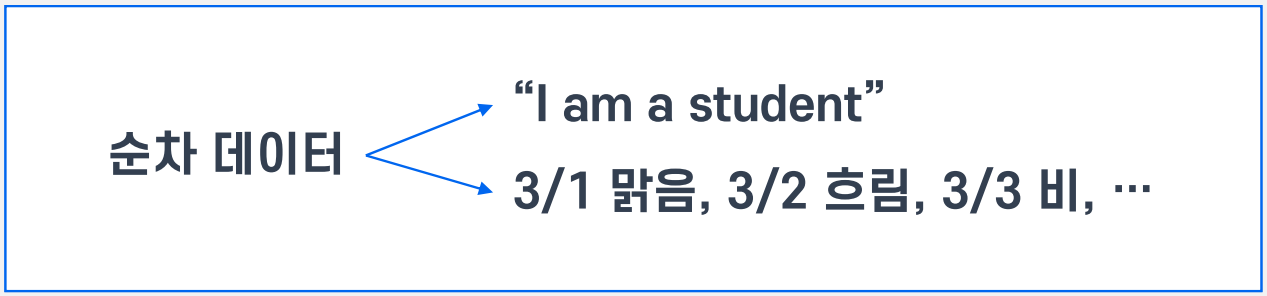
순환신경망 개념과 응용

김재광 교수 (소프트웨어융합대학 글로벌융합학부)

순차 데이터

순차 데이터(sequential data)

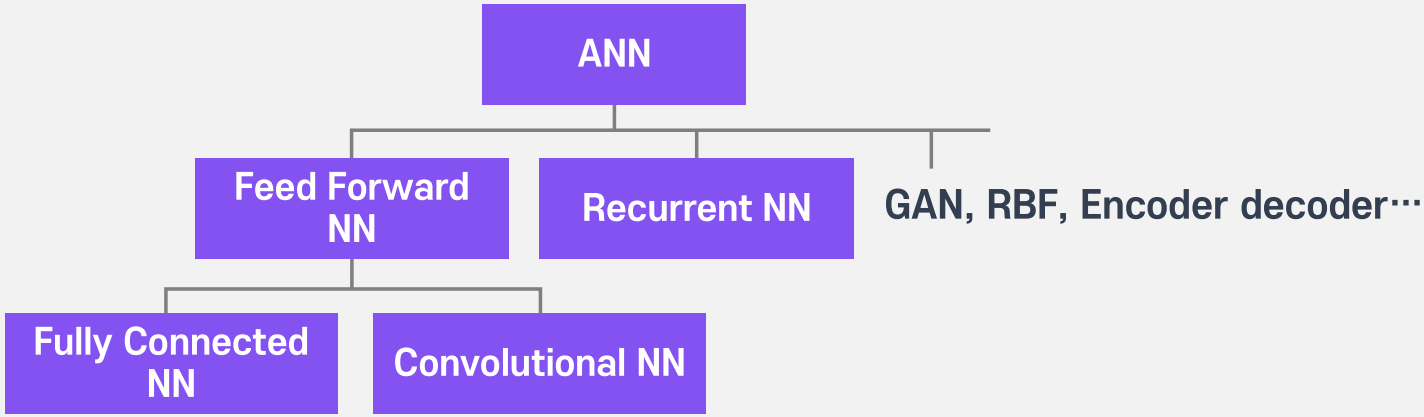
- 텍스트
- 시계열 데이터(time series data)
- …
- 순서에 의미가 있는 데이터



순차 데이터

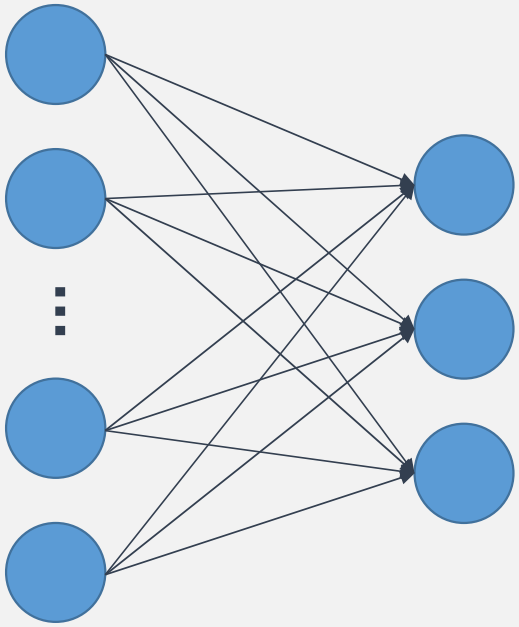
순차 데이터(sequential data)

