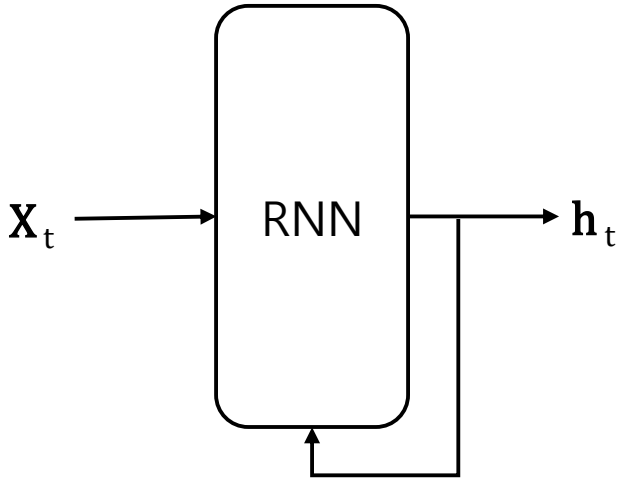
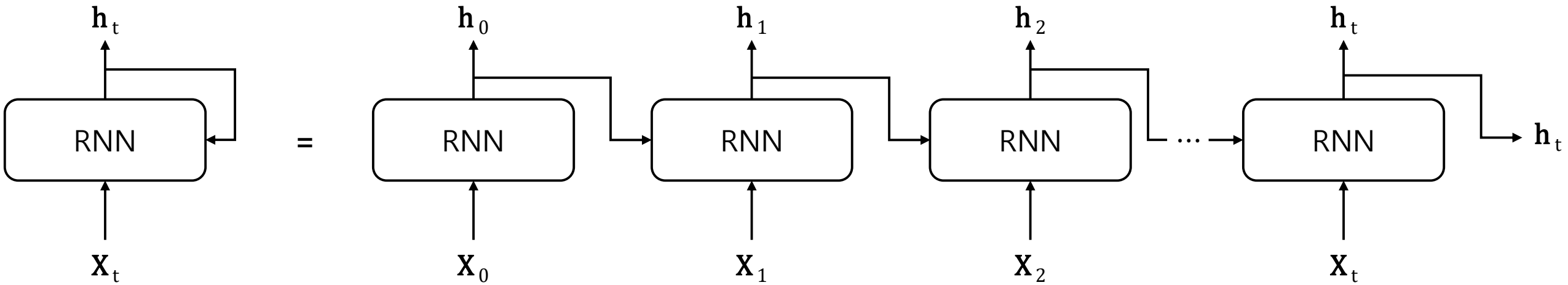
Recurrent Neural Network (RNN)

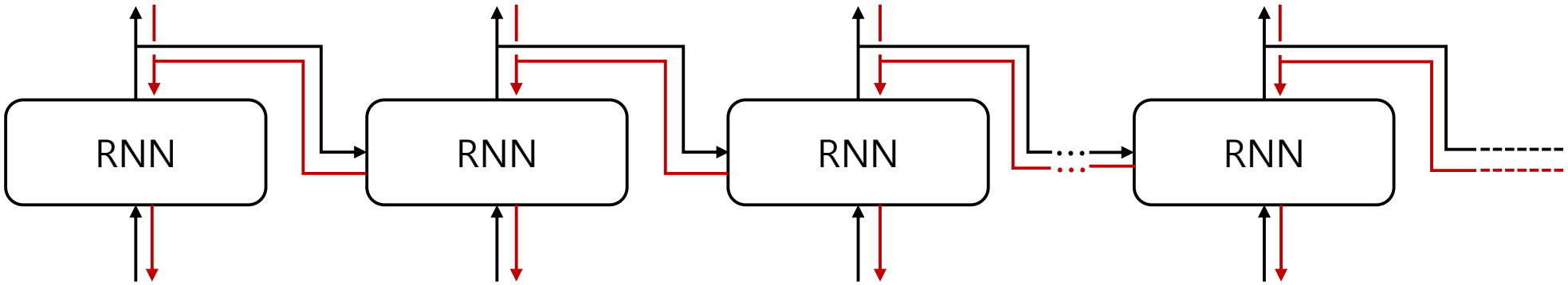


RNN 계층의 순환 구조 펼치기



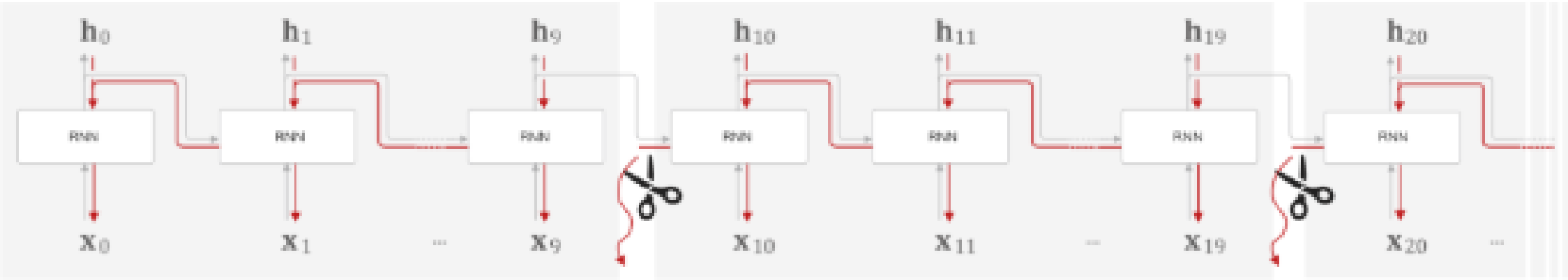
Recurrent Neural Network (RNN)

BPTT (Backpropagation Through Time)



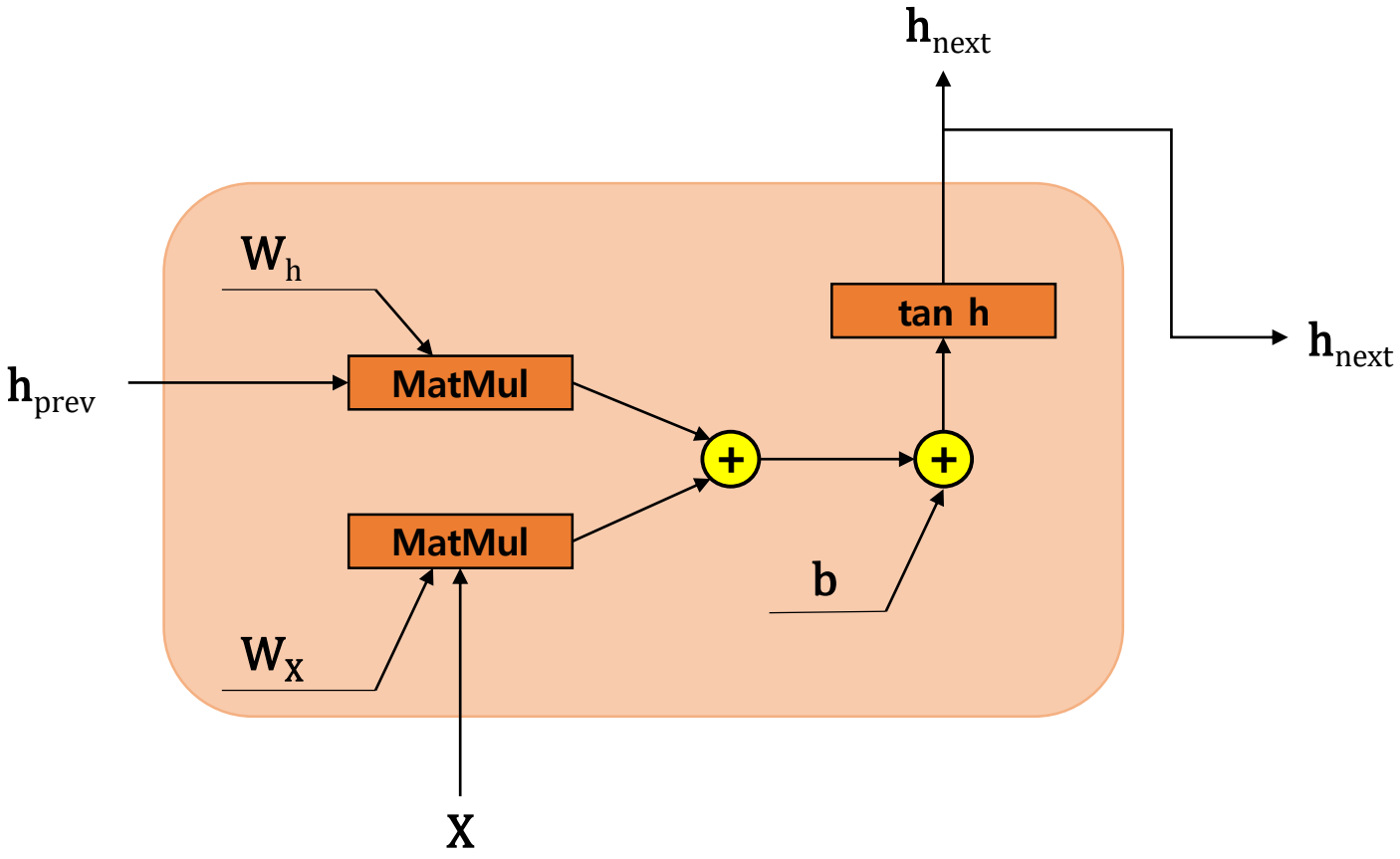
Recurrent Neural Network (RNN)

Truncated BPTT



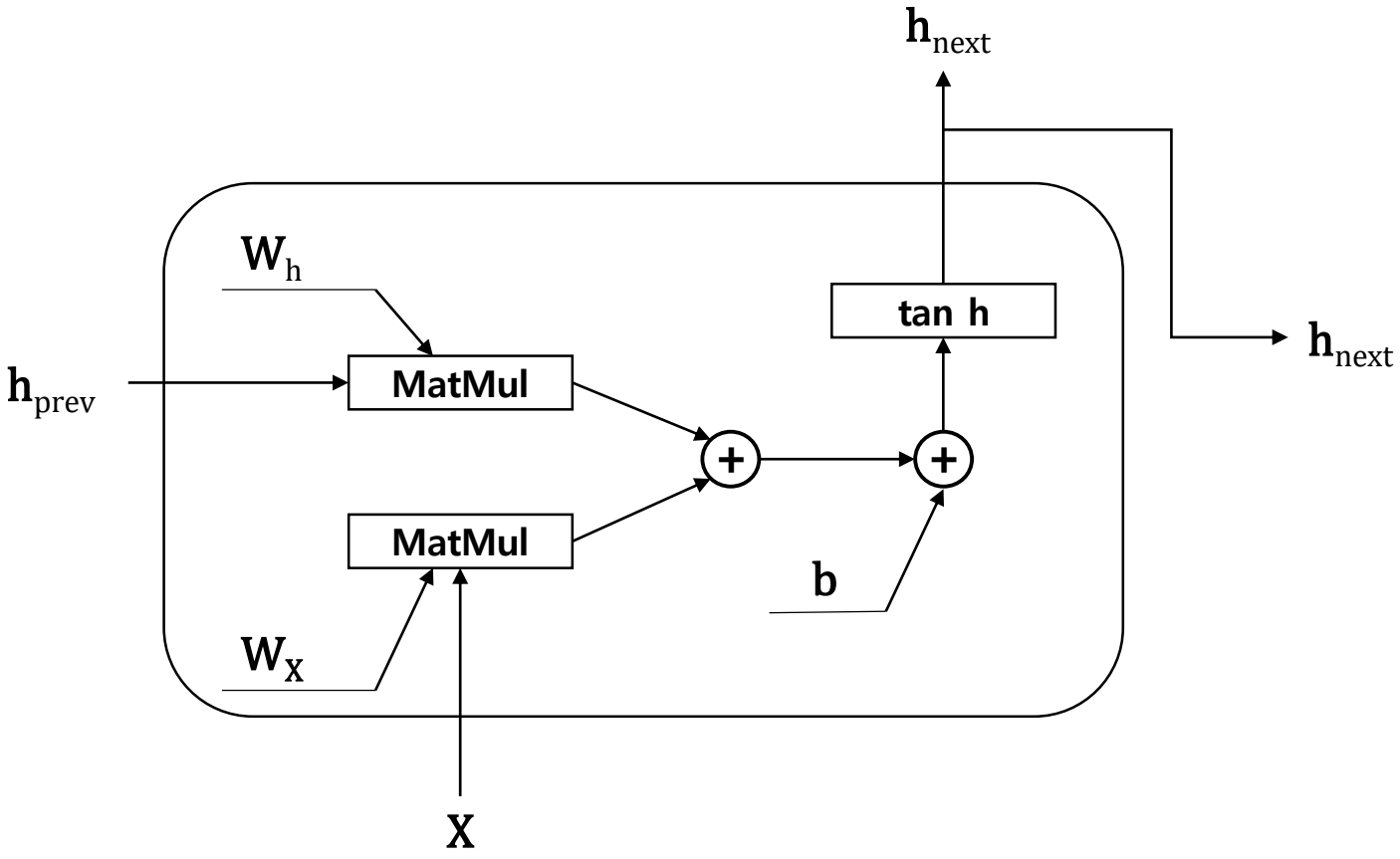
Recurrent Neural Network (RNN)

forward (순전파)



