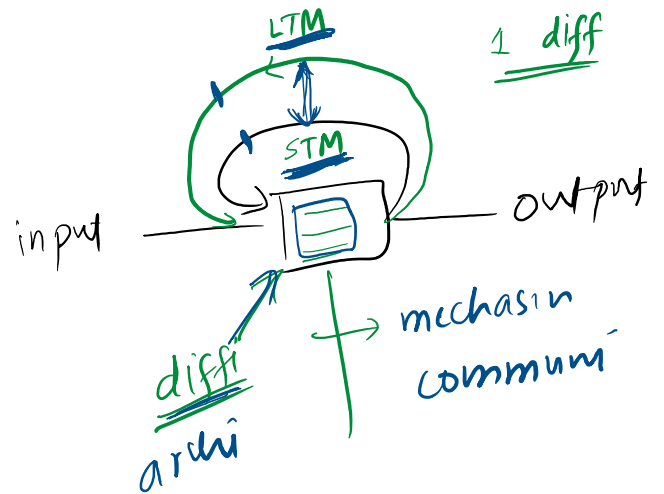
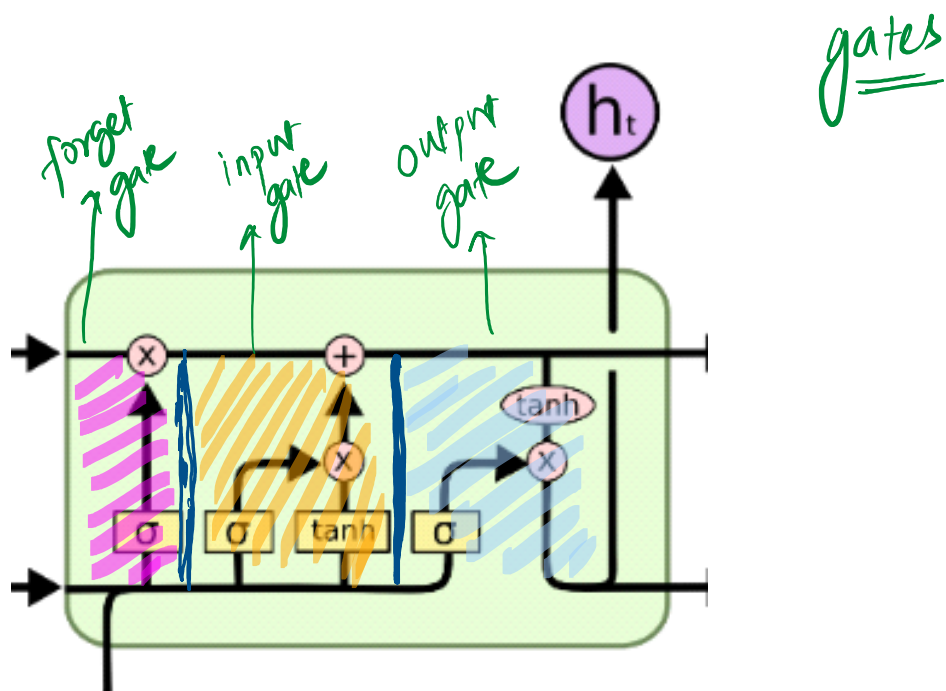
