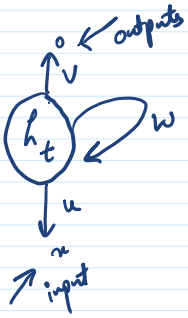
Recurrent Neural Networks :-
(RNNs)

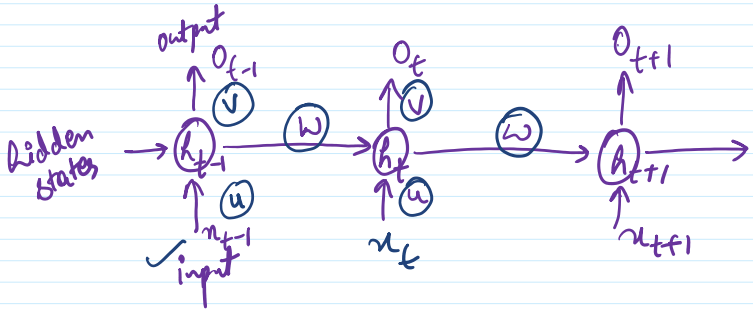
LSTM (Long Short Term Memory)

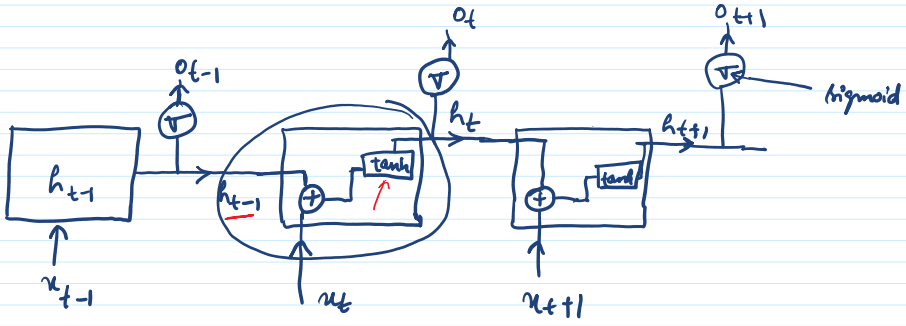


U, V, W are weight matrices

$$h_t = f(wh_{t-1} + ux_t + a)$$

$$o_t = g(vh_t + b)$$





Long- Short term memory :-

Gated idea

Three gates

Forget Gate
(0 - 1)

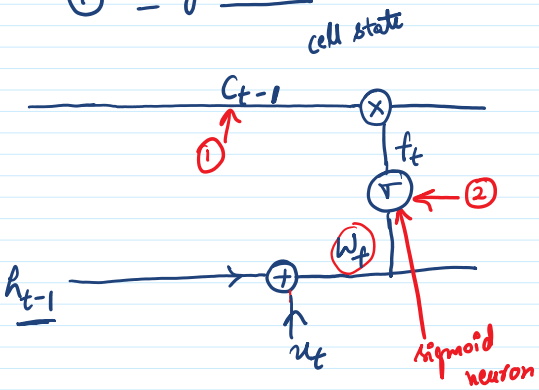
Input Gate
(0 - 1)

Output Gate
(0 - 1)

weights with which can let somebody in/out.

