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# 딥러닝 올인원

순환 신경망  
17강

딥러닝호형

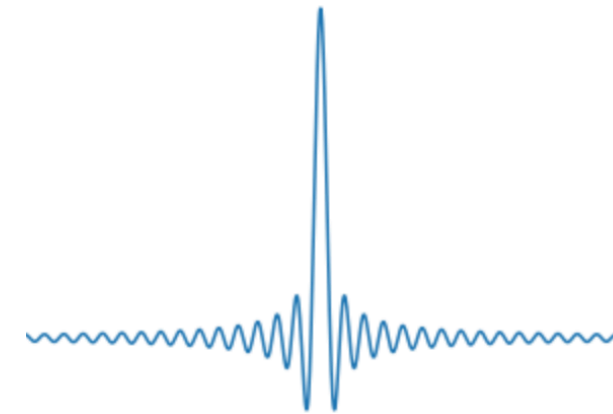
# 순환 신경망 (Recurrent Neural Network)



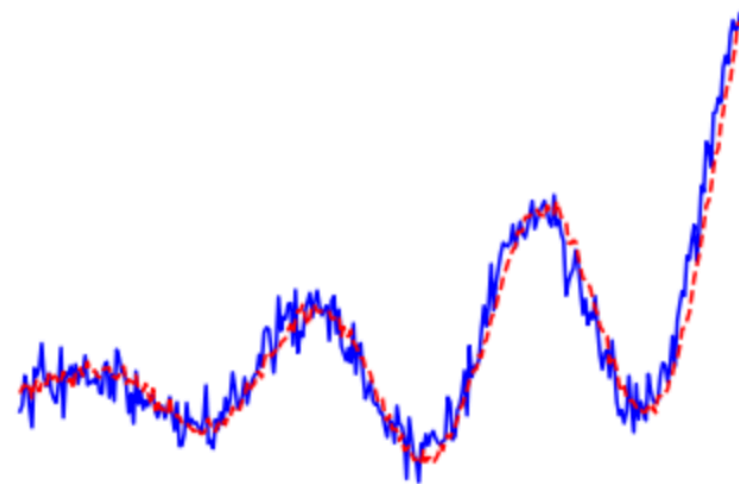
