taplingua

TALENT COCO

AI/ML Projects/Internships

Modeling

Supervised Learning

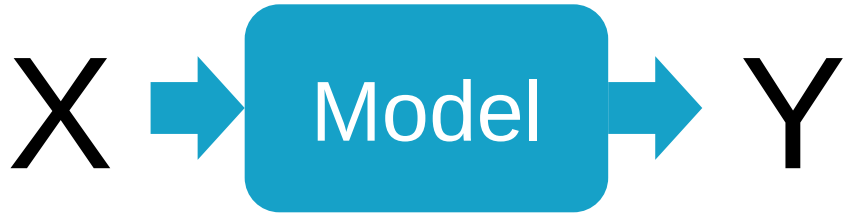
Supervised Learning

- Data Sets with input and outputs are given

$$<X, Y>_D$$

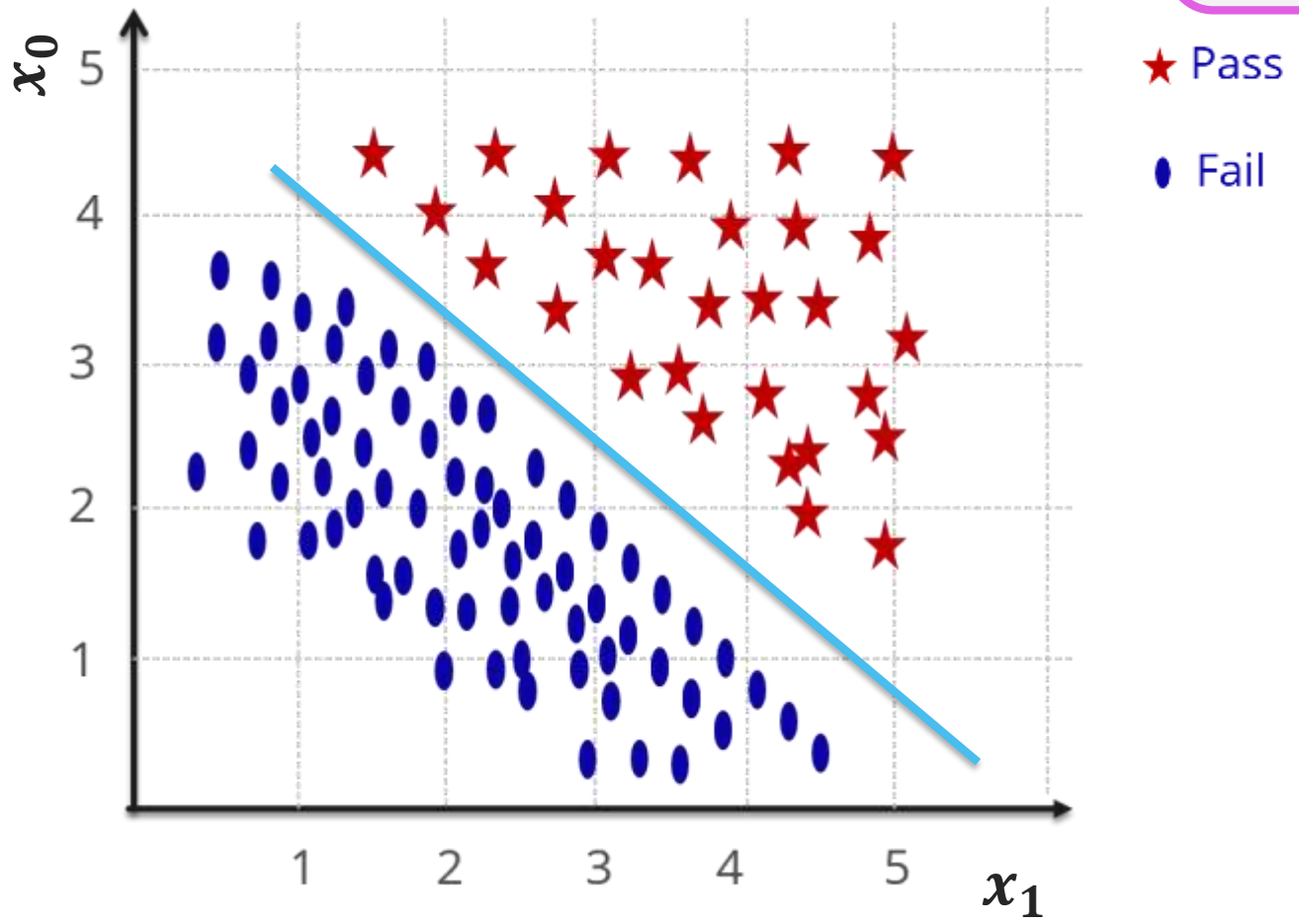
dataset D

- We create a function to map input (x) to Output (y)



