

# RNN

## (Recurrent Neural Networks)

까지 요약(모두의 딥러닝)

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example-Hidden Layer**
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# Part\_1

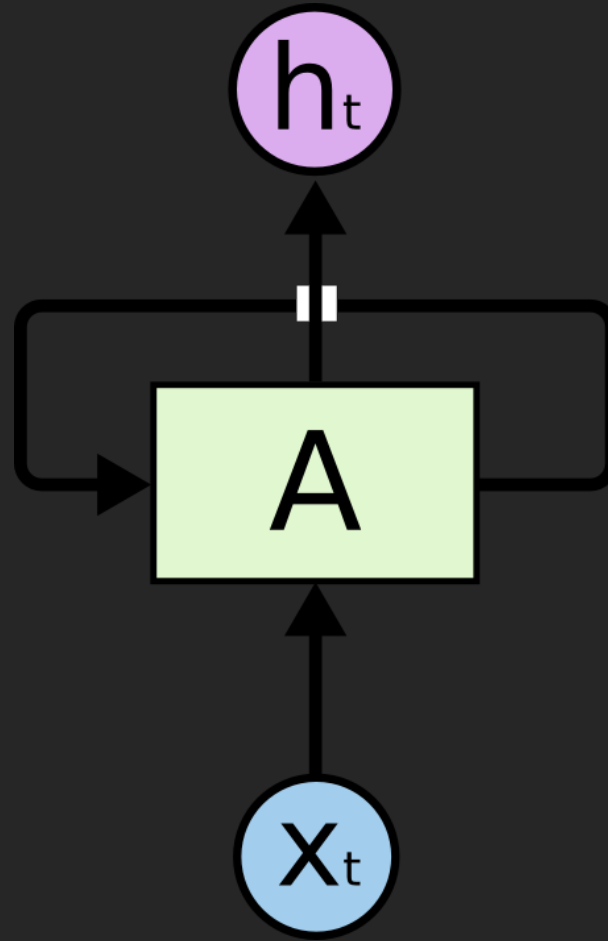
# RNN ? (Recurrent Neural Networks)

순서가 있는 데이터

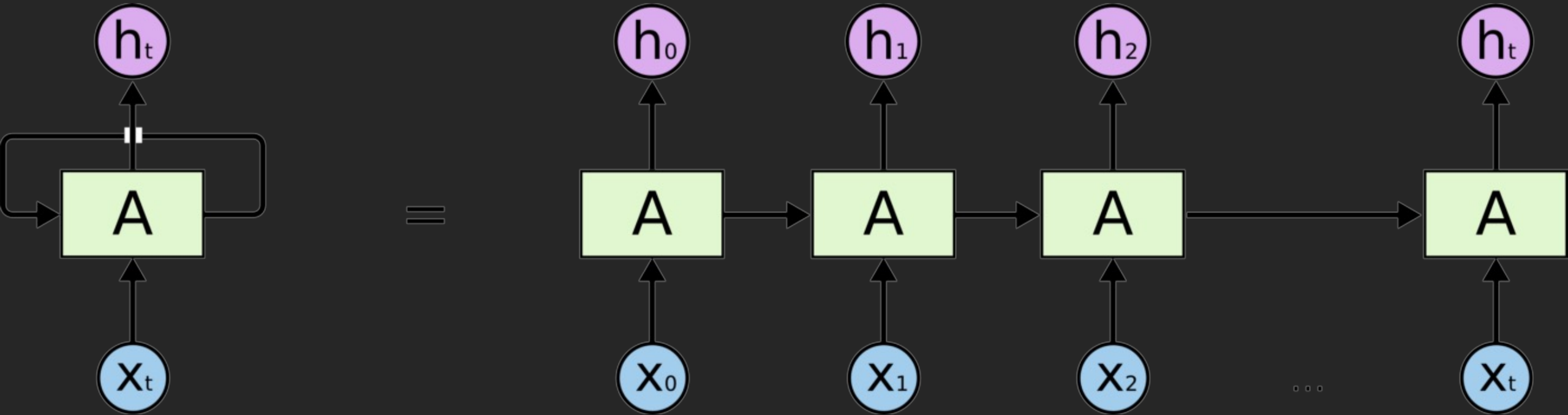
ex) words : hello(h->e->l->l->o)

