

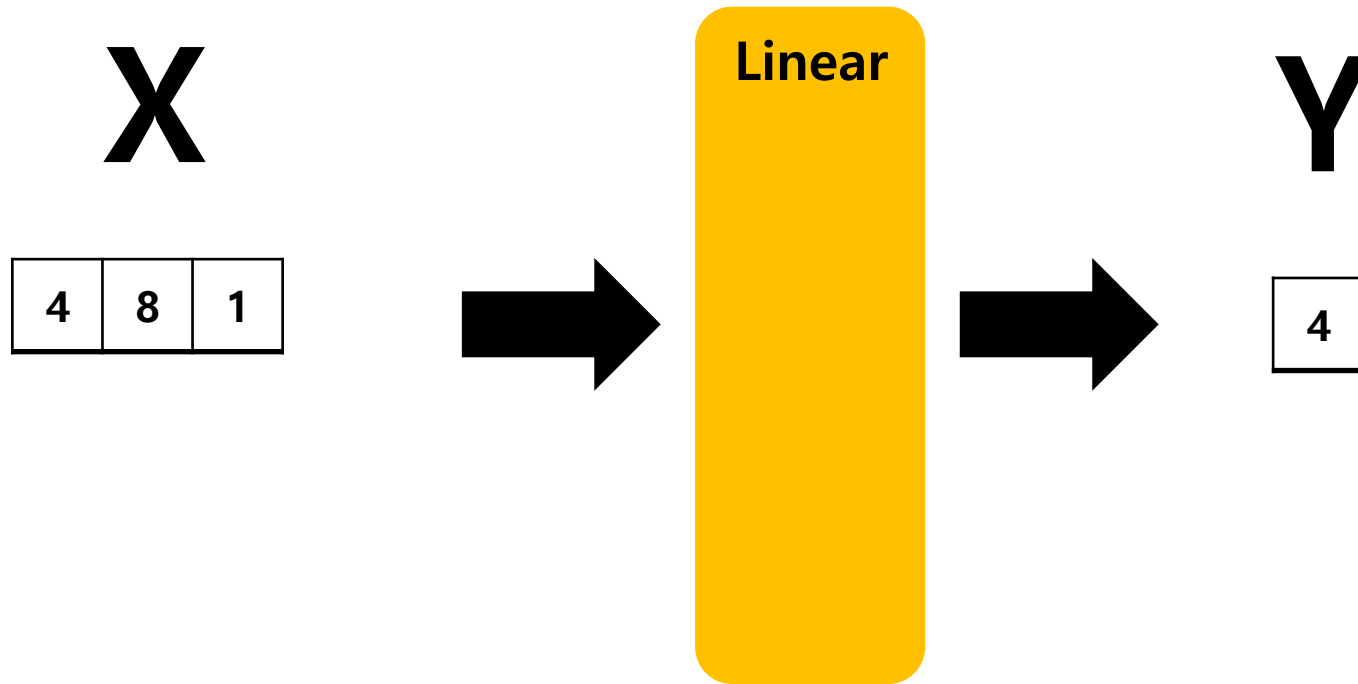
딥러닝 기초

강사 윤예빈

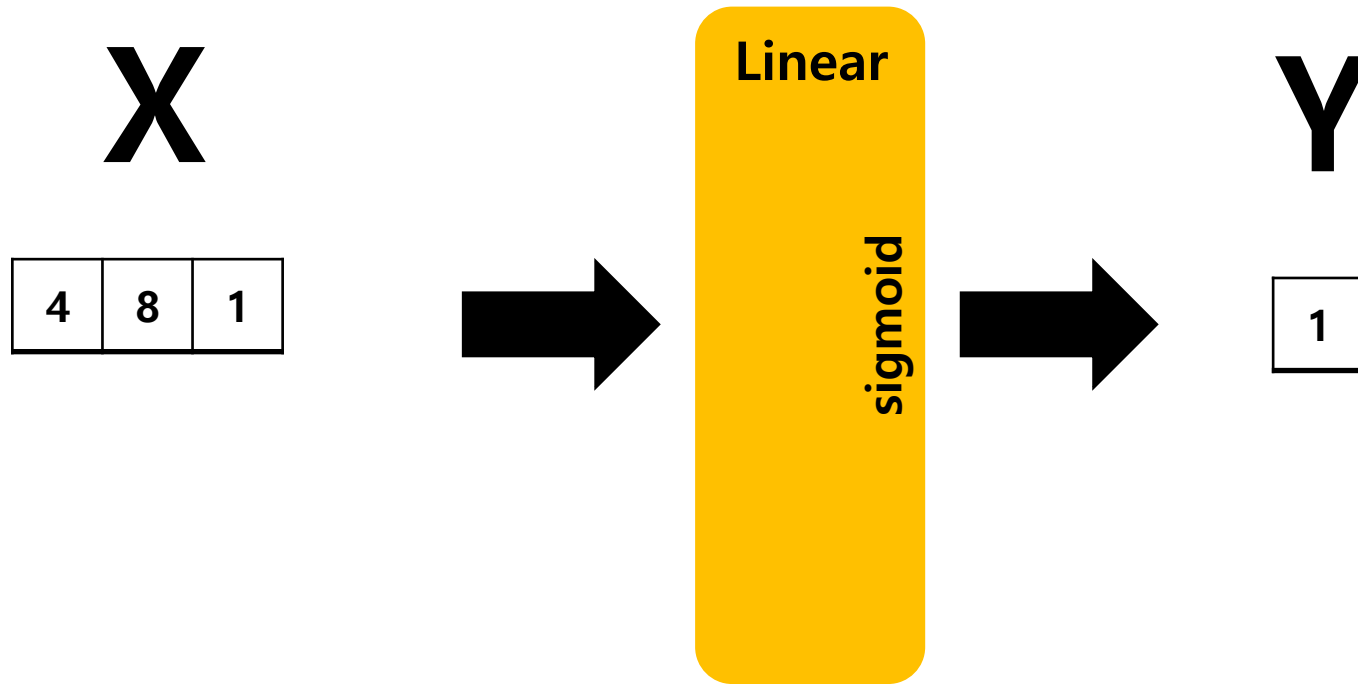
yebinyoun@gmail.com

<https://github.com/yebiny>

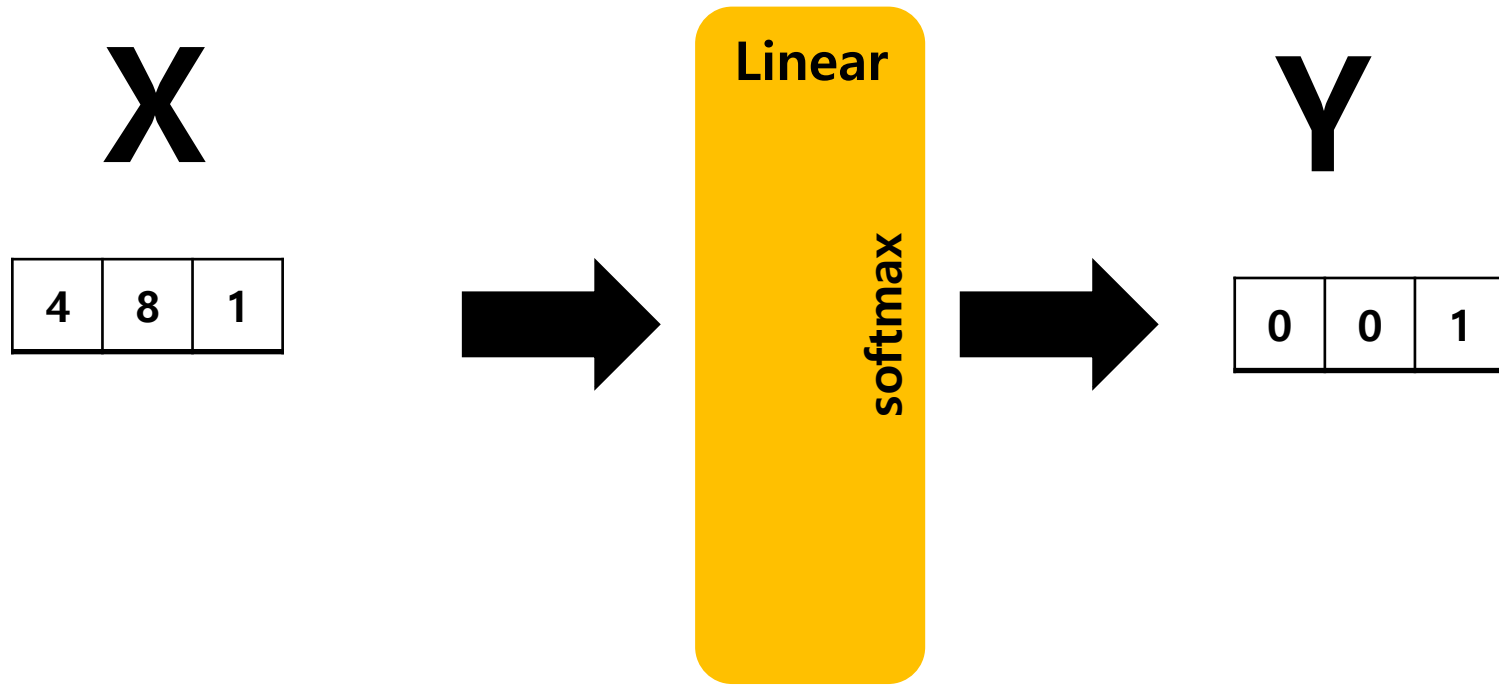
Linear regression



Logistic regression



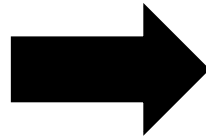
Softmax regression



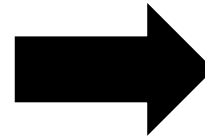
Model

X

| | | |
|---|---|---|