$$f(x) = y$$

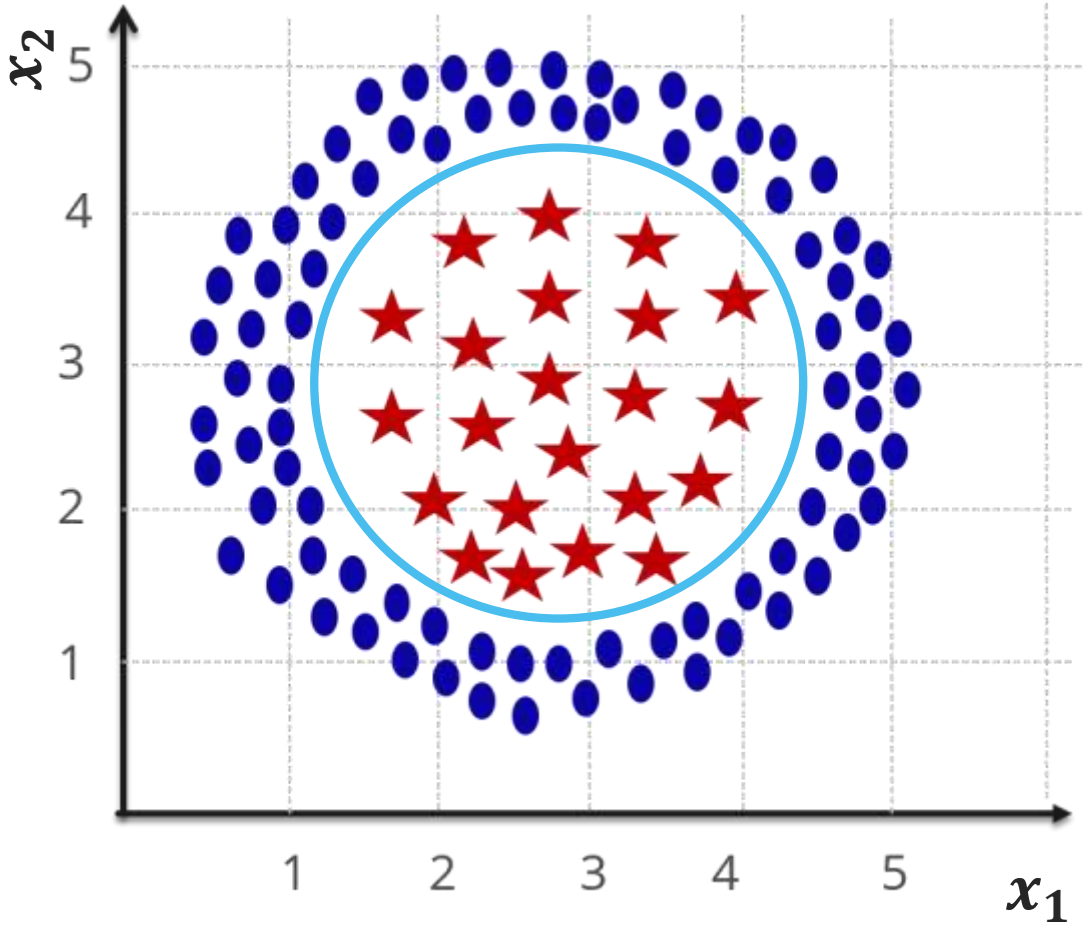
Model



This line is called
"Decision Boundary"