## 순환 신경망의 활용



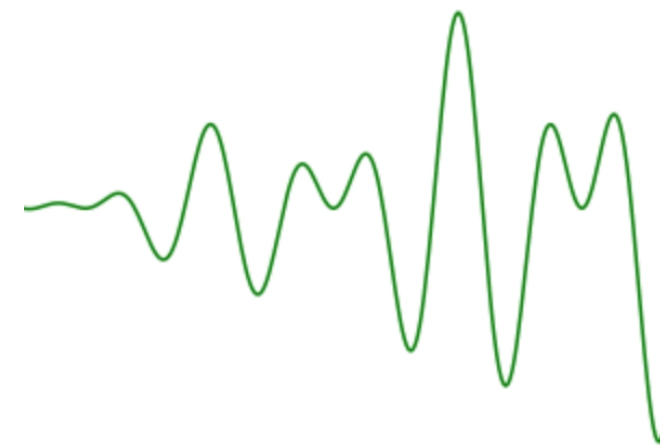
언어 번역



신호 처리



주가 예측

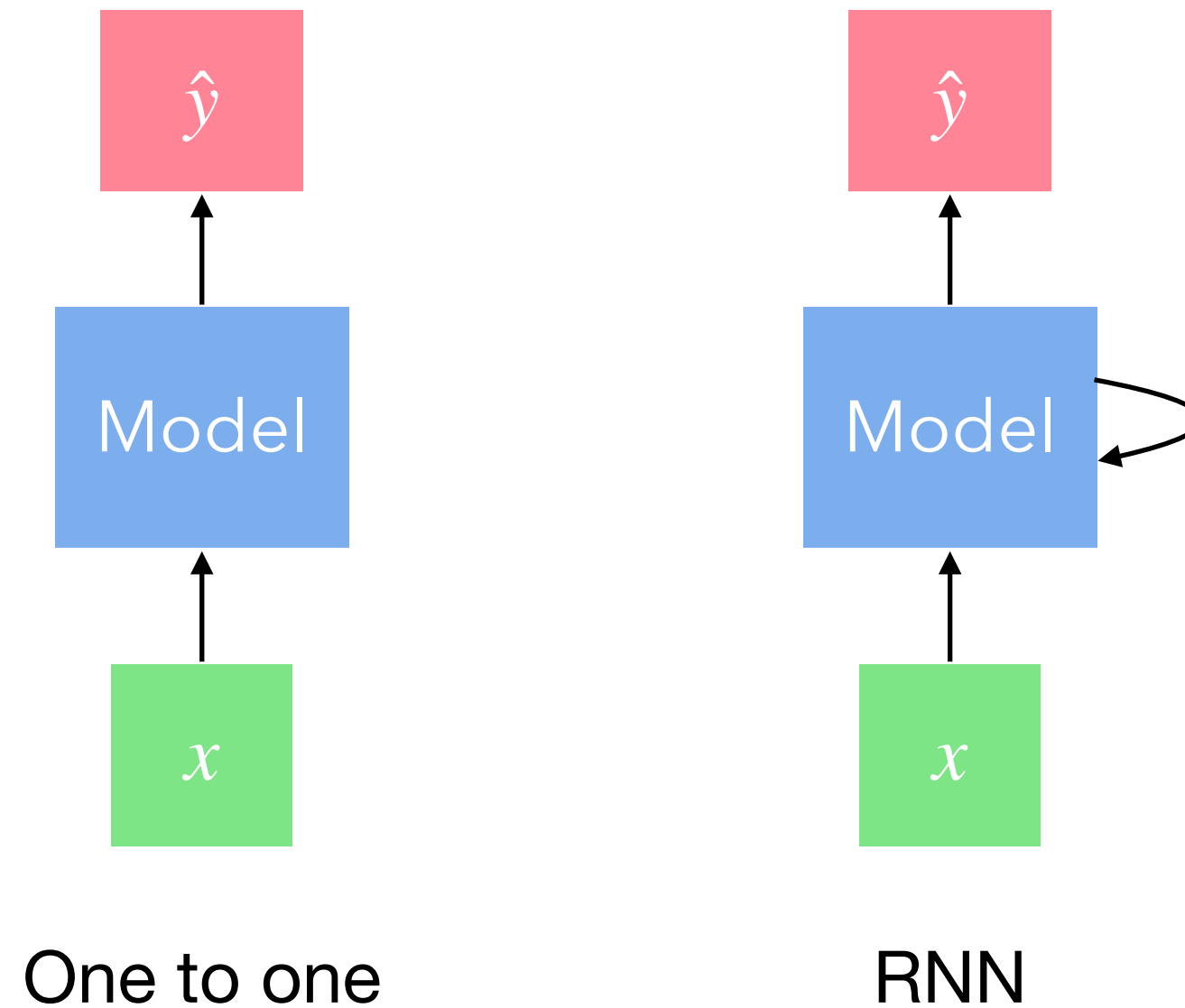


음성 인식

# 순환 신경망 (Recurrent Neural Network)



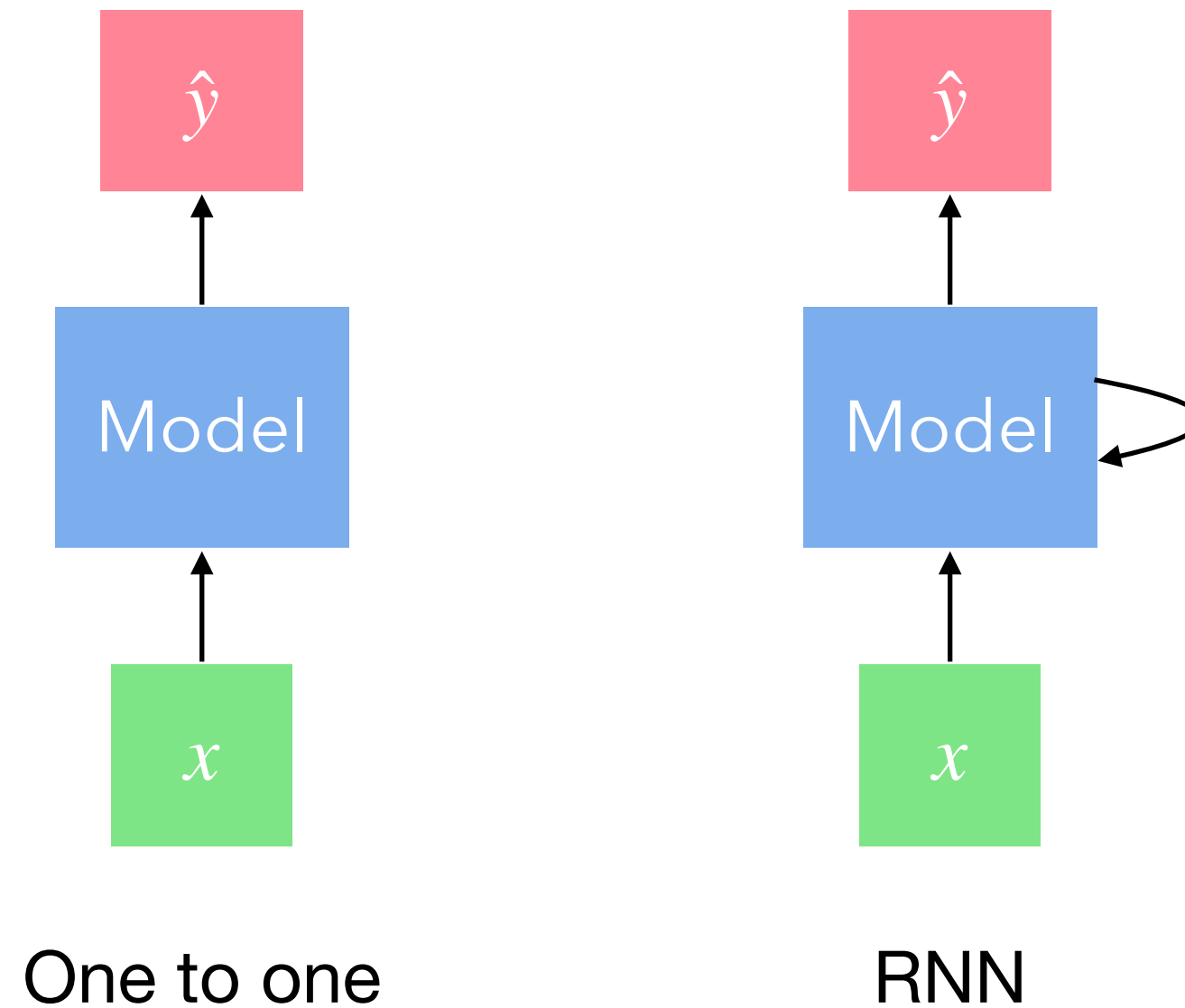