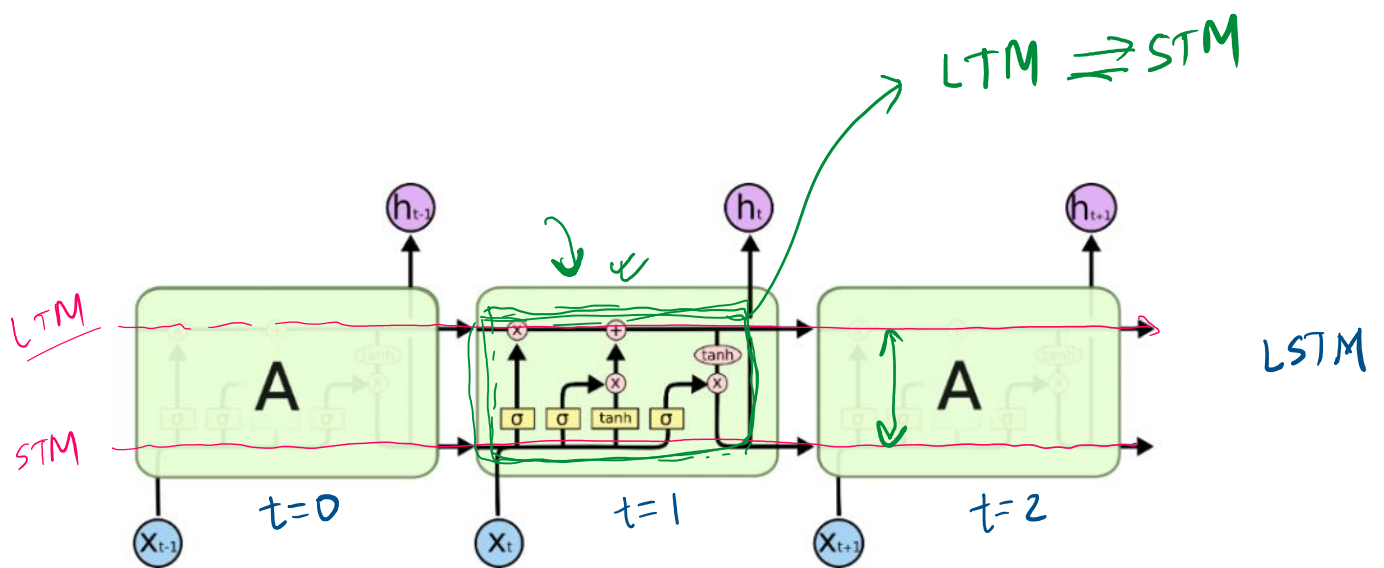
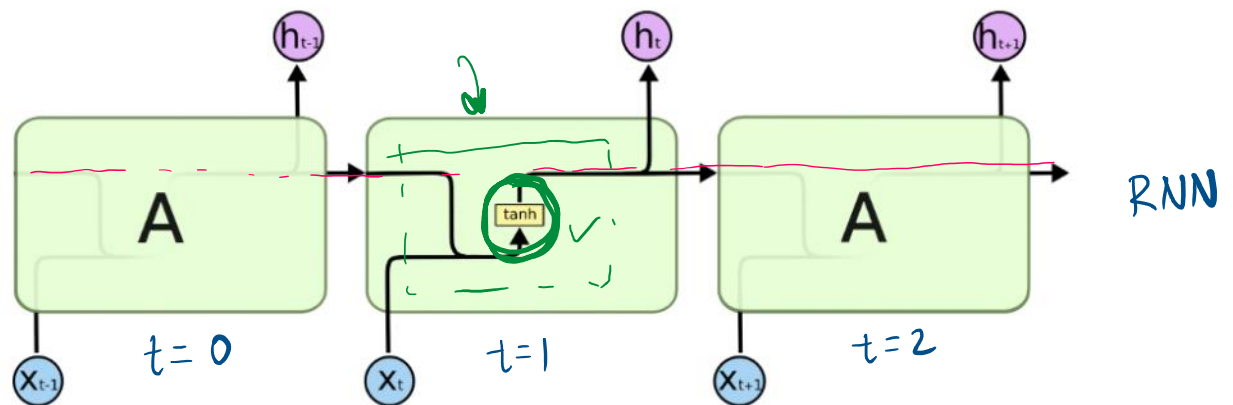


