

For the purpose of classifying Slovenian sentences based on their sentiment we fine-tune the SBERT model with TS-DAE. We choose bert-base-uncased (TODO) for our base model to fine-tune. For the loss function we use the Denois-

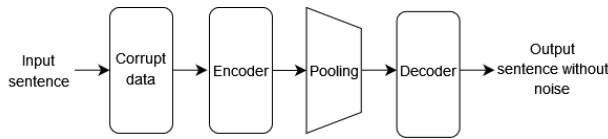


Figure 1. Architecture of TSDAE model

ingAutoEncoderLoss as our loss function when training. We train the method and compare our results with the corpus.

TSDAE has been shown by Wang, Reimers and Gurevych [1] to outperform other unsupervised approaches and other supervised models, trained with a lot of labeled data. Many previous works were evaluated on Semantic Textual Similarity (STS) which might return good performance but it is unclear how it performs on specific domains.

GPL

The Generative Pseudo Labeling (GPL) is a domain adaptation technique that utilizes unsupervised learning. It allows us to fine-tune a dense retrieval model (for example SBERT [2]) on a desired domain. First step of GPL is preparing (query, sentence)-pairs. This takes three phases: generating suitable queries, negative mining and using cross-encoder to assign a score to each pair [3].

Queries are generated using a pretrained T5 encoder-decoder model [4]. Three queries are generated for each input sentence. The next step is negative mining, where 50 of the most similar sentences are retrieved for each of the generated queries, using an existing dense retrieval model. The (query, input sentence)-pairs are denoted as (Q, P^+) and the negative sentence as P^- .

The last step of data preparation involves a cross-encoder that assigns a score to each (query, sentence)-pair. For each (Q, P^+, P^-) -tuple a margin δ is calculated using the next formula:

$$\delta = CE(Q, P^+) - CE(Q, P^-), \quad (1)$$

where CE is the score predicted by the cross-encoder. This gives us a dataset $D_{GPL} = \{(Q_i, P_i, P_i^-, \delta_i)\}_i$, which is used for training a dense retrieval model with the MarginMSE loss function. This model thus learns to map queries and sentences into a vector space and is fine-tuned to a given domain.

Data

Kakšne podatke uporabljamo, kako izgledajo, in what way did you prepare the data, delitev na množice (poudarimo, da se vse metode treniranje z enako učno množico). Pokažemo morda par primerov povedi v tabeli.

Testing approach

Naslov morda še ni ustrezen in se bo prilagodil. Katero metriko uporabimo za primerjavo rezultatov, kako iz sentence embedding pridemo do klasifikacije povedi.

Results

TO DO: Use the results section to present the final results of your work. Present the results in a objective and scientific fashion. Use visualisations to convey your results in a clear and efficient manner. When comparing results between various techniques use appropriate statistical methodology.

Discussion

TO DO: Use the Discussion section to objectively evaluate your work, do not just put praise on everything you did, be critical and exposes flaws and weaknesses of your solution. You can also explain what you would do differently if you would be able to start again and what upgrades could be done on the project in the future.

Acknowledgments

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References

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- [2] Nils Reimers and Iryna Gurevych. Sentence-bert: Sentence embeddings using siamese bert-networks. *CoRR*, abs/1908.10084, 2019.
- [3] Kexin Wang, Nandan Thakur, Nils Reimers, and Iryna Gurevych. GPL: generative pseudo labeling for unsupervised domain adaptation of dense retrieval. *CoRR*, abs/2112.07577, 2021.
- [4] Colin Raffel, Noam Shazeer, Adam Roberts, Katherine Lee, Sharan Narang, Michael Matena, Yanqi Zhou, Wei Li, and Peter J. Liu. Exploring the limits of transfer learning with a unified text-to-text transformer. *Journal of Machine Learning Research*, 21(140):1–67, 2020.