일반적인 인공 신경망 vs 순환 신경망



# 순환 신경망 (Recurrent Neural Network)



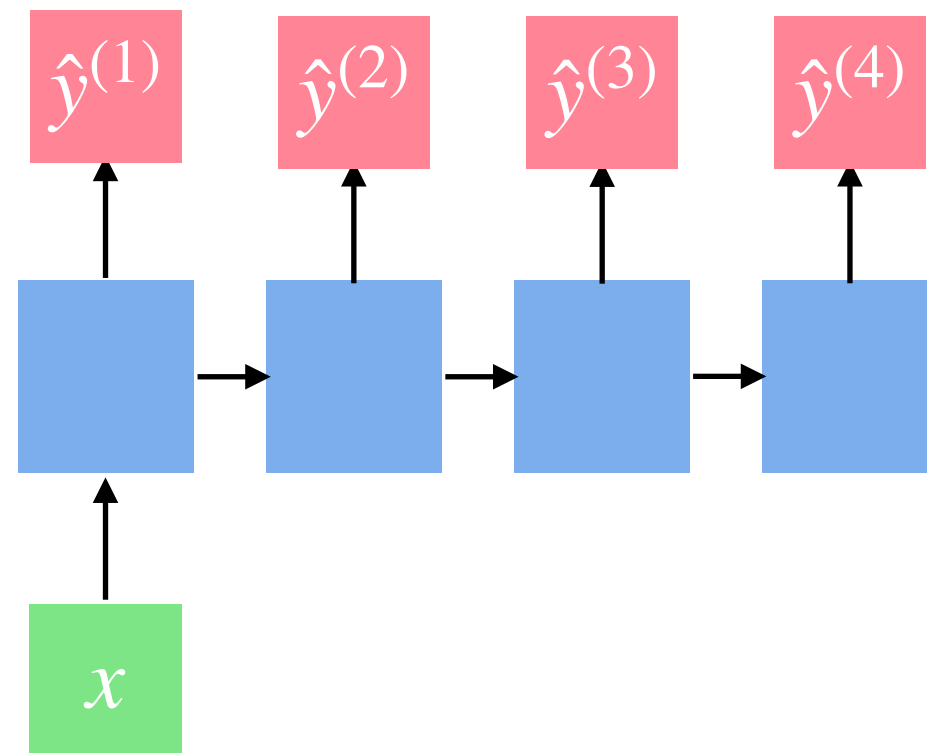
일반적인 인공 신경망 vs 순환 신경망



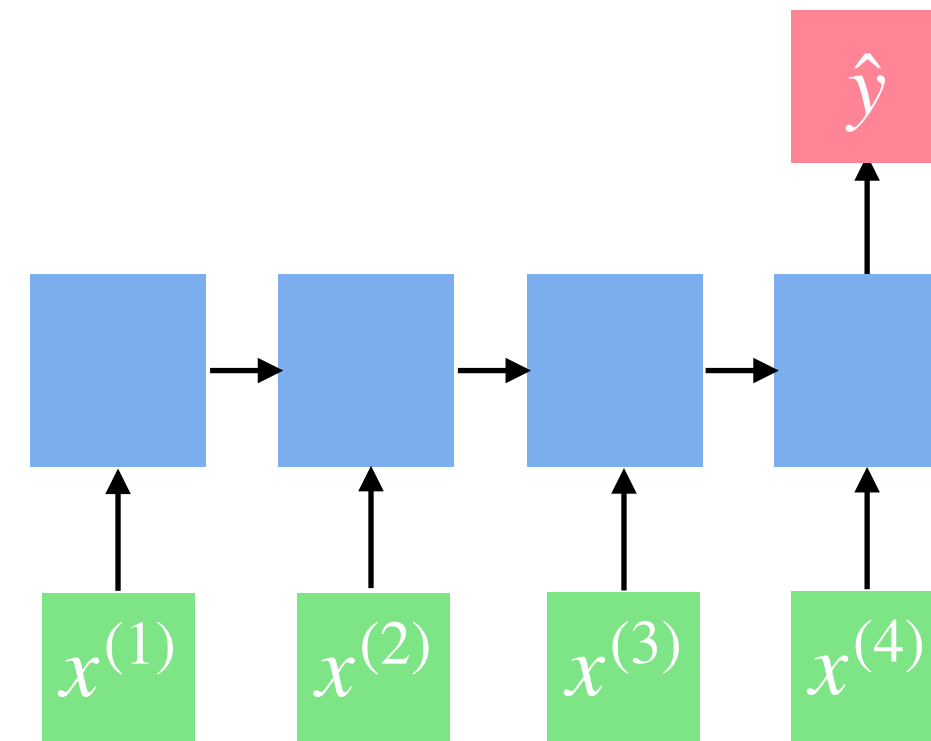
# 순환 신경망 (Recurrent Neural Network)



