# Categorizing Comparative Sentences

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## Key Ideas

- Task: Identifying comparative sentences and categorizing the intended preference (e.g., "Python has better NLP libraries than MATLAB" → Python, better, MATLAB).
- New cross-domain dataset: CompSent-19 corpus consisting of 7,199 sentences with item pairs from three domains: "Brands", "Computer Science", and "General/Random".
- Evaluation: A gradient boosting model based on pre-trained sentence embeddings achieves an F1 score of 85% improving upon a strong rule-based baseline.
- Model Application: Extracting comparative sentences for pro/con argumentation in argument search engines or debating systems.

# **CompSent-19 Characteristics**

Domain	BETTER	WORSE	NONE	Total
CompSci	581	248	1,596	2,425
Brands	404	167	1,764	2,335
Random	379	178	1,882	2,439
Total	1,364	593	5,242	7,199

# **Examples of the Labeld Comparative Sentences**

The first item is BETTER/WORSE/NONE than the second item. The ordering of the items is important.

Domain	Sentence	Label
CompSci	This time Windows 8 was roughly 8 percent slower than Windows 7.	WORSE
Brands	These include Motorola, Samsung and Nokia.	NONE
Random	Right now, I think tennis is easier than baseball.	BETTER

### **Downloads and Demo**

#### Dataset:

https://zenodo.org/record/3237552

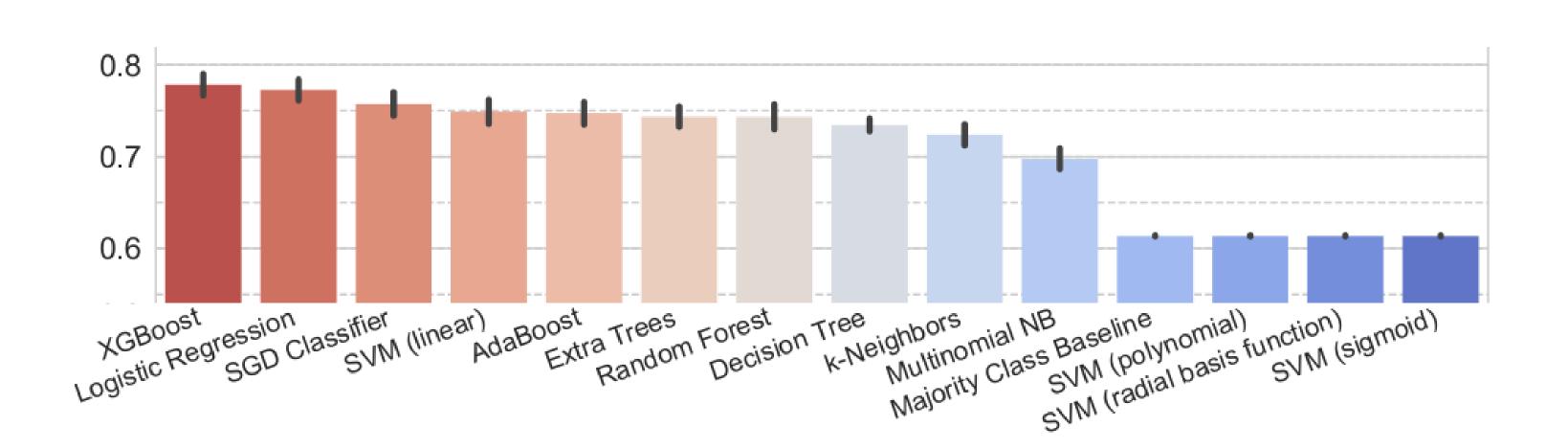
#### Code:

https://github.com/uhh-lt/comparative

#### Demo:

ltdemos.informatik.uni-hamburg.de/cam/

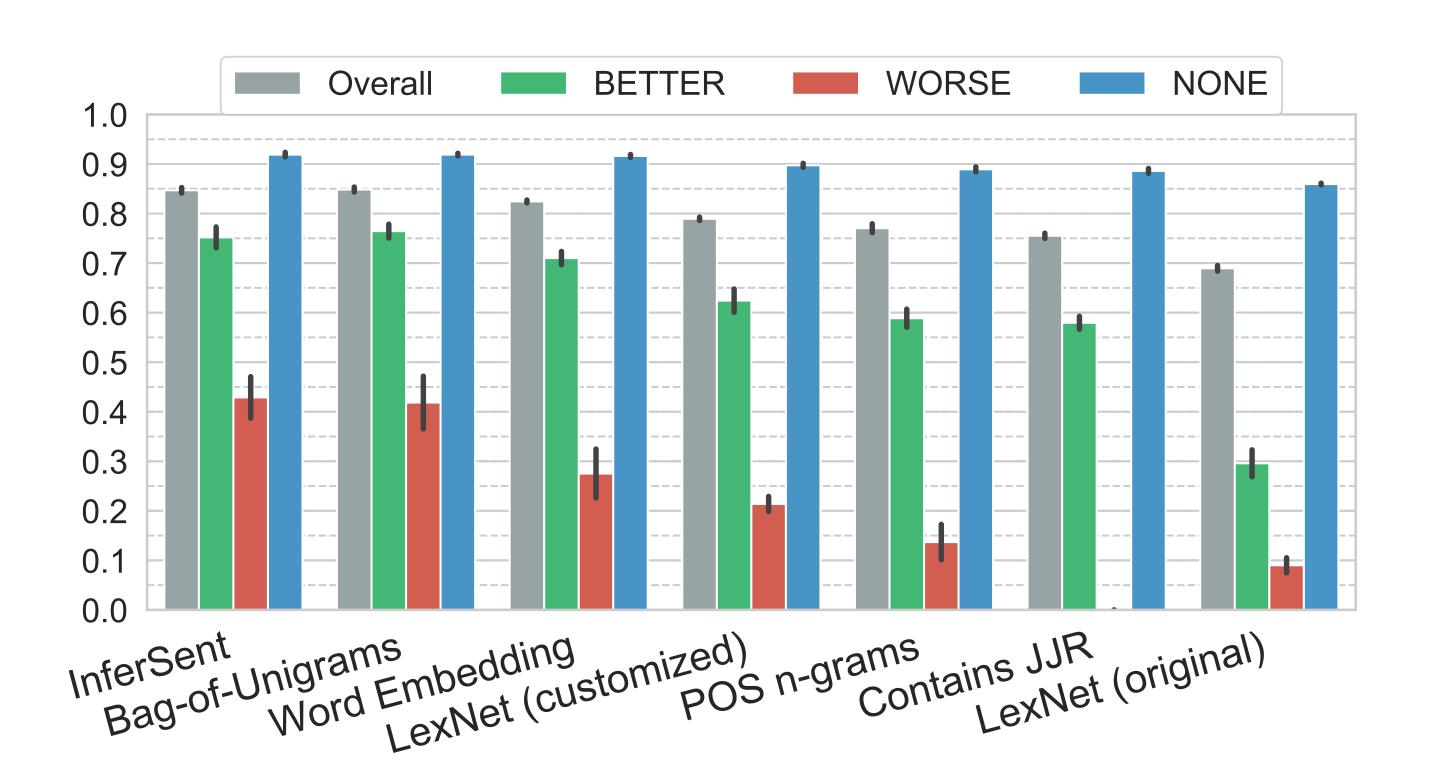
# Impact of Classification Model (Bag-of-Words Representation)



# Rule-based vs. XGBoost

Model	BETTER	WORSE	NONE	ALL
Rule-based Baseline	0.65	0.44	0.90	0.82
XGBoost+InferSent	0.75	0.43	0.92	0.85

# Impact of Feature Representation (XGBoost with different features)



## **Cross-Domain Transfer**

Domain	CompSci	Brands	Random
CompSci	0.82	0.84	0.84
Brands	0.76	0.83	0.83
Random	0.79	0.84	0.86

# Comparative Argument Mining: "Python vs. MATLAB"



Wow, Python much faster than MatLab

RE: Wow, Python much faster than MatLab.

Remember that Python with NumPy tend to be faster than Matlab.

Python might be faster Click, to show context. I'm not good at MATLAB so I don't know how to get computational times (or in Python, for that matter).

As you can see from the results- Matlab is significantly faster than python.

Right, exactly; but "flat" Matlab (that is, Matlab with few looping constructs) has been shown to me to be faster than Python+NumPy for intensive calculations.

But I also tested with 64 bit float maxtrix and on my machine, Matlab 2010b is still faster than Python 3.2 with Numpy-MKL