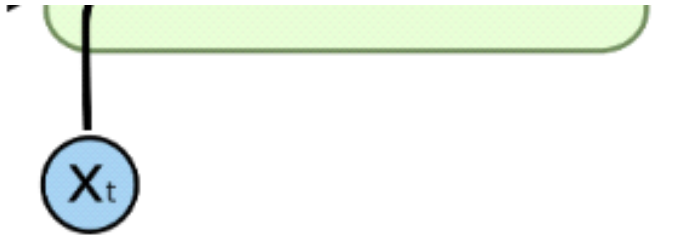
21 August 2023 17:27



LSTM Architecture

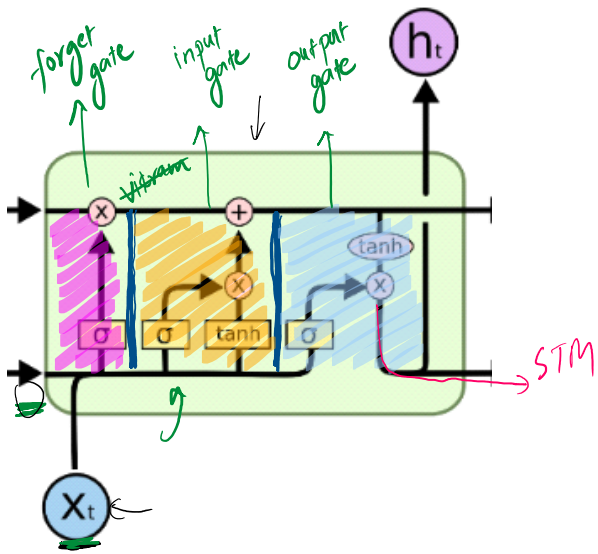
21 August 2023 18:41



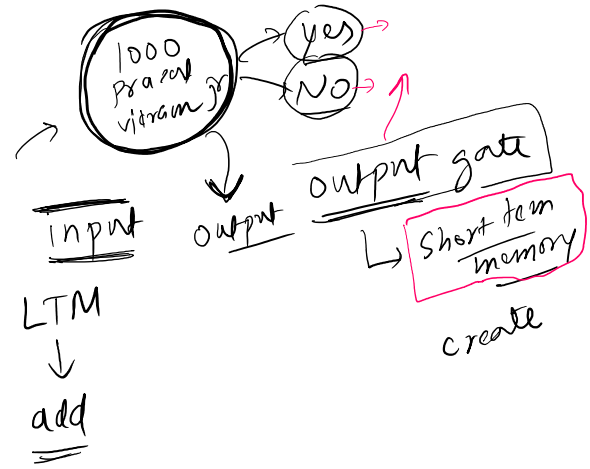


LSTM Gates

21 August 2023 19:06



forget
input
LTM
remove

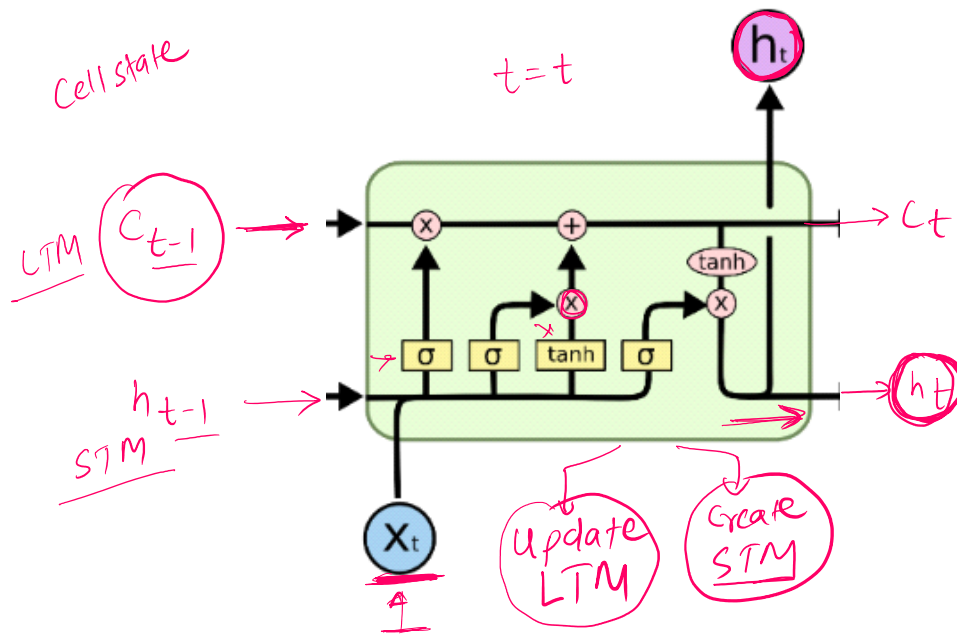


Summary

