With the publication of Bidirectional Encoder Representations from Transformers (BERT) by the Google AI team (Devlin et al., 2018), a small revolution in the field of natural language processing (NLP) was triggered. BERT is a huge neural network model based on the transformer architecture (Vaswani et al., 2017) and was pretrained on 3.3 billion words from BooksCorpus (Zhu et al., 2015) and English Wikipedia. It builds upon previous approaches on pretraining contextual representations, particularly Semi-supervised Sequence Learning (Dai & Le, 2015), GPT (Radford et al., 2018), ELMo (Peters et al., 2018), and ULMFit (Howard & Ruder, 2018) and thus also follows the new trend in NLP: transfer learning. Transfer learning is the technique of transferring knowledge gained from performing one task to another, similar one, and is therefore beneficial compared to the resource intensive process of training neural networks (sometimes with several hundred million parameters) from scratch. However, what really sets BERT apart from other approaches is that it is “the first deeply bidirectional, unsupervised language representation, pre-trained using only a plain text corpus”, as stated in Google AI’s blog (Devlin & Chang, 2018). This bidirectionality, combined with the self-attention mechanism, provides a better grasp of word meanings and context, which is reflected in achieving state-of-the-art performance on eleven NLP tasks, as reported by Devlin et al. (2018). Through open sourcing of BERT, numerous researchers were able to utilize the model for their own tasks and domains, including the cooking domain (Stojanov et al., 2021). / Das Open Sourcing von BERT sorgt dafür, dass quasi jedermann sein eigenes Modell in kurzester Zeit für seine eigenen speziellen Aufgaben und Domänen finetunen kann, so z.B. auch für die Kochdomäne. However, BERT lacks domain-specific knowledge due to pretraining being only performed on data from the general text domain, resulting in a performance restriction on domain-specific tasks

However, BERT’s performance on domain-specific tasks is limited due to its lack of domain-specific knowledge (Gururangan et al., 2020), as pretraining was only performed on data from the general text domain. Several approaches emerged to tackle this issue, generally aiming to reduce this data shift by presenting domain-specific data of the desired domain to the model. Meanwhile, a variety of BERT models geared towards different languages and domains are available, including CamemBERT for the French language (Martin et al., 2020), BioBERT for the biomedical domain (Lee et al., 2020), SciBERT for the scientific domain (Beltagy et al., 2019), FinBERT for the financial domain (Araci, 2019), or HateBERT for abusive language (Caselli et al., 2020), just to name a few. But there is only little research done regarding the adaptation of BERT for the cooking domain, and no sophisticated model that is applicable for a broad range of downstream tasks in this domain is provided yet.

Inspired by these latest developments and remaining research gaps, the goal of this bachelor thesis consists in the adaptation of BERT for the cooking domain via domain-adaptive pretraining (DAPT), the default approach in literature to approximate a model to a specific domain. The performance of the resulting model is then evaluated against similar approaches for multiple downstream tasks, including named-entity recognition (NER), multi-class classification (MCC) and question answering (QA). This results in the underlying research question of this thesis:

*How does DAPT of BERT for the cooking domain affect the performance of downstream tasks in this domain?*

To answer this question … Aufbau erläutern

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