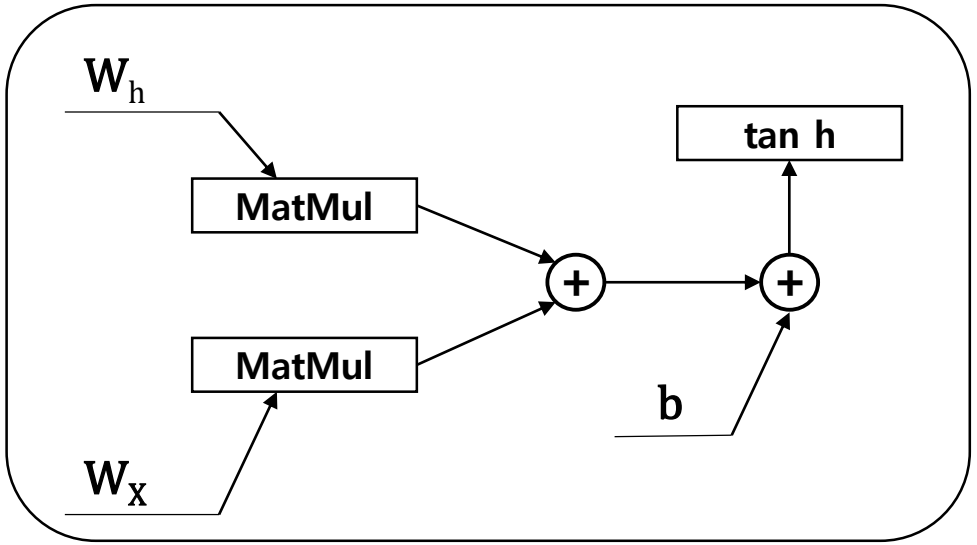
Recurrent Neural Network (RNN)

forward (순전파)



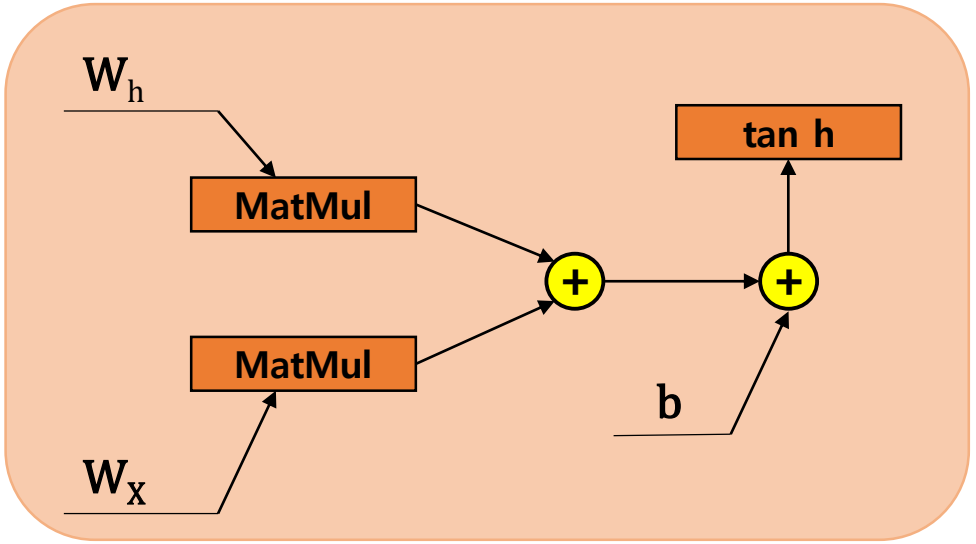
Recurrent Neural Network (RNN)

forward (순전파)



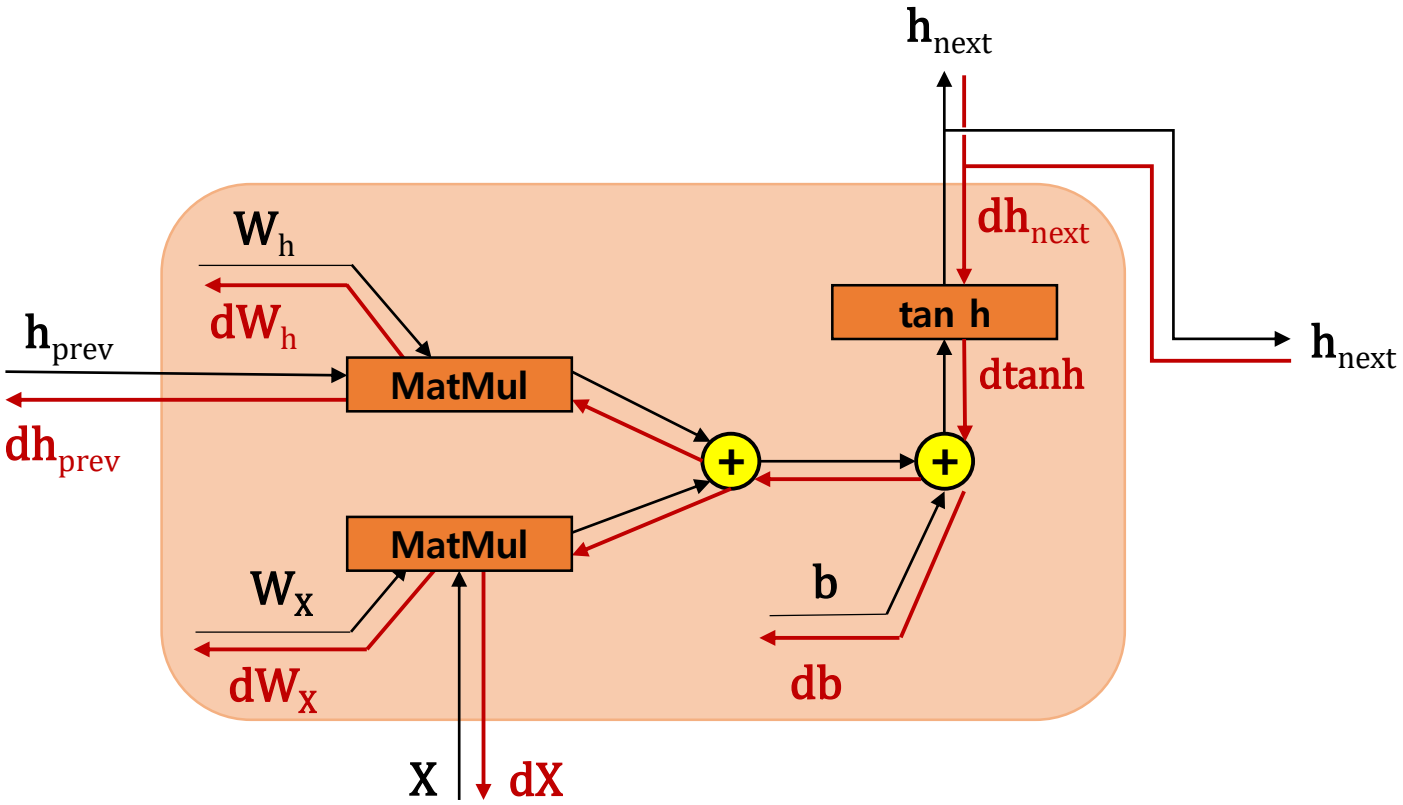
Recurrent Neural Network (RNN)

forward (순전파)



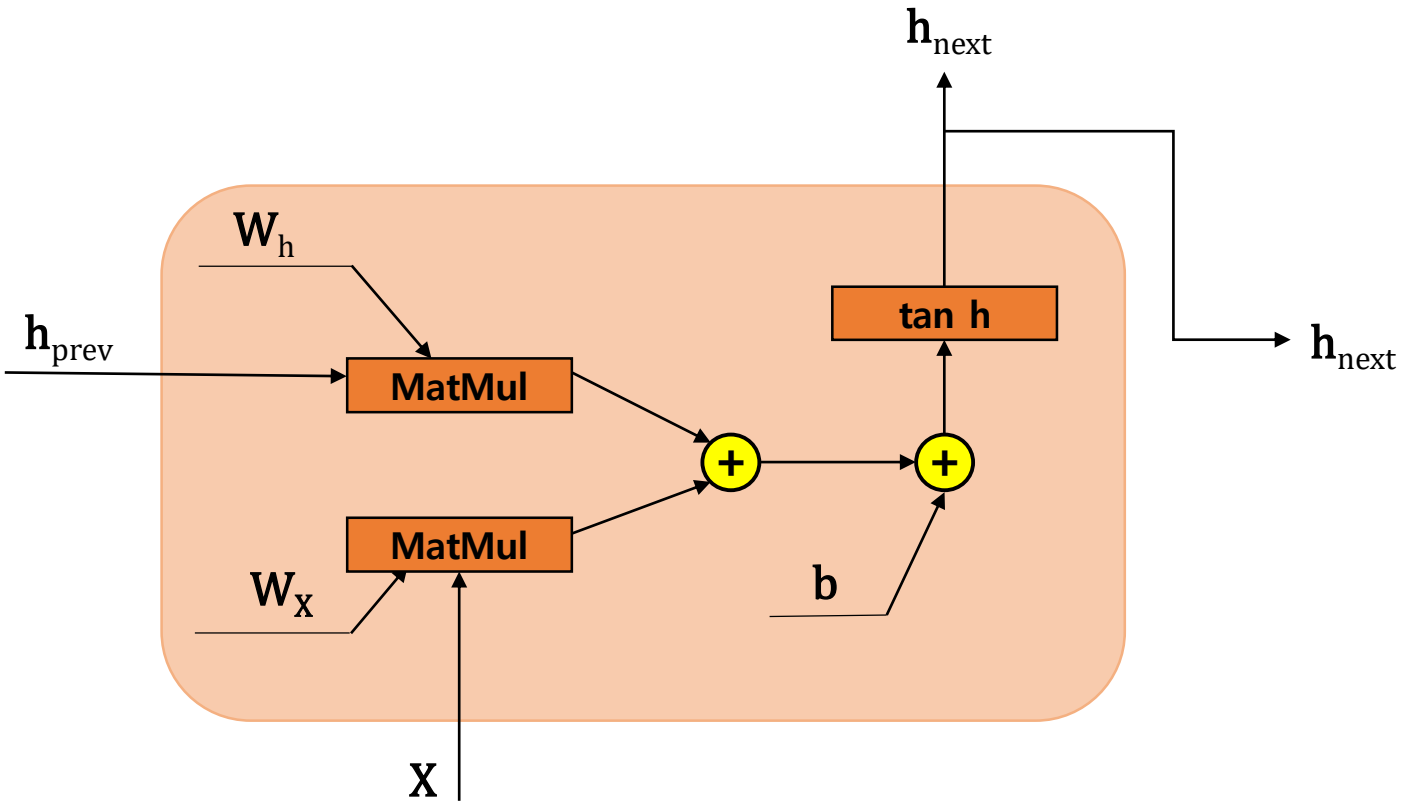
Recurrent Neural Network (RNN)

backward (역전파)



