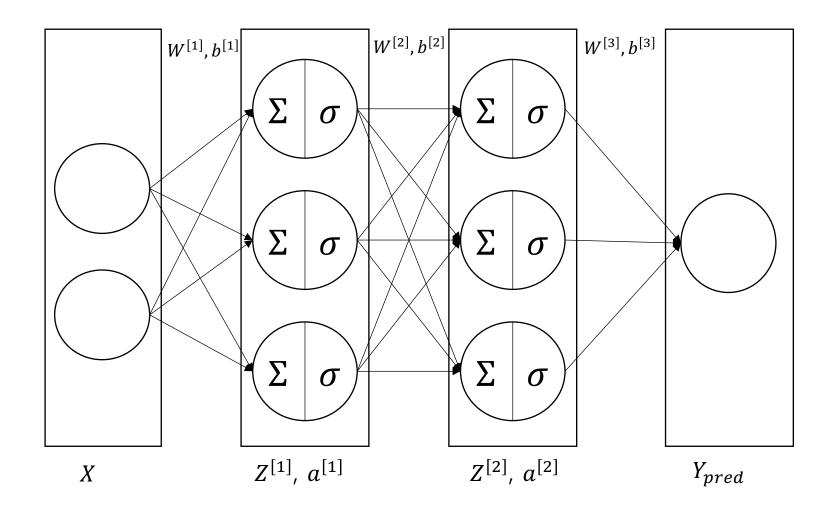
# 순전파 <Feed Forward>



### 3층 신경망

입력층 은닉층 출력층

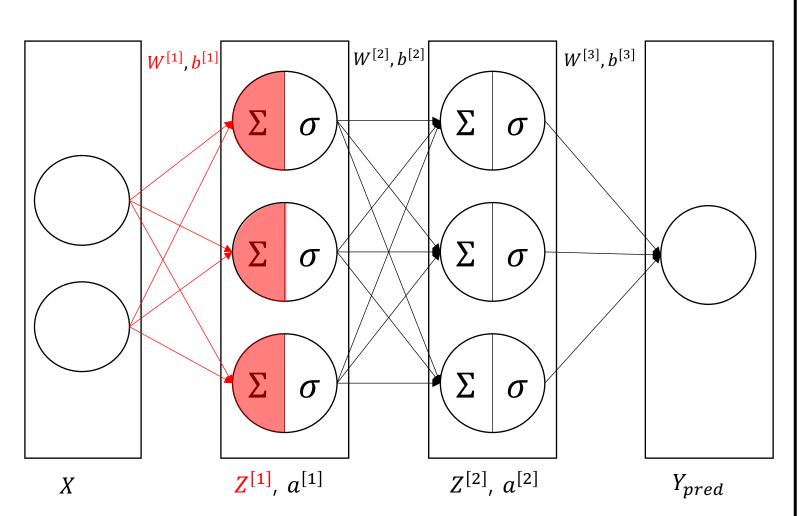




순전파 입력층 은닉층 출력층  $W^{[2]}, b^{[2]}$  $W^{[3]}, b^{[3]}$  $W^{[1]}, b^{[1]}$  $\sigma$  $\sigma$  $\sigma$  $\sigma$  $\sigma$  $Z^{[1]}, a^{[1]}$  $Z^{[2]}, a^{[2]}$  $Y_{pred}$ X PUBLIC AI