| 4 | 8 | 1 |
|---|---|---|



Model



Y

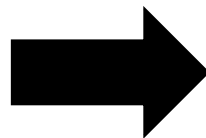
| | | |
|---|---|---|
| 4 | 8 | 1 |
|---|---|---|



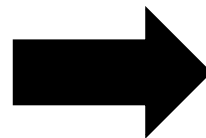
주가예측

오늘 가격?

X



Model



Y

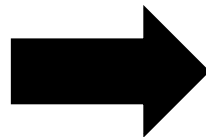
주가예측



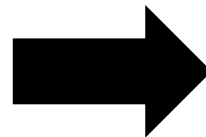
오늘 가격?

X

| | | | | | | |
|----|----|----|--|-----|--|----|
| 45 | 50 | 60 | | ... | | 85 |
|----|----|----|--|-----|--|----|



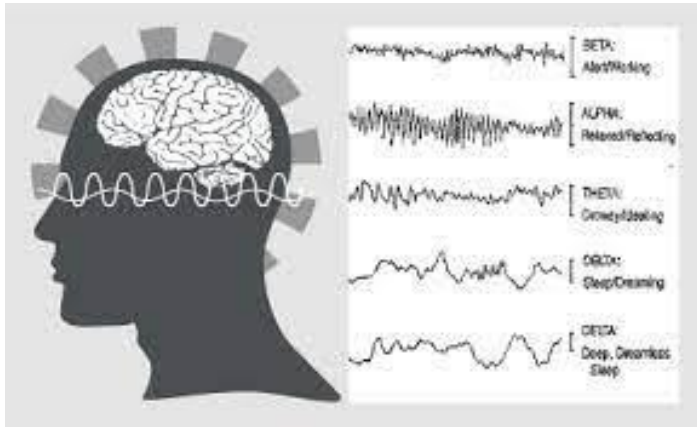
Model



Y

90

뇌파

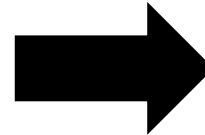
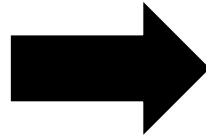


수면? 각성? 운동?

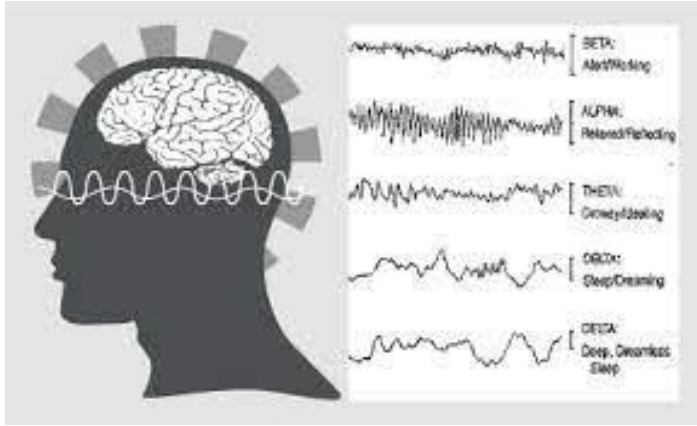
X

Model

Y



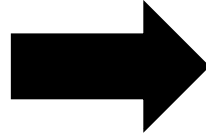
뇌파



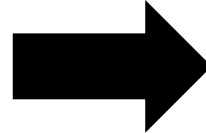
수면? 각성? 운동?