- 데이터의 입력 순서가 중요함
- 이전에 입력한 데이터를 기억하는 기능이 필요함



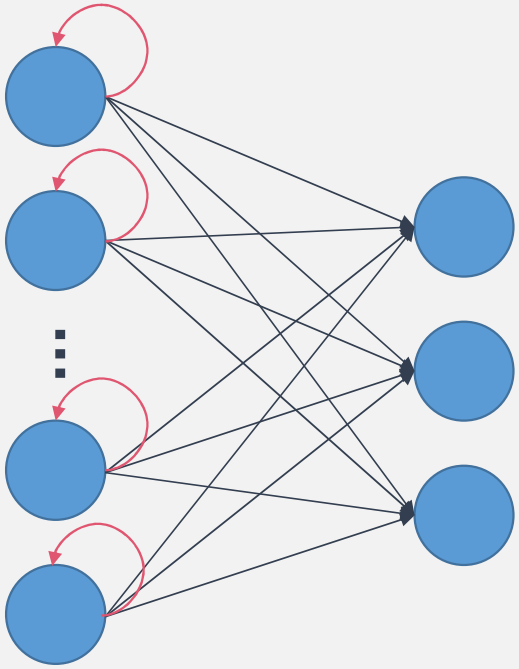
순환 신경망

순환 신경망(Recurrent Neural Network)



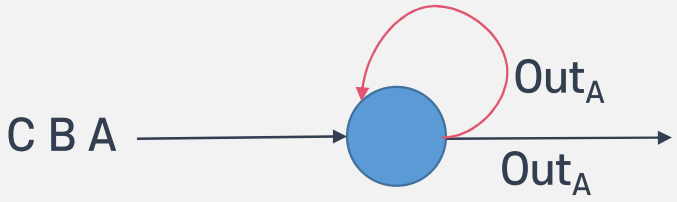
순환 신경망

순환 신경망(Recurrent Neural Network)

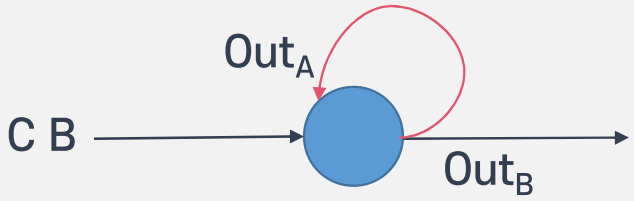


순환 신경망

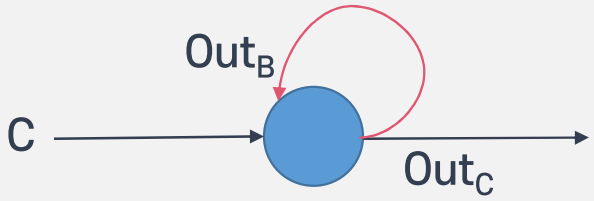
순환 신경망(Recurrent Neural Network)



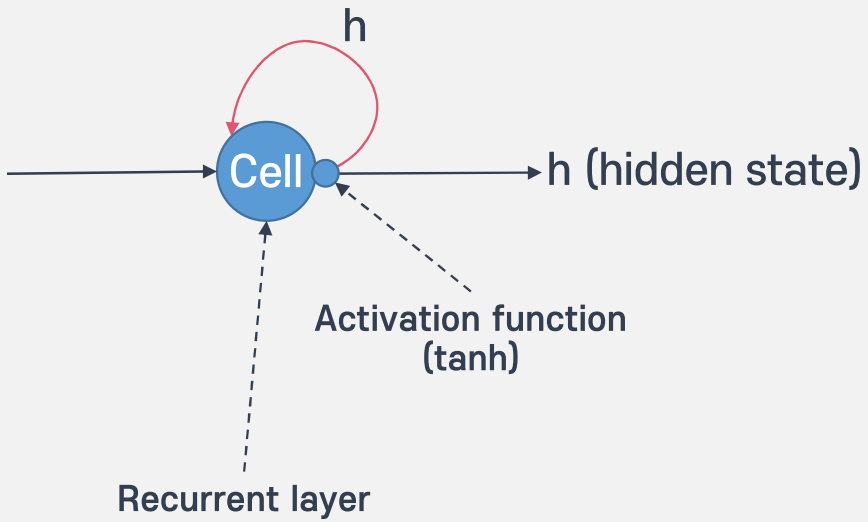
순환 신경망(Recurrent Neural Network)



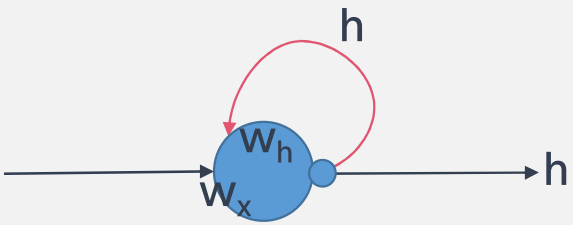
순환 신경망(Recurrent Neural Network)



