

Neural Networks for Narrative Continuation

The field of artificial intelligence has long envisioned using computers to automatically write stories. The first systems emerged fifty years ago and largely focused on modeling the underlying structure of stories, with less emphasis on modeling their natural language representation. With the advent of machine learning, researchers have found new opportunities to automatically acquire narrative knowledge directly from text corpora. However, current systems still lack the language processing needed to dynamically predict ‘what happens next’ in human-authored story text, a task I refer to as *narrative continuation*. We focus on two different forms narrative continuation in this work: closed-choice prediction and free-text generation. For both cases we explore a set of neural network approaches, which have shown to be very powerful for language processing tasks but are less explored for the narrative domain.

In closed-choice prediction, the goal is to choose the next text segment in a given story from a set of provided candidates. There are three variants of closed-choice prediction we address in this work. The first involves a framework we previously developed, the Choice of Plausible Alternatives (COPA). In COPA, the system is presented with a single sentence and then is asked to choose which of two alternative sentences conveys the more plausible cause (or effect) of the premise sentence. We explored a neural encoder-decoder model for this problem, and applied to it a dataset of stories (ROCStories) that convey a variety of commonsense causal and temporal relations associated with everyday events. Our model obtains higher accuracy than existing non-neural approaches when the ROCStories are used exclusively for training, but it falls short of the state-of-the-art when applied to much larger datasets. Related to COPA is the Story Cloze Test, where the first four sentences of a story are given as context for selecting the correct ending sentence from two candidates. For this framework we developed an Recurrent Neural Network (RNN)-based binary classifier trained to distinguish correct from artificially generated incorrect endings in the ROCStories. This approach significantly outperformed the previously established baselines on the Story Cloze Test. Finally, we examined closed-choice prediction in an interactive user application, the Data-driven Interactive Narrative Engine (DINE), where people can explore different outcomes of a story for the purpose of educational training or entertainment, for instance. A user provides text that advances the story, and system must select from multiple possible continuations in real time. We observed that the models applied to COPA and the Story Cloze Test have less impact on DINE prediction accuracy, due to the unique way the DINE stories are authored.

The second focus of this work is free-text generation, where there are no candidates provided for what happens next, and instead the system generates unique story text. We make use of an RNN language model trained on a large corpus of fiction stories to generate continuations. This task is difficult to evaluate since unlike closed-choice prediction, there is no single correct continuation. We found that automated linguistic analyses could be used to gauge the quality of generated stories relative to human authoring. We applied our model to an assistive writing tool (Creative Help) that gives users automated suggestions for how to continue a story they are writing. We found that automated linguistic analyses could be used to predict how users incorporated the suggestions within their stories, thus providing a signal for their quality.