05_week1_quiz

Recurrent Neural Networks

测验, 10 个问题

第 1 个问题

1

point

1。第 1 个问题

Suppose your training examples are sentences (sequences of words). Which of the following refers to the jth word in the ith training example?

x(i)<j>

x<i>(j)

x(j)<i>

x<j>(i)

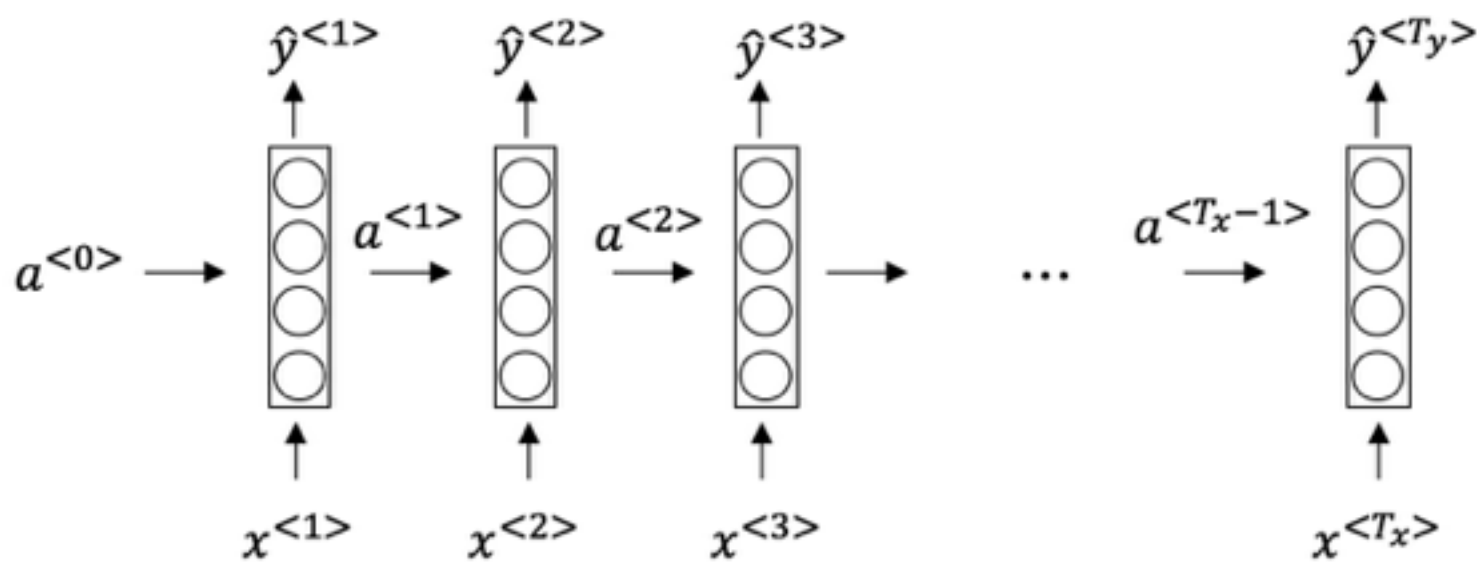
第 2 个问题

1

point

2。第 2 个问题

Consider this RNN:



This specific type of architecture is appropriate when:

Tx=Ty

Tx<Ty

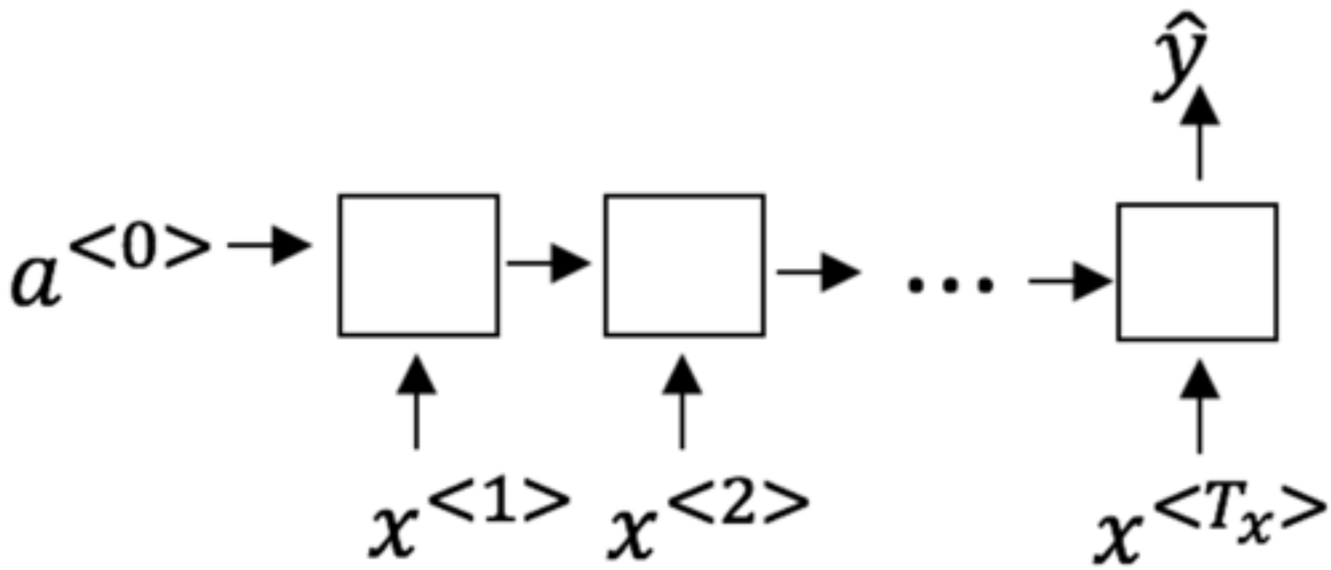
Tx>Ty

Tx=1

第 3 个问题
1
point

3。第 3 个问题

To which of these tasks would you apply a many-to-one RNN architecture? (Check all that apply).



Speech recognition (input an audio clip and output a transcript)

Sentiment classification (input a piece of text and output a 0/1 to denote positive or negative sentiment)

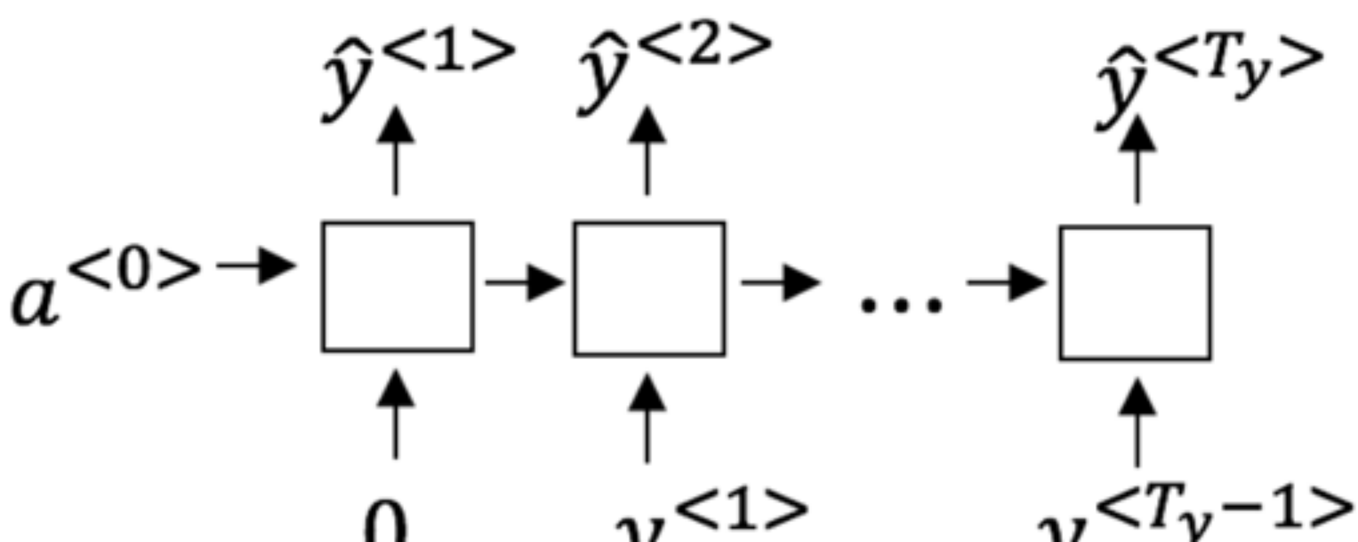
Image classification (input an image and output a label)

Gender recognition from speech (input an audio clip and output a label indicating the speaker’s gender)

第 4 个问题
1
point

4。第 4 个问题

You are training this RNN language model.