순환 신경망(Recurrent Neural Network)

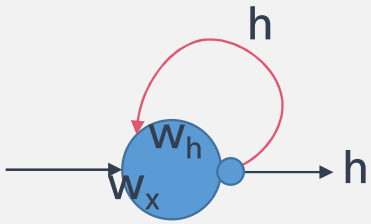


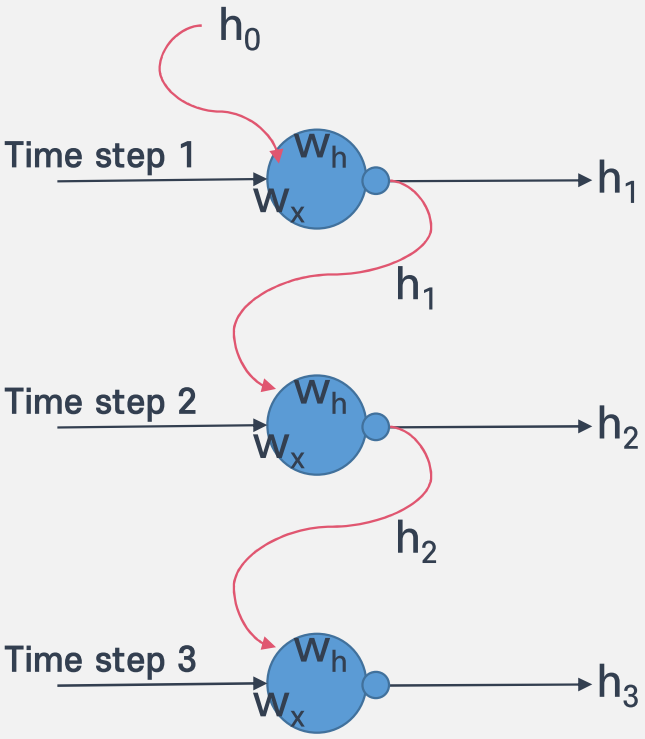
순환 신경망(Recurrent Neural Network)



순환 신경망

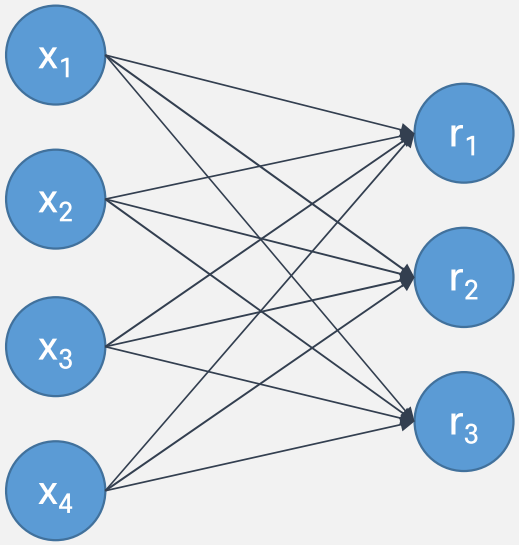
순환 신경망(Recurrent Neural Network)