NN/CNN은 하지 못하는 경우

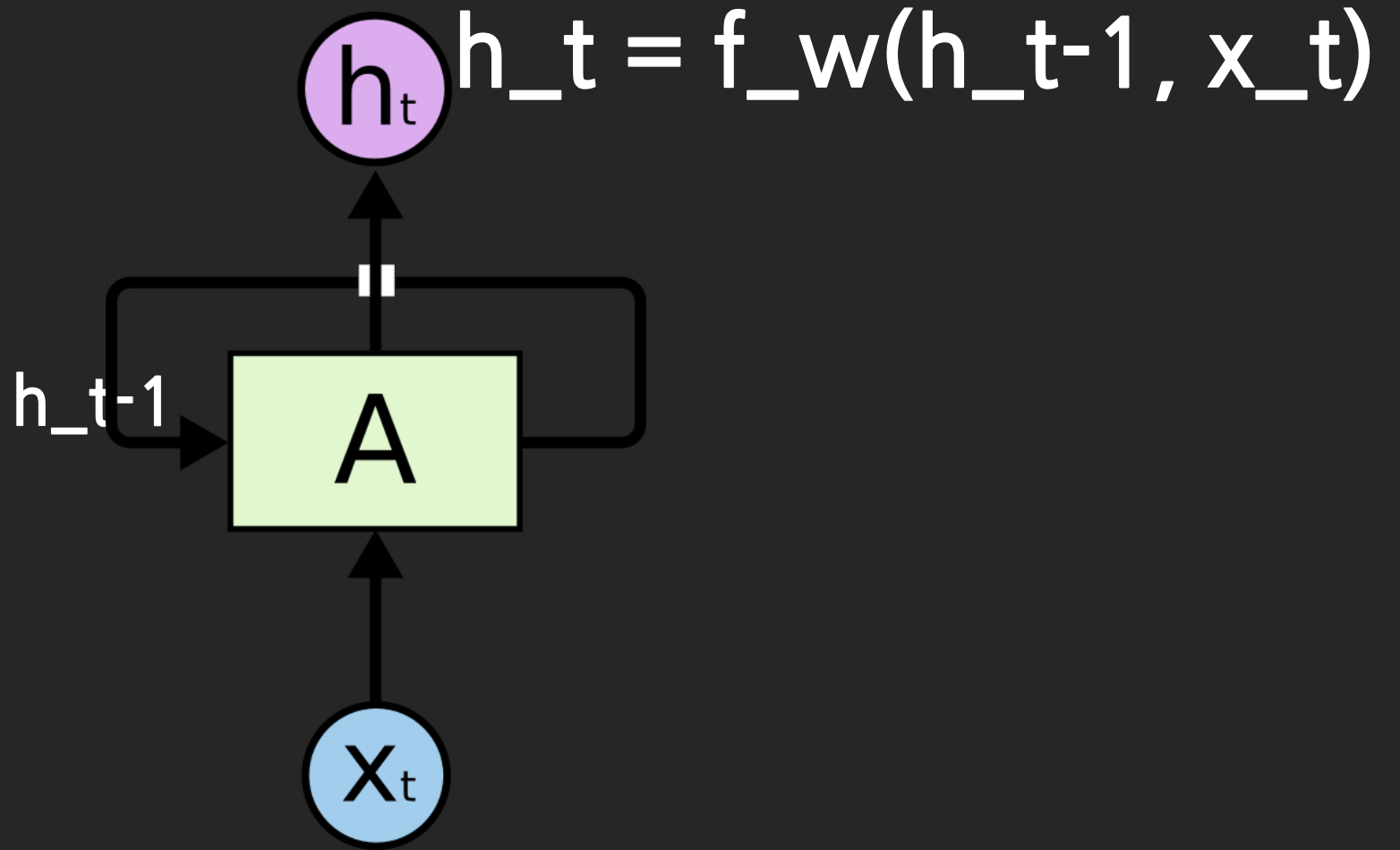
# RNN ? (Recurrent Neural Networks)