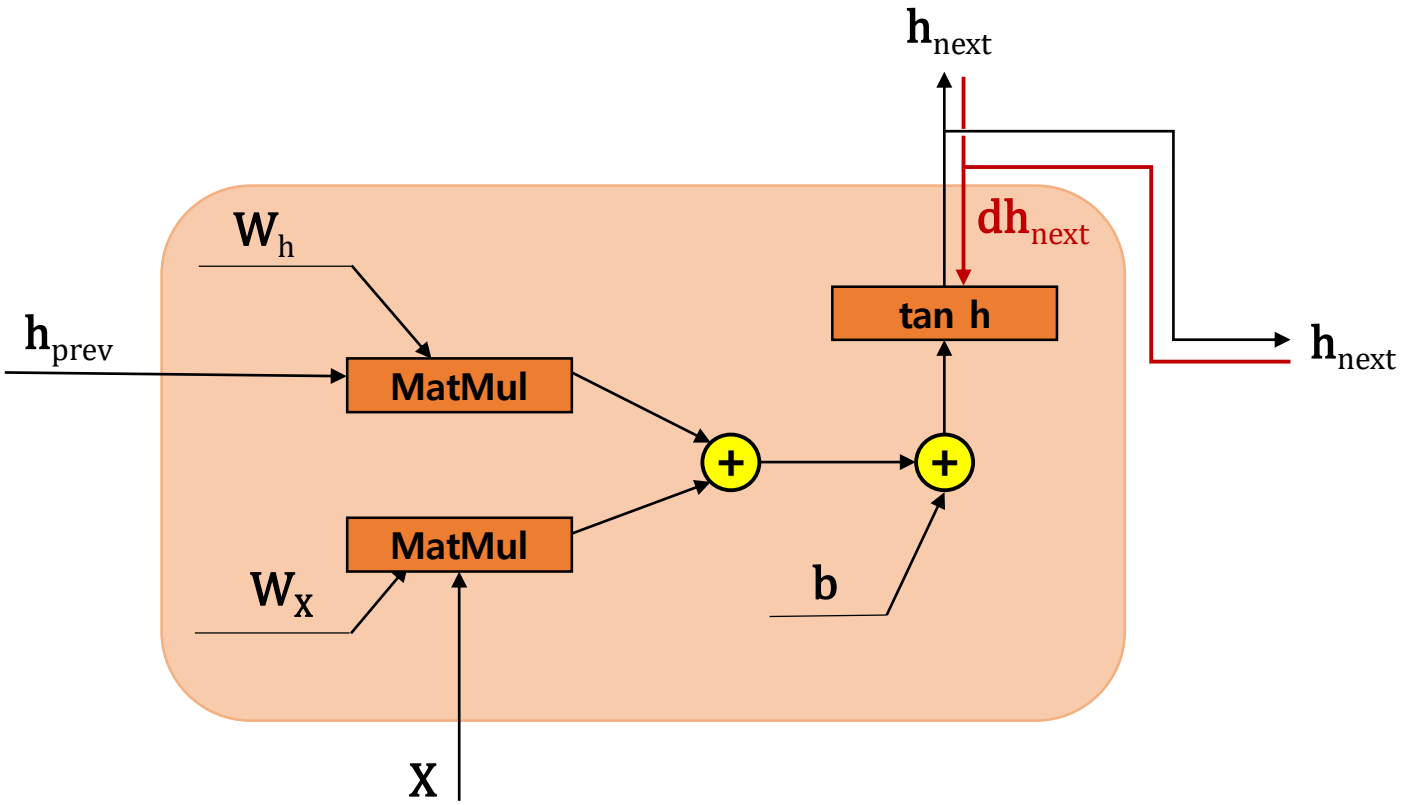
Recurrent Neural Network (RNN)

backward (역전파) - 시작



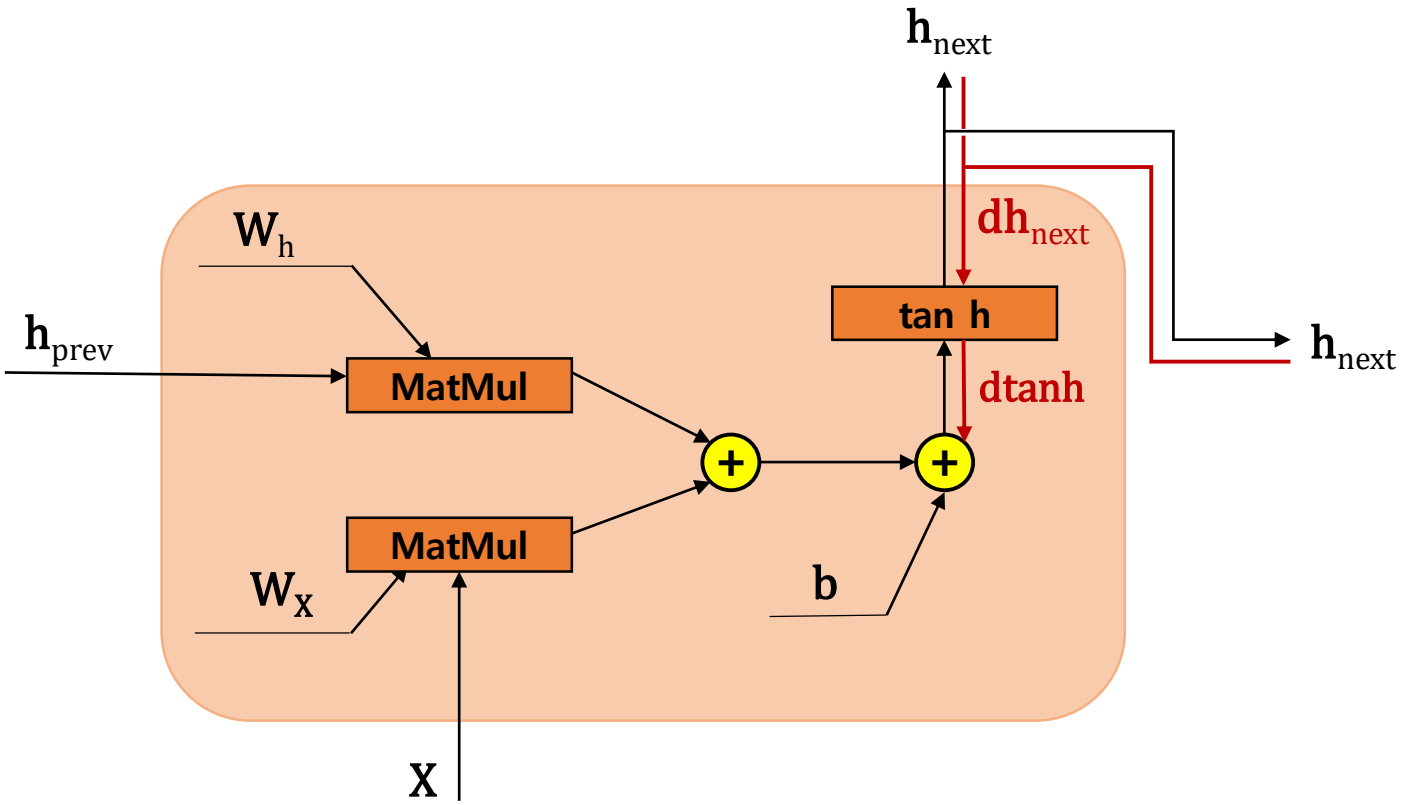
Recurrent Neural Network (RNN)

backward (역전파) - (1) dh_next



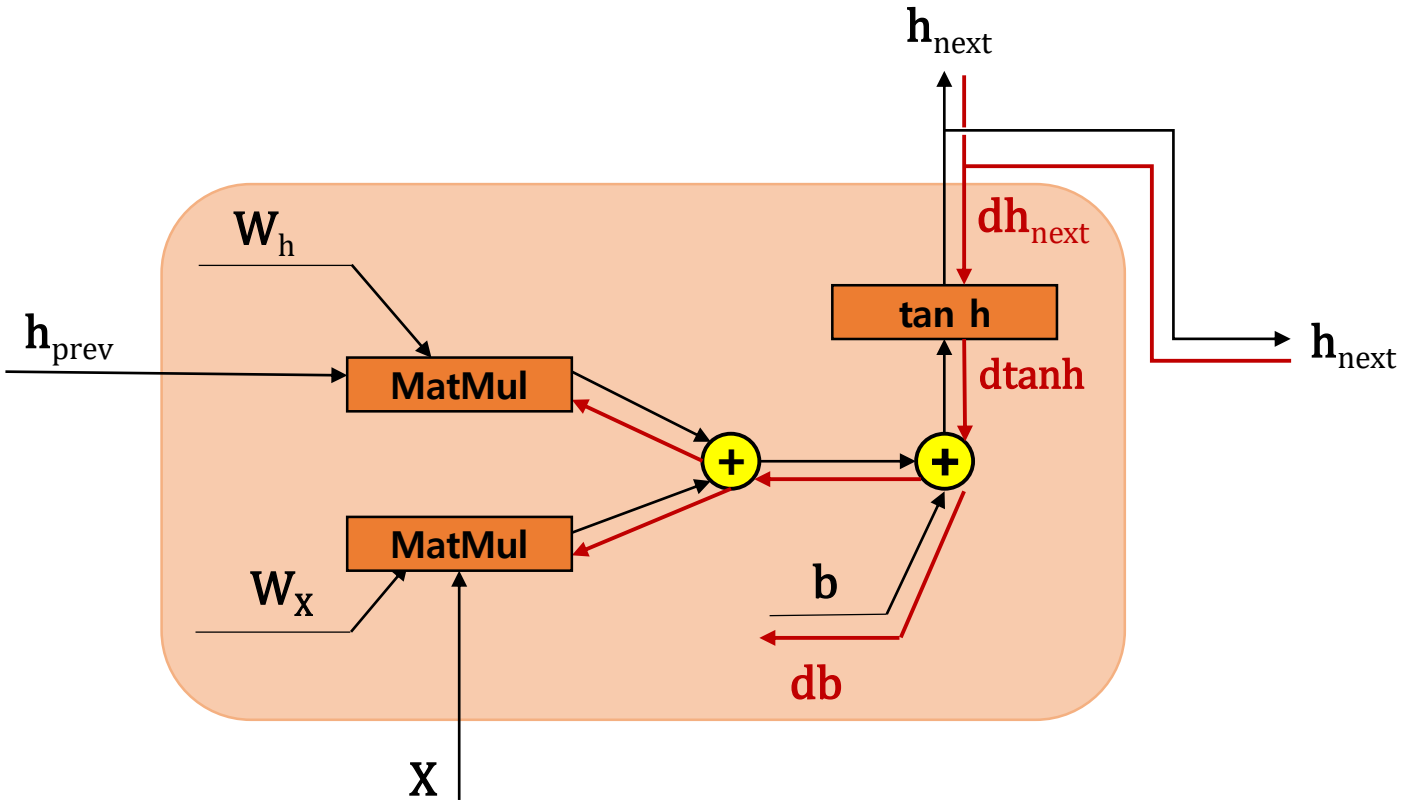
Recurrent Neural Network (RNN)

backward (역전파) - (2) dtanh



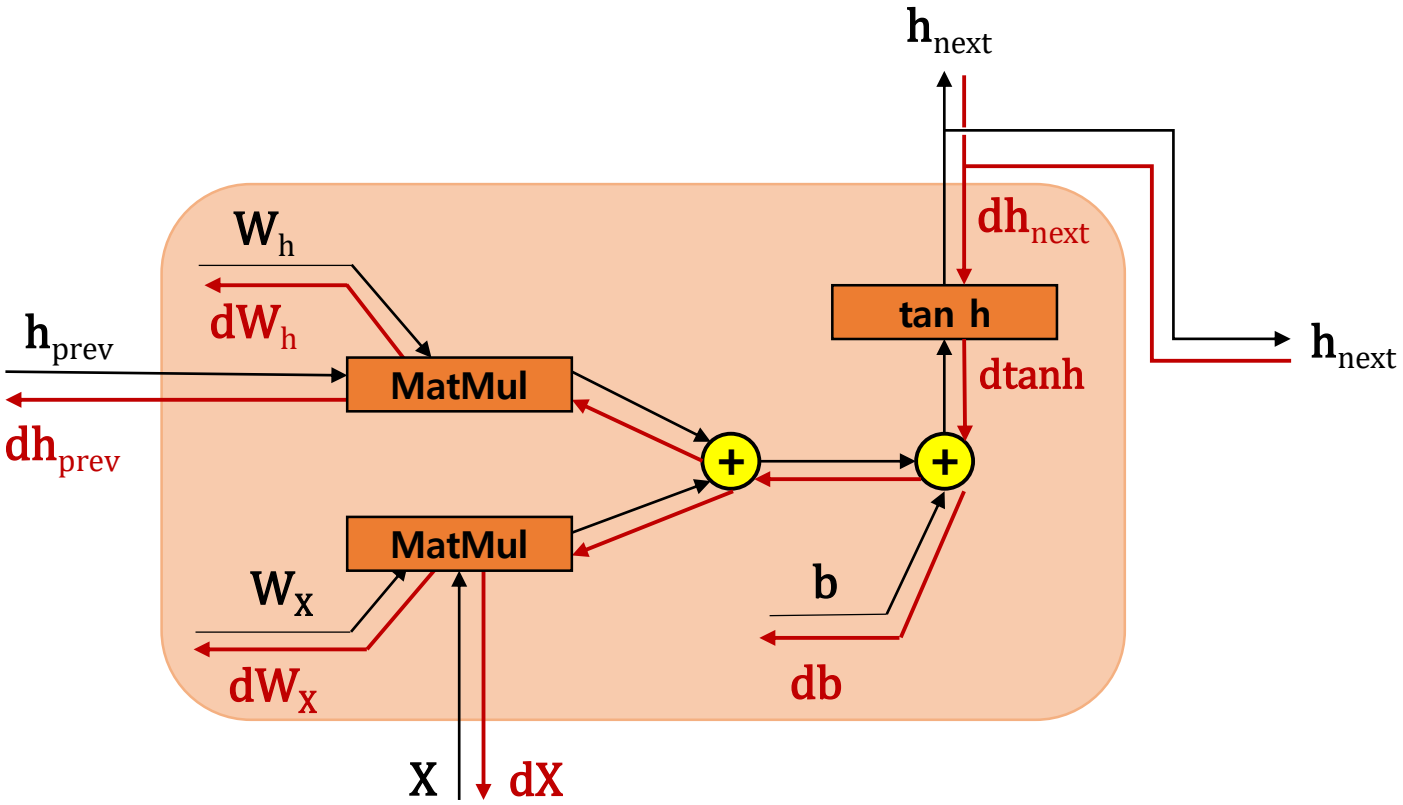
Recurrent Neural Network (RNN)