셀의 가중치와 입출력

$w_x = 12$

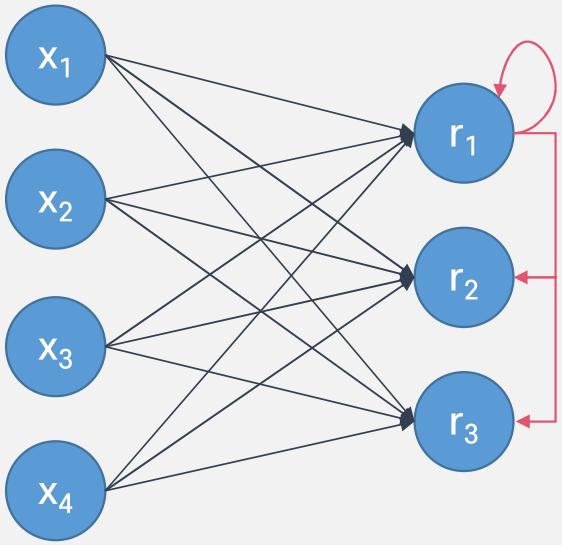


Input layer Recurrent layer

셀의 가중치와 입출력

$w_x = 12$

$w_h = 3$

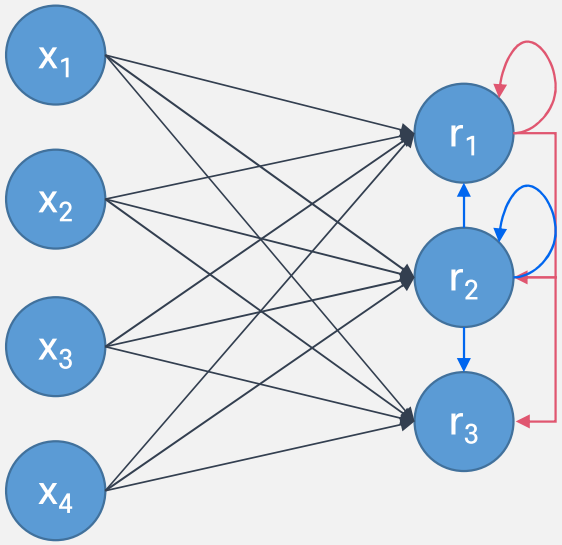


Input layer Recurrent layer

셀의 가중치와 입출력

$w_x = 12$

$w_h = 6$

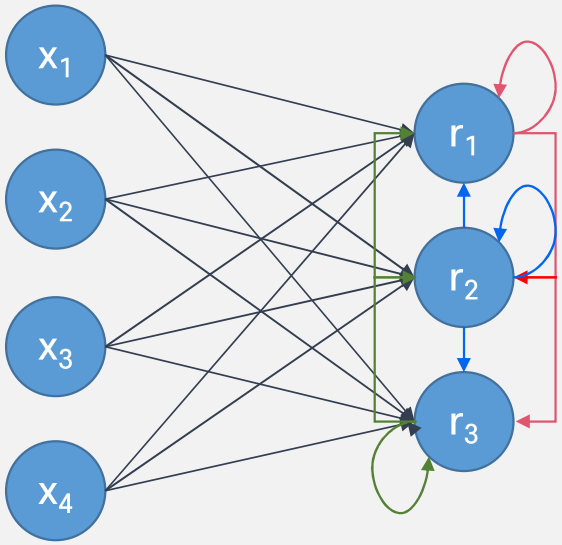


Input layer Recurrent layer

