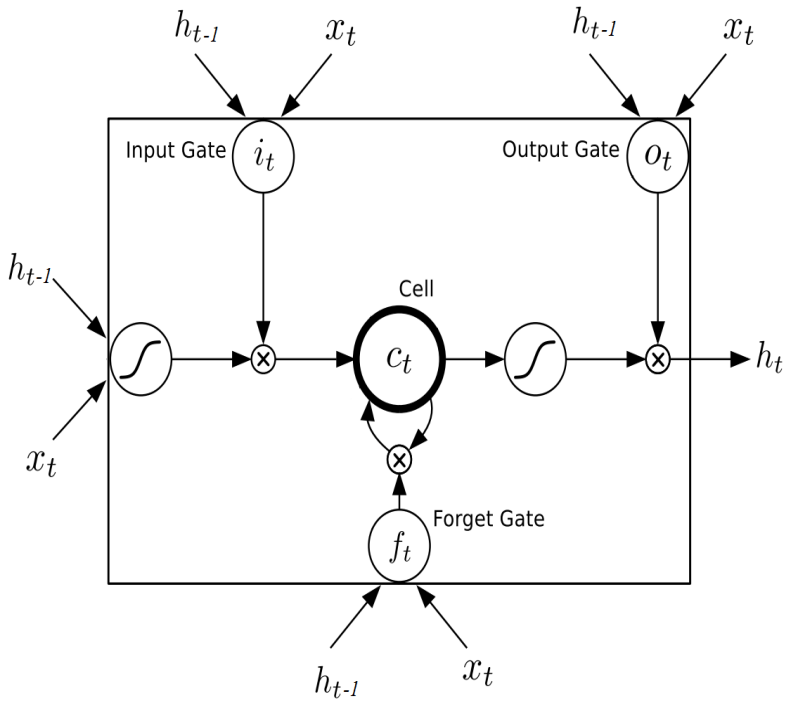
2. LSTM

Homework due Mar 29, 2023 08:59 -03 Past due

The diagram below shows a single LSTM unit that consists of Input, Output, and Forget



The behavior of such a unit as a recurrent neural network is specified by a set of updat equations define how the gates, "memory cell" c_t and the "visible state" h_t are updated and previous states c_{t-1}, h_{t-1}. For the LSTM unit,

$$
\begin{aligned}
f_t &= \text{sigmoid}(W^{f,h}h_{t-1} + W^{f,x}x_t + b_f) \\
i_t &= \text{sigmoid}(W^{i,h}h_{t-1} + W^{i,x}x_t + b_i) \\
o_t &= \text{sigmoid}(W^{o,h}h_{t-1} + W^{o,x}x_t + b_o) \\
c_t &= f_t \odot c_{t-1} + i_t \odot \tanh(W^{c,h}h_{t-1} + W^{c,x}x_t + b_c) \\
h_t &= o_t \odot \tanh(c_t)
\end{aligned}
$$

where symbol $\odot$ stands for element-wise multiplication. The adjustable parameters in $W^{f,h}$, $W^{f,x}$, $W^{i,h}$, $W^{i,x}$, $W^{o,h}$, $W^{o,x}$, $W^{c,h}$, $W^{c,x}$, as well as the offset parameter vectors b_f, b changing these parameters, we change how the unit evolves as a function of inputs x_t.

To keep things simple, in this problem we assume that x_t, c_t, and h_t are all scalars. Conc parameters are given by

$$W^{f,h} = 0 \quad W^{f,x} = 0 \quad b_f = -100 \quad W^{c,h} = -100$$

Submit You have used 0 of 5 attempts

LSTM states 2

1 point possible (graded)

Now, we run the same model again with the same parameters and same initial conditio question. The only difference is that our input sequence in now: [1, 1, 0, 1, 1].

Calculate the values h_t at each time-step and enter them below as an array $[h_0, h_1, h_2, h$

(Please round h_t to the closest integer in every time-step. If $h_t = \pm 0.5$, then round it to For ease of calculation, assume that $\text{sigmoid}(x) \approx 1$ and $\tanh(x) \approx 1$ for $x \geq 1$, and $\text{sigmoid}(x$ $x \leq -1$.)

Submit You have used 0 of 5 attempts

LSTM info

1 point possible (graded)

What information is carried in the state h_t?

- Whether the total number of zeros is odd.
- Whether the number of consecutive zeros is odd.
- Whethe
- Whether the number of consecutive ones is odd.

Previous Next

- Last question - two status even/odd, but h has 3 status
  hi, I repeat my question here in a new discussion: What confuses me here is the following: I have two input st
- My version of the LSTM diagram
- Hint for last question: “LSTM info”
  Additional to what was already said by other colleagues in this sequence of Q&A, which is basically to compa
- ? Stuck on the first problem
  Hi all, You may help me with this. It seems I am calculating ht in "LSTM states" but probably missing some ba
- Picture LSTM does not correspond to what I saw before in youtube video on LSTM
  The picture does not correspond at all to what I saw in the youtube video of LSTM and also in the drawing lp
- what is wrong with my LSTM states first question?
  in my solution, two of the equations have always the same value over all iterations, and one of them takes eit
- ? I can not see C(t-1) on the figure. Please check.
  Hi Staff I can not see C(t-1) on the figure. Please check.