論 文 の 内 容 の 要 旨

論文題目　　A Multi-faceted Approach to Domain-aware Neural Text Generation
　　　　　　（ドメインを考慮したテキスト生成のための多角的な取り組み）

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　Machine translation, dialogue, summarization, and story generation. The technology for text generation is deeply related to the major NLP tasks and researchers have eagerly explored methods for text generation with high quality. The major difficulty is caused by the large diversity of probable outputs.

Compared to traditional classification tasks, the patterns of probable outputs (i.e., sequences of words) are countless. Moreover, the measure of what is good output depends significantly on the goal, situation, and domain where text generation is used. For this reason, employing text generation for practical use has often required developers to spend large costs for designing and manually customizing a system for each purpose.

　Recently, the rapid increase in data on the Web and advances in machine learning represented by neural networks have motivated researchers to adopt data-driven approaches for text generation. Although the approaches allowed developers to notably reduce the large costs, it also raised another problem; the performance of data-driven models significantly drops in specialized domains which are different from training data, and sufficient in-domain data for training is not necessarily available. As a result, in the age of data-driven approaches, developers have difficulty collecting a large amount of in-domain data instead of manually designing an in-domain system.

　To resolve the problem, many practitioners have explored methods to handle the difference of domains called domain adaptation; assuming that we have a large out-domain data and a small in-domain data, we exploit a large amount of out-domain data for such as data-selection, fine-tuning, and multi-domain learning. In the approaches, the difference in domains is often treated as the difference in datasets due to the convenience for experiments and large costs of annotating domain tags to each example.

Although such attempts have had some success, it is still unclear that which factors in domain differences can affect the performance of models. We consider there is room for improvement by exploring domains at a finer level in a multi-faceted approach. Our challenges are threefold:

- **Situation-aware generation:** Examples in a dataset for text generation are not made under the same situation even if they are in the same dataset; who, when, where, and under what circumstances an example was created can all potentially affect the result, particularly in tasks where outputs can have high diversity. We attempt to exploit the situations in dialogue with conversation data collected from social media. %% The conversations

- **Vocabulary adaptation:** Domain differences can affect the vocabulary that appears in the text and its meaning. However, due to the scarcity of in-domain parallel data available for training, differences in vocabulary and meaning of words were one of the difficult problems to solve by the existing methods of domain adaptation. In particular, in a model based on a neural network that has been frequently used in recent years, the vocabulary is often built in the phase of pre-processing. The scheme has hindered us from applying domain adaptation methods to embedding layers of models. We propose a method to directly adapt the embedding layers of a trained model by using the embeddings pre-trained from in-domain monolingual corpora.

- **Handling implicit domains in Latent Variables:** The difficulty in handling finer domains in data is mainly attributed to the cost of labeling or collection. Domains that can affect generated outputs are not necessarily available; they may not be publicly available due to privacy concerns or may simply not be recorded as data. Such inaccessible domains can also involve what output a model should generate. We try to capture such inevitable randomness in text generation by latent variables of variational models and propose a method for effectively handling fine-grained domains that implicitly appear in texts.