

데이터 사이언스와 인공지능

제주대학교 변영철

나, 연서





양, 들끼



추억의 빵 튀기

보름쌔 상회














나만의 메리골드 

날짜	길이 (전체)	너비	길이 (앞다리)
2019.06.16	0	0	0
2019.06.20	1.6cm	0.28cm	0.9cm
06.22	2.6cm	3.8cm	1.4cm
6.25	3.0 3cm	4.6cm	1.6cm
2019.6.29	4.4	5.8 5.8cm	2cm
	5.0	0.58cm	
	5.0	0.6	2.2

② 돌고래

① 큰따개비



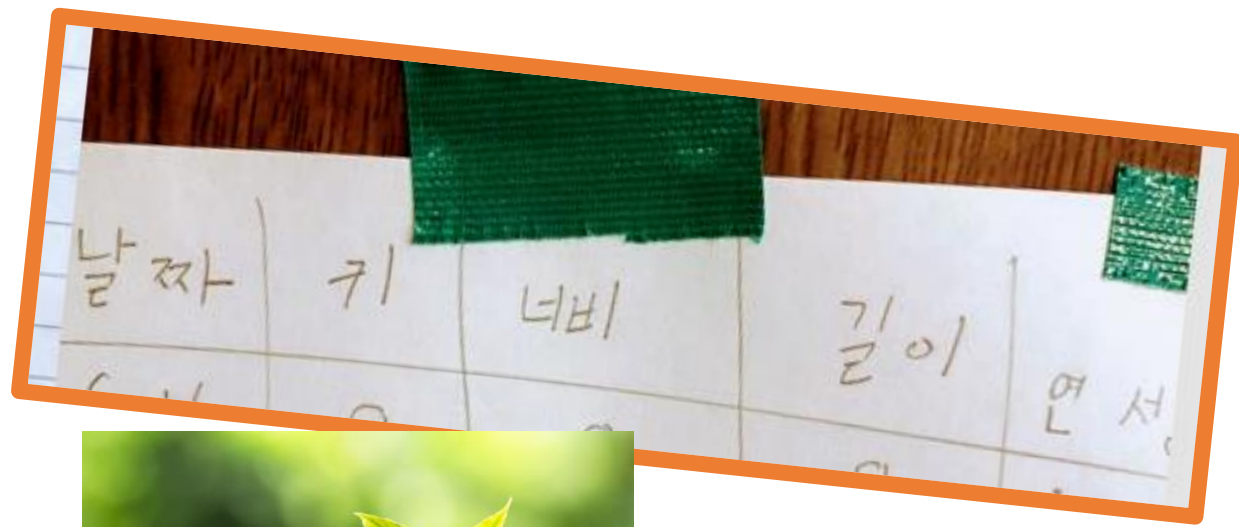
2019.06.16	0	0	0
2019.06.20	1.6cm	0.28cm	0.9cm
2019.06.22	3.3cm	4.5cm	1.5cm
6.25	3.5cm	5cm	1.8cm
6.29	5cm	0.65cm	2.5cm

날짜	길이	너비	길이
	0	0	0
	12mm	2.9mm	8mm
6.22	25mm	4.5mm	13mm
25	31mm	5.5mm	15mm
6.29	45.5mm	60mm	19mm

③ 세시개

지난날짜, 키, 잎 너비, 잎 길이, 주인

1, 0, 0, 0, 1
1, 0, 0, 0, 2
1, 0, 0, 0, 3
5, 16, 28, 9, 1
5, 16, 2.8, 9, 2
5, 12, 2.9, 8, 3
7, 33, 4.5, 15, 1
7, 26, 3.8, 14, 2
7, 25, 4.5, 13, 3
10, 35, 5, 18, 1
10, 30, 4.6, 16, 2
10, 31, 5.5, 15, 3
14, 50, 6.5, 25, 1
14, 44, 5.8, 20, 2
14, 45.5, 6, 19, 3
20, 56, 6.8, 27, 1
20, 50, 6, 22, 2
20, 51, 6.5, 21, 3



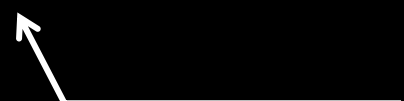
'날짜'가 지남에 따라
'잎 너비'는 얼마나 자랐을까?
점으로 찍어보라(plot!)
(주인에 따라 다른 색으로 표시)

