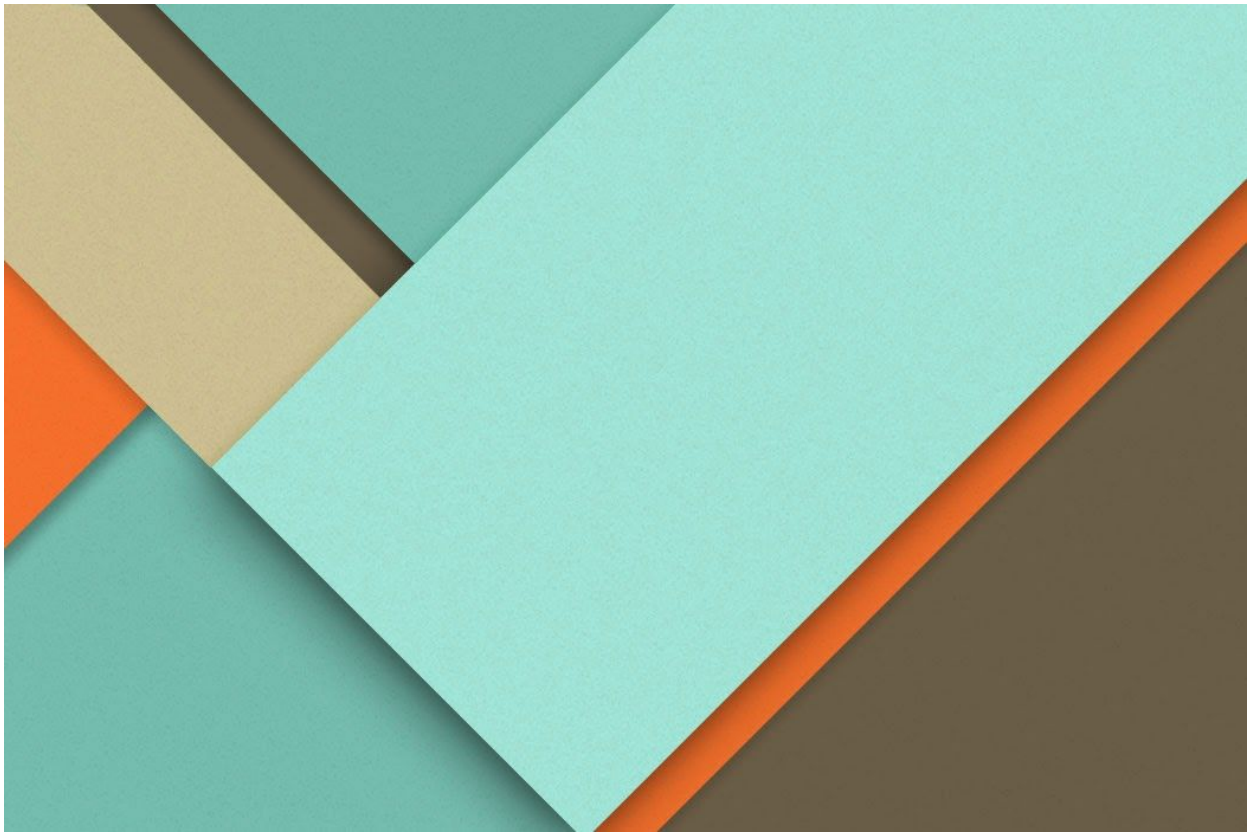

Conditional Text Generation

Alberto Benincasa (alberto.benincasa@linksfoundation.com)

Giuseppe Rizzo (giuseppe.rizzo@linksfoundation.com)

TASK

In the last years, the task of text generation has made significant progress since the first models relying on rules and statistical inference, which had limitations: human language is in fact very flexible, and a set of fixed rules can only cover a tiny part of the language knowledge while statistics cannot capture the semantic meaning of the text. Furthermore, the definition and extension of these rules required developers to have an in-depth knowledge of linguistics other than technical skills.

For these reasons, although performing well in simple tasks, these models could not be used in practice. For this project, we will instead use an approach based on neural networks, which have raised the level of accuracy and variety of generations, taking into account that there are two types of generation:

- Unconditional Text Generation
- Conditional Text Generation.

About the former, the main problem is that the generation is mainly based on the **content** of an input set of examples utilized for the training phase. This leads to little diversification of the generated text and little adherence to the human expressions, while the latter is influenced by external conditions, such as the **context**, the **topic** or the **emotion**.

The Conditional Text Generation can be applied to the goal-oriented conversations, chatbots, and Query & Answering (Q&A) systems in order to make the interaction more consistent, smooth and enjoyable.

GOALS

The goal of the project is to be able to generate *conditional* text, i.e, not to base the generation only on the content of the training set but also consider several factors: in fact, a real person adjusts the content according to topic, mood, and working environment to name a few.

The project will test how to:

1. Model Natural Language with deep learning
2. Predict the next words that shape a coherent and meaningful statement

SPECIFICATIONS

We recommend the use of the **Common Objects in Context (COCO)** dataset that is large-scale object detection, segmentation, and captioning dataset. COCO dataset is freely available at the following link: https://cocodataset.org/#captions-2015.

The task description and solution is based on the Conditional Transformer Language Model paper available at https://arxiv.org/pdf/1909.05858.pdf.

To assess the quality of your results you must use the following metrics:

- BLEU (Bilingual Evaluation Understudy)
- SELF-BLEU (which take into consideration the variety in the generated text)
- POS-BLEU (which take into consideration also the structure in the sentence building)

The scorer to compute these metrics is available at:

Texygen (https://github.com/geek-ai/Texygen)

The model must be implemented using PyTorch deep learning library. A pre-compiled version can be installed via:

pip install torch

We suggest the use of a python virtual environment (or conda environment if you prefer to install PyTorch from source) with Python >= 3.5.0 and a version of torch >= 1.4.0.

Another library we suggest is Transformers, which contains pre-trained models used in nowadays Natural Language Understanding. The package can be installed via pip:

pip install transformers

Documentation is available at https://huggingface.co/transformers/.

Further instructions on how to use GPU computing resources is described https://docs.google.com/document/d/1broktVAVixy70Px3dGfoBkxXyFzbFf1yNkA1l_L8i1I/edit

DELIVERABLES

1. Report: a document containing the following sections: task description, tools used (with reference to literature if necessary), dataset description, approach description, results and final conclusions. The document must follow the official CVPR template (we will provide you with everything you need as soon as necessary) -- min 6 pages.
2. A link to your repository (choose one platform among Github, GitLab, BitBucket) with a “HOW TO USE” section in the README.md
3. A presentation (13 minutes) of your work.