Metaphor Detection for Low Resource Languages
From Zero-Shot to Few-Shot Learning in Middle High German

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Our Goal

Metaphor Detection

- We want to find adjective-noun metaphors.
- Our focus lies on intentional metaphors.
- We start without annotated examples.
- This provides a useful tool for literary scholars.

Low Resource Languages

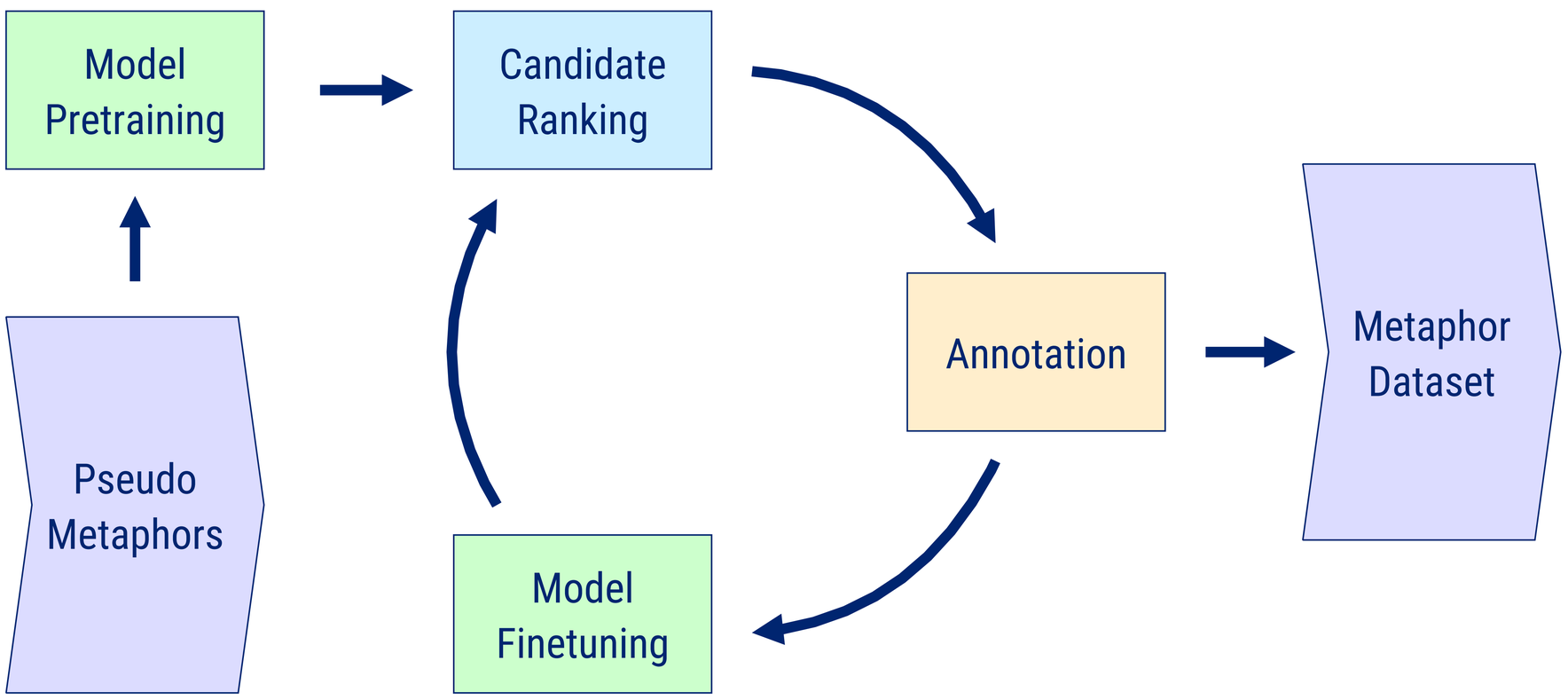
- Our main application is Middle High German.
- No large language models or syntax trees.
- POS tags and lemmata are available.
- We can train simple word embeddings.

General Approach

A small feedforward network transforms the word embeddings of the adjective-noun pair into a special vector space:

- **Metaphoric** word pairs have a **high** cosine distance.
- **Literal** word pairs have a **low** cosine distance.
- The cosine distance of the word pairs represents their **metaphoricity**.

Overview



Zero-Shot Pretraining

- The idea of the pretraining is to model metaphors as selectional preference violations.
- For pretraining we temporarily assume that all word pairs in our corpus are non-metaphors.
- As metaphor examples we create pseudo-metaphors by randomly combining adjectives and nouns.

Few-Shot Finetuning

- Using our trained model, we rank all adjective-noun pairs in our corpus by their metaphoricity.
- We annotate examples with *high* metaphoricity, *low* metaphoricity and *random* examples.
- Then we can finetune the pretrained model using the newly annotated dataset.

Dataset Creation

- The interactive annotation results in an annotated dataset without needing to annotate a whole corpus.
- We have low annotation cost to create a dataset consisting of metaphors and non-metaphors.
- The dataset contains difficult examples that were wrongly classified in a previous iteration.

Results

Unsupervised

method	TSV[2,3]	poems[3]
supervised (ours)	0.90	0.82
SVM baseline[2] features (+abst)	0.92	0.77
SVM baseline[2] features	0.67	0.75
zero-shot GerDraCor (ours)	0.70	0.74
zero-shot (ours)	0.57	0.77
baseline[2] (+abst)	0.86	0.76
baseline[2]	0.57	0.79

Results of our supervised and unsupervised baseline comparison experiments: The numbers are the average precision. The methods marked with +abst use abstractness features that are not present in low resource languages such as Middle High German.

Supervised

	GDC[1]	Schiller[1]	TSV[3,4]	poems[3]	MHG[5]
base	0.26	0.32	0.70	0.74	0.22
iter 1	0.60	0.44	0.84	0.77	0.61
iter 2	0.71	0.53	0.67	0.74	0.25
iter 3	0.46	0.55	0.72	0.78	0.60
iter 4	0.73	0.62	0.70	0.77	0.40
iter 5	0.95	0.70	0.59	0.78	0.60
iter 6	0.60	0.77	0.70	0.82	0.66

Results of the iteratively trained model on the GerDraCor (GDC) and held out Schiller test sets (precision at top 100) and on the TSV and poetry test sets (average precision); The MHG column shows the results of the experiment on Middle High German (precision at top 100).

Examples

grenzenloses Mitleid (DE)
borderless sympathy

ein **aufrichtiges Herz** (DE)
an **upright heart**

Behutsam schreite er auf **leisen Sohlen** (DE)
Gentle shall he tread on **silent soles**

schoenen gewin (MHG)
radiant victory

der vogele **süezer dôz** (MHG)
the birds' **sweet sound**

mit vil **getriuwer huote** (MHG)
with much **faithful loyalty**

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[5] Zeppezauer-Wachauer, K. (2022). Mittelhochdeutsche Begriffsdatenbank (mhdbdb). Universität Salzburg. Interdisziplinäres Zentrum für Mittelalter und Frühneuzeit (IZMF). Koordination: Katharina Zeppezauer-Wachauer. 1972-2022 (laufend).

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