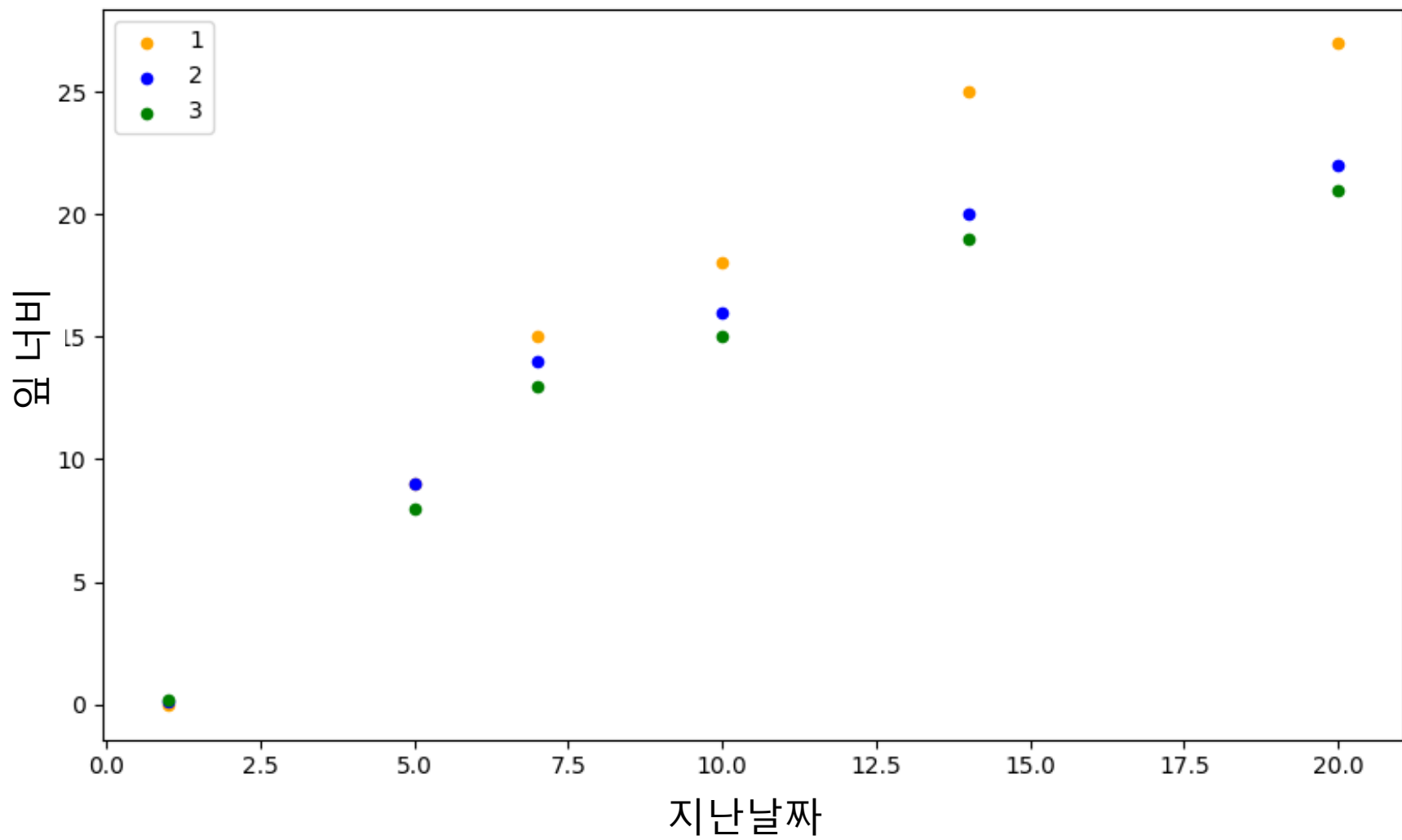
plot(df, '날짜', '잎 너비', '주인')