X

| | | | | | | |
|----|----|----|--|-----|--|----|
| 45 | 50 | 60 | | ... | | 85 |
|----|----|----|--|-----|--|----|



Model



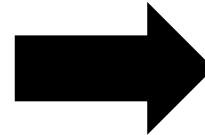
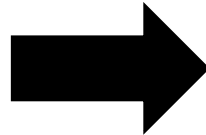
Y

| | | |
|---|---|---|
| 0 | 0 | 1 |
|---|---|---|

자연어 처리

만나서 반갑습니다. 기계번역 → Nice to meet you
챗봇 → 저도 만나서 반가워요

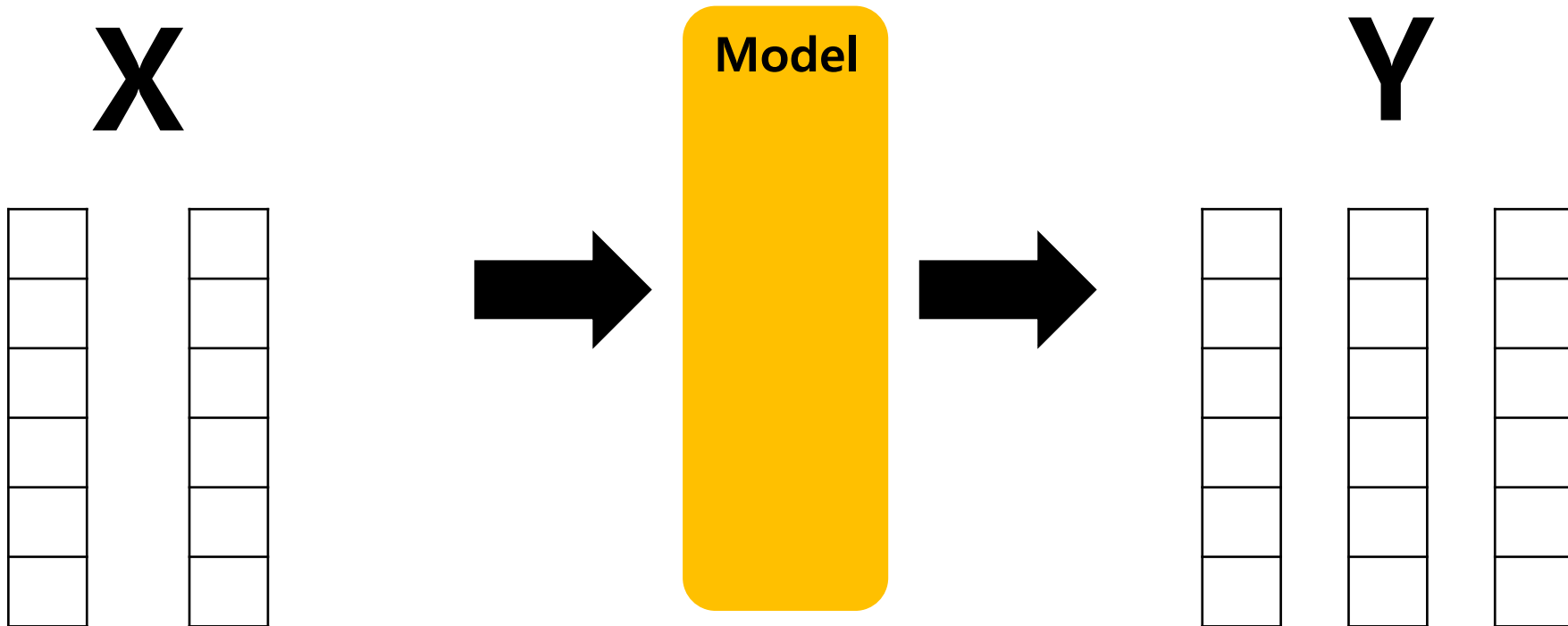
X



Y

자연어 처리

만나서 반갑습니다. 기계번역 → Nice to meet you
챗봇 → 저도 만나서 반가워요

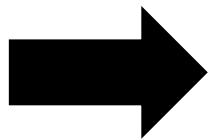


이미지 처리

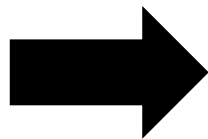


이미지분류 → 개? 고양이? 새? 자동차? ... ?