21 August 2023 19:29

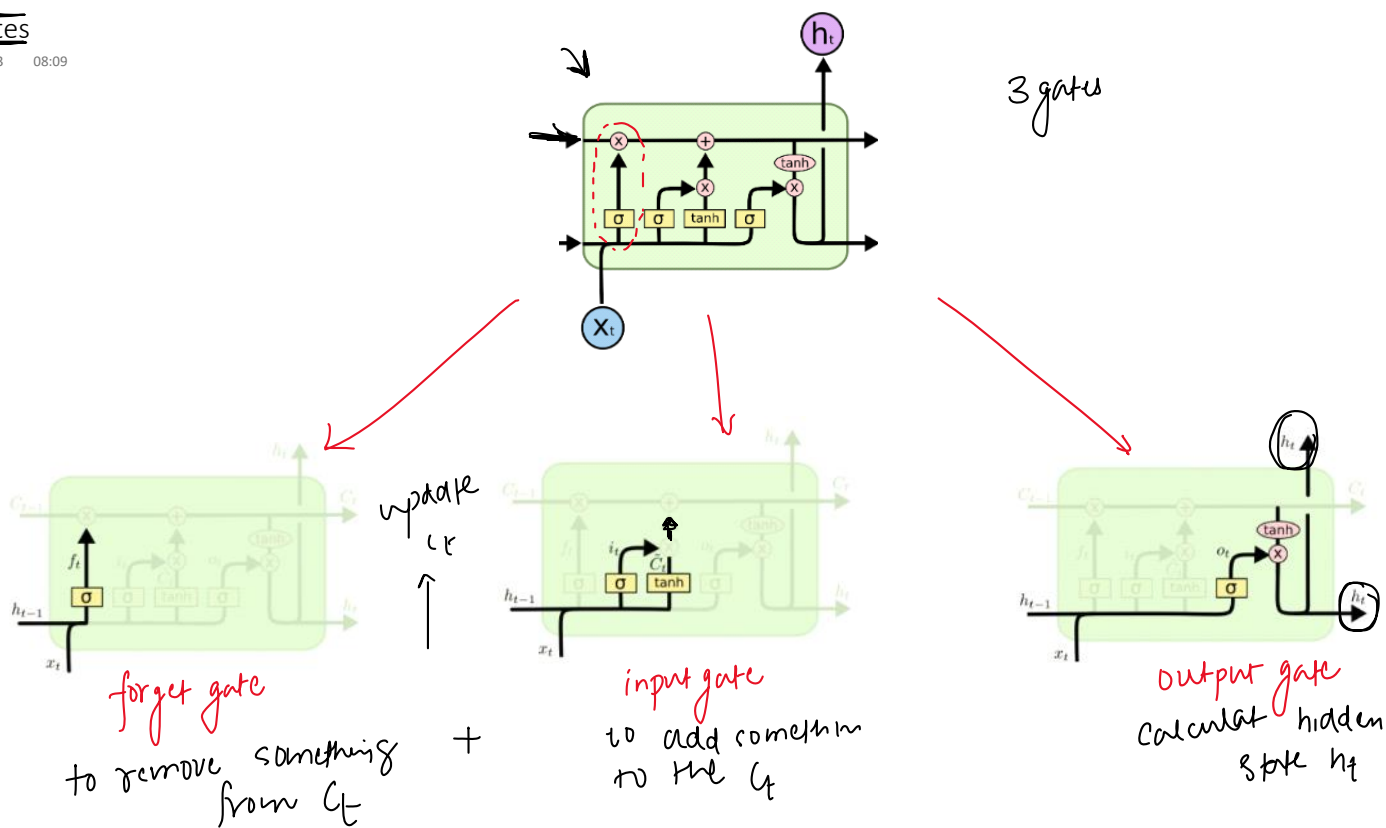
LSTM

input \rightarrow \square \rightarrow output
 \downarrow
process



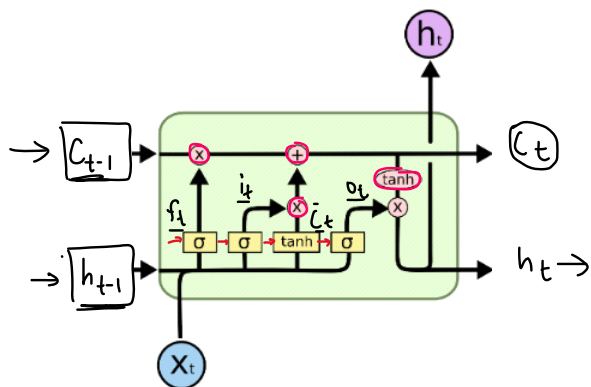
29 August 2023 07:57





What are C_t and h_t

29 August 2023 08:08



$\begin{bmatrix} \underline{h_t} & \underline{C_t} \end{bmatrix}$