At the tth time step, what is the RNN doing? Choose the best answer.

Estimating P(y<1>,y<2>,…,y<t−1>)

Estimating P(y<t>)

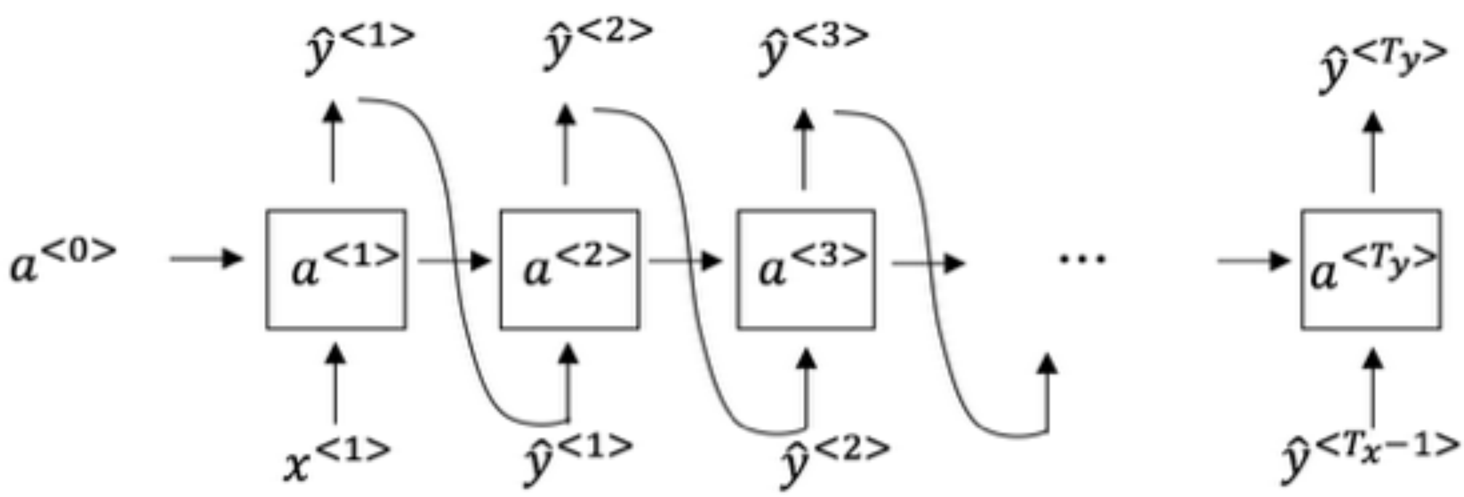
Estimating P(y<t>∣y<1>,y<2>,…,y<t−1>)

Estimating P(y<t>∣y<1>,y<2>,…,y<t>)

第 5 个问题
1
point

5。第 5 个问题

You have finished training a language model RNN and are using it to sample random sentences, as follows:



What are you doing at each time step t?

(i) Use the probabilities output by the RNN to pick the highest probability word for that time-step as y^<t>. (ii) Then pass the ground-truth word from the training set to the next time-step.

(i) Use the probabilities output by the RNN to randomly sample a chosen word for that time-step as y^<t>. (ii) Then pass the ground-truth word from the training set to the next time-step.

(i) Use the probabilities output by the RNN to pick the highest probability word for that time-step as y^<t>. (ii) Then pass this selected word to the next time-step.

(i) Use the probabilities output by the RNN to randomly sample a chosen word for that time-step as y^<t>. (ii) Then pass this selected word to the next time-step.

第 6 个问题
1
point

6。第 6 个问题

You are training an RNN, and find that your weights and activations are all taking on the value of NaN ("Not a Number"). Which of these is the most likely cause of this problem?

Vanishing gradient problem.

Exploding gradient problem.

ReLU activation function g(.) used to compute g(z), where z is too large.

Sigmoid activation function g(.) used to compute g(z), where z is too large.