X



Model



Y

이미지 처리



이미지분류 → 개? 고양이? 새? 자동차? ... ?

X

| | | | | | | |
|---|---|---|---|---|---|--|
| | | | | | | |
| | | | | | | |
| 3 | 0 | 1 | 2 | 7 | 4 | |
| 1 | 5 | 8 | 9 | 3 | 1 | |
| 2 | 7 | 2 | 5 | 1 | 3 | |
| 0 | 1 | 3 | 1 | 7 | 8 | |
| 4 | 2 | 1 | 6 | 2 | 8 | |
| 2 | 4 | 5 | 2 | 3 | 9 | |

Model

Y

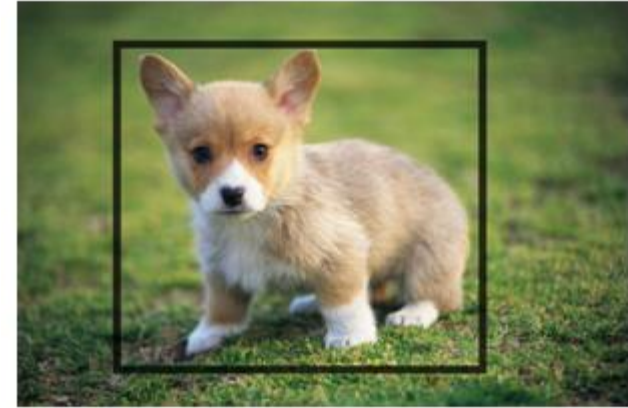
| |
|---|
| 0 |
| 1 |
| 0 |
| 0 |
| 0 |
| 0 |