셀의 가중치와 입출력

$w_x = 12$

$w_h = 9$



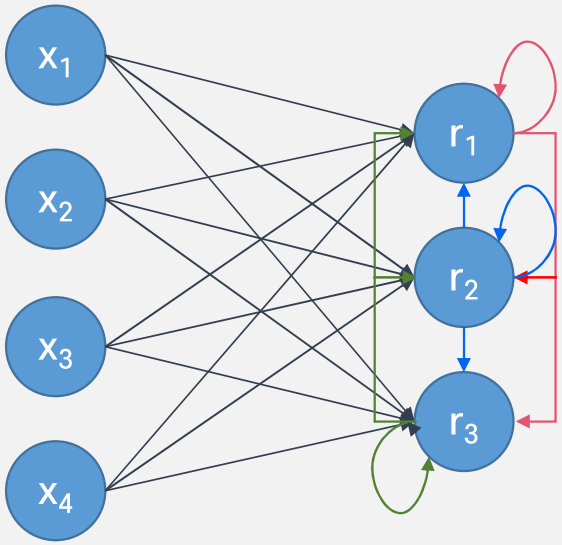
Input layer Recurrent layer

셀의 가중치와 입출력

$w_x = 12$

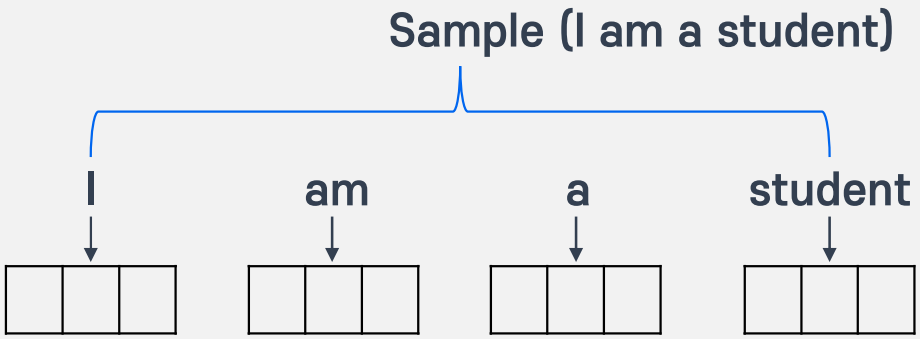
$w_h = 9$

$b = 3$

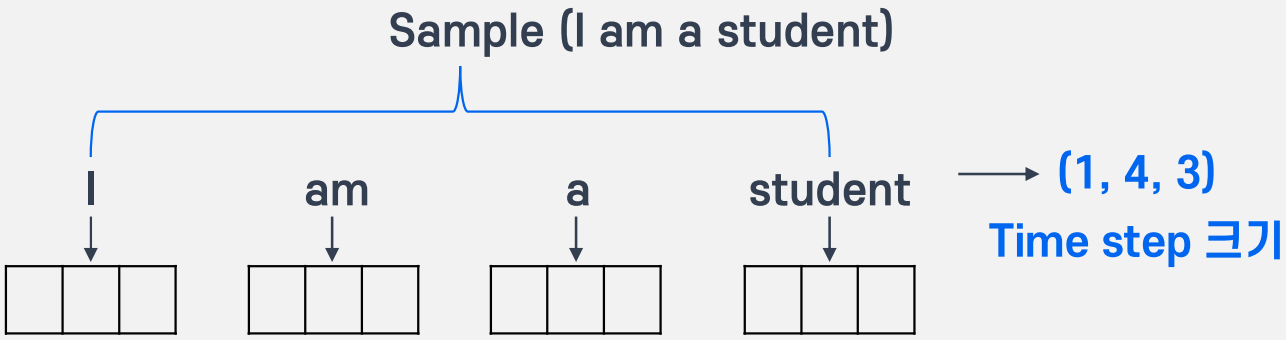


Input layer Recurrent layer

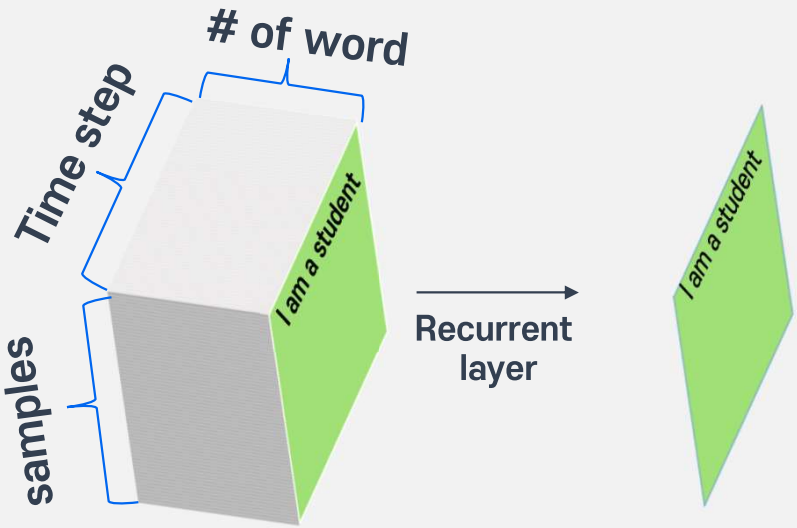