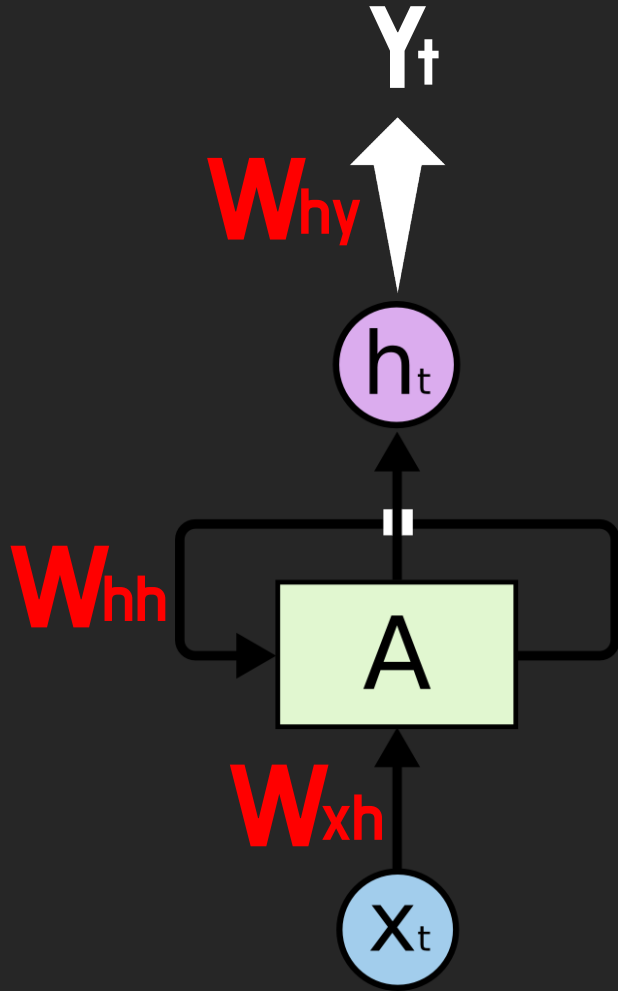
# RNN ? (Recurrent Neural Networks)



