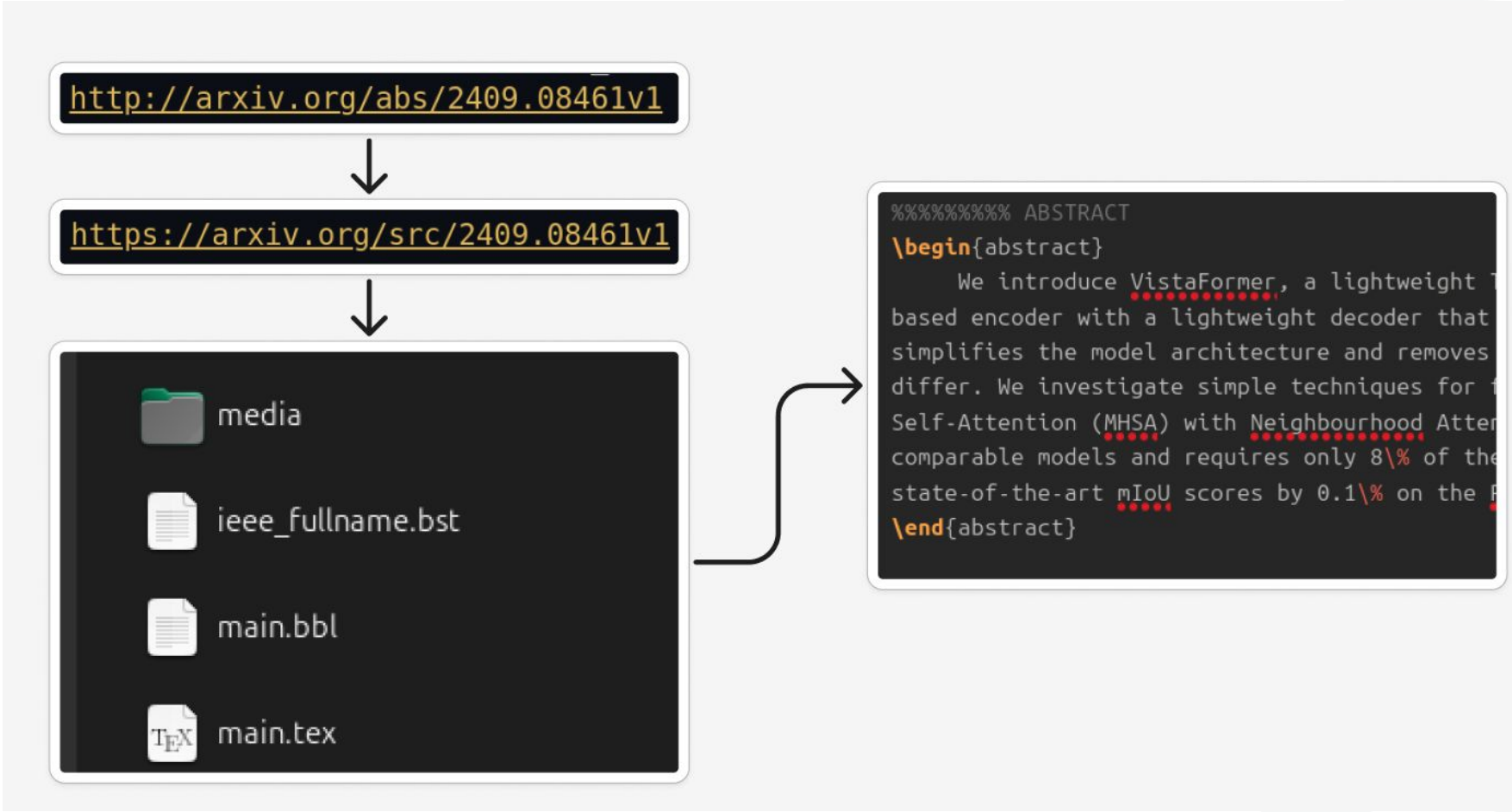

```
Vectorizing: 100%|██████████| 2305/2305 [00:00<00:00, 10512.55it/s]
Reference:
Title: attention is all you need
Link: http://arxiv.org/abs/1706.03762v7

1. Idx: 163
Title: Quantum Graph Transformer for NLP Sentiment Classification
Cosine similarity: 0.973
Link: http://arxiv.org/abs/2506.07937v1

2. Idx: 1002
Title: TreeGPT: Pure TreeFFN Encoder-Decoder Architecture for Structured
  Reasoning Without Attention Mechanisms
Cosine similarity: 0.962
Link: http://arxiv.org/abs/2509.05550v2

3. Idx: 1815
Title: Encoding Syntactic Knowledge in Transformer Encoder for Intent Detection
  and Slot Filling
Cosine similarity: 0.960
Link: http://arxiv.org/abs/2012.11689v1

4. Idx: 126
Title: Weighted Transformer Network for Machine Translation
Cosine similarity: 0.960
Link: http://arxiv.org/abs/1711.02132v1
...
Title: Cross-Attention Speculative Decoding
Cosine similarity: 0.959
Link: http://arxiv.org/abs/2505.24544v3
```