입력층 은닉층

출력층



$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

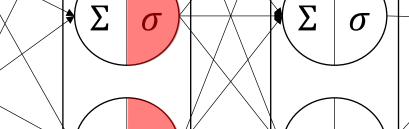


입력층 은닉층

출력층

 $W^{[1]}, b^{[1]}$   $W^{[2]}, b^{[2]}$   $W^{[3]}, b^{[3]}$ 

Σσ



$$Z^{[1]}, a^{[1]}$$
  $Z^{[2]}, a^{[2]}$ 

X

 $\sigma$ 

$$Y_{pred}$$

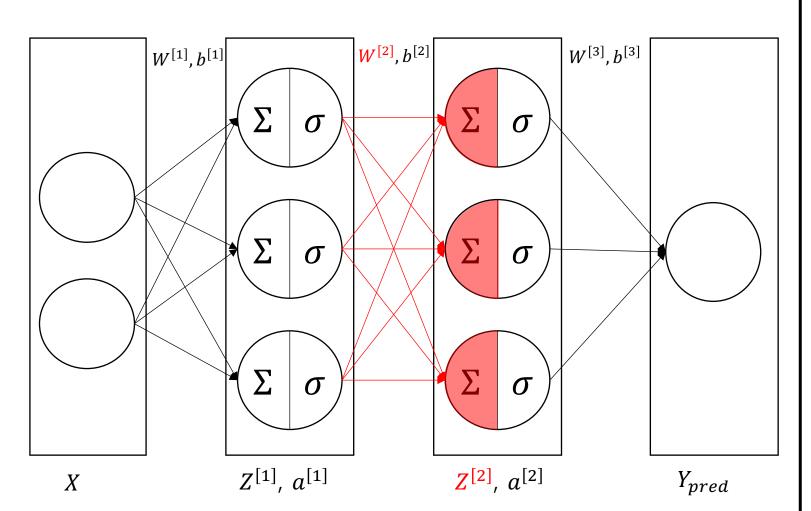
$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