셀의 가중치와 입출력



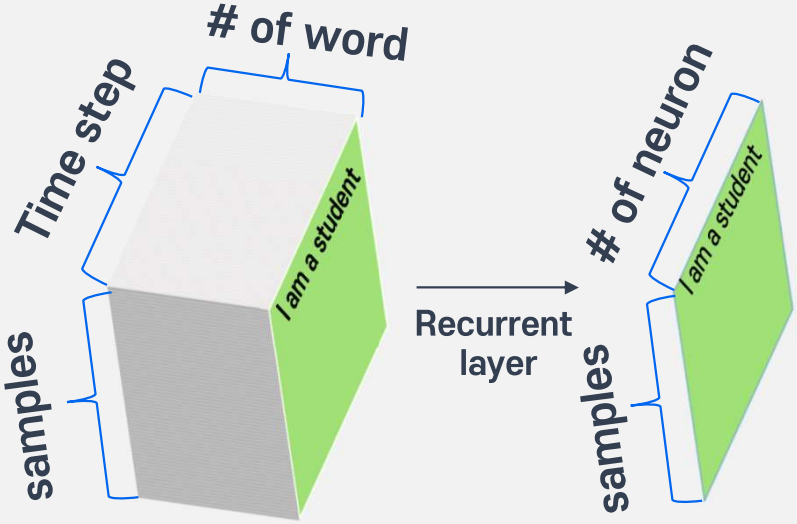
셀의 가중치와 입출력



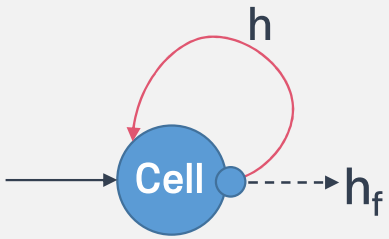
셀의 가중치와 입출력


# of word
Time step
samples
I am a student
Recurrent layer
I am a student

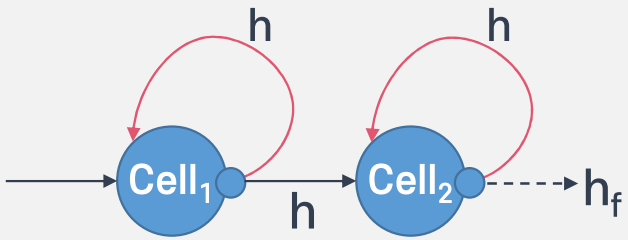
셀의 가중치와 입출력


# of word
Time step
samples
I am a student