아까 그 데이터

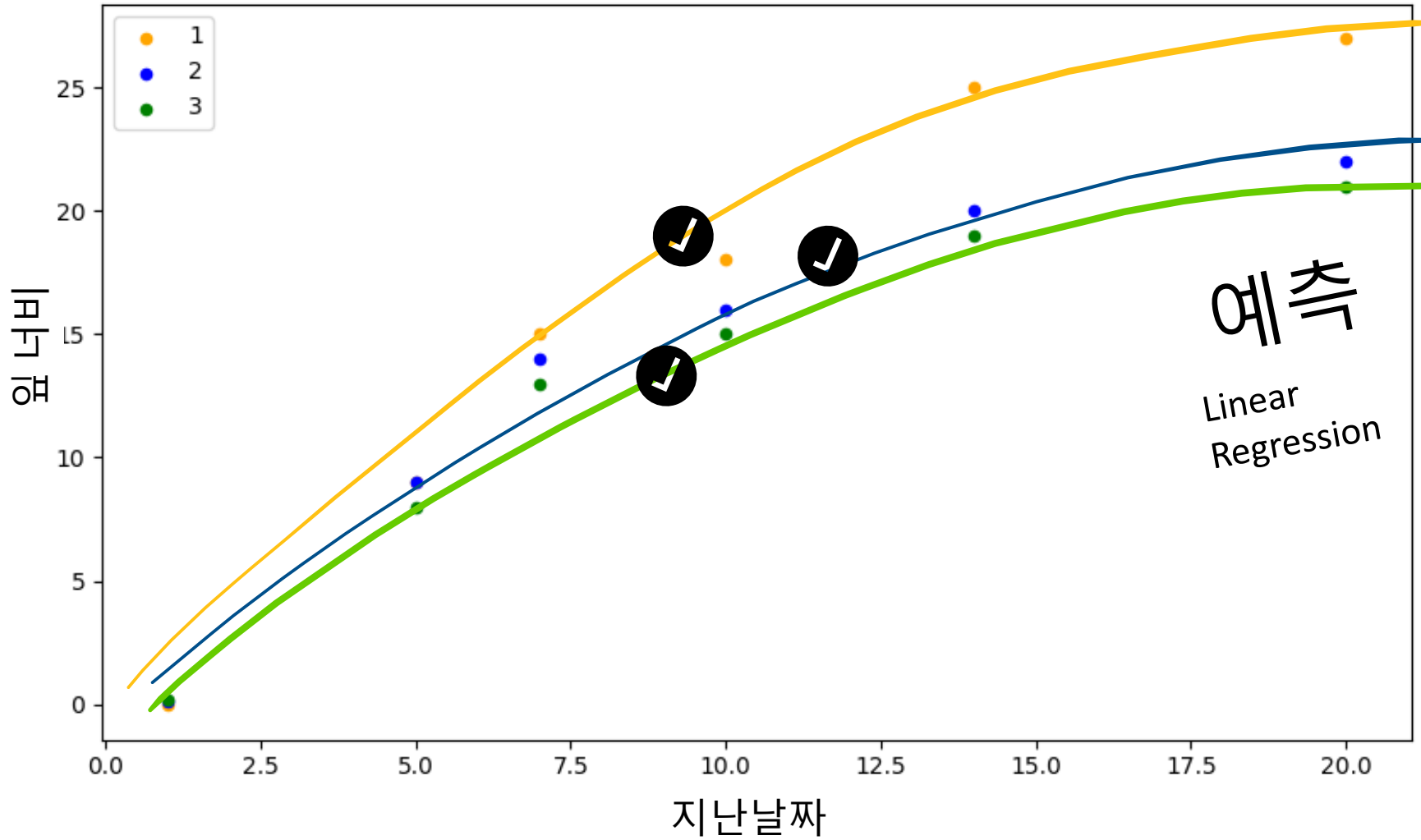


첫째 아이, 둘째
셋째

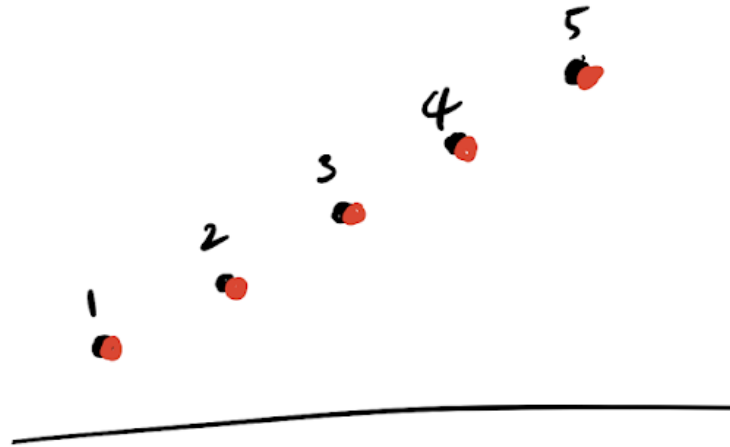




지난날짜 vs. 앞 너비



스코어(score)

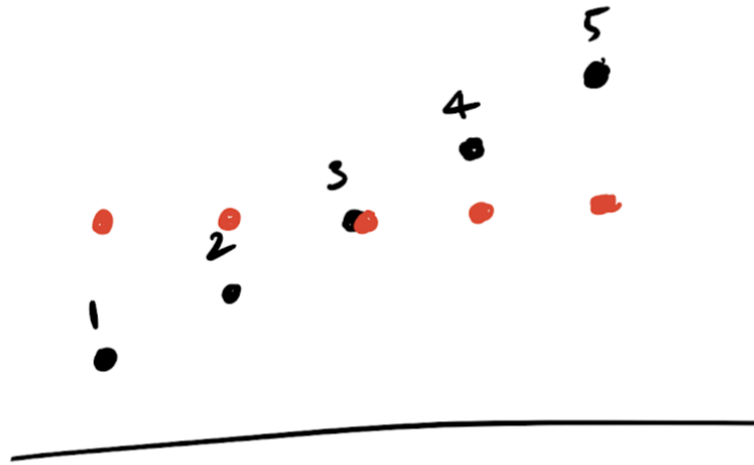


$$\text{score} = 1 - \frac{(\bullet - \bullet)^2}{(\bullet - \underbrace{\overline{(\bullet)}}_{\text{mean}})^2} = 1 - \frac{0}{10} = 1$$

↓

$$\begin{aligned} & (1-3)^2 + (2-3)^2 + (3-3)^2 + (4-3)^2 + (5-3)^2 \\ &= 2^2 + 1^2 + 0^2 + 1^2 + 2^2 = 10 \end{aligned}$$

스코어(score)



$$\text{score} = 1 - \frac{(\bullet - \bullet)^2}{(\bullet - \overline{\text{color}})^2} = 1 - \frac{10}{10} = 1 - 1 = 0$$

$$\begin{aligned} &= (1-3)^2 + (2-3)^2 + (3-3)^2 + (4-3)^2 + (5-3)^2 \\ &= 2^2 + 1^2 + 0^2 + 1^2 + 2^2 = 10 \end{aligned}$$

예측 알고리즘

Machine Learning

- KNeighborsRegressor (K-근접)
- DecisionTreeRegressor (결정 트리)
- RandomForestRegressor (랜덤 포레스트)
- GradientBoostingRegressor (부스팅)
- XGBRegressor (부스팅)
- CatBoostRegressor (부스팅)

