

FEVEROUS: Fact Extraction and VERification Over Unstructured and Structured information

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Task

Given a claim, a model will retrieve evidence from Wikipedia articles as relevant sentences and table cells. Each retrieved evidence is accompanied with the section titles and column headers where they existed in the original Wikipedia article. The model then classifies whether the evidence SUPPORTS or REFUTES the given claim, or if there is NOTENOUGHINFO to verify the claim given the evidence

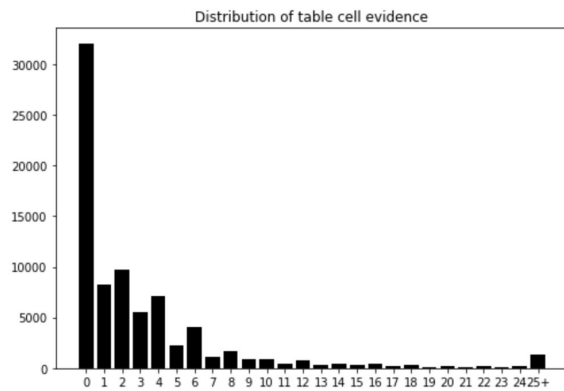
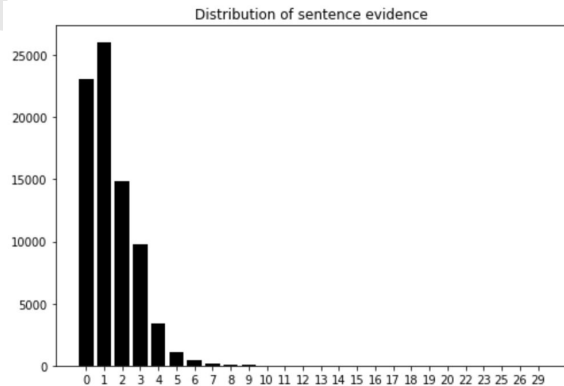


Dataset

Number of samples in each split of the FEVEROUS dataset

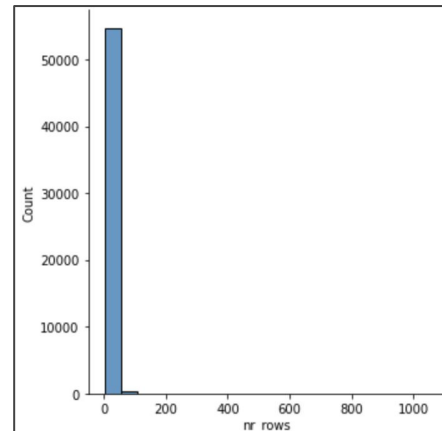
	Train	Dev	Test
Supported	41835	3908	3372
Refuted	27215	3481	2973
NotEnoughInfo (NEI)	2241	501	1500
Total	71291	7890	7845

Data distributions



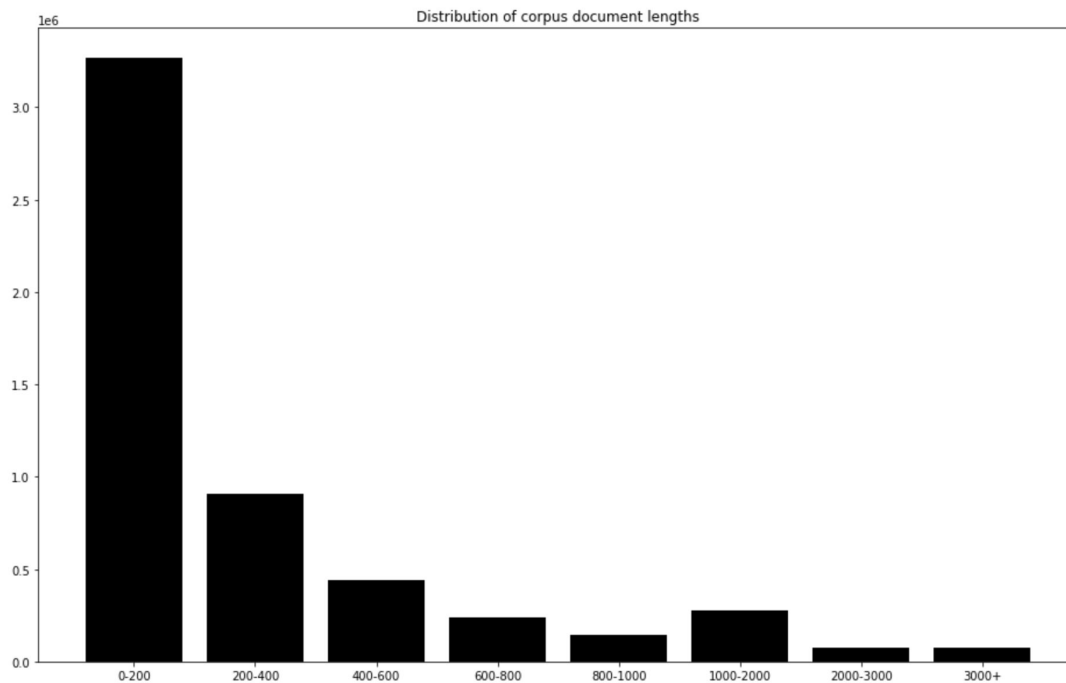
Distribution of:

- Sentence evidence
- Table cell evidence
- Rows in table evidence
- Columns in table evidence





Data distributions





Claims requiring evidence of only sentence, only cell or both

	Train	Dev	Test
E_{sent}	31607	3745	3589
E_{cells}	25020	2738	2816
E_{sent} + E_{cells}	20865	2468	2062