## RNN(Recurrent Neural Network)



One to many

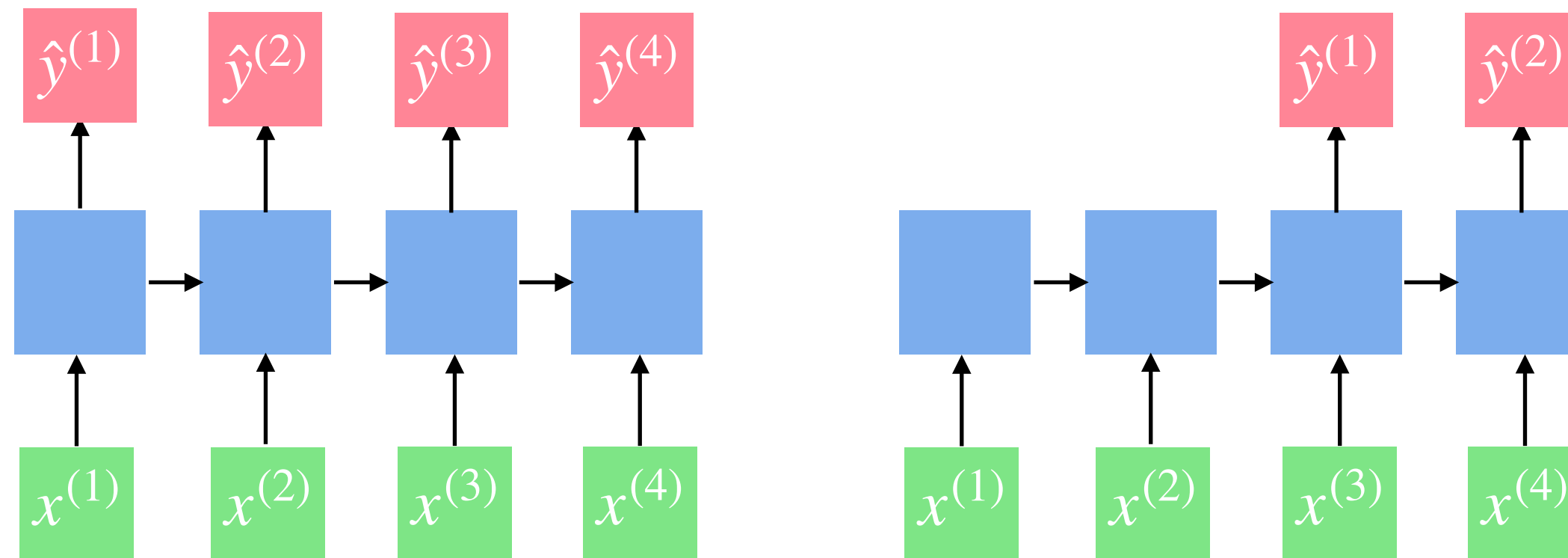


Many to one

# 순환 신경망 (Recurrent Neural Network)



## RNN(Recurrent Neural Network)

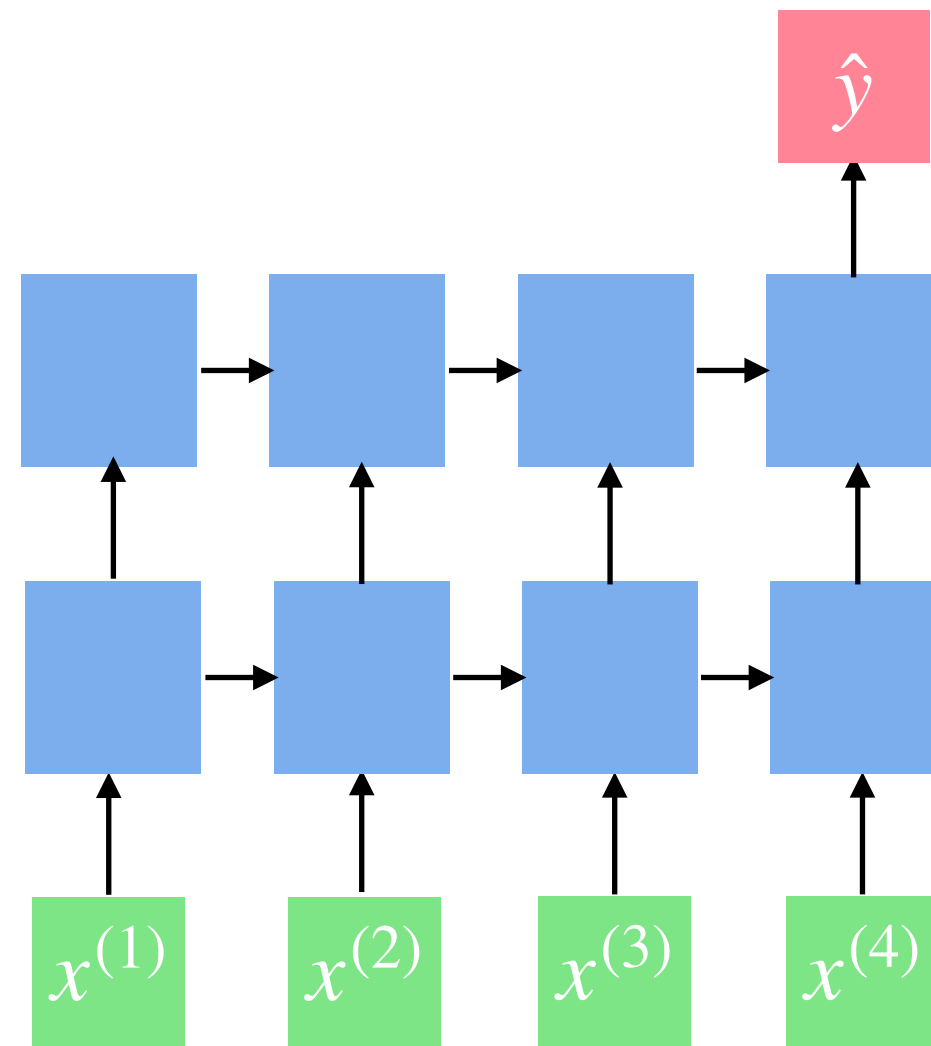


Many to many

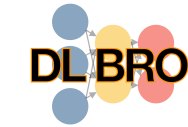
# 순환 신경망 (Recurrent Neural Network)