第 7 个问题
1
point

7。第 7 个问题

Suppose you are training a LSTM. You have a 10000 word vocabulary, and are using an LSTM with 100-dimensional activations $a^{<t>}$. What is the dimension of Γ_u at each time step?

1

100

300

10000

第 8 个问题
1
point

8。第 8 个问题

Here're the update equations for the GRU.

GRU

$$\tilde{c}^{<t>} = \tanh(W_c[\Gamma_r * c^{<t-1>}, x^{<t>}] + b_c)$$

$$\Gamma_u = \sigma(W_u[\, c^{<t-1>}, x^{<t>}] + b_u)$$

$$\Gamma_r = \sigma(W_r[\, c^{<t-1>}, x^{<t>}] + b_r)$$

$$c^{<t>} = \Gamma_u * \tilde{c}^{<t>} + (1 - \Gamma_u) * c^{<t-1>}$$

$$a^{<t>} = c^{<t>}$$

Alice proposes to simplify the GRU by always removing the Γ_u. I.e., setting $\Gamma_u = 1$. Betty proposes to simplify the GRU by removing the Γ_r. I. e., setting $\Gamma_r = 1$ always. Which of these models is more likely to work without vanishing gradient problems even when trained on very long input sequences?

Alice’s model (removing Γu), because if Γr≈0 for a timestep, the gradient can propagate back through that timestep without much decay.

Alice’s model (removing Γu), because if Γr≈1 for a timestep, the gradient can propagate back through that timestep without much decay.

Betty’s model (removing Γr), because if Γu≈0 for a timestep, the gradient can propagate back through that timestep without much decay.

Betty’s model (removing Γr), because if Γu≈1 for a timestep, the gradient can propagate back through that timestep without much decay.

第 9 个问题
1
point

9。第 9 个问题

Here are the equations for the GRU and the LSTM:

GRU

$$\tilde{c}^{<t>} = \tanh(W_c[\Gamma_r * c^{<t-1>}, x^{<t>}] + b_c)$$

$$\Gamma_u = \sigma(W_u[\, c^{<t-1>}, x^{<t>}] + b_u)$$

$$\Gamma_r = \sigma(W_r[\, c^{<t-1>}, x^{<t>}] + b_r)$$

$$c^{<t>} = \Gamma_u * \tilde{c}^{<t>} + (1 - \Gamma_u) * c^{<t-1>}$$

$$a^{<t>} = c^{<t>}$$

LSTM

$$\tilde{c}^{<t>} = \tanh(W_c[a^{<t-1>}, x^{<t>}] + b_c)$$

$$\Gamma_u = \sigma(W_u[\, a^{<t-1>}, x^{<t>}] + b_u)$$

$$\Gamma_f = \sigma(W_f[\, a^{<t-1>}, x^{<t>}] + b_f)$$

$$\Gamma_o = \sigma(W_o[\, a^{<t-1>}, x^{<t>}] + b_o)$$

$$c^{<t>} = \Gamma_u * \tilde{c}^{<t>} + \Gamma_f * c^{<t-1>}$$

$$a^{<t>} = \Gamma_o * c^{<t>}$$

From these, we can see that the Update Gate and Forget Gate in the LSTM play a role similar to _______ and ______ in the GRU. What should go in the the blanks?

Γu and 1−Γu

Γu and Γr

1−Γu and Γu

Γr and Γu

第 10 个问题
1
point

10。第 10 个问题

You have a pet dog whose mood is heavily dependent on the current and past few days' weather. You've collected data for the past 365 days on the weather, which you represent as a sequence as $x<1>,\ldots,x<365>$. You've also collected data on your dog's mood, which you represent as $y<1>,\ldots,y<365>$. You'd like to build a model to map from $x \to y$. Should you use a Unidirectional RNN or Bidirectional RNN for this problem?

Bidirectional RNN, because this allows the prediction of mood on day t to take into account more information.

Bidirectional RNN, because this allows backpropagation to compute more accurate gradients.

Unidirectional RNN, because the value of $y<t>$ depends only on $x<1>,\ldots,x<t>$, but not on $x<t+1>,\ldots,x<365>$

Unidirectional RNN, because the value of $y<t>$ depends only on $x<t>$, and not other days' weather.

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