이미지 처리



X

객체검출



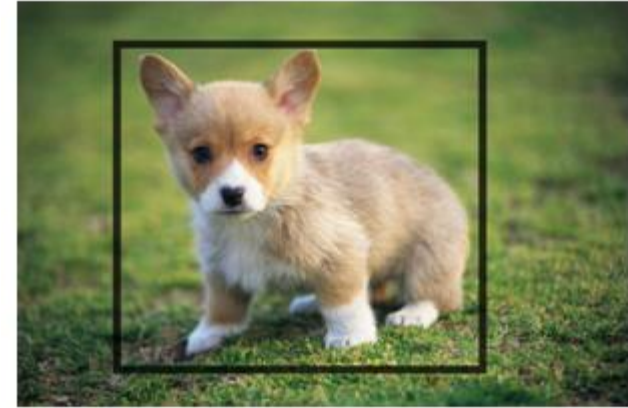
Y

Model

이미지 처리



객체검출



X

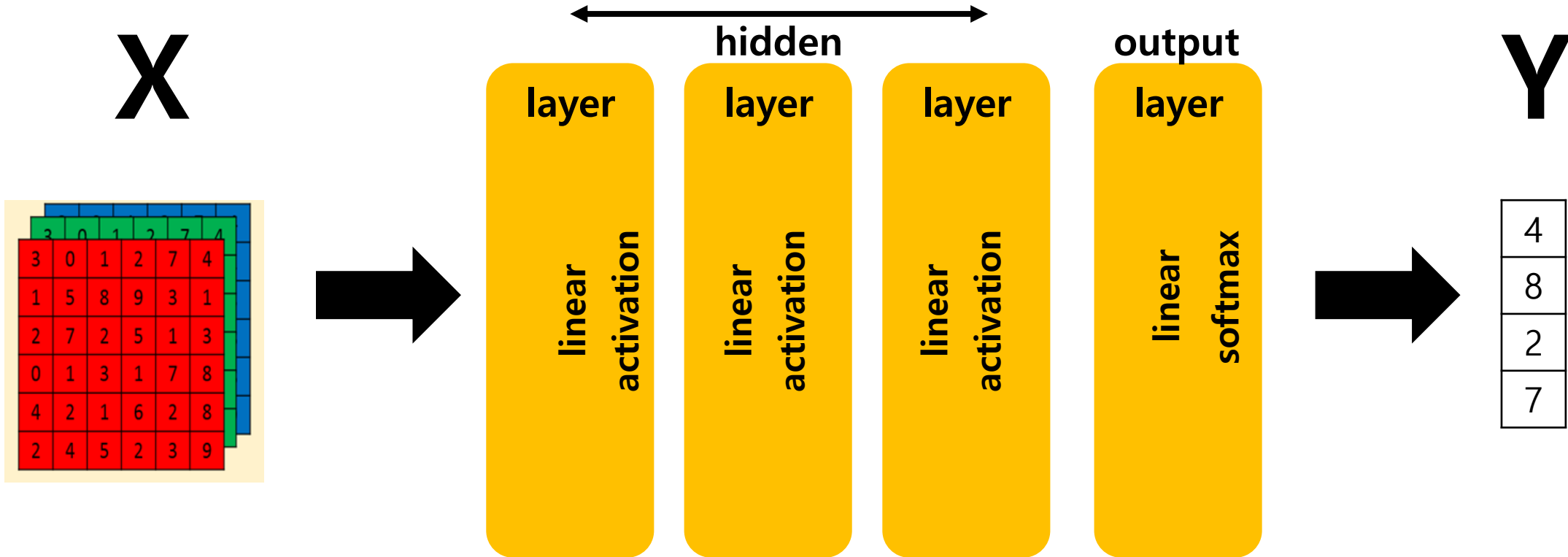
| | | | | | |
|---|---|---|---|---|---|
| 3 | 0 | 1 | 2 | 7 | 4 |
| 1 | 5 | 8 | 9 | 3 | 1 |
| 2 | 7 | 2 | 5 | 1 | 3 |
| 0 | 1 | 3 | 1 | 7 | 8 |
| 4 | 2 | 1 | 6 | 2 | 8 |
| 2 | 4 | 5 | 2 | 3 | 9 |