Recurrent layer
# of neuron
samples
I am a student

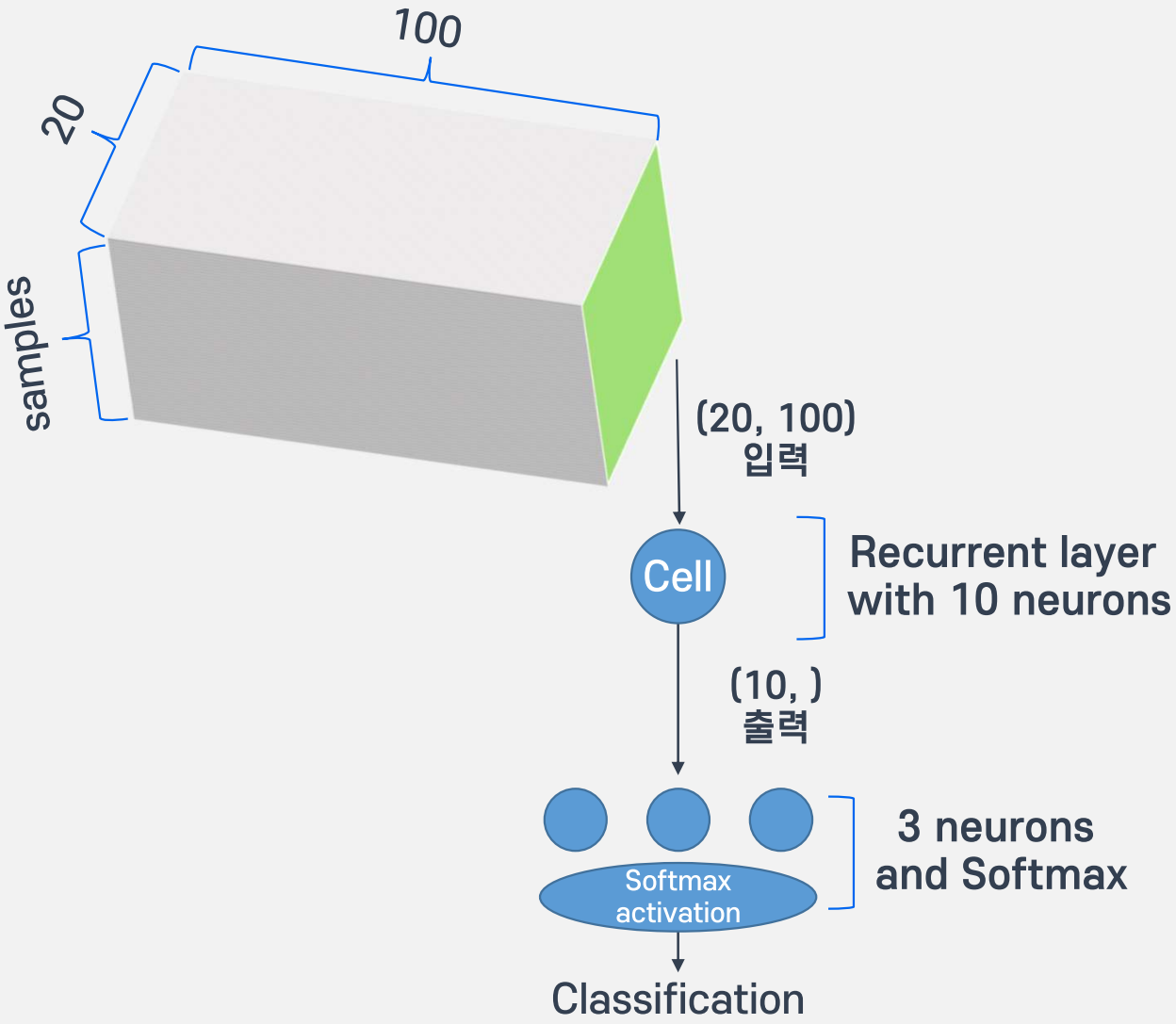
셀의 가중치와 입출력



셀의 가중치와 입출력



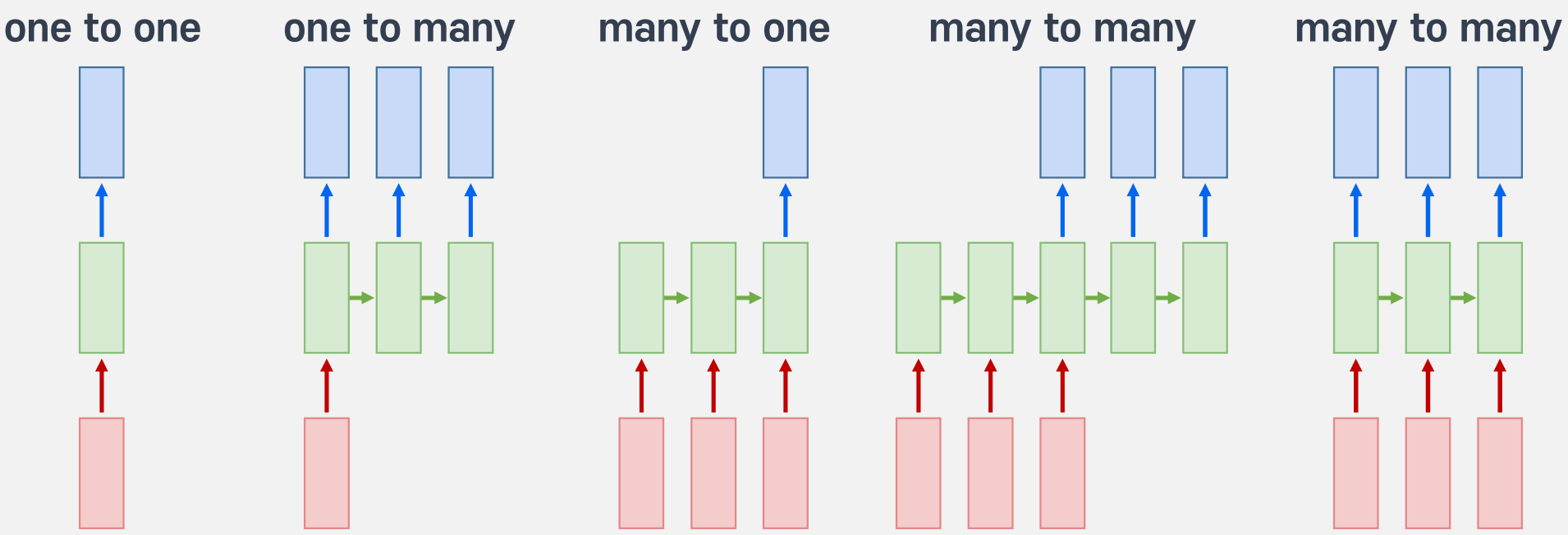
셀의 가중치와 입출력


100
20
samples
(20, 100)
입력
Cell
Recurrent layer
with 10 neurons
(10,)
출력
3 neurons
and Softmax
Softmax
activation
Classification