Подробнее тут: https://habr.com/ru/articles/492432/

Parse .tex

Access Paper:

View PDF
HTML (experimental)
TeX Source



Статья: https://arxiv.org/abs/2409.08461v1

Tokenizer

```
    """ Remove LaTeX commands and comments """
    # Remove comments
    text = raw_text
    text = re.sub(r'%.*$', '', text, flags=re.MULTILINE)
    text = re.sub(r'[0-9]', '', text)

    # Remove LaTeX commands (e.g., \textbf{...}, \cite{...})
    text = re.sub(r'\\[a-zA-Z]+\{[^}]*\}', '', text)
    text = re.sub(r'\\[a-zA-Z]+\[.*?\]', '', text)
    text = re.sub(r'\\[a-zA-Z]+', '', text)

    # Remove special LaTeX characters
    text = re.sub(r'[^\w\s]', '', text)
    text = re.sub(r'_', '', text)

    # Remove multiple spaces and newlines
    text = re.sub(r' +', ' ', text)
    text = re.sub(r'\n\n+', ' ', text)
    text = re.sub(r'\n', ' ', text)
    text = re.sub(r' +', ' ', text)
    text = re.sub(r'\\', '', text)
    text = re.sub(r' +', ' ', text)

    text = text.lower().strip()

    text = ' '.join([word for word in text.split() if 2 <= len(word) <= 6])
```

Tokenizer

```
the goal of also forms the of the neural gpu and convss all of which use neural as basic block hidder
['the', 'goal', 'of', 'also', 'forms', 'the', 'of', 'the', 'neural', 'gpu', 'and', 'convss', 'all', '
Processing papers:   2%|          | 1/50 [00:00<00:33,  1.47it/s]
acmart make sure to enter the title from your rights ny is for more and models in where data is we th
['acmart', 'make', 'sure', 'to', 'enter', 'the', 'title', 'from', 'your', 'rights', 'ny', 'is', 'for'
Processing papers:   4%|▍         | 2/50 [00:01<00:35,  1.35it/s]
visual task three task types with the hybrid design with tree study the of flow the with global study
['visual', 'task', 'three', 'task', 'types', 'with', 'the', 'hybrid', 'design', 'with', 'tree', 'stud
Processing papers:   6%|▌         | 3/50 [00:04<01:16,  1.63s/it]
we novel with for intent and slot we encode into the by it to parse and of each token via our model i
['we', 'novel', 'with', 'for', 'intent', 'and', 'slot', 'we', 'encode', 'into', 'the', 'by', 'it', 't
Processing papers:   8%|▊         | 4/50 [00:04<00:57,  1.25s/it]
on neural often use models with some form of or new that avoids and it uses only and layers while the
['on', 'neural', 'often', 'use', 'models', 'with', 'some', 'form', 'of', 'or', 'new', 'that', 'avoids
Processing papers:  10%|▉         | 5/50 [00:05<00:48,  1.07s/it]
manasa yixiao wang nikhil verma yipeng ji chul lee sd is widely for in large models llms when the dra
['manasa', 'yixiao', 'wang', 'nikhil', 'verma', 'yipeng', 'ji', 'chul', 'lee', 'sd', 'is', 'widely',
Processing papers:  12%|█▏        | 6/50 [00:06<00:44,  1.01s/it]
have the in nlp in recent years but very large and we that the design of model on large in manner and
['have', 'the', 'in', 'nlp', 'in', 'recent', 'years', 'but', 'very', 'large', 'and', 'we', 'that', 't
Processing papers:  14%|█▍        | 7/50 [00:08<00:58,  1.37s/it]
li yi iiis qi zhi cvpr cvpr cvpr rgb gray ex todo rgb hybrid have broad these can the of while on mam
['li', 'yi', 'iiis', 'qi', 'zhi', 'cvpr', 'cvpr', 'cvpr', 'rgb', 'gray', 'ex', 'todo', 'rgb', 'hybrid
Processing papers:  16%|█▌        | 8/50 [00:11<01:13,  1.75s/it]
```

SentenceTransformer

Это библиотека для доступа, использования и обучения современных моделей. Его можно использовать для вычисления векторных представлений (embeddings) с помощью моделей Sentence Transformers и тд.