vectors

$\rightarrow \begin{bmatrix} \underline{0.1} & \underline{0.3} & \underline{0.9} \end{bmatrix}$
3d vector

rule

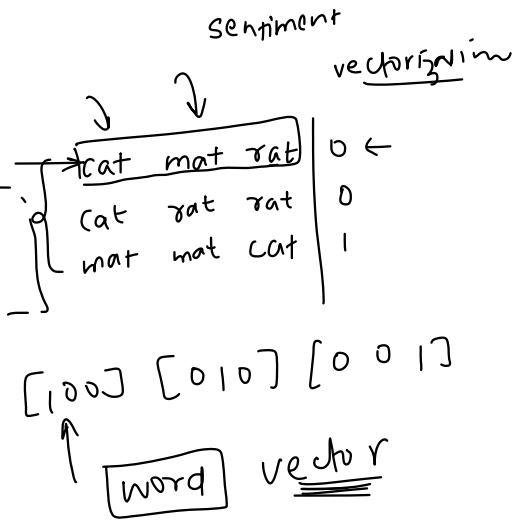
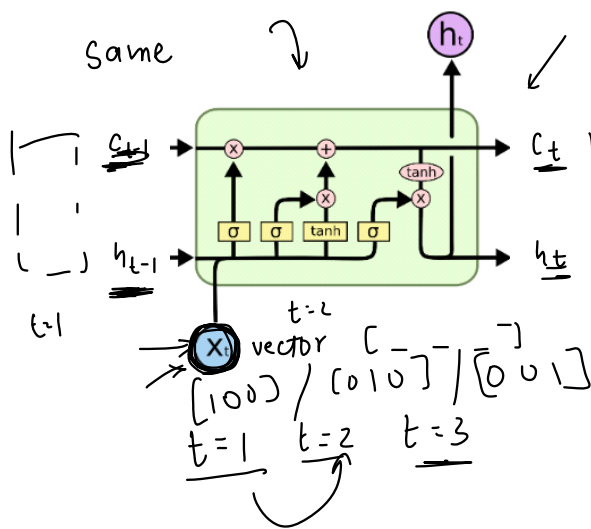
$\begin{bmatrix} \underline{h_t} & \underline{C_t} \end{bmatrix}$ dim equal