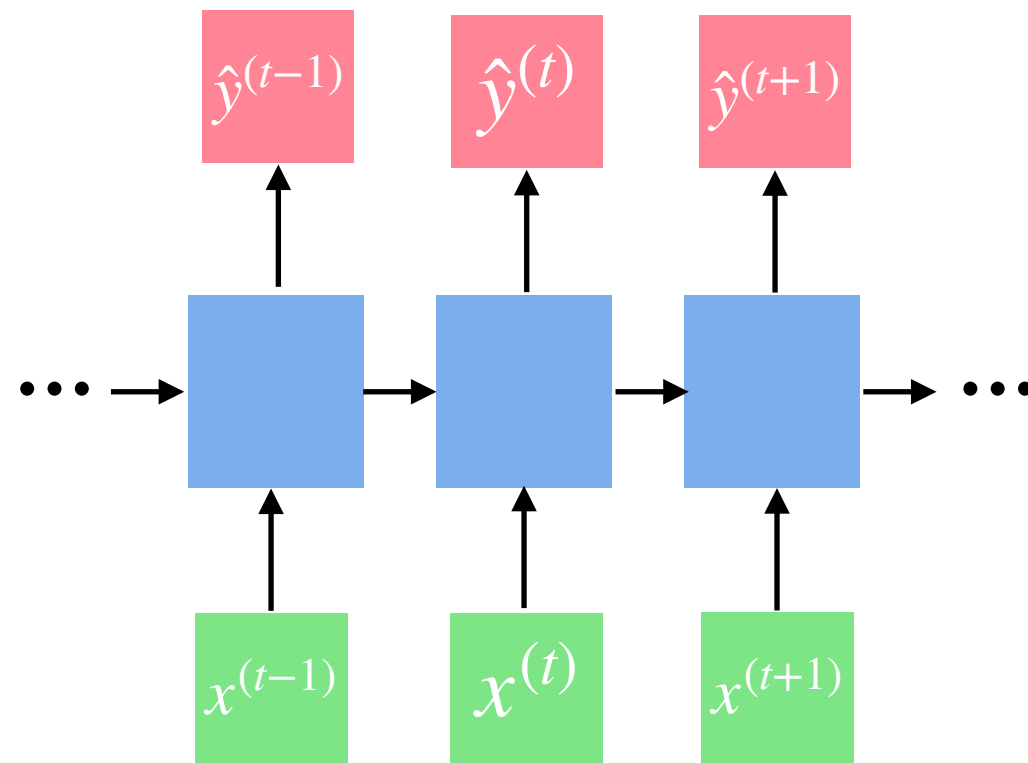
## RNN(Recurrent Neural Network)