- LinearRegression (선형 회귀)
- MLPRegressor
- RNN/LSTM/GRU

Deep Learning



키 몸무게 발 크기 학년 성별



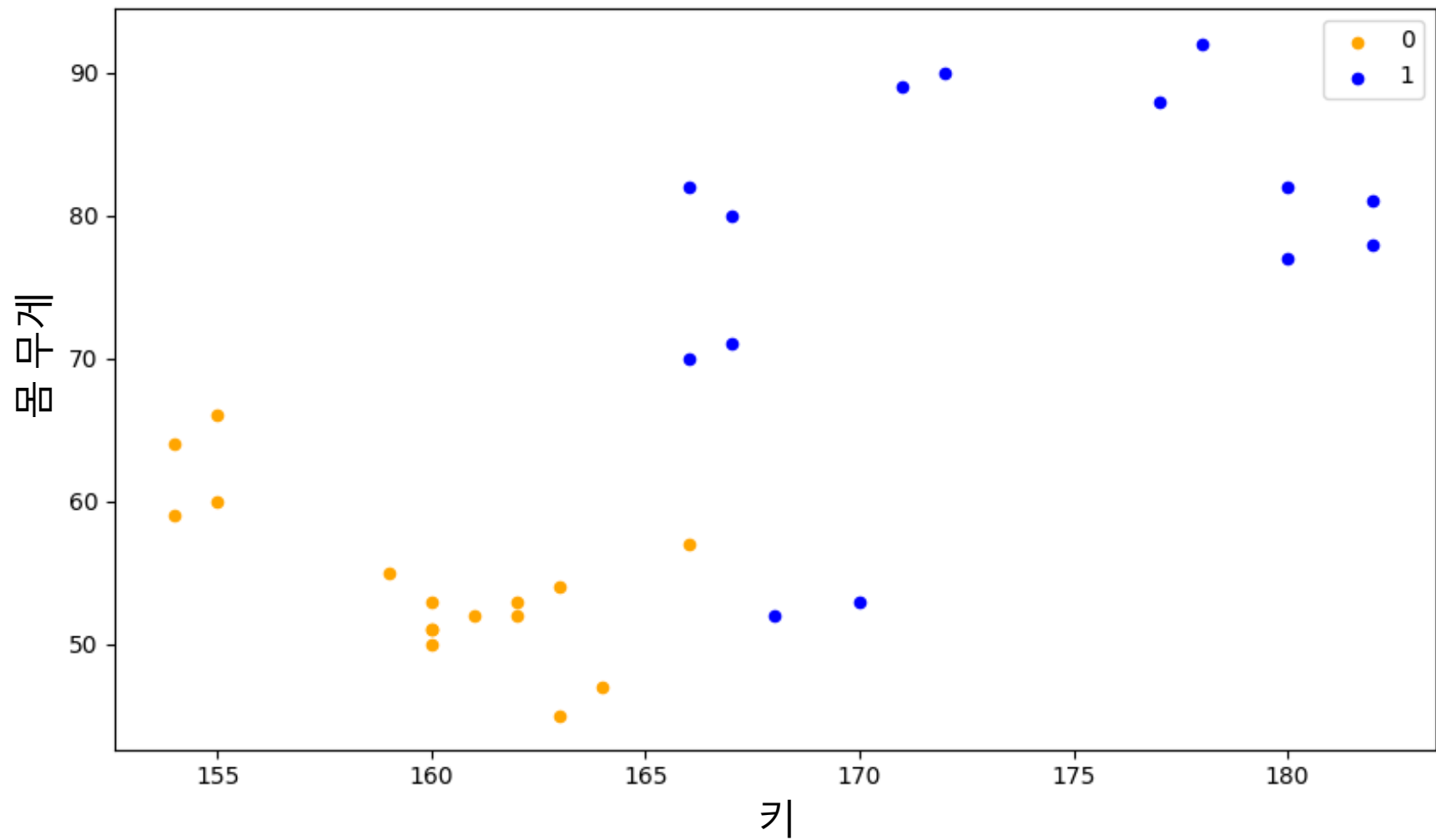
번호, 키, 몸무게, 발 크기, 학년, 성별

1,166,57,240,1,0
2,178,92,265,1,1
3,167,80,270,1,1
4,168,52,245,2,1
5,155,60,235,2,0
6,163,45,230,2,0
7,160,53,235,3,0
8,180,77,260,4,1
9,167,71,260,2,1
10,160,51,245,2,0
11,162,53,240,2,0
12,180,82,280,6,1
13,172,90,255,6,1
14,160,51,245,5,0
15,155,66,245,5,0
16,163,54,242,5,0
17,177,88,263,5,1
18,166,82,268,6,1
19,170,53,247,6,1
20,154,59,234,1,0
21,164,47,232,1,0

키에 따라
몸무게는 어떻게 변할까?
(성별에 따라 다른 색으로 표시)