Подробнее тут: https://sbert.net/

```
model = SentenceTransformer('all-mpnet-base-v2')
```

all-mpnet-base-v2 – предобученная модель, которая преобразует текст в плотные векторные представления (embeddings) размерности 768.

Требует больше времени на просчет всех статей.

```
Processing papers: 100%|██████████| 50/50 [00:55<00:00,  1.12s/it]
```

Результат

Similarity Results:

	df_idx	arxiv_url	summary_score	total_score
0	126	http://arxiv.org/abs/1711.02132v1	0.960140	0.815051
1	2218	http://arxiv.org/abs/2110.02402v1	0.940819	0.785097
2	76	http://arxiv.org/abs/2210.00640v2	0.952367	0.784601
3	380	http://arxiv.org/abs/2209.08167v2	0.950042	0.777945
4	1172	http://arxiv.org/abs/2402.17966v3	0.947652	0.738277
5	440	http://arxiv.org/abs/2105.03824v4	0.954867	0.719494
6	1002	http://arxiv.org/abs/2509.05550v2	0.962243	0.716848
7	353	http://arxiv.org/abs/2304.06446v2	0.941394	0.707573
8	1602	http://arxiv.org/abs/2010.03688v2	0.959285	0.700678
9	1429	http://arxiv.org/abs/2505.22425v1	0.953622	0.685458
10	371	http://arxiv.org/abs/2503.00687v3	0.946130	0.675962
11	1384	http://arxiv.org/abs/2308.11295v3	0.946153	0.673223
12	2210	http://arxiv.org/abs/2102.04754v1	0.953567	0.672192
13	1531	http://arxiv.org/abs/2412.19829v1	0.943064	0.657920
14	1897	http://arxiv.org/abs/2408.03440v1	0.940683	0.657904
15	1717	http://arxiv.org/abs/2502.03805v1	0.950810	0.653870
16	903	http://arxiv.org/abs/2503.07294v2	0.952555	0.651679
17	1264	http://arxiv.org/abs/2209.08575v1	0.938000	0.642967
18	1815	http://arxiv.org/abs/2012.11689v1	0.960384	0.639985
19	2197	http://arxiv.org/abs/1904.09408v2	0.948292	0.638151
20	280	http://arxiv.org/abs/2210.14319v1	0.947207	0.635352

title	tot
Weighted Transformer Network for Machine Trans...	
Language Modeling using LMUs: 10x Better Data ...	
Wide Attention Is The Way Forward For Transfor...	
Quantum Vision Transformers	
STC-ViT: Spatio Temporal Continuous Vision Tra...	
FNet: Mixing Tokens with Fourier Transforms	
TreeGPT: Pure TreeFFN Encoder-Decoder Architec...	
AxFormer: Accuracy-driven Approximation of Tra...	
Scaling Reasoning without Attention	
Pay Attention when Required	
Transformer Meets Twicing: Harnessing Unattend...	
Uncertainty Estimation of Transformers' Predic...	
Bayesian Transformer Language Models for Speec...	
GFormer: Accelerating Large Language Models wi...	
TF-Locoformer: Transformer with Local Modeling...	
Identify Critical KV Cache in LLM Inference fr...	
From $\mathcal{O}(n^{2})$ to $\mathcal{O}(n)$ ...	
Encoding Syntactic Knowledge in Transformer En...	
Language Models with Transformers	
Explicitly Increasing Input Information Densit...	
ATTENTION2D: Communication Efficient Distribut...	

Вывод

В ходе выполнения данного исследования был разработан алгоритм информационного поиска, включающий в себя: токенизацию, использование лингвистических моделей, очистку данных.

В результате работы алгоритма удалось получить список наиболее релевантных статей.

Используемые источники

1. Arxiv API
2. Arxiv
3. Перевод статьи FastText
4. Sentence Transformer
5. Github

Спасибо за внимание