

WikiCheck

Advanced Information Retrieval - Group 31

Fabian Kaltenegger: BackEnd and Evaluation

Bastian Kandlbauer: FrontEnd and Evaluation

Florian Fellner: Chrome Extension, BackEnd and Evaluation

https://github.com/fkaltenegger/WikiCheck_air31

Introduction

- Retrieve Knowledge from one of the biggest databases
- Natural language statements
- Multilingual queries

Web Application and Chrome Extension

WikiCheck

Fact Check

Albert Einstein died at the age of 86

SBert ▾ Use Cross Encoder ✓ Response Language: en ▾ Check the fact →

Top 5 Results

Albert Einstein CONTRADICTS

Article: <https://en.wikipedia.org/wiki/Albert%20Einstein>

Relevant Paragraph:
Einstein refused surgery, saying, "I want to go when I want. It is tasteless to prolong life artificially. I have done my share; it is time to go. I will do it elegantly." He died in the University Medical Center of Princeton at Plainsboro early the next morning at the age of 76, having continued to work until near the end.

Alfred the Great CONTRADICTS

Article: <https://en.wikipedia.org/wiki/Alfred%20the%20Great>

Albert Einstein died at the age of 86

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Albert Einstein died at the age of 86

Einstein refused surgery, saying, "I want to go when I want. It is tasteless to prolong life artificially. I have done my share; it is time to go. I will do it elegantly." He died in the University Medical Center of Princeton at Plainsboro early the next morning at the age of 76, having continued to work until near the end. [\[Albert Einstein\]](#)

Web Application: Fact Check Page

Chrome Extension: WikiCheck

3

Research Questions

„How effective and accurate can multilingual transformer-based retrieval systems match queries to relevant articles from Wikipedia?“

„How do such multilingual transformer-based approaches such as *mBERT* and *sBERT* compare to traditional *TF-IDF* in retrieving relevant Wikipedia articles?“

Data and Methods

- <https://huggingface.co/datasets/wikimedia/wikipedia>
- Limitations → Take first 2000 entries
- Multilingual Transformer Models:
 - sBERT: *paraphrase-multilingual-MiniLM-L12-v2*
 - mBERT: *bert-base-multilingual-cased*
- Traditional approach: TF-IDF
- Addition:
 - Cross Encoder: *mmarco-mMiniLMv2-L12-H384-v1*
 - Natural Language Inference: *bart-large-mnli*
 - Translation: *opus-mt-en-de/es*

Evaluation

- Testdata based on included articles
- All possible model configurations
- Defined ground truth for queries
- Interactive charts within the WebApp

```
{  
  "url": "https://en.wikipedia.org/wiki/Blue",  
  "expected": "SUPPORTS",  
  "claims": {  
    "en": "Blue is one of the three primary colours.",  
    "de": "Blau ist eine der drei Grundfarben.",  
    "es": "El azul es uno de los tres colores primarios."  
  }  
}
```

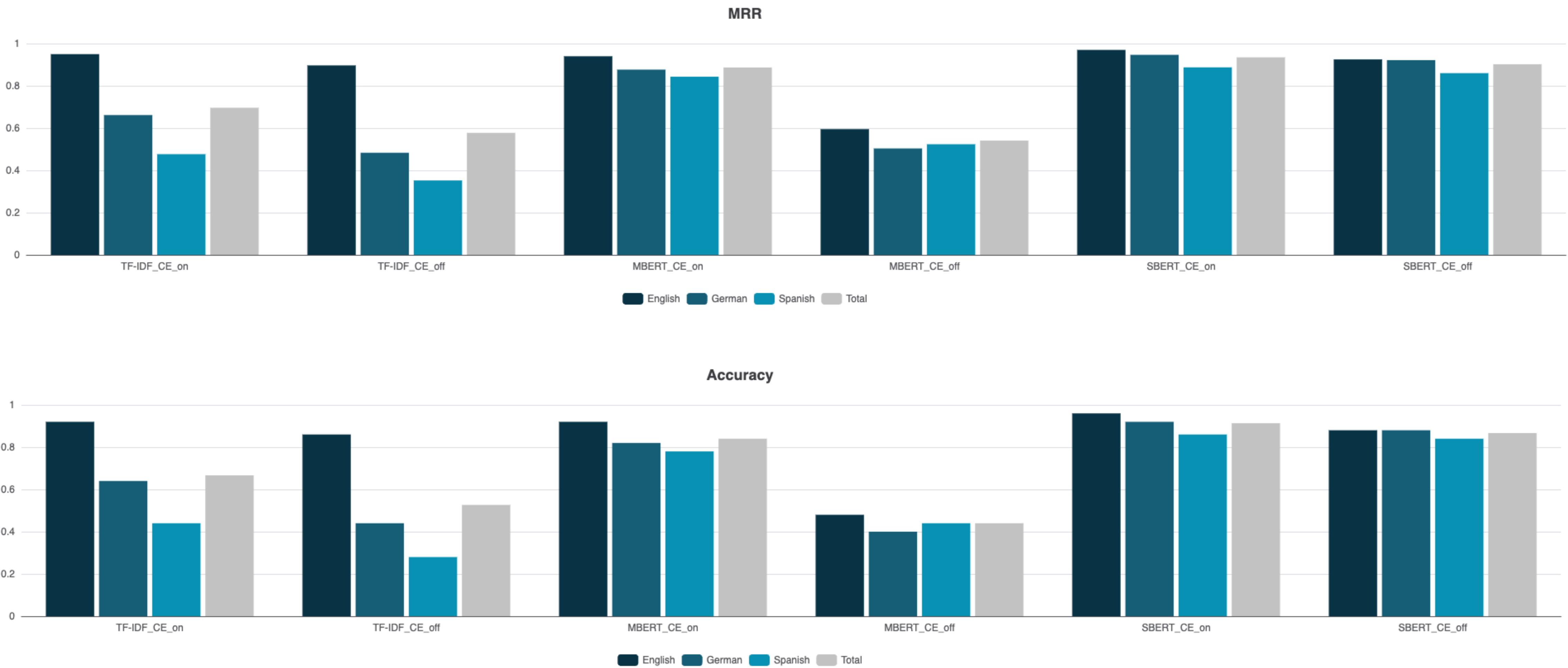
Metrics

- Accuracy
- Mean Reciprocal Rank
- Hit Rate
- Hit Rate Rank

Findings

- Best approach: sBERT
- Worst approach: mBERT without cross encoder
- Multilingual handling
- TF-IDF able to compete with english-only input statements

Findings



Conclusion

- Multilingual transformer-based models: well suited
- Include all english articles: high computational and storage resources
- Wikipedia articles in different languages
- Large Language Model

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