

CMPSCI 389 Final Project Milestone 2 (HW7)

Ian Davis, Miguel Lopez Rivera

Assigned: April 20 (Blaze it) 2022; Due: April 26 2022 @ 11:59 pm EST

1 New results and Result explanation

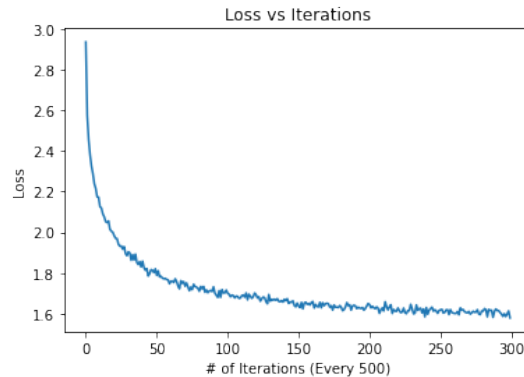


Figure 1: This is loss vs time graph of training the RNN, the number of loss being recorded every 5000 iterations over 150000 iterations. It's a simple graph, the loss goes down quickly then plateaus to around 1-2.

2 Plan for Demos

Our demonstration would be set up like a quiz-bowl! We will start out by explaining how we wanted to create something that "sounded" intelligent. We settled on creating a model that could generate questions for a quiz-bowl in the hope that we could play a small round with the questions it comes up with. At this point we aren't concerned with generating answers for those questions because 1) It requires much much more data (like sets upon sets of wiki pages associated to each question) and 2) we thought it would be fun to come up with the answers ourselves. From the offset we established that we may not be able to create sensible questions, but we also thought this would be more interesting. Then we will explain how RNN models are different from the NNs we learned in class, specifically how they are able to capture order and time in a way normal NNs can't. We will also go over their ability to operate over sequences of vectors (and thus can map many-to-one, one-to-many, or many-to-many). Then we will give a quick explanation of what NLP and one-hot encodings are and then we will transition into word embeddings and their ability to capture connotation.

From there we will give a synopsis of the source code for our model and how the GRU layer works. We will show a couple of graphs of loss through different rounds of training. We will then show how we took the TriviaQA dataset and parsed it down to just the questions to fit our task.

Afterwards we'll end off the demo with a small round of trivia with the question generated by the model.

3 The bit where you can rant

So far, using and training an RNN has been pretty good. In the beginning, there was confusion on how to implement a GRU layer, a way of allowing the network to "remember" previous inputs/outputs for longer than just linear layers. Much frustration with hidden sizes and input sizes was had. We tried looking at other models and mixing what they had with the code we had, and that caused all sorts of problems on its own. Until we figured out that by actually

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 Having?
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 In which country is the security in the US books of
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 Give a youngest professing and starred the starring

(a) Generated using 'W', 'H', and 'I'

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 Davis and the starred as a seriol Carron was a star
 Elizake Carron was a starring the song Charles is a
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 Give the starring which course in the USA was said
 Howseam and the starring which colour of the starri
 In which counbrans on the starred and the state of
 John Can in thom is an animal is a stage was a stre
 Kin Man and Sang in the UK consist on the starrinht
 Later ofxan in the film 'The Singer of the station
 Mary?
 On which countries was the first plant is a star of
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 Zen Carron in the US state is the name of which col

(b) Generated using each letter of the alphabet 2

Figure 2: This figure is the output of the model after this training session, given the first letter and a max sentence length of 50 characters. As you can see, the model has greatly improved over the last milestone, clearly showing English words and even using question marks at times.

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 In which country is the first produced the state of
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 Give a year in the US television series The State o
 Give a year in the US television series The State o

(a) Generated using 'W', 'H', and 'I'

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 From which country is the first produced the state
 Give a year in the US television series The State o
 How many the second country is the first name of th
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 King House of the British part of the US President
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 On which country is the first produced the state of
 Name the film 'The State of the US President of the
 Prime Minister of the British part of the US Presid
 Queens and the British part of the US President of
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 The state of the US President of the British part o
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 Which country is the first name of the film of the
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(b) Generated using each letter of the alphabet 2

Figure 3: This third image is the output of the model after another 150000 iterations. No matter how many times the generation was run, the same output was received for a given input. The model has clearly overfit the data and just hard-coded an answer for a given input. Important to note, is that at this point the model generates little gibberish, almost all of the words produced are English.

reading the documentation thoroughly and not skimming it, that we were using the layer wrong and a few simple fixes later the model was working like a dream.

So, things that went well: using an RNN, the dataset we have gets us some pretty good results as well, and using a GRU layer produces great results even with low training times. What we would do differently: read the documentation better, don't blindly follow a tutorial/guide, implement saving and reloading models earlier.