same

$h_t \begin{bmatrix} 0.1 & 0.45 & 0.6 \end{bmatrix}$

$C_t \begin{bmatrix} 0.55 & 0.6 & 0.0 \end{bmatrix}$

RNN

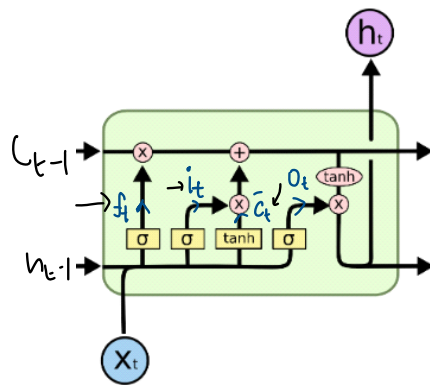


OHE

cat	mat	rat
1	0	0
0	1	0
0	0	1

What are f_t , i_t , o_t and \bar{C}_t

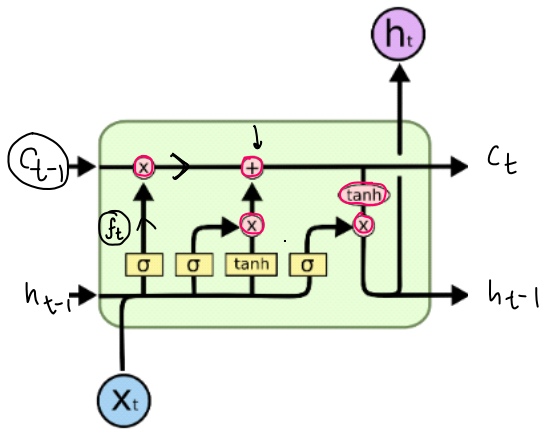
29 August 2023 08:09



Handwritten notes explaining the components:

- f_t : forget gate
- i_t : input gate
- \bar{C}_t : candidate cell state
- o_t : output gate
- These are vectors.
- The candidate cell state is calculated as $C_t = h_t$.
- The final cell state is C_t .
- The final hidden state is h_t .

$[x \ y \ z]$
 $[\quad \quad]$



→ ⊗
→ +
→ tanh

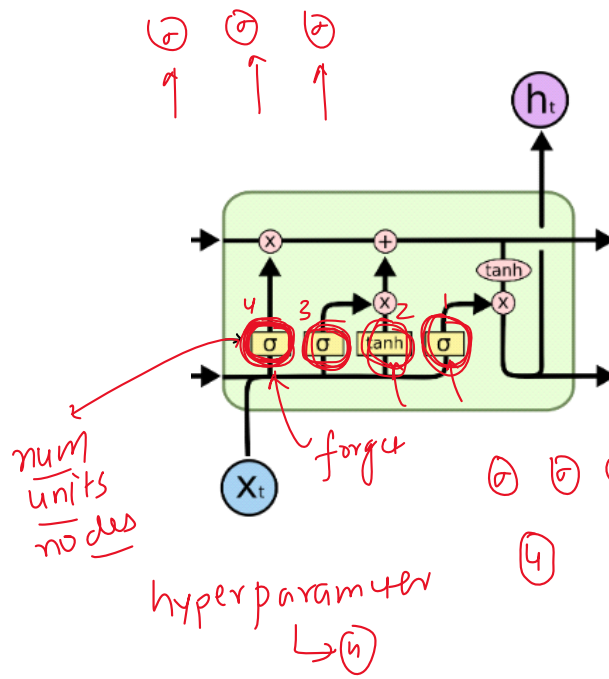
$C_{t-1} = \begin{bmatrix} 4 & 5 & 6 \\ 1 & 2 & 3 \end{bmatrix} \rightarrow \begin{bmatrix} 0.26 & 0.34 & 0.53 \end{bmatrix}$
tanh(u)

shape/dim $f_t = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$
↓
vector $C_{t-1} \otimes f_t \rightarrow \text{vector}$
→ [4 10 18]