Model

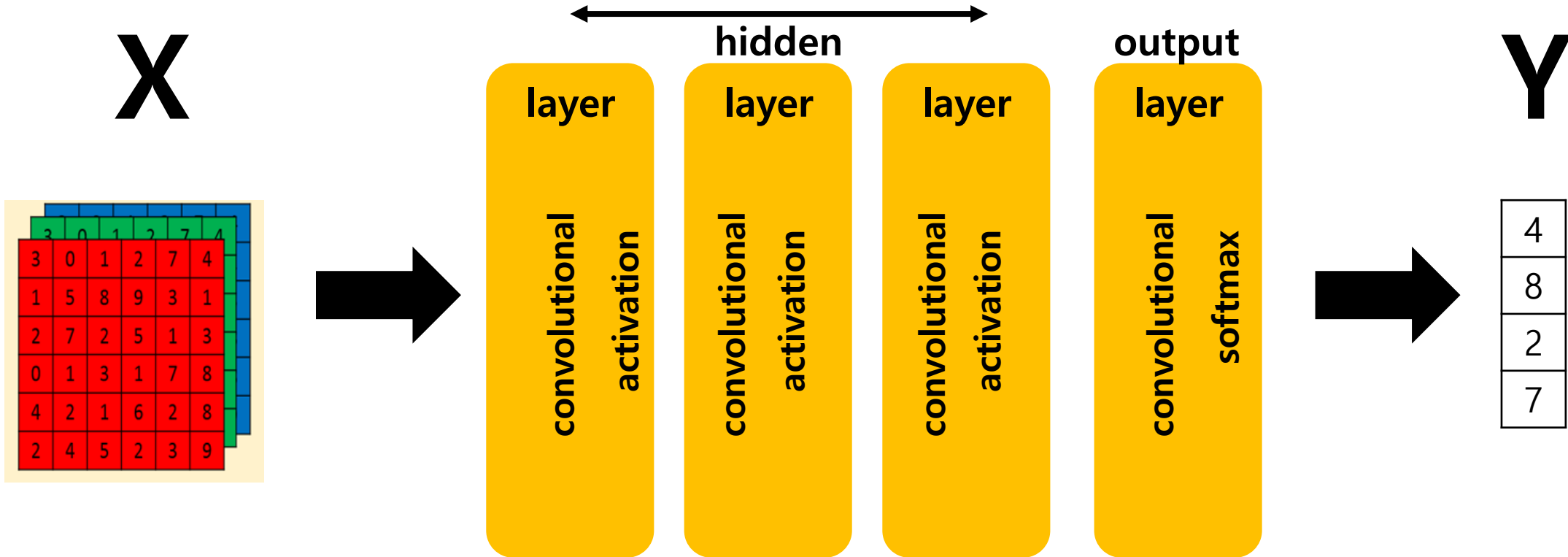
Y

| |
|---|
| 4 |
| 8 |
| 2 |
| 7 |

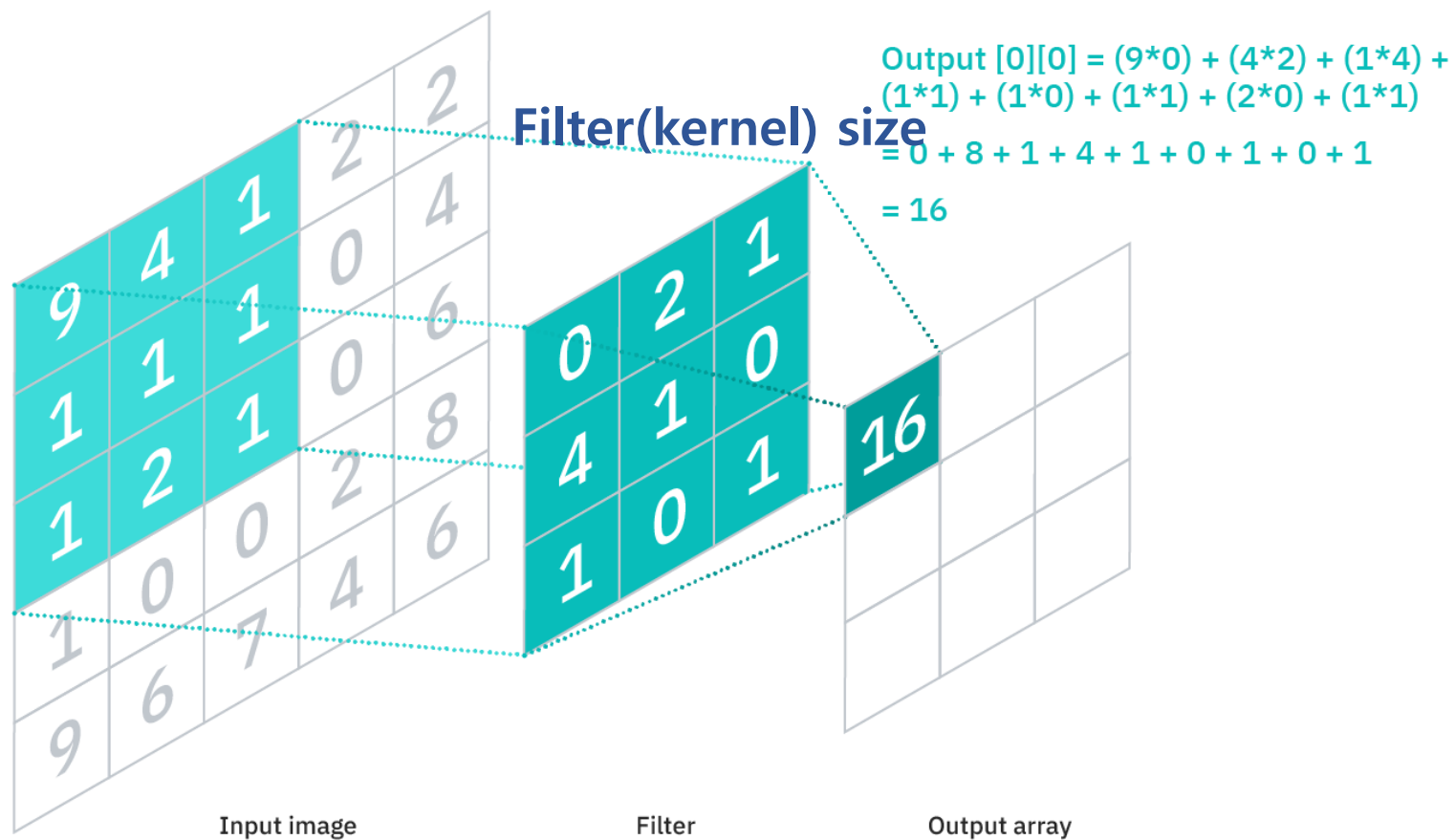
Deep Neural Network



Convolutional Neural Network



CNN 알고리즘



CNN 알고리즘

| | | | | | |
|---|-----|-----|-----|-----|-----|
| 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 105 | 102 | 100 | 97 | 96 |
| 0 | 103 | 99 | 103 | 101 | 102 |
| 0 | 101 | 98 | 104 | 102 | 100 |
| 0 | 99 | 101 | 106 | 104 | 99 |
| 0 | 104 | 104 | 104 | 100 | 98 |