backward (역전파) – (3) 덧셈 노드



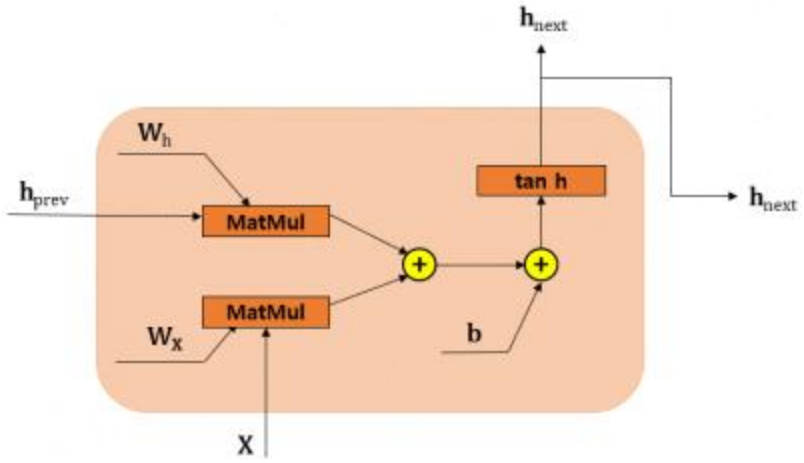
Recurrent Neural Network (RNN)

backward (역전파) – (4) 곱셈 노드

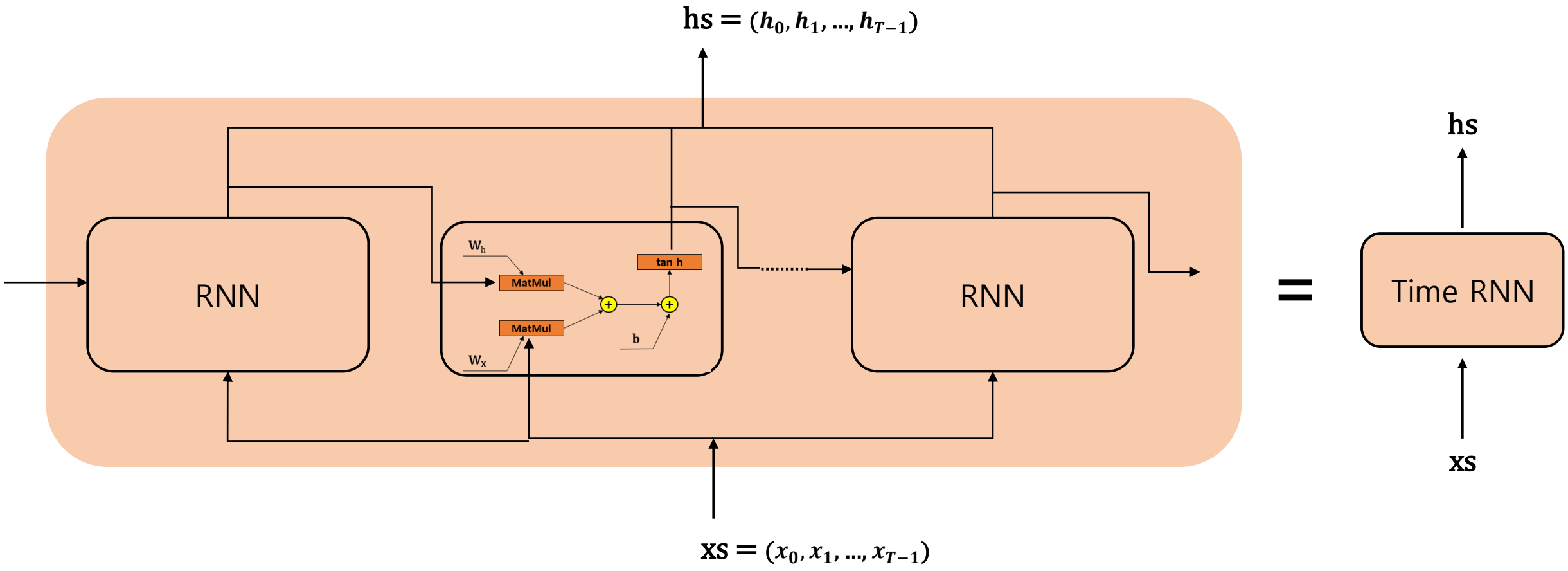


Recurrent Neural Network (RNN)