# 순환 신경망 (Recurrent Neural Network)



## Vanilla RNN



$$y^{(t)} = \text{softmax}(o^{(t)})$$

$$o^{(t)} = c + Vh^{(t)}$$

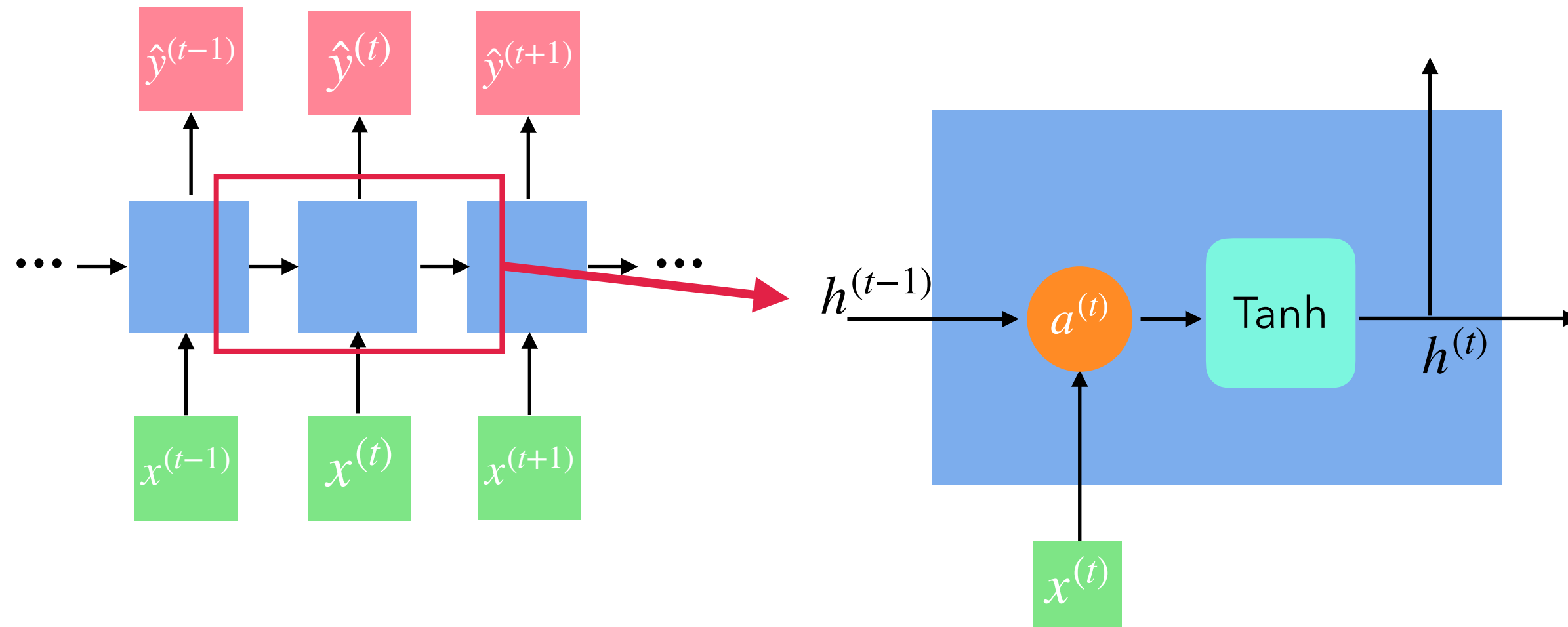
$$h^{(t)} = f_W(h^{(t-1)}, x^{(t)})$$



# 순환 신경망 (Recurrent Neural Network)



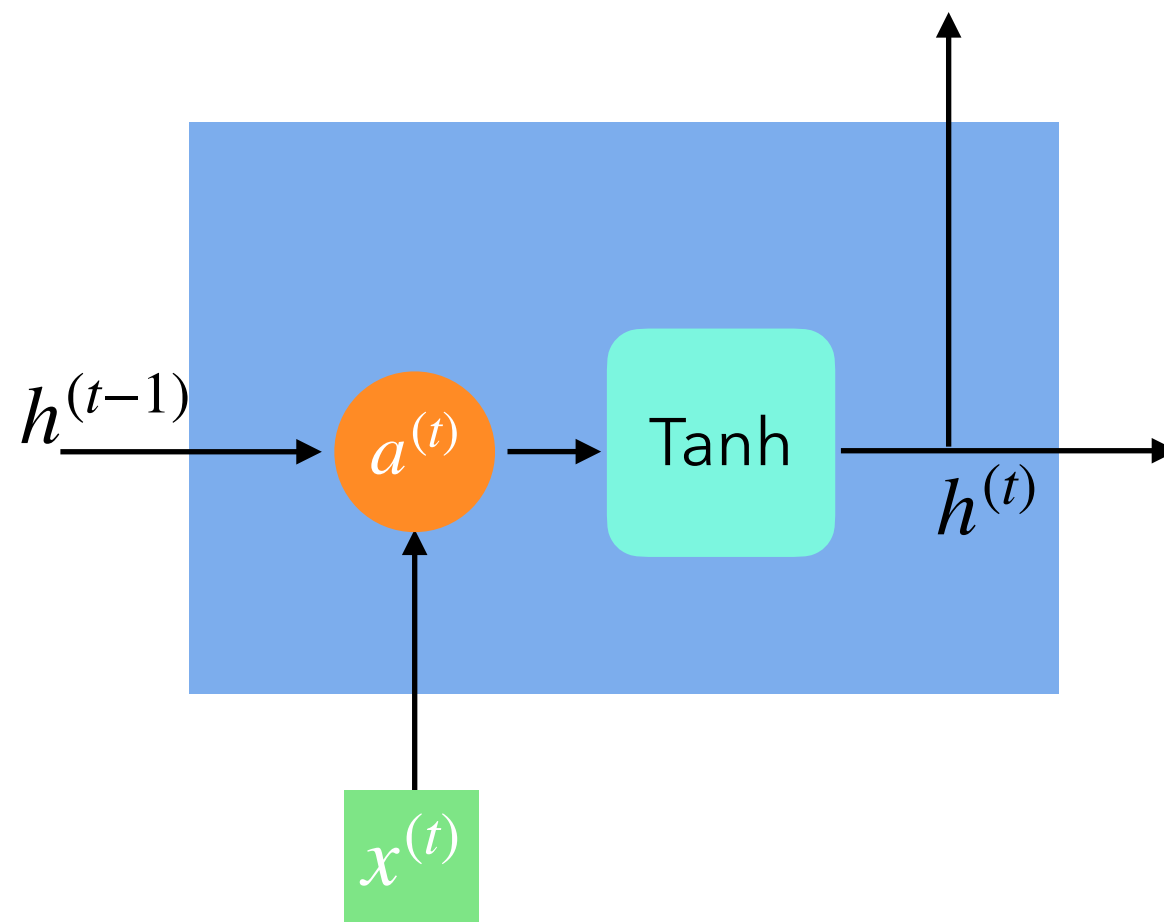
