Text Generation with Recurrent Neural Networks Goals and Overview

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1 Goals

This section describes the goals and purpose of this tutorial.

1. Review the task of language modeling.
2. Understand recurrent neural networks (RNNs)
3. Understand the sequence structure of the inputs to an RNN
4. Understand and implement greedy sampling of RNNs to generate text
5. Train an RNN on different datasets using Keras and generate novel text

2 Overview

The purpose of this tutorial is to gain familiarity with the implementation and training of recurrent neural networks. Ultimately, students will train a character-based RNN on Shakespeare's sonnets and Linux kernel code and generate novel text that resembles the data the RNN trained on. Students will learn about recurrent neural networks, assuming they are already familiar with regular, feedforward neural networks. They will also learn how to create valid training data, i.e., matrices, from raw text data. After training and RNN, they will also learn how to implement greedy sampling to generate novel character-based sequences based on the training data of the RNN.

To speed up training and configuration, we will use a Google Colaboratory notebook, similar to an iPython/Jupyter notebook, for the programming section. Additionally, we also receive free use of a Tesla K80 GPU for 12 hours at a time, which will vastly help improve the speed of training. We use numpy and Keras as our programming libraries.

This tutorial aligns with Chapter 9b: Neural Sequence Modeling: RNNs and LSTMs of the Third Edition of *Speech and Language Processing* by Dan Jurafsky and James H. Martin.