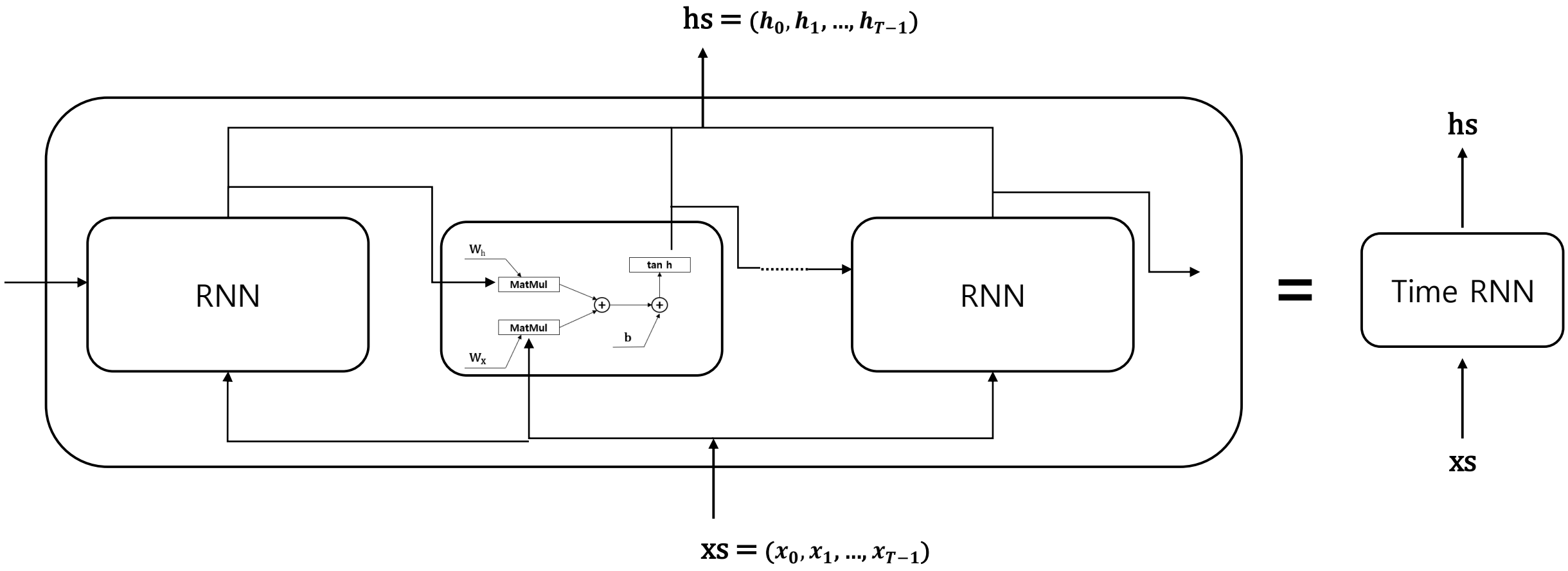
backward (역전파) – gif



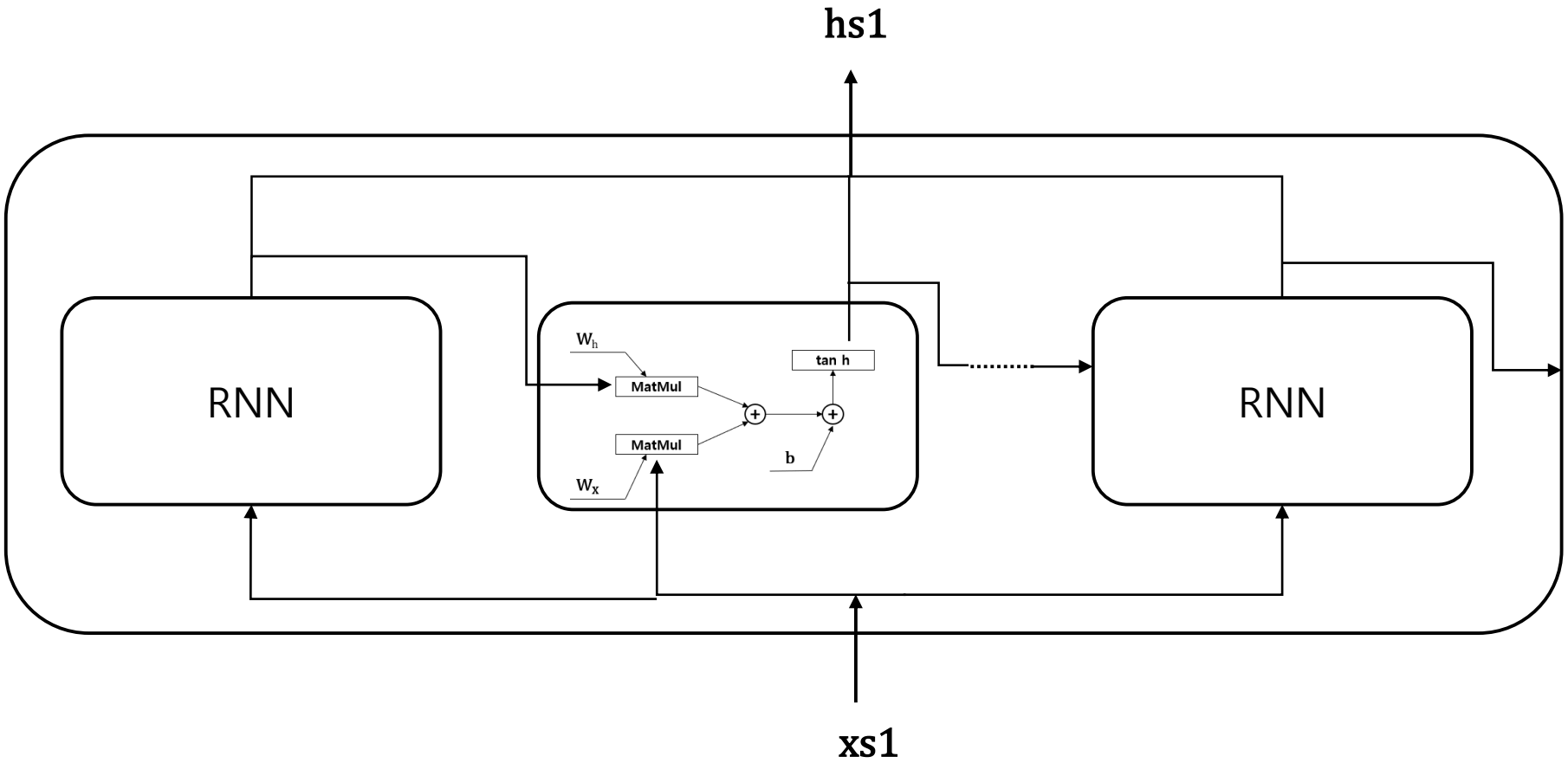
Time RNN 계층과 RNN 계층



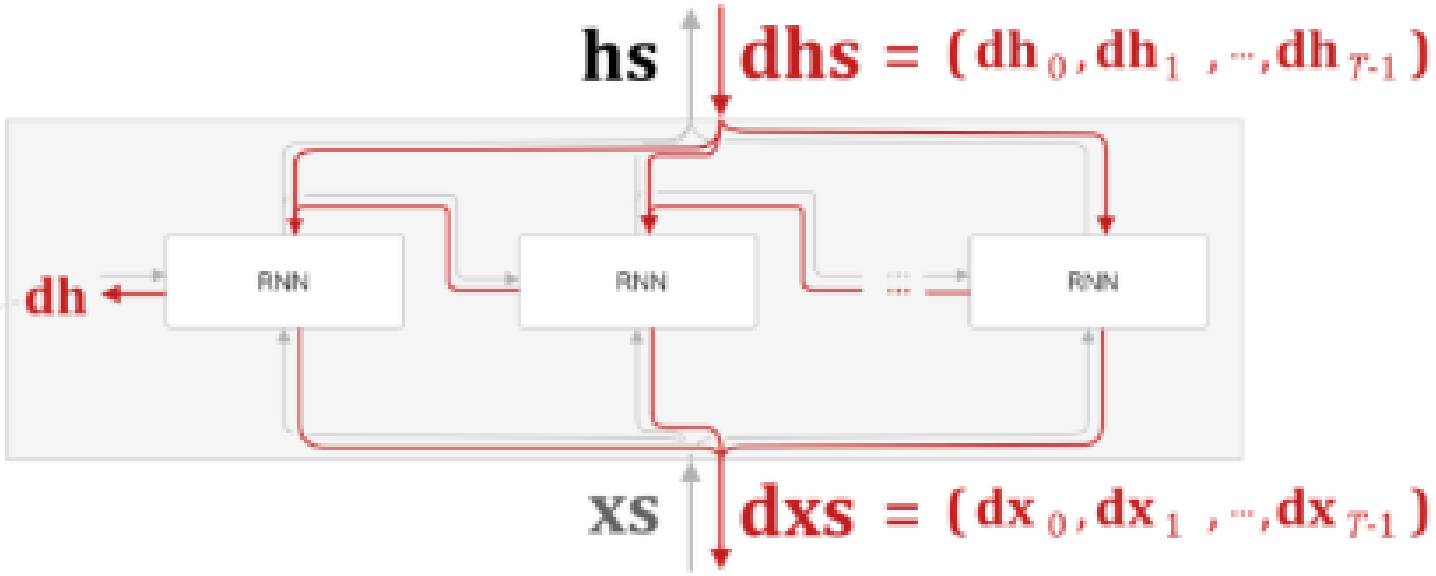
Time RNN 계층과 RNN 계층



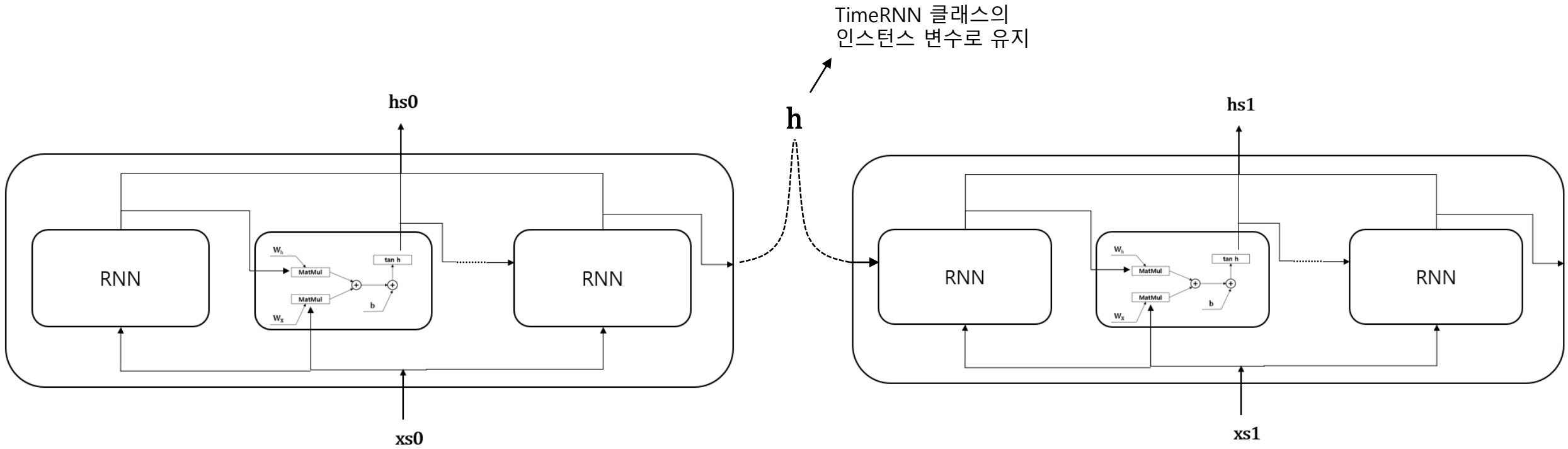
Time RNN 계층과 RNN 계층



Time RNN 계층의 역전파

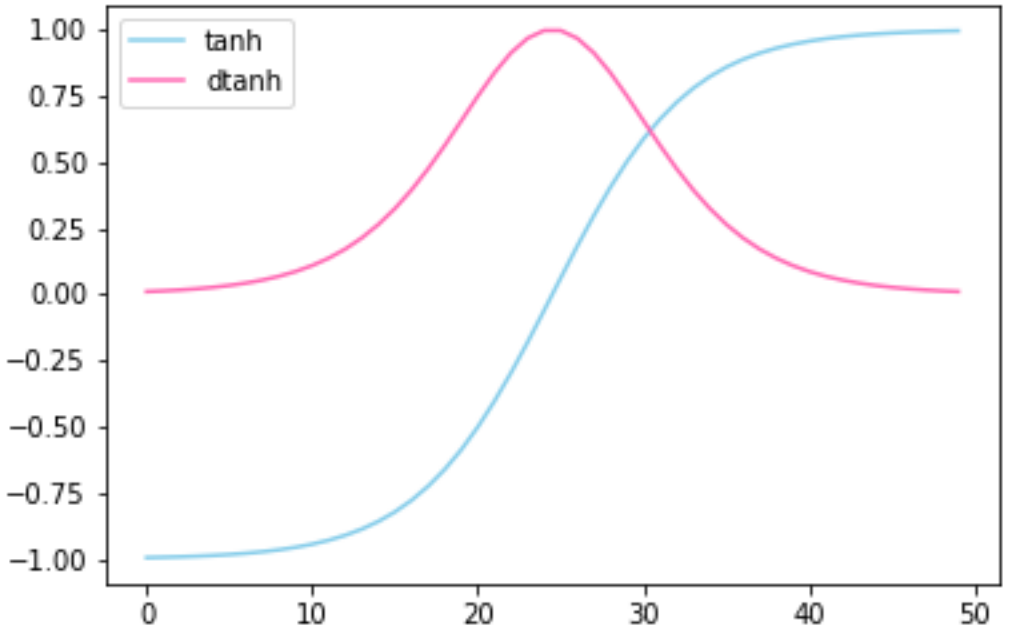


Time RNN 계층과 RNN 계층

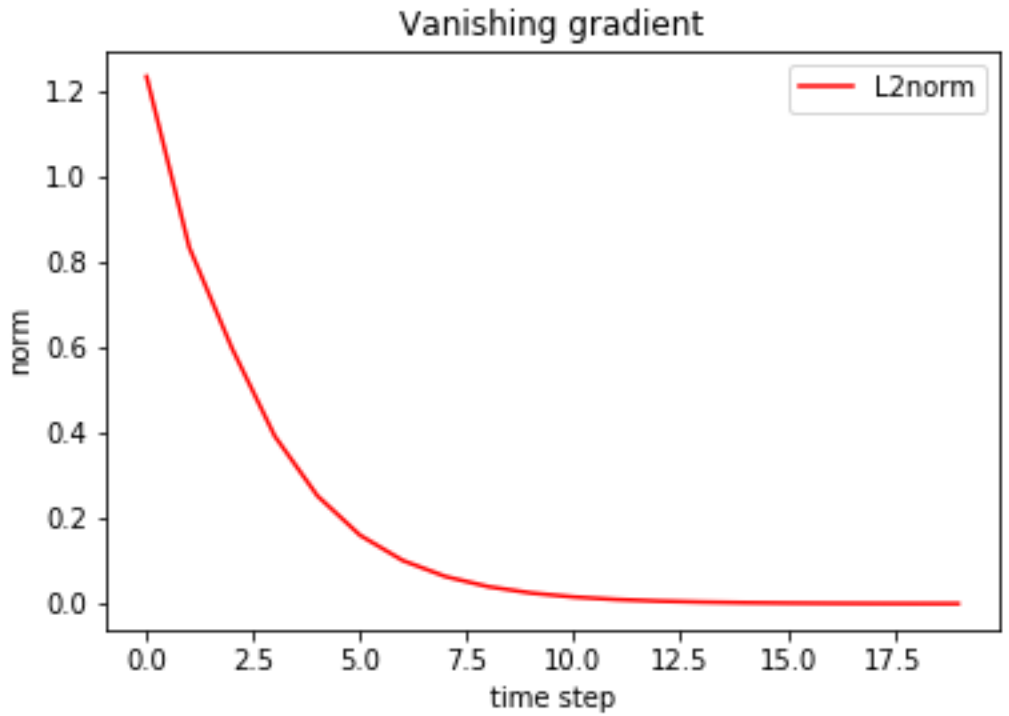


Hyperbolic tangent