$$f(x) = \theta_0 x_0 + \theta_1 x_1$$

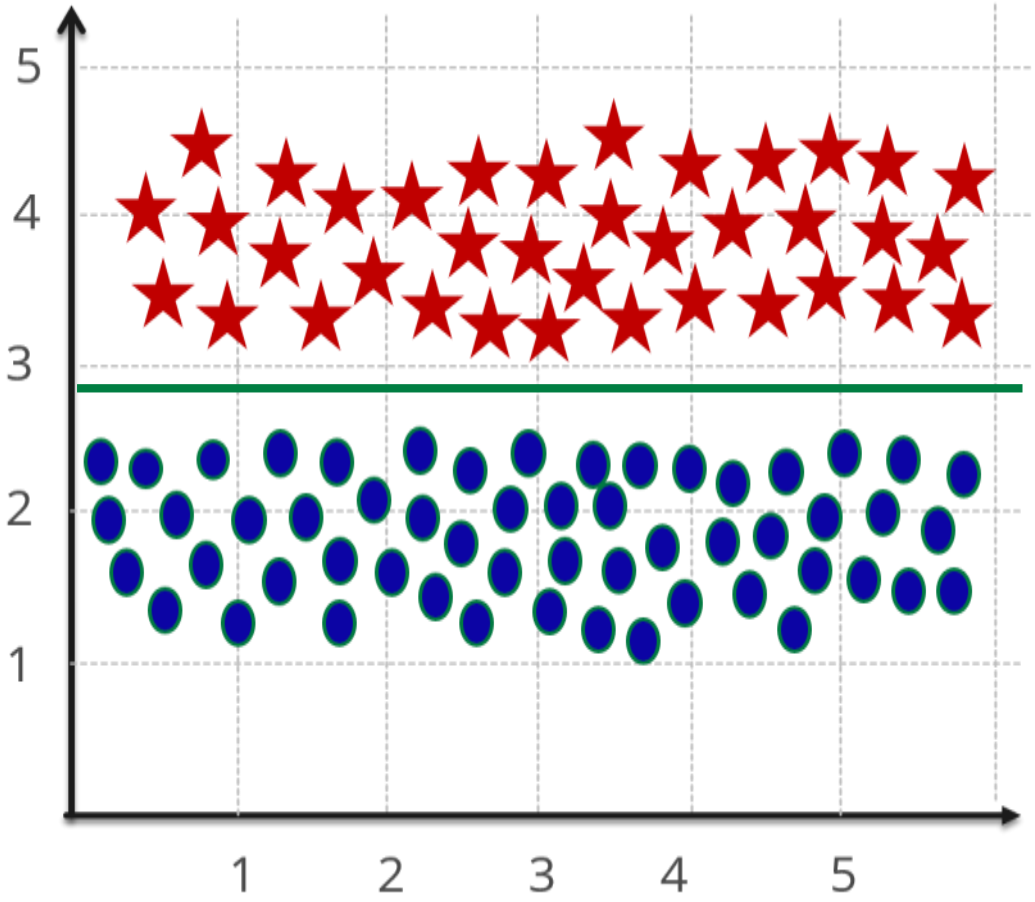
Model



This Circle is called
“Decision Boundary”

$$f(x) = \theta_0 + \theta_1 x_1^2 + \theta_2 x_2^2 + \theta_3 x_1 + \theta_4 x_2$$

Classification 0 or 1



$$f(x) = X\theta^T$$

We need $X\theta^T$ to give us 0 or 1

Logistic Function

Logistic Function

Logistic Function of z

$$g(z) = \frac{1}{1 + e^{-z}}$$

$$0 \leq g(z) \leq 1$$

Sigmoid Function

Logistic Regression

```
from sklearn.linear_model import LogisticRegression
lr_model=LogisticRegression(penalty='l2', solver= 'newton-cg', C=5)
```

```
lr_model.fit(x_train,y_train)
```

Logistic Regression

```
y_pred_lr = lr_model.predict(x_test)
y_pred_lr
```

```
array([1, 1, 0, 1, 1, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 1, 0, 0, 0,
       1, 0, 0, 0, 1, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0,
       0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 1, 0, 0, 1, 1, 0,
       0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 0, 0, 0, 0, 1, 0,
       1, 1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 0,
       1, 0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 1, 0,
       0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0,
       0, 1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1,
       0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1,
       1, 0, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0,
       0, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0,
       1, 0, 0, 1, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0,
       1, 1, 0])
```

```
from sklearn.metrics import accuracy_score
acc_lr = accuracy_score(y_pred_lr, y_test)
acc_lr
```