## Vanilla RNN



# 순환 신경망 (Recurrent Neural Network)



## Vanilla RNN



$$h^{(t)} = f_W(h^{(t-1)}, x^{(t)})$$

$$a^{(t)} = b + Wh^{(t-1)} + Ux^{(t)}$$

$$a^{(t)}, h^{(t)} : N \times 1 \quad x^{(t)} : M \times 1$$

$$W : N \times N, U : N \times M, V : L \times N$$

$$h^{(t)} = \tanh(a^{(t)})$$

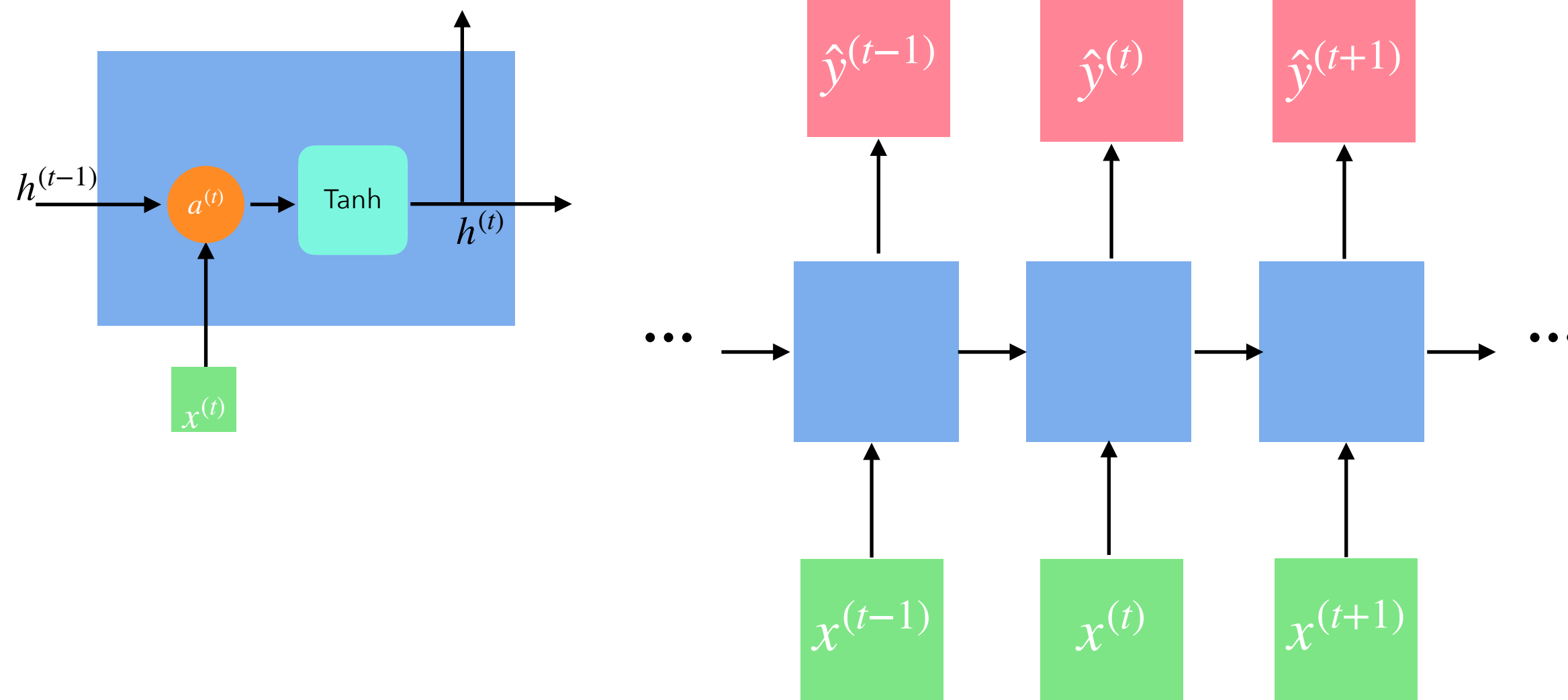
$$o^{(t)} = c + Vh^{(t)}$$

$$y^{(t)} = \text{softmax}(o^{(t)})$$

# 순환 신경망 (Recurrent Neural Network)



## Vanilla RNN



# 순환 신경망 (Recurrent Neural Network)



## RNN의 손실함수

- Cross-Entropy
- MSE