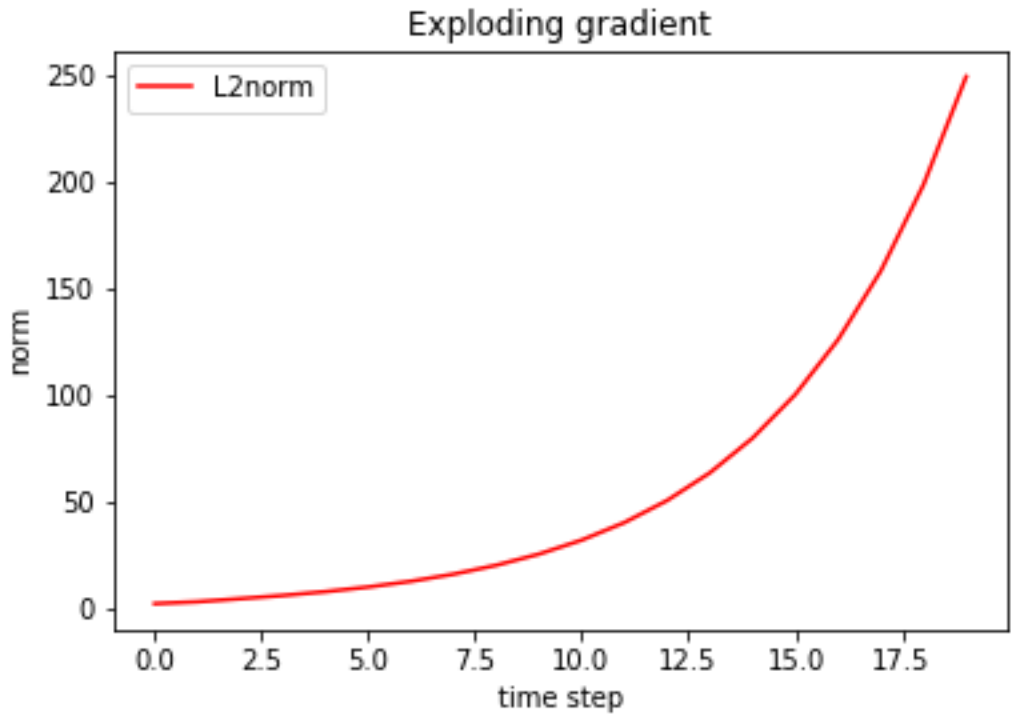
tanh & dtanh



Vanishing gradient

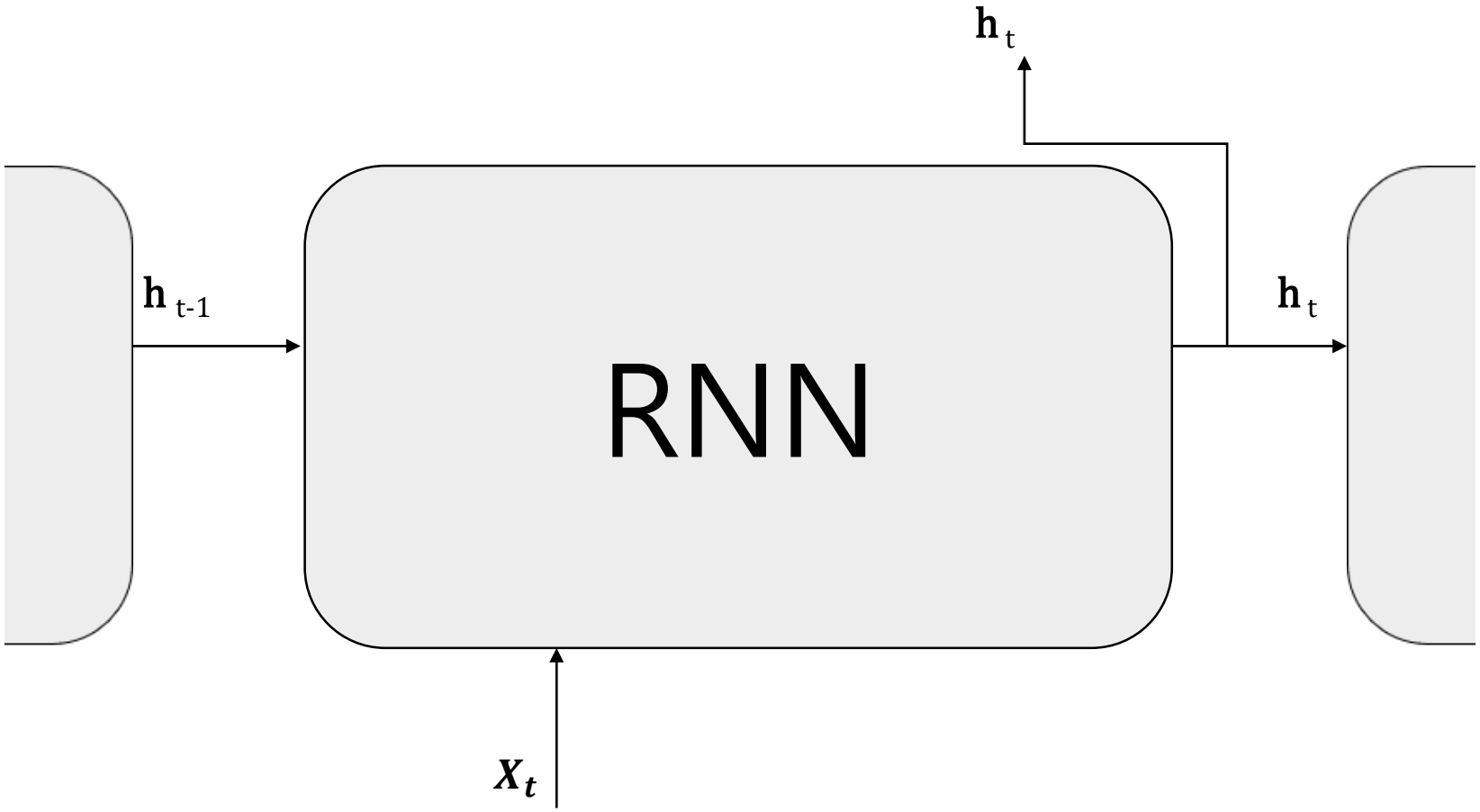


Exploding gradient



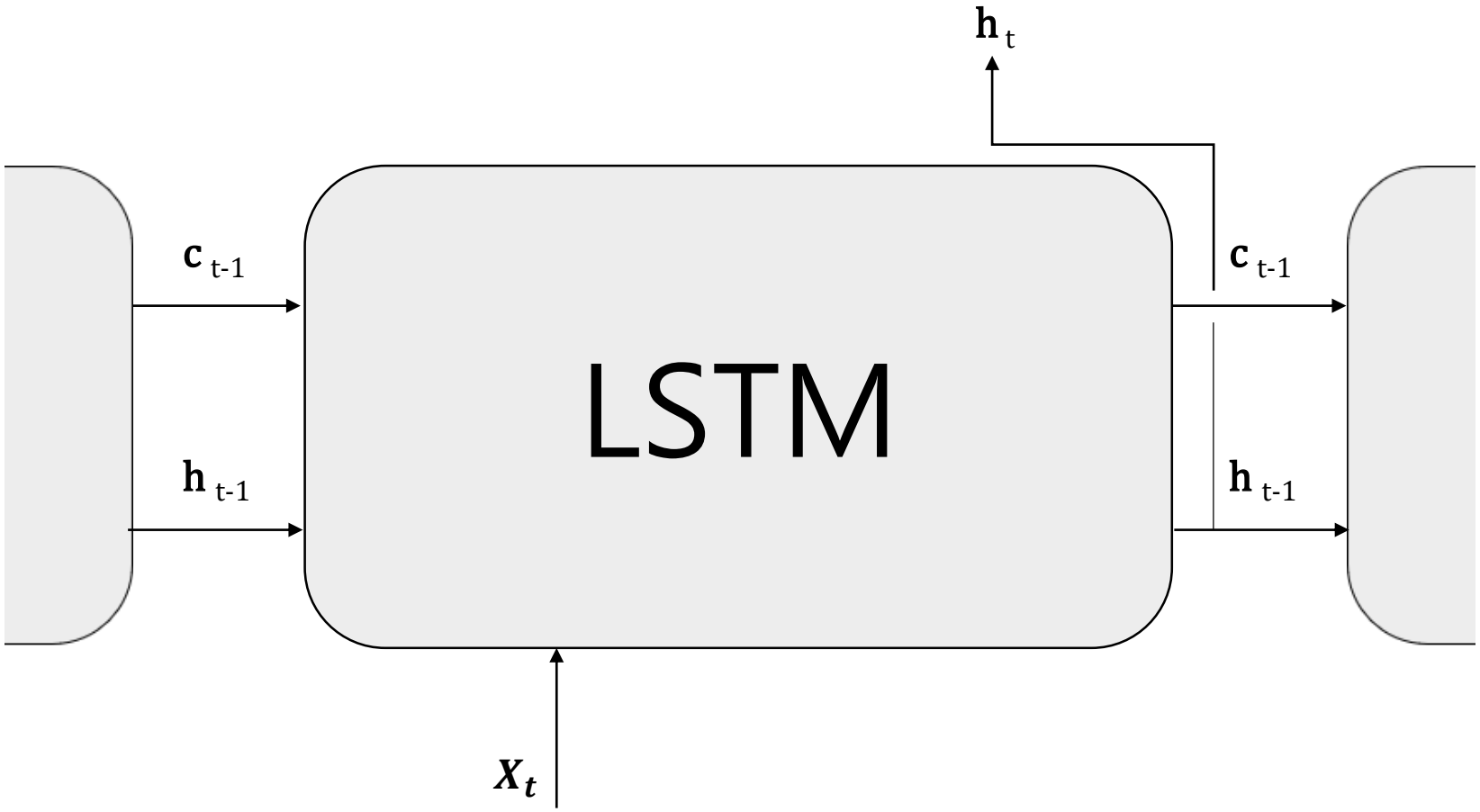
Recurrent Neural Network (RNN)

Interface



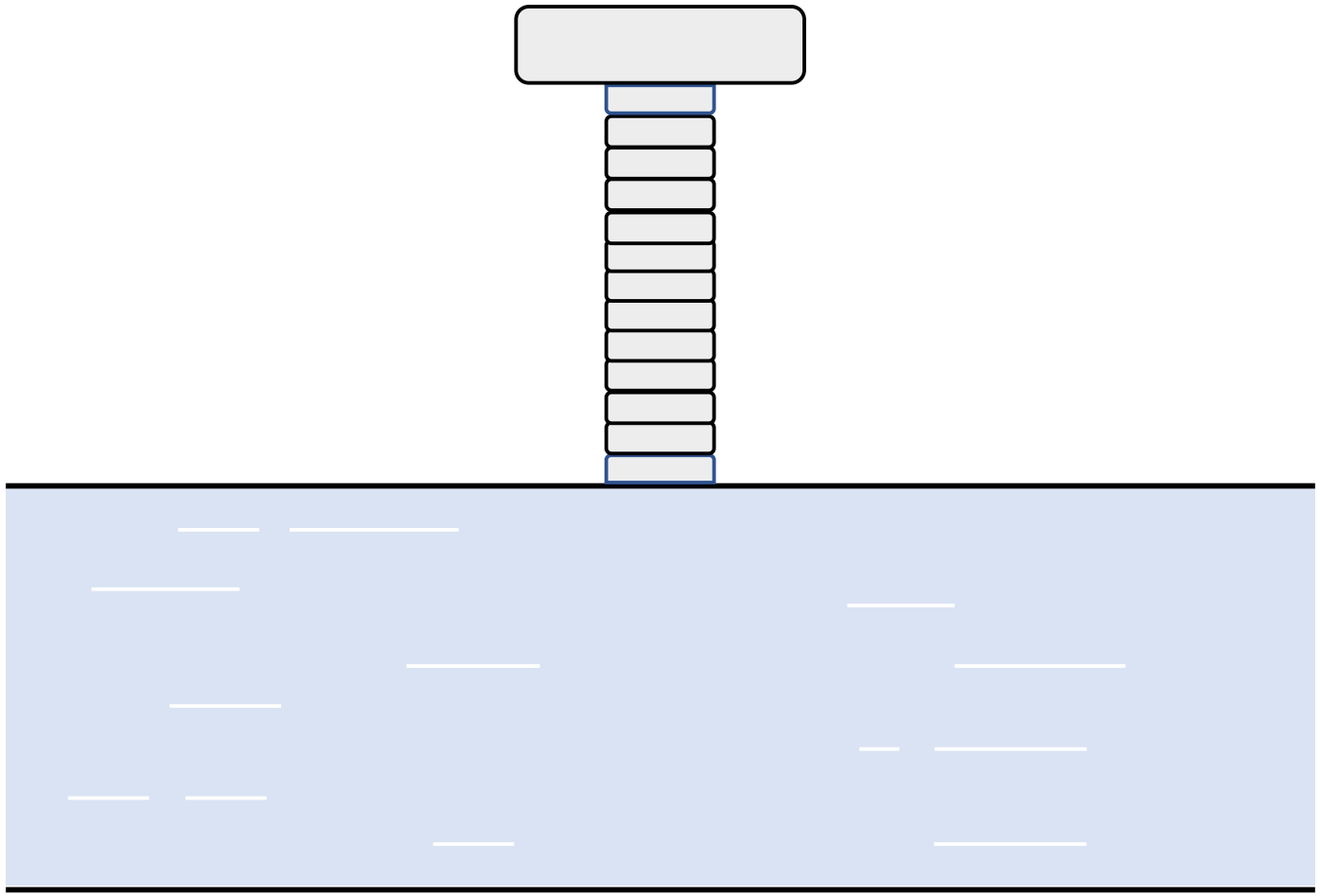
Long Shor Term Memory (LSTM)

Interface



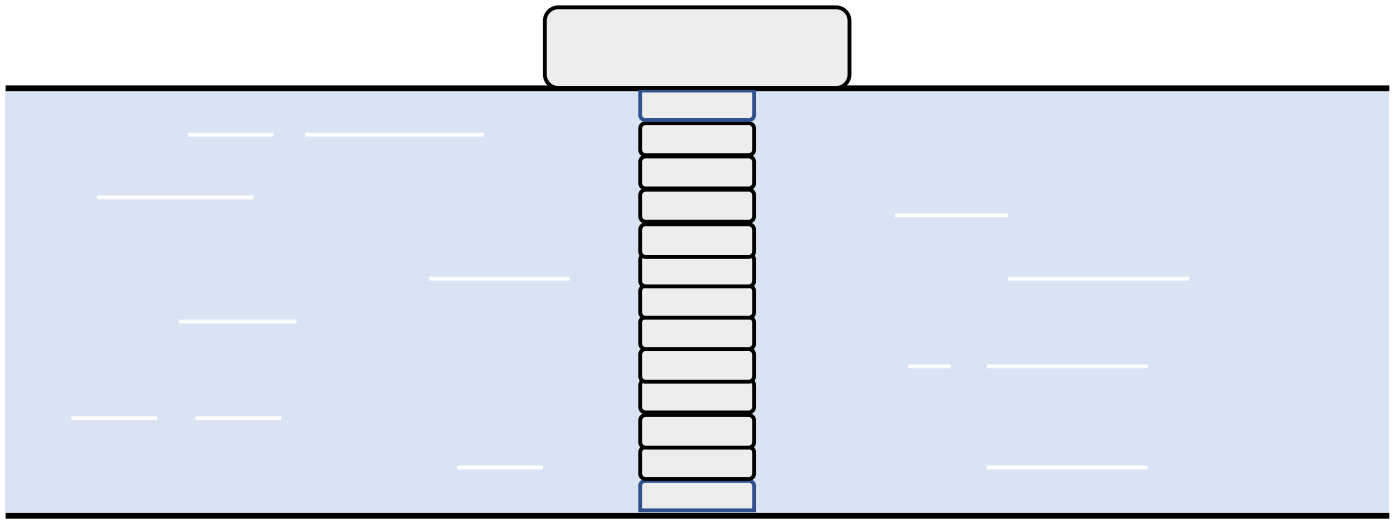
Long Shor Term Memory (LSTM)