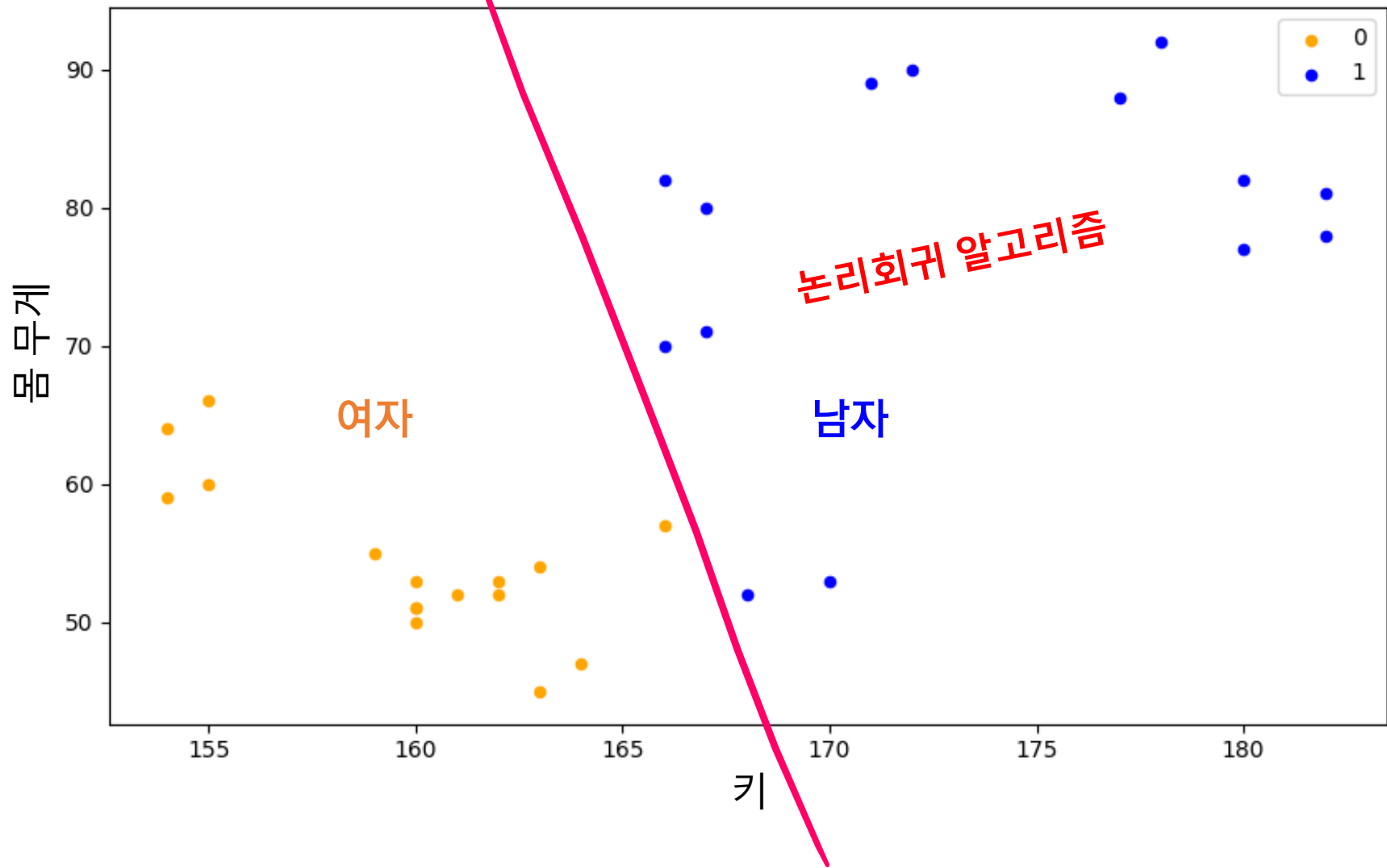
```
plot(df, '키', '몸무게', '성별')
```

키 vs. 몸무게



분류

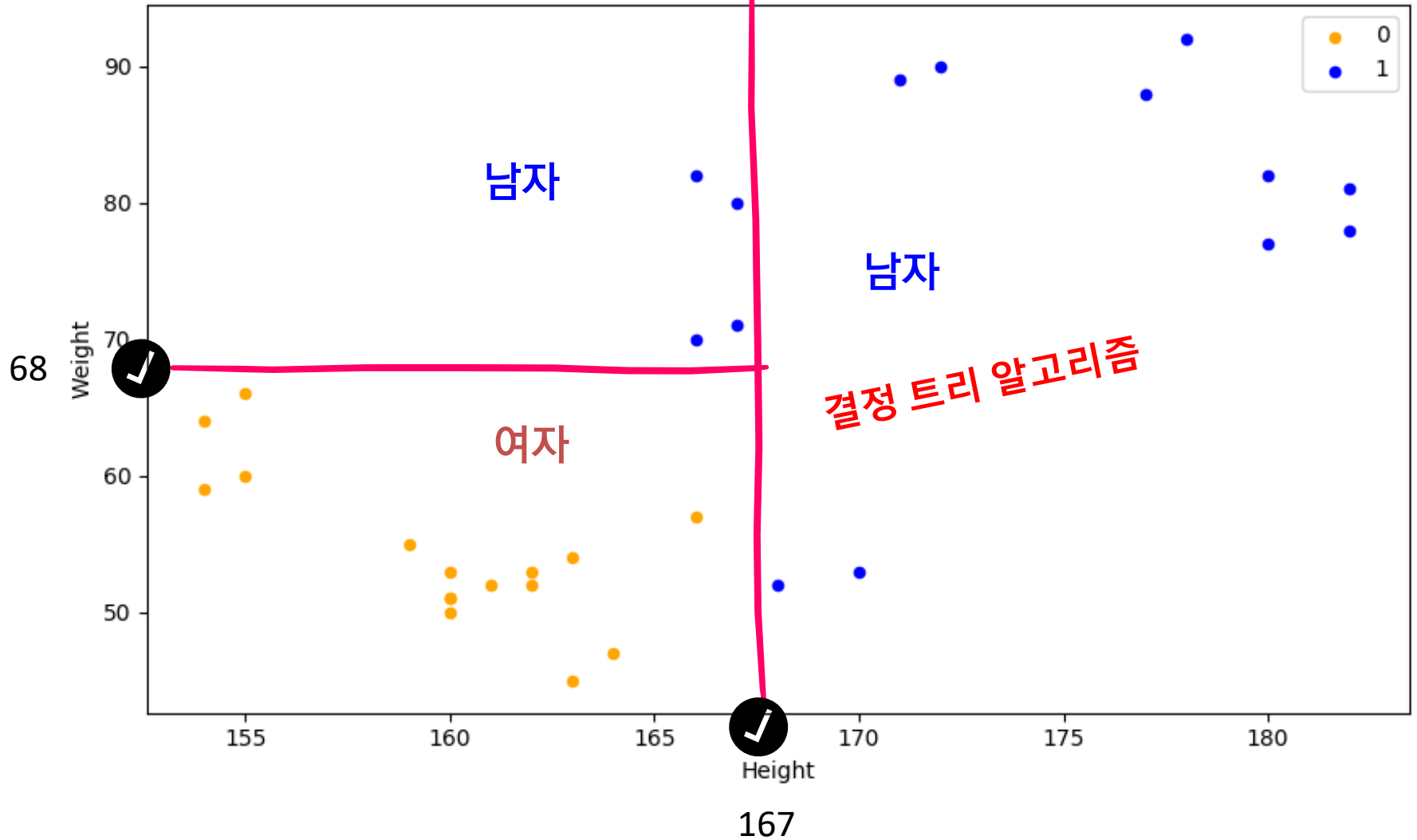
Classification



분류

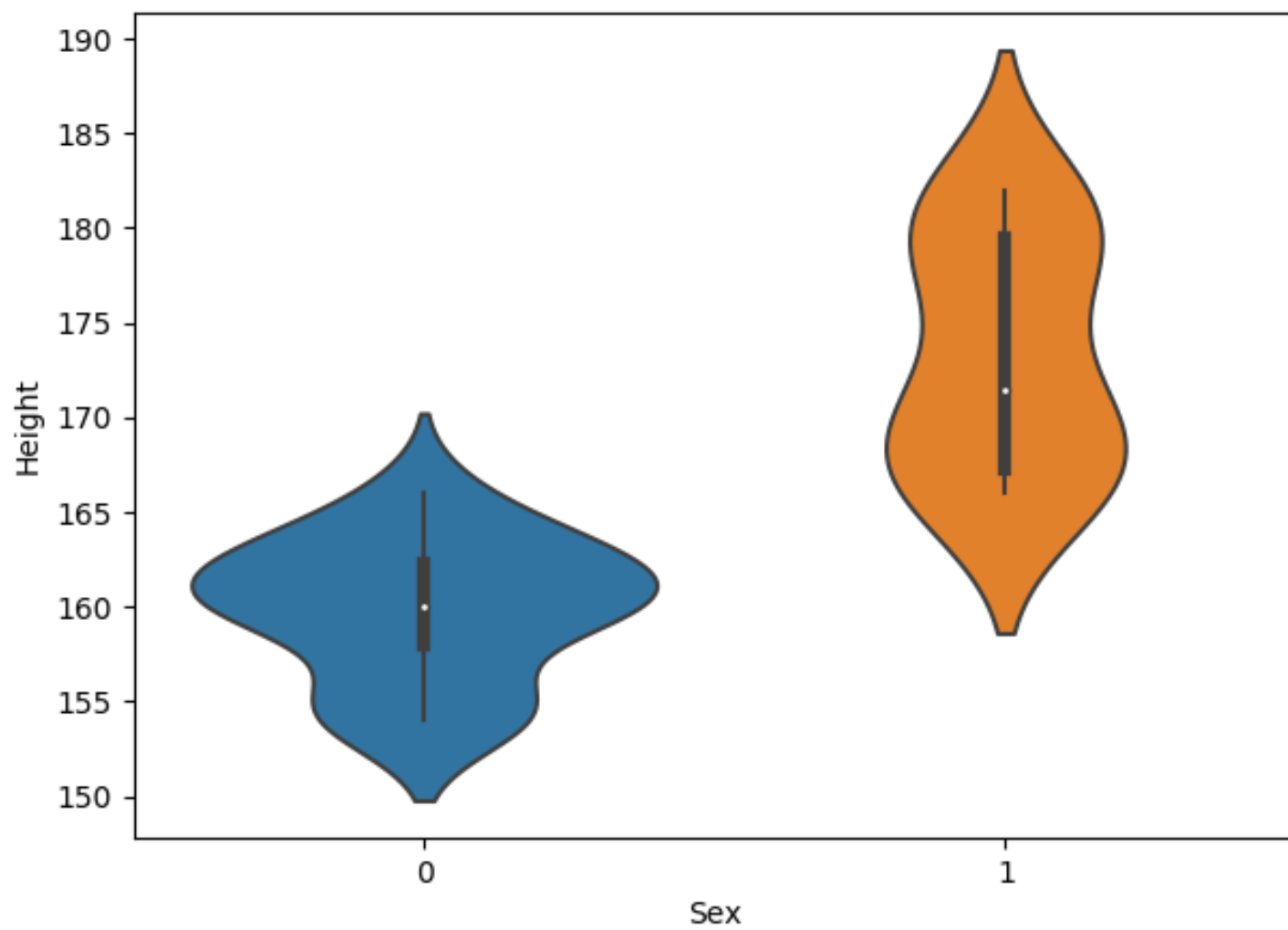
Classification

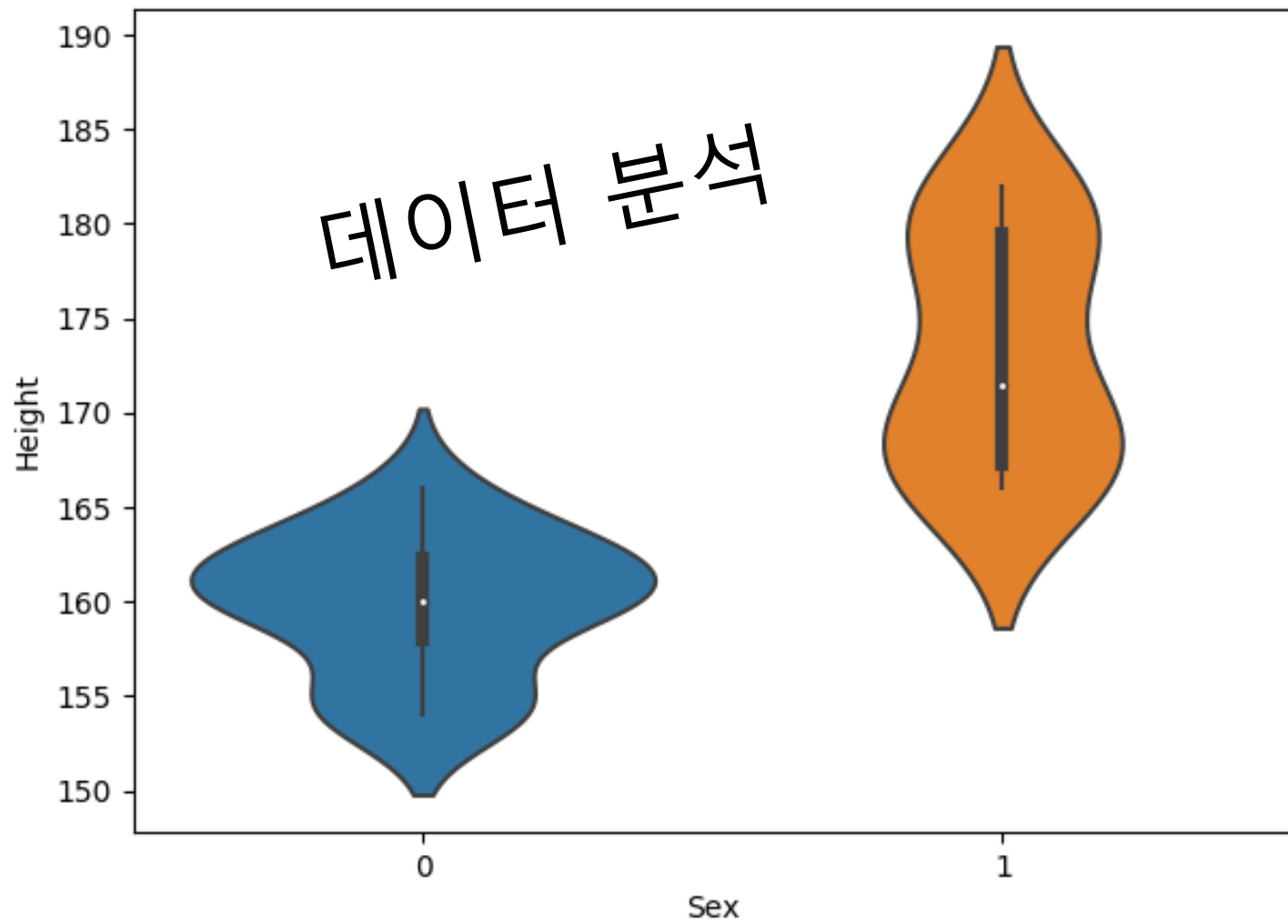
Height vs. Weight




```
violinplot(df, '성별', '키')
```

성별에 따라 키가 어떻게 변하는지
바이올린 모양으로 표시해보라!





키, 몸무게, 발 크기, 학년, 성별

학습용
문제

166,57,240,1,0
178,92,265,1,1
167,80,270,1,1
168,52,245,2,1
155,60,235,2,0
163,45,230,2,0
160,53,235,3,0
180,77,260,4,1
167,71,260,2,1
160,51,245,2,0
162,53,240,2,0
180,82,280,6,1
172,90,255,6,1
160,51,245,5,0

정답

테스트용
문제

155,66,245,5,0
163,54,242,5,0
177,88,263,5,1
166,82,268,6,1
170,53,247,6,1
154,59,234,1,0
164,47,232,1,0

정답

키, 몸무게, 발 크기, 학년, 성별

학습용
문제

166,57,240,1,0
178,92,265,1,1
167,80,270,1,1
168,52,245,2,1
155,60,235,2,0
163,45,230,2,0
160,53,235,3,0
180,77,260,4,1
167,71,260,2,1
160,51,245,2,0
162,53,240,2,0
180,82,280,6,1
172,90,255,6,1
160,51,245,5,0

