ICS 661
Advanced AI

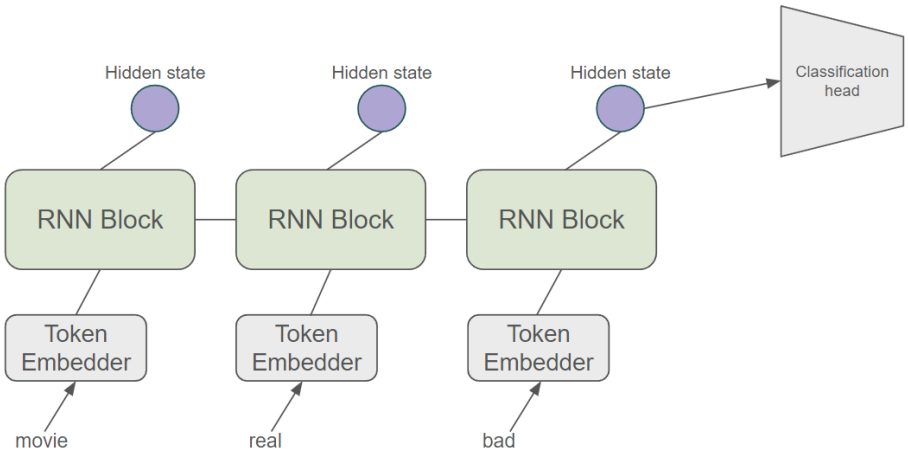
Fall 2024

Assignment Report Example

Section 1: Task Description

The goal of this project is to train a recurrent neural network (RNN) to predict if a movie review is positive or negative based on its content (text).

Section 2: Model Description



The model consists of three main components; a token embedder, an RNN, and a linear classification head which predicts sentiment based on the last hidden state of the RNN.

Section 3: Experiment Settings

3.1 Dataset Description

Movie reviews have been classified as either positive or negative based on their stars (<=4 is negative and >= 7 is positive). These reviews number 50,000 split into equal size test and train sets both with balanced labels. The movies reviewed in the test set are different than in the train set.

3.2 Detailed Experimental Setups

The reviews were all prepossessed by removing HTML tags and punctuation. Then this cleaned text was separated by white spaces and each word seen in the train set was used as a token in the vocabulary. All 25,000 training examples were used to train four models for 15 epochs each. The model with the lowest binary cross-entropy loss and the highest accuracy was selected.

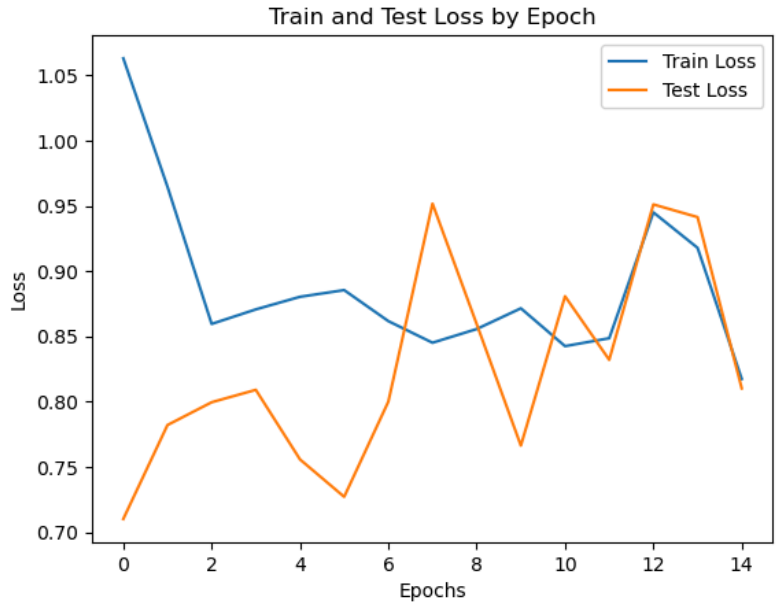
3.3 Evaluation Metrics

Binary cross-entropy loss and 01 loss (accuracy) were used to evaluate the models' performance.

3.4 Source Code

https://github.com/jnicolow/RNN_binary_sentiment_prediction

3.5 Training Convergence Plot



3.6 Model Performance

The model did not learn with accuracy hovering around 50% equivalent to the performance of a random guess on this problem.

3.7 Ablation Studies

Both RNN and long-short-term memory backbones were used to a similar effect. Slightly lower binary cross-entropy and 01 loss were attained by increasing embedding sizes and hidden representation size to 300 and 256 respectively from 64 and 128.