비유하자면 게이트는 물의 흐름을 제어한다



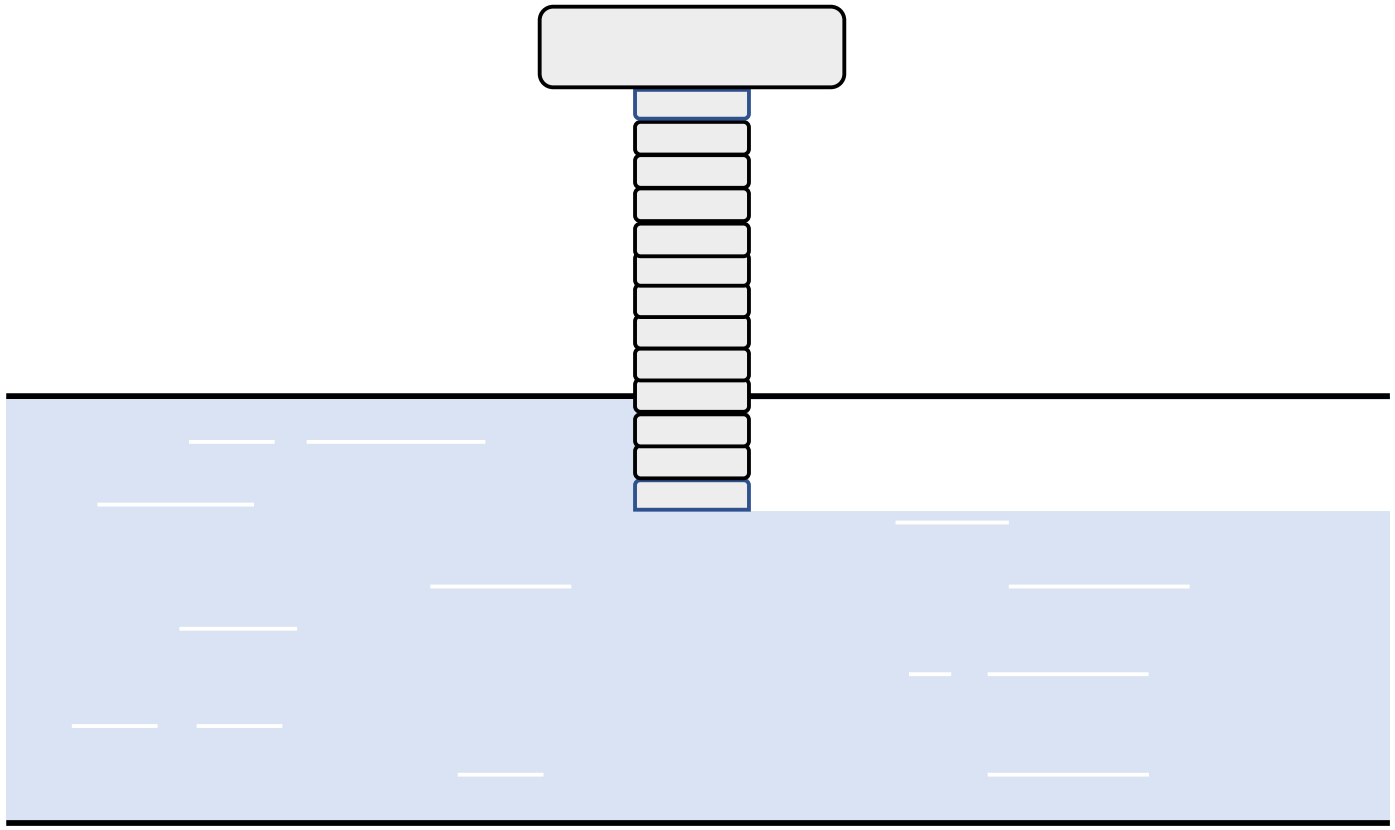
Long Shor Term Memory (LSTM)

비유하자면 게이트는 물의 흐름을 제어한다



Long Shor Term Memory (LSTM)

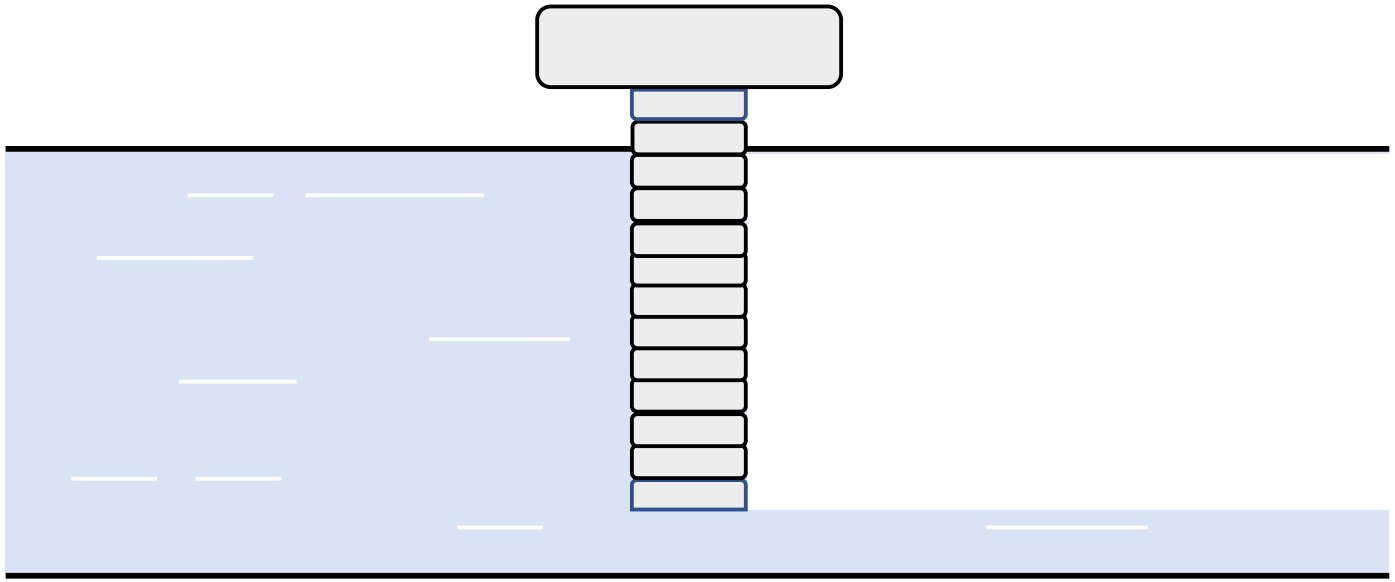
물이 흐르는 양을 0.0 ~ 1.0 범위에서 제어한다.



0.7 (70%)

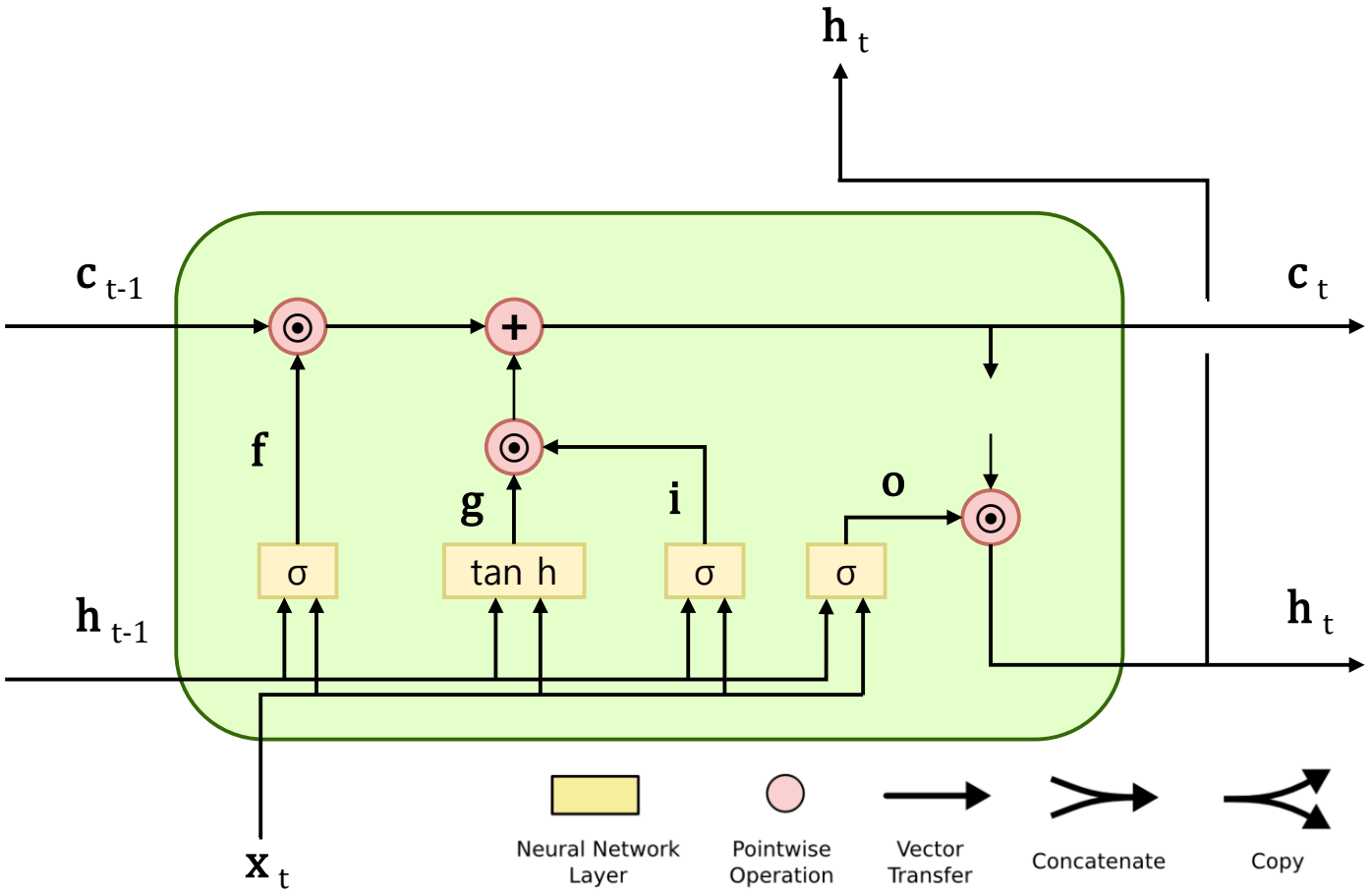
Long Shor Term Memory (LSTM)

물이 흐르는 양을 0.0 ~ 1.0 범위에서 제어한다.



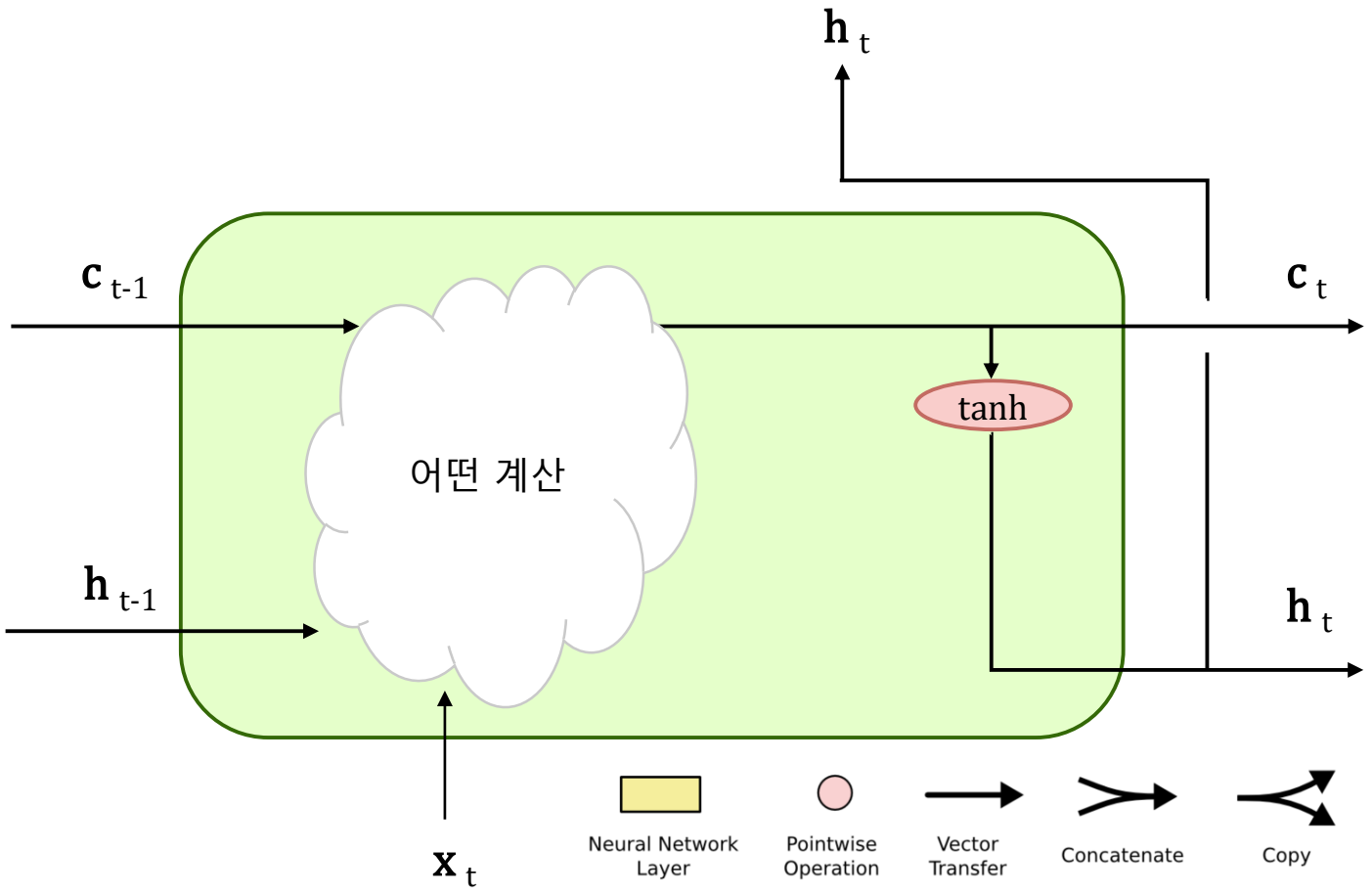
0.2 (20%)