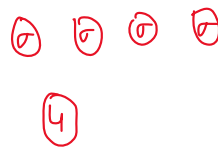
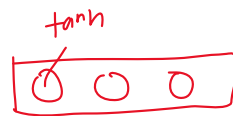
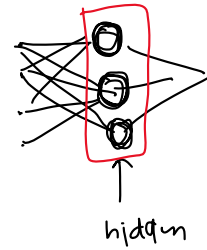
[5 7 9]

→ Neural Network Layers

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ANN



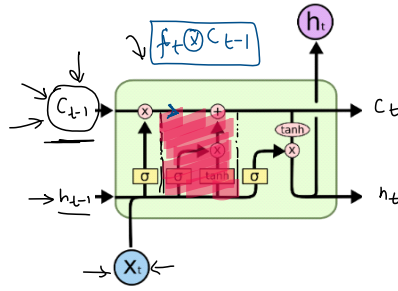
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The Input Gate

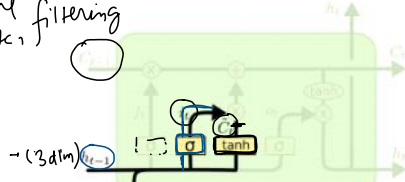
30 August 2023 04:38

add some new
imp info to me
 c_t



- stages
- 1) \bar{c}_t candidate cell state
 - 2) i_t current
 - 3) c_t cell state

potential
imp info
filtering



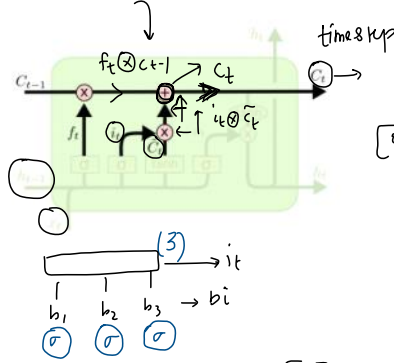
pointwise

$i_t \otimes \bar{c}_t \rightarrow \bar{c}_t^*$ (filtered candidate cell state)

$$\begin{bmatrix} 0.5 & 0.5 & 0.5 \end{bmatrix} \begin{bmatrix} 4 & 5 & 6 \end{bmatrix} \begin{matrix} 1 & 1 & 1 \end{matrix} \downarrow \begin{matrix} 50\% & 0\% & 100\% \end{matrix}$$

$$\begin{bmatrix} 2 & 2.5 & 3 \end{bmatrix}$$

$$c_t = f_t \otimes c_{t-1} \oplus i_t \otimes \bar{c}_t$$



$$i_t = \sigma(w_i[h_{t-1}, x_t] + b_i)$$

i_t - filter

$$\bar{c}_t \rightarrow c_t$$

$$\begin{aligned} & \begin{bmatrix} 4 & 5 & 6 \end{bmatrix} \xrightarrow{t=t-1} \begin{bmatrix} 4 & 5 & 6 \end{bmatrix} \xrightarrow{t=t} \begin{bmatrix} 4 & 5 & 6 \end{bmatrix} \\ & f_t = \begin{bmatrix} 1 & 1 & 1 \end{bmatrix} \\ & i_t \otimes \bar{c}_t = \begin{bmatrix} 0 & 0 & 0 \end{bmatrix} \\ & \begin{bmatrix} 4 & 5 & 6 \end{bmatrix} \begin{bmatrix} 0 & 0 & 0 \end{bmatrix} \downarrow \\ & c_t = \begin{bmatrix} 4 & 5 & 6 \end{bmatrix} \end{aligned}$$

long term context