# RNN ? (Recurrent Neural Networks)



# RNN ? (Recurrent Neural Networks)



$$h_t = f_W(h_{t-1}, x_t)$$



$$h_t = \tanh(W_{hh}h_{t-1} + W_{xh}x_t)$$

$$y_t = W_{hy}h_t$$



# Part\_2

# Character-level language model

hello

# Character-level language model

hello → One hot encoding

# Character-level language model

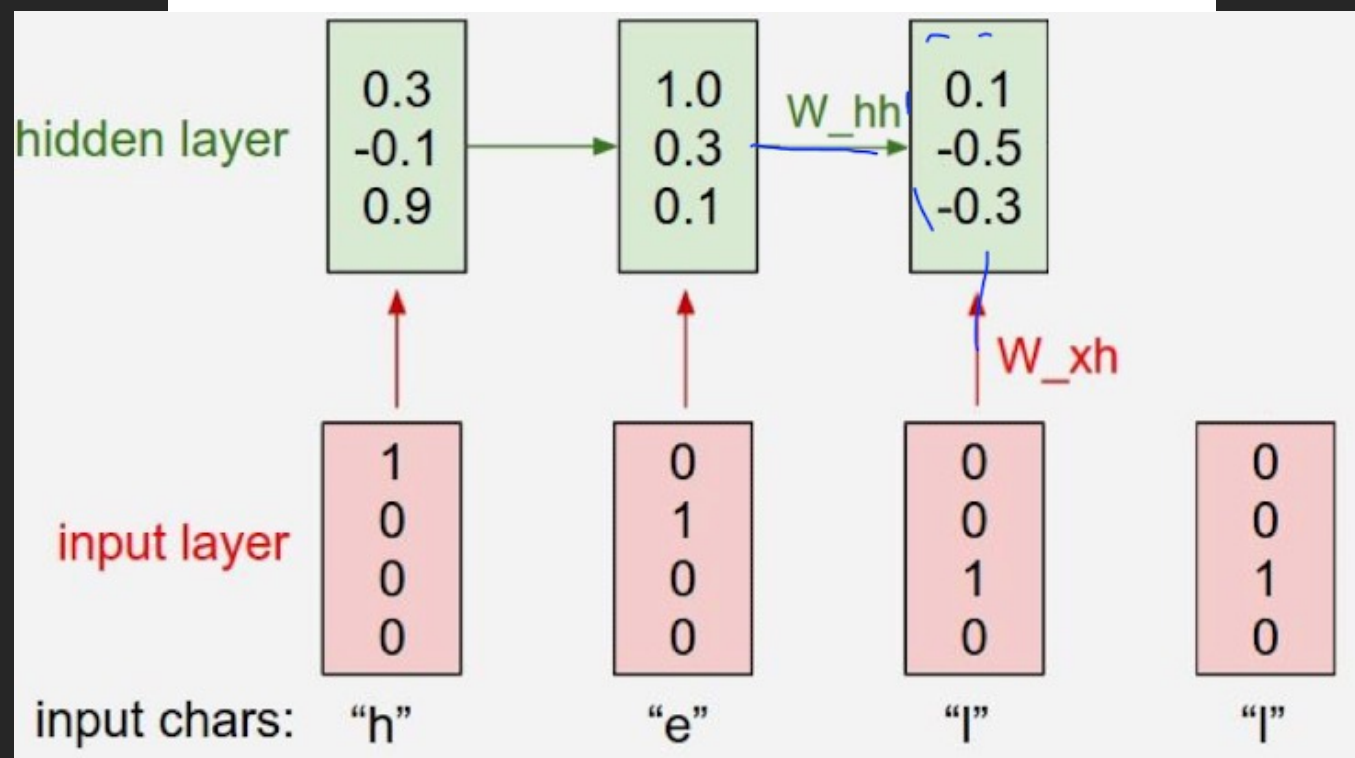
hello → One hot encoding

→

| h | e | l | o |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 |

# Character-level language model

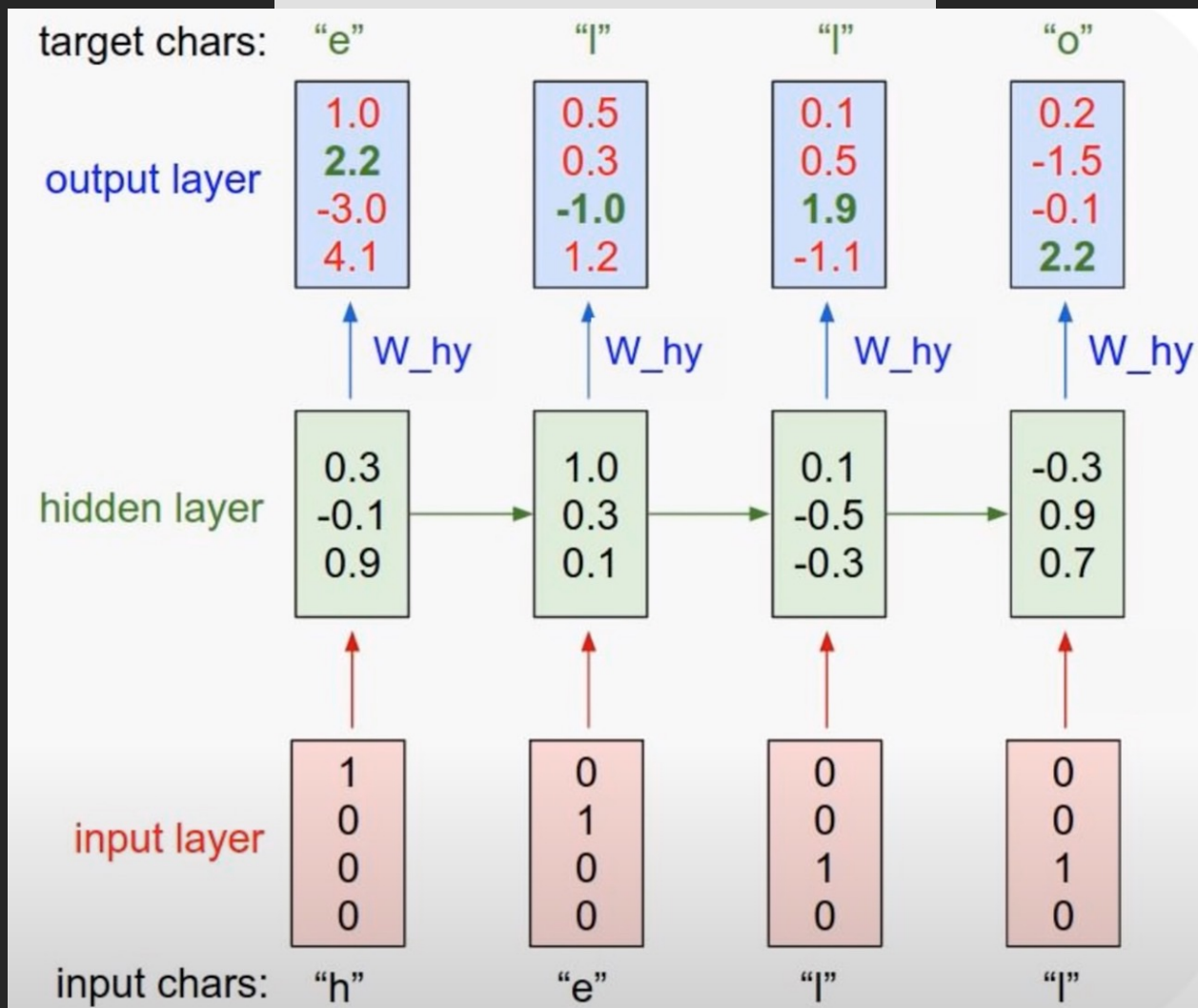
$$h_t = \tanh(W_{hh}h_{t-1} + W_{xh}x_t)$$