Long Short Term Memory (LSTM)



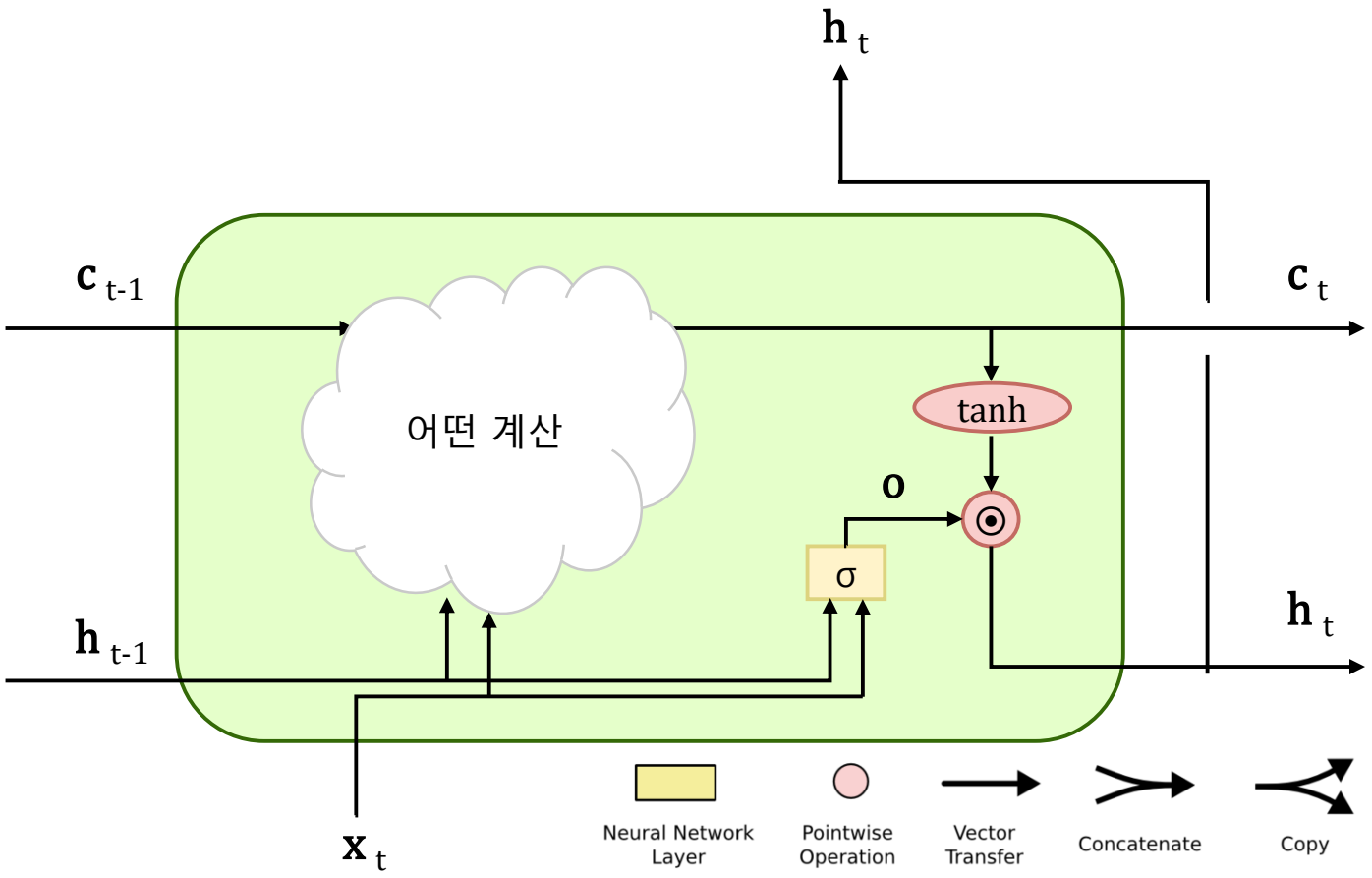
Long Short Term Memory (LSTM)

기억 셀 c_t를 바탕으로 은닉상태 h_t를 계산하는 LSTM 계층



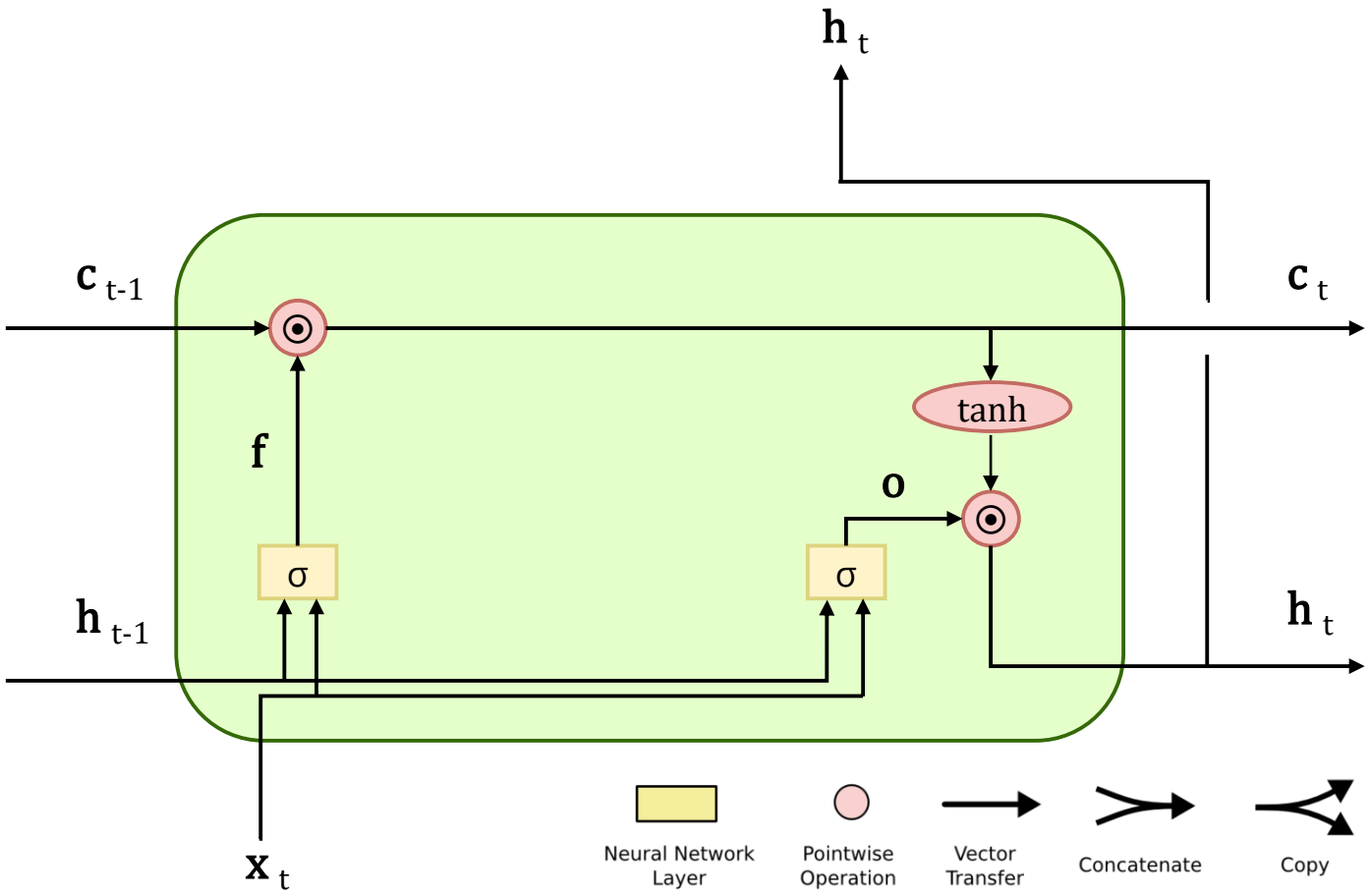
Long Short Term Memory (LSTM)

output 게이트 추가 (o gate)



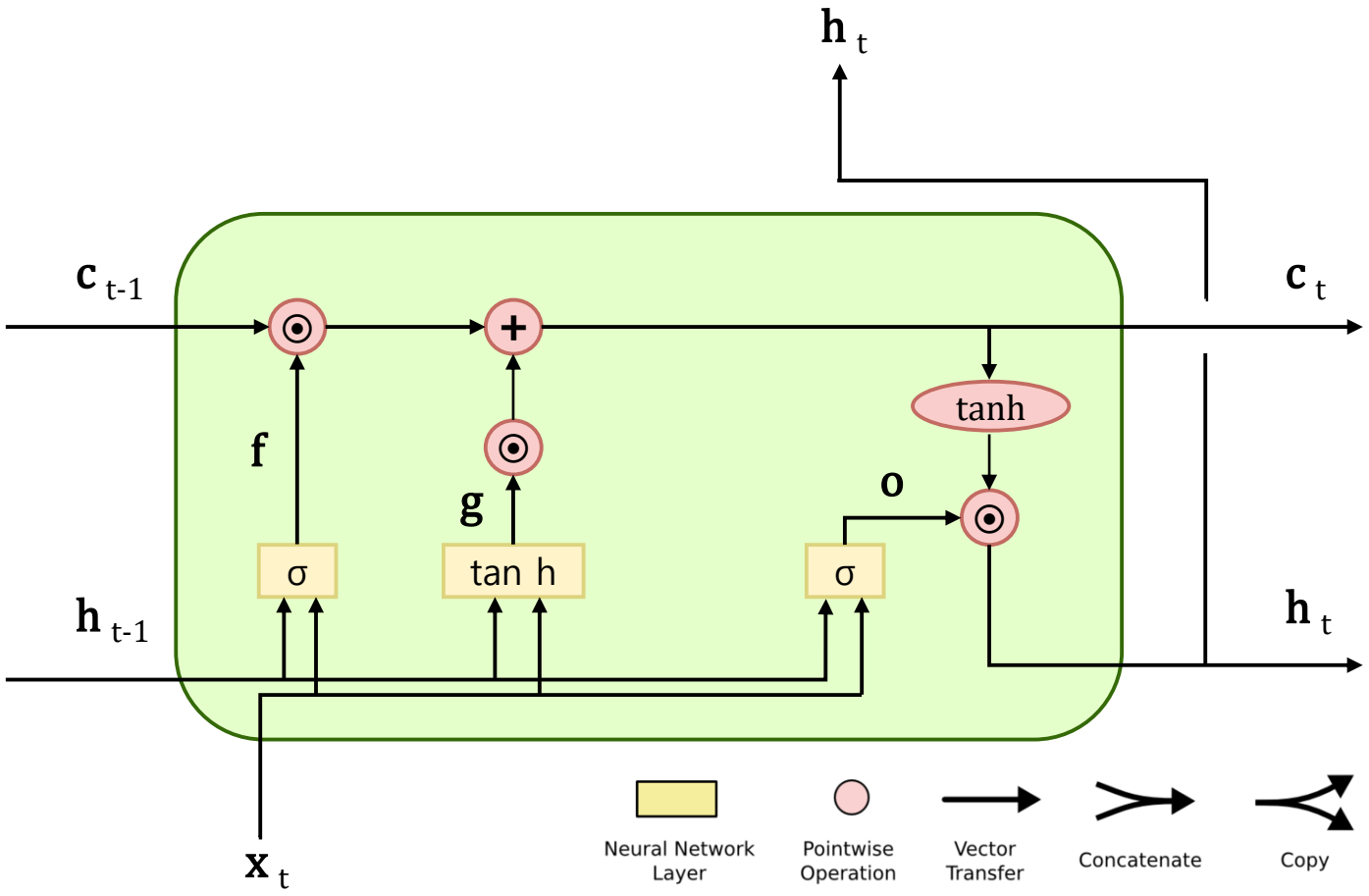
Long Short Term Memory (LSTM)

forgot 게이트 추가 (f gate)



Long Short Term Memory (LSTM)

새로운 기억 셀에 필요한 정보를 추가 (g gate)



Long Short Term Memory (LSTM)

Input 게이트 추가 (i gate)