Baseline Model

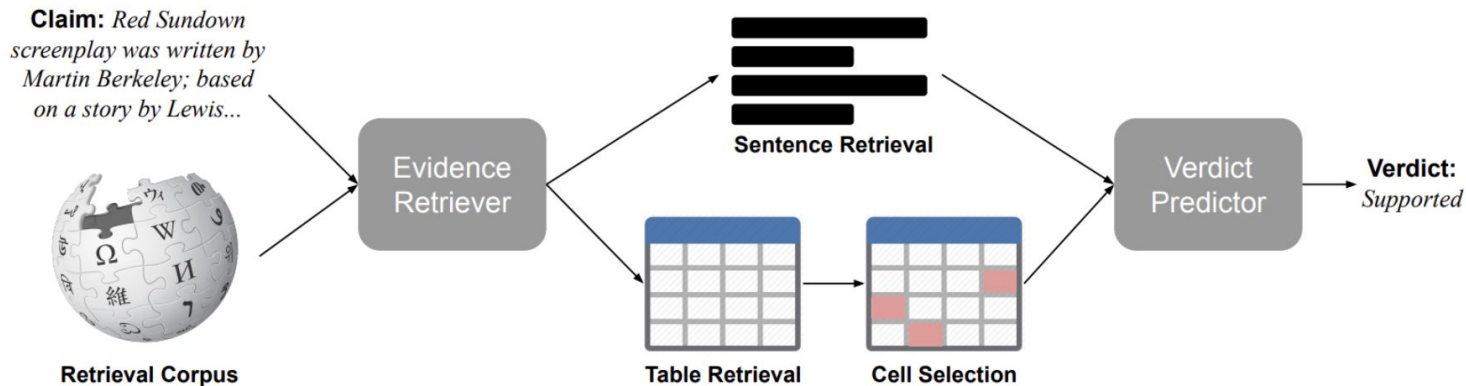


Figure 1: Baseline model introduced in [Aly et al. \(2021\)](#)

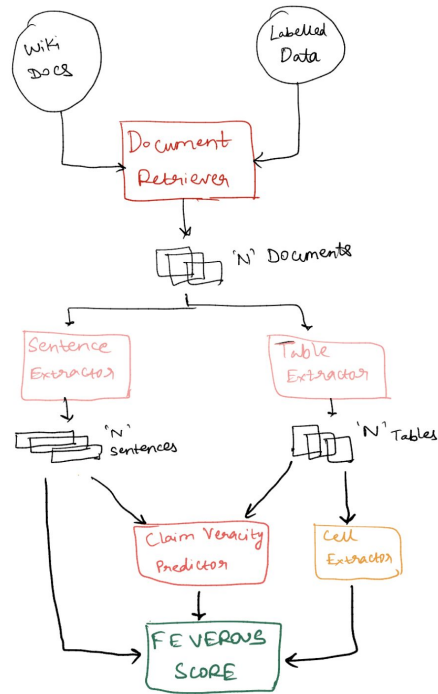


Proposed Model

We propose to break down the process into 4 steps:

- **Document Retrieval:** TF-IDF
- **Sentence Extraction:** TF-IDF
- **Table Extraction:** TaPaS
- **Cell Extraction:** TaPaSForQuestionAnswering
- **Claim Verification:** RoBERTa

Proposed Model



Flow chart of the proposed approach



Results

Method	Task	Metric	Performance
Baseline	Document Retrieval	Accuracy	77.24%
	Claim Verification	FEVEROUS	0.19
TaPaS+RoBERTa	Document Retrieval	Accuracy	70.2%
	Sentence Extraction	Precision@5	23.89
	Table Extraction	Precision@5	0.73
	Table Cell Extraction	Precision	9.03
	Claim Veracity Prediction	FEVEROUS	0.11



Model Outputs

Evidence:

Narendra Modi is the 14th Prime Minister of India. He won the largest share of seats in elections.

	Prime Minister	Number of seats
0	Narendra Modi	312
1	Manmohan Singh	121
2	Nehru	300

Claim: Nehru won the largest number of seats.

"Text Verification: {'Support': 0.2, 'NotEnoughInfo': 6.9, 'Refute': 92.9}"

'Table Verification: Refused'



Model Outputs - Multilingual

Evidence:

नरेंद्र मोदी भारत के 14वें प्रधानमंत्री हैं। उन्होंने चुनावों में सबसे अधिक सीटें जीतीं।

	Prime Minister	Number of seats
0	Narendra Modi	312
1	Manmohan Singh	121
2	Nehru	300

Claim: Modi won the largest seats in the elections

"Text Verification: {'Support': 97.1, 'NotEnoughInfo': 1.9, 'Refute': 1.0}"

'Table Verification: Entailed'



Interpretability - GradCAM visualization

Legend: ■ Negative ■ Neutral ■ Positive						
True Label	Predicted Label	Attribution Label	Attribution Score		Word Importance	
0	entailment (0.97)	entailment	4.41	[CLS] नर ेंद्र मो दी भारत के 14 वें प्रधान मंत्री हैं । उ न्ह ों ने चु नाव ों में सब से अधिक सी टें जी ती ं । [SEP] Modi won the largest seat s in the elections [SEP]		



Probing Knowledge in LLMs

Input: [MASK] was the first prime minister of India

```
{'score': 0.0010983875254169106,  
  'token': 5960,  
  'token_str': 'singh',  
  'sequence': 'singh was the first prime minister of india'},  
{'score': 0.0005622405442409217,  
  'token': 23556,  
  'token_str': 'nehru',  
  'sequence': 'nehru was the first prime minister of india'},  
{'score': 0.00048819667426869273,  
  'token': 12338,  
  'token_str': 'gandhi',  
  'sequence': 'gandhi was the first prime minister of india']}
```



Thanks...!!!!