$$a^{[1]} = relu(Z^{[1]})$$



입력층 은닉층

출력층



$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

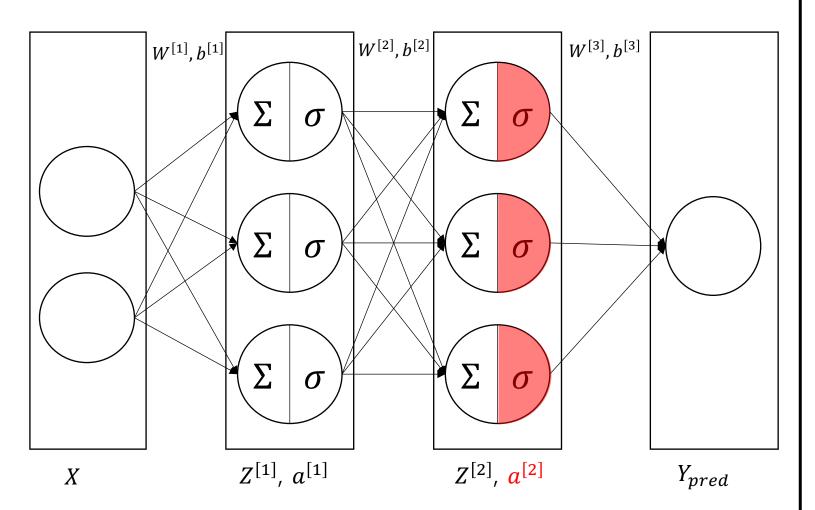
$$a^{[1]} = relu(Z^{[1]})$$

$$Z^{[1]} = a^{[1]}W^{[2]} + b^{[2]}$$



입력층 은닉층

출력층



$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

$$a^{[1]} = relu(Z^{[1]})$$

$$Z^{[1]} = a^{[1]}W^{[2]} + b^{[2]}$$

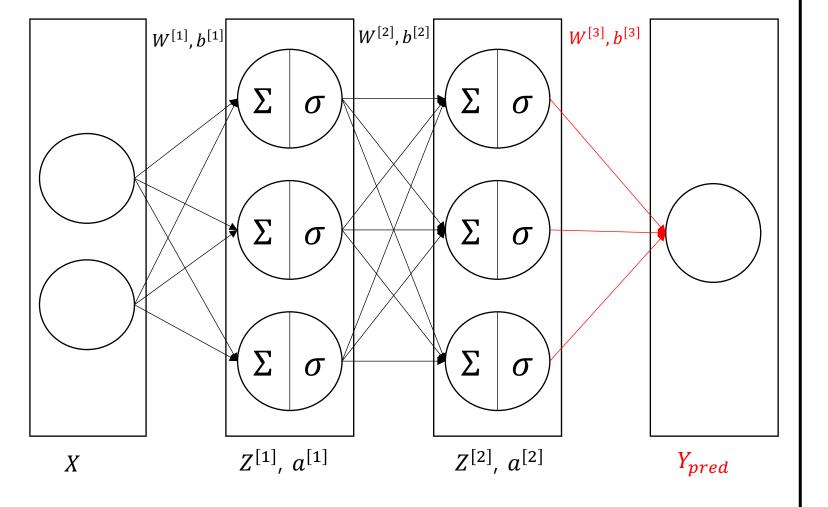
$$a^{[2]} = relu(Z^{[2]})$$



입력층

은닉층

출력층



$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

$$a^{[1]} = relu(Z^{[1]})$$

$$Z^{[1]} = a^{[1]}W^{[2]} + b^{[2]}$$

$$a^{[2]} = relu(Z^{[2]})$$

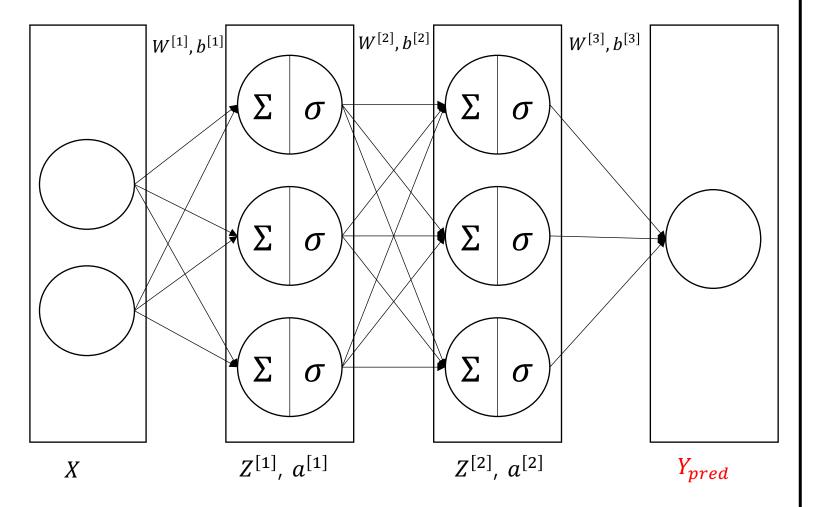
$$Y_{pred} = a^{[2]}W^{[3]} + b^{[3]}$$



입력층

은닉층

출력층



$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

$$a^{[1]} = relu(Z^{[1]})$$

$$Z^{[1]} = a^{[1]}W^{[2]} + b^{[2]}$$

$$a^{[2]} = relu(Z^{[2]})$$

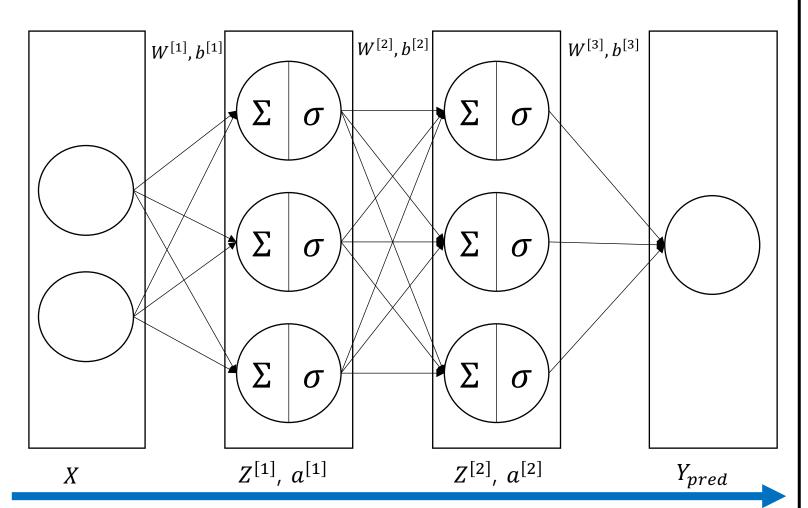
$$Y_{pred} = a^{[2]}W^{[3]} + b^{[3]}$$

$$Loss = \frac{1}{2}(Y_{pred} - Y_{true})^2 \leftarrow$$
 손실함수



입력층 은닉층

출력층



#### 순전파

입력값(X)로부터  $Y_{pred}$ 를 산출하는 과정

$$Z^{[1]} = XW^{[1]} + b^{[1]}$$

$$a^{[1]} = relu(Z^{[1]})$$

$$Z^{[1]} = a^{[1]}W^{[2]} + b^{[2]}$$

$$a^{[2]} = relu(Z^{[2]})$$

$$Y_{pred} = a^{[2]}W^{[3]} + b^{[3]}$$

$$Loss = \frac{1}{2}(Y_{pred} - Y_{true})^2$$
  $\leftarrow$  손실함수