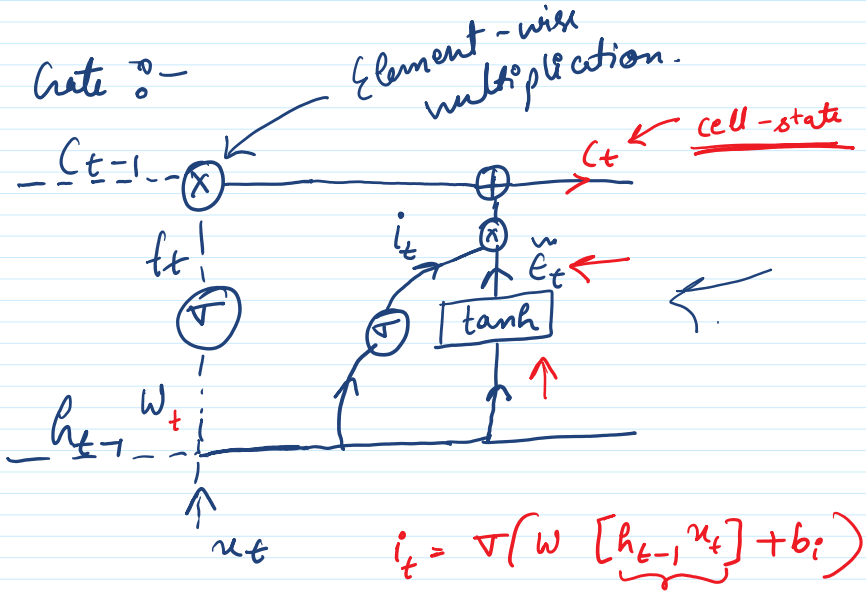
CELL STATE :- remembers even from the far away.

① Forget Gate :-



$$f_t(\text{forget gate}) = \sigma(W_f[h_{t-1}, x_t] + b_f)$$

② Input Gate :-



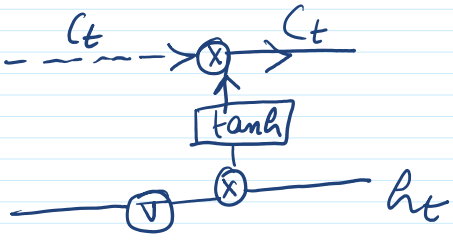
$$i_t = \sigma(W[h_{t-1}, x_t] + b_i)$$

$$\tilde{C}_t = \tanh(W[h_{t-1}, x_t] + b)$$

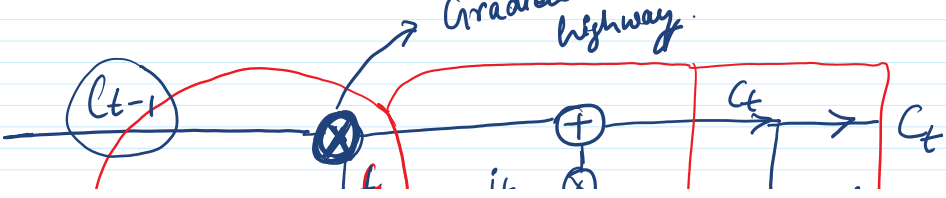
$$C_t = (C_{t-1} \cdot f_t + i_t \cdot \tilde{C}_t)$$

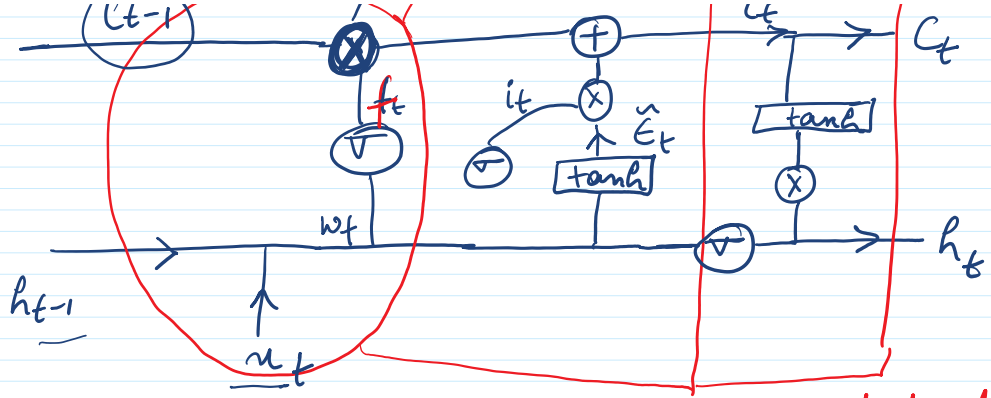
element-wise multiplication

③ Output Gate :-



LSTM :-





time stamp

$t+1$

forget gate

which part of C_{t-1} should be forgotten

input gate

current cell state

output gate

determines what should be the next hidden state