정답

테스트용
문제

155,66,245,5,0
163,54,242,5,0
177,88,263,5,1
166,82,268,6,1
170,53,247,6,1
154,59,234,1,0
164,47,232,1,0

정답

```
youngJa = svm.SVC()
```

```
youngJa.fit('학습용문제', '정답')
```

```
prediction=youngJa.predict('테스트용 문제')
```


분류 알고리즘

Machine Learning

- SVC (서포트벡터머신)
- DecisionTreeClassifier (결정트리)
- RandomForestClassifier (랜덤포레스트)
- XGBClassifier (XGBoost, eXtreme Gradient Boosting, Boosting or Additive Training) (부스팅)

- LogisticRegression (논리회귀)
- Multilayer Neural Networks
- CNN/RCNN/GCNN

Deep Learning



머신러닝 인공지능

지능이란?

(지능, intelligence, 知能)

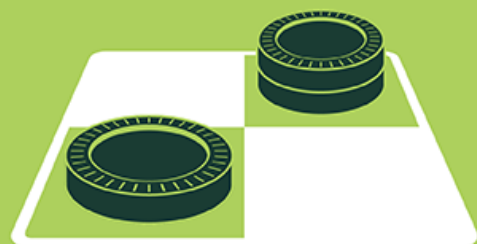
새로운 사물 현상에 부딪쳐 그 의미를
이해하고 처리 방법을 알아내는 지적
활동 능력

인공지능

AI (Artificial Intelligence),
사람의 지능을 컴퓨터에
구현한 지능

ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



MACHINE LEARNING

Machine learning begins to flourish.

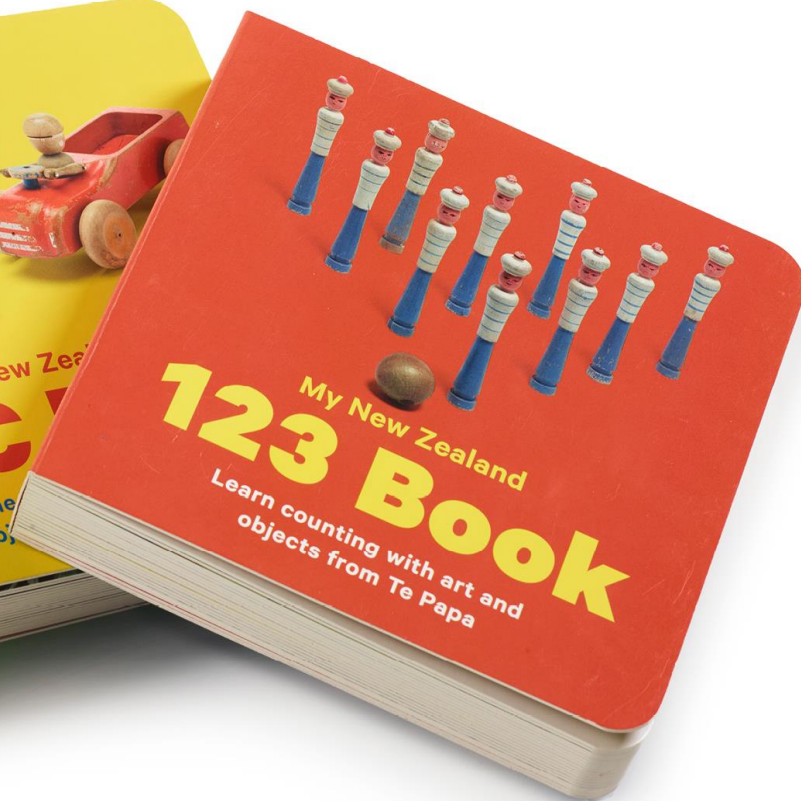
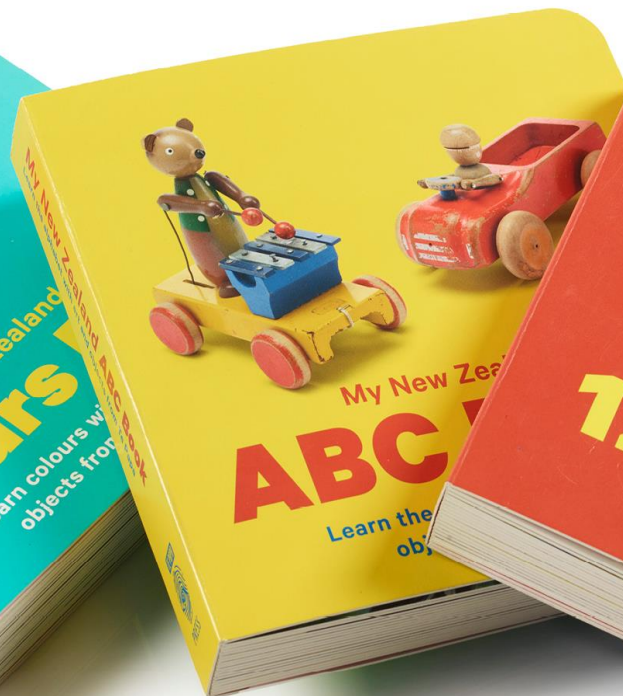


DEEP LEARNING

Deep learning breakthroughs drive AI boom.



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.





개



토끼



돼지



오리



지도학습

Supervised Learning

Machine Learning Techniques