Image Matrix

Kernel Matrix

| | | |
|----|----|----|
| 0 | -1 | 0 |
| -1 | 5 | -1 |
| 0 | -1 | 0 |

| | | | | | |
|-----|--|--|--|--|--|
| 320 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Output Matrix

$$\begin{aligned} &0 * 0 + 0 * -1 + 0 * 0 \\ &+ 0 * -1 + 105 * 5 + 102 * -1 \\ &+ 0 * 0 + 103 * -1 + 99 * 0 = 320 \end{aligned}$$

**Convolution with horizontal and
vertical strides = 1**

Pooling

| | | | |
|-----|----|----|----|
| 13 | 20 | 30 | 0 |
| 8 | 12 | 3 | 0 |
| 34 | 70 | 33 | 5 |
| 111 | 80 | 10 | 23 |

Activation Map

| | |
|-----|----|
| 20 | 30 |
| 111 | 33 |

Max Pooling

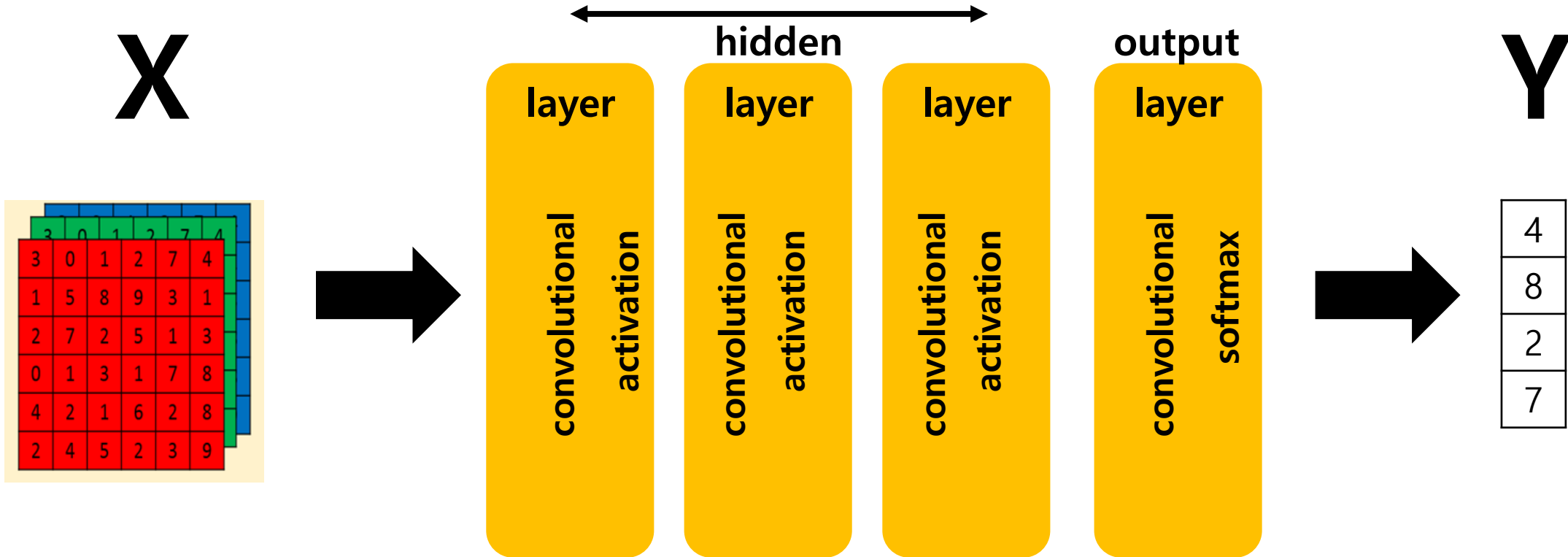
| | |
|----|----|
| 13 | 8 |
| 66 | 18 |

Average Pooling

| | |
|----|---|
| 8 | 0 |
| 34 | 5 |

Min Pooling

Convolutional Neural Network



모델 개발 과정

데이터

모델

모델 개발 과정

데이터

모델

모델 개발 과정

데이터

데이터 수집, 가공, EDA, 데이터 전처리 ...

모델

모델 build, 학습, 결과

최적화

