5. Gating and LSTM

Exercises due Mar 29, 2023 08:59 -03 Completed

Gating and LSTM

0:00 / 0:00 1.0x

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Gating

1/1 point (graded)

Recall that the most simple, single-layered RNN can be written in equation as:

$$s_t = \tanh\left(W^{s,s} s_{t-1} + W^{s,x} x_t\right).$$

Recognize that, in the above formulation, s_t is always overwritten with the calculated r
$\tanh\left(W^{s,s} s_{t-1} + W^{s,x} x_t\right)$.

Now, we introduce a gate vector g_t of the same dimension as s_t, which determines "ho
overwrite in the next state." In equation, a single-layered gated RNN can be written as:

$$g_t = \text{sigmoid}\left(W^{g,s} s_{t-1} + W^{g,x} x_t\right)$$

Submit You have used 1 of 2 attempts

LSTM

1/1 point (graded)

Which of the following components of an LSTM represent the context or state? (Choos

- [x]
- [x]
- [ ]
- [ ]

✔

Submit You have used 1 of 2 attempts

LSTM Calculations

1/1 point (graded)

Let all the neural network's weight matrices, the hidden state, and the memory cell be a
-value be . Calculate the value of the new hidden state. Round sigmoid to or , and

$$f_t = \text{sigmoid}(W^{f,h}h_{t-1} + W^{f,x}x_t) \quad \text{forget gate}$$
$$i_t = \text{sigmoid}(W^{i,h}h_{t-1} + W^{i,x}x_t) \quad \text{input gate}$$
$$o_t = \text{sigmoid}(W^{o,h}h_{t-1} + W^{o,x}x_t) \quad \text{output gate}$$
$$c_t = f_t \odot c_{t-1} + i_t \odot \tanh(W^{c,h}h_{t-1} + W^{c,x}x_t) \quad \text{mem ce}$$
$$h_t = o_t \odot \tanh(c_t) \quad \text{visible state}$$

- ( ) -1
- (•) 1
- ( ) 0

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? Need for gate function

RNN content is literally non-existent

? hidden state?

In the last question, the network description has a "memory cell" and a "visible state", but the question asks

? Could I ask how the LSTM model does back propagation?

I was watching the video and the last part was talking about back propagation conceptually in RNN. Could n

A video on LSTM: definitely to watch!

Probably one of the best visual explanation on how this works. Consider watching this as an intro to the lectu

Community TA

Any other Neuroscience nerds?

Once upon a time I started going to school to be a Neuroscientist... The parallels between memory consolida

Terminology in LSTM Calculation Question

Is it just me or is this question confusing? The "hidden" state and the "visible" state seem to be refering to th