# Part\_3

# Character-level language model

$$y_t = W_{hy} h_t$$



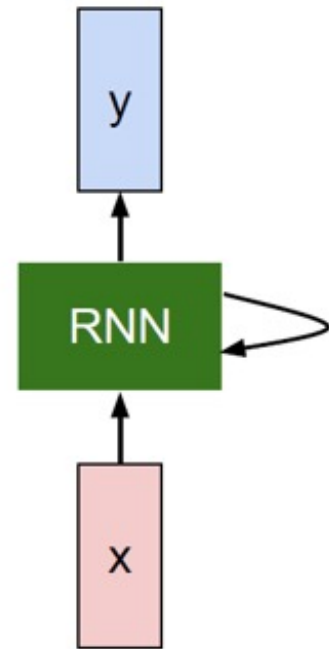
# RNN applications

- Language Modeling
- Speech Recognition
- Machine Translation
- Conversation Modeling/Question Answering
- Image/Video Captioning
- Image/Music/Dance Generation



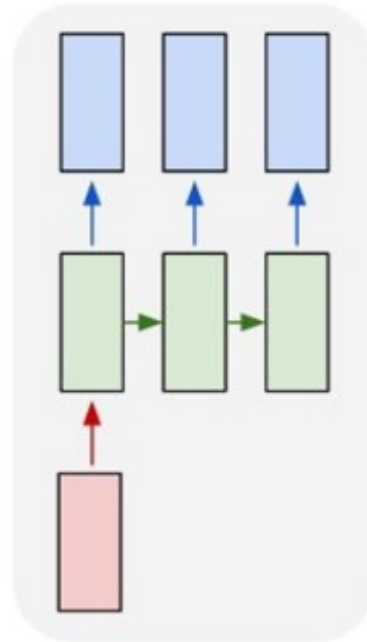
# Part\_4

# A lot of flexibility



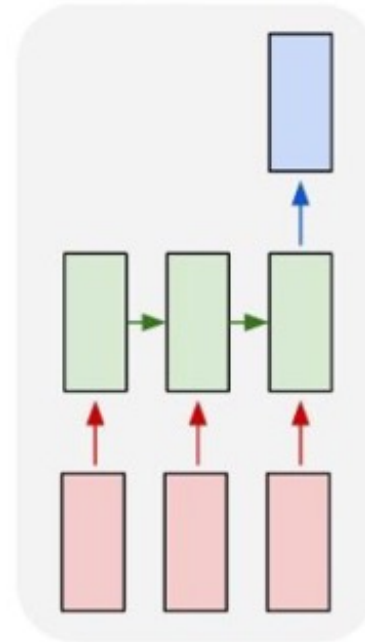
<기본구조>

one to many



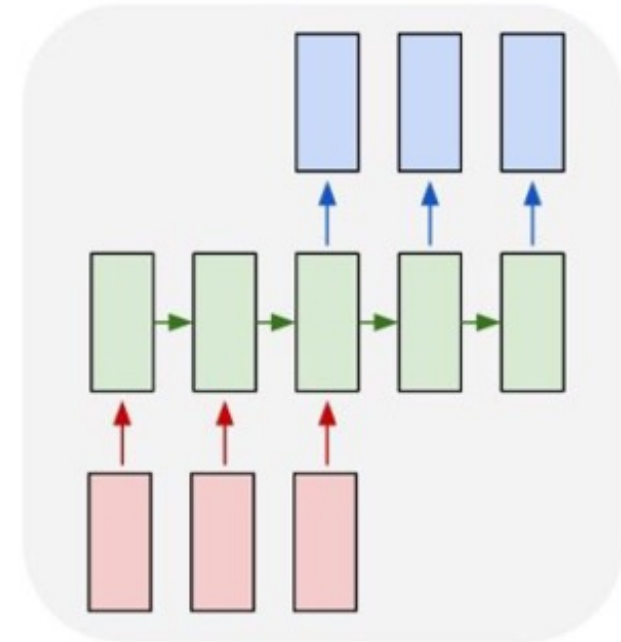
<사진설명 붙이기>  
사진 → 단어

many to one



<감성분석>  
단어 → 감성점수

many to many



<번역>  
단어 → 단어

# A lot of flexibility – Multi-Layer RNN