Recurrent Neural Networks: Applications

Vanilla Neural Networks

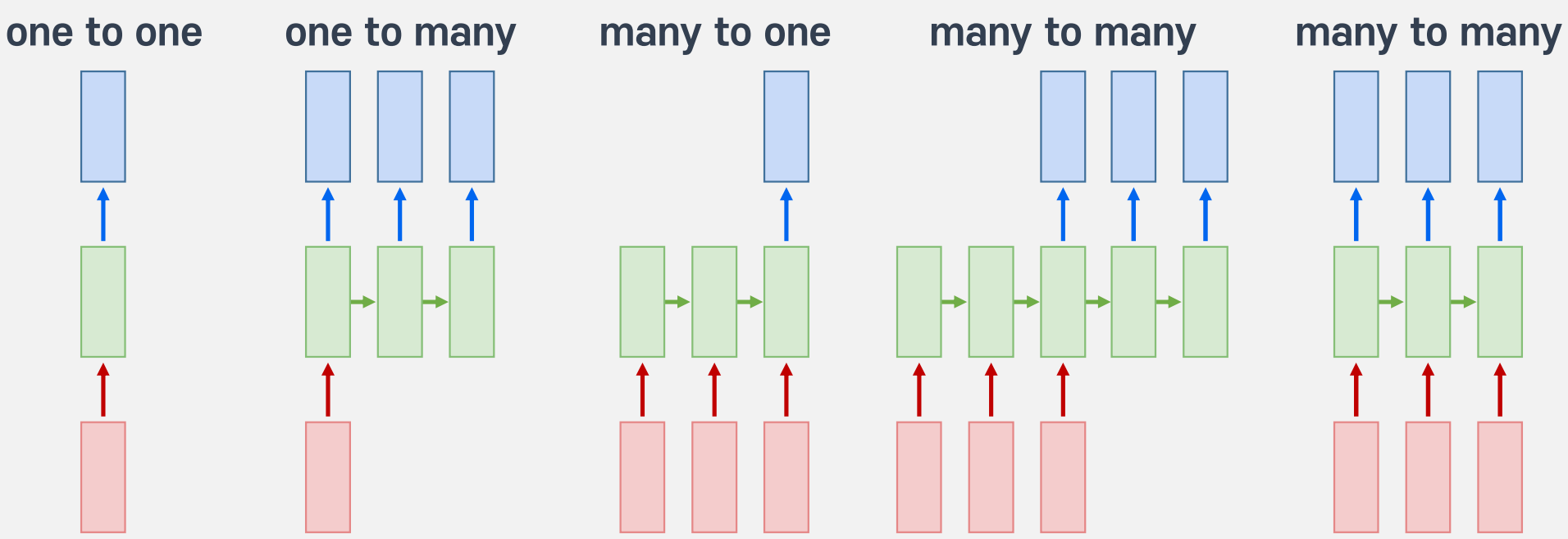
Recurrent Neural Networks: Applications



e.g. Image Captioning

image → sequence of words

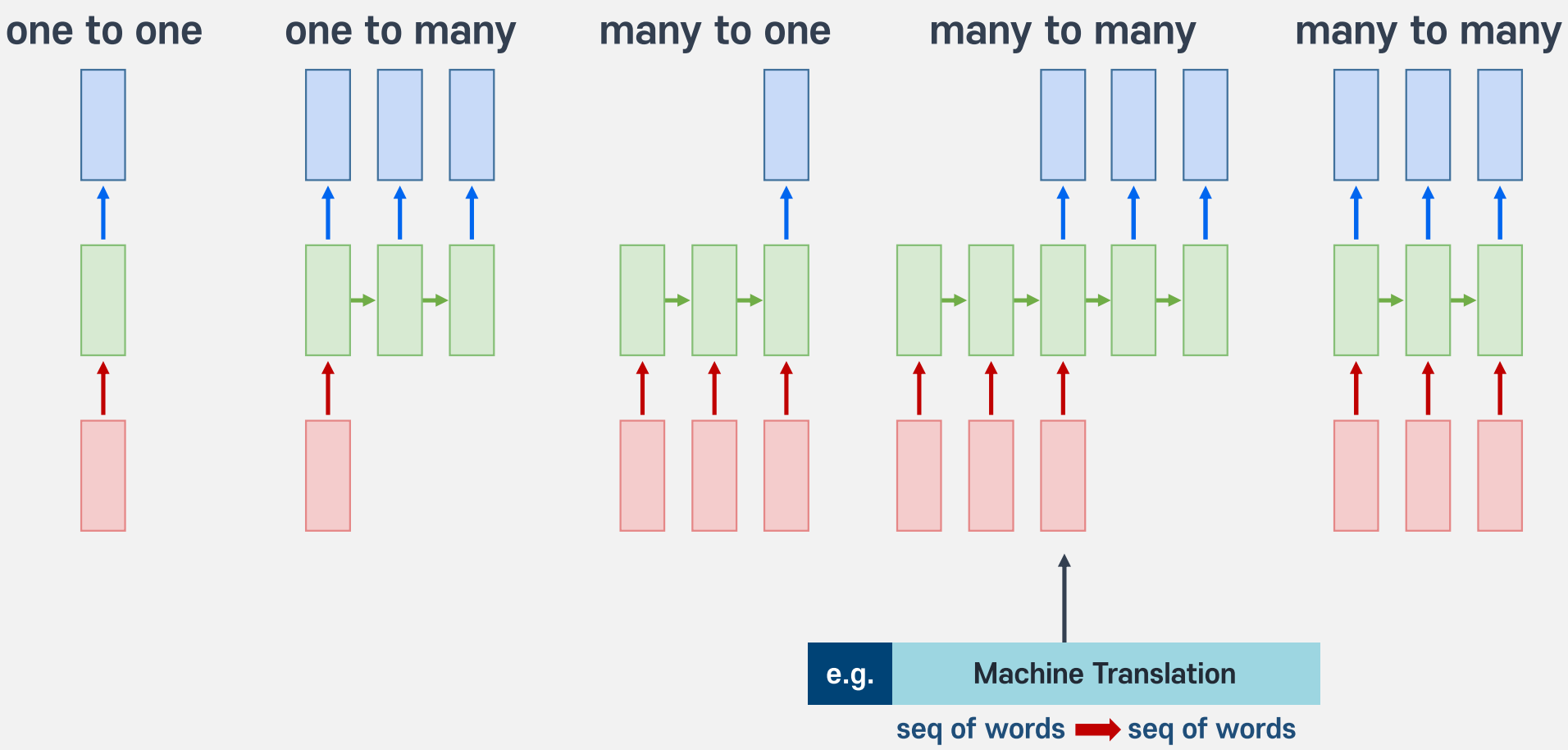
Recurrent Neural Networks: Applications



e.g. Sentiment Classification

sequence of words → sentiment

Recurrent Neural Networks: Applications



Recurrent Neural Networks: Applications