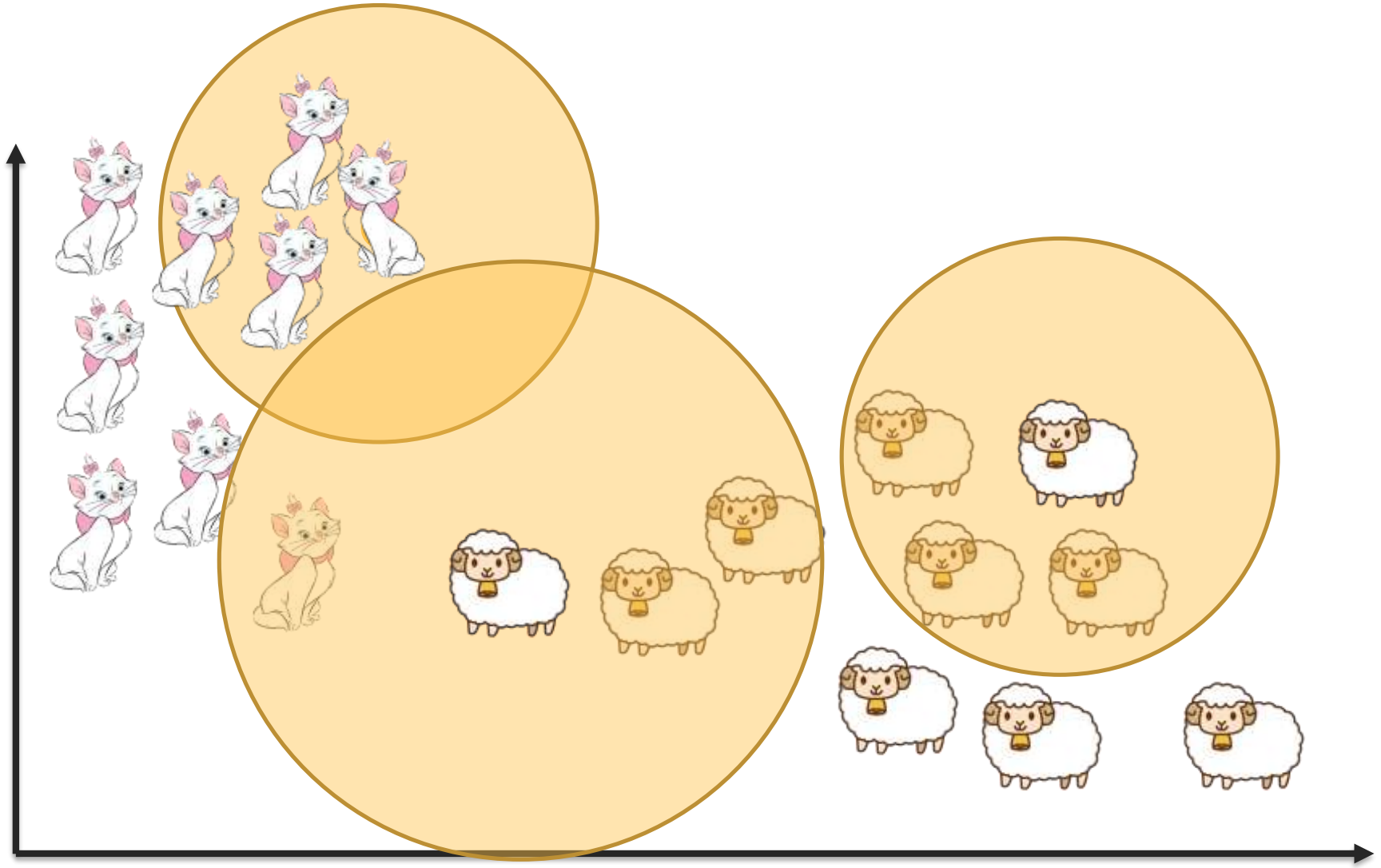
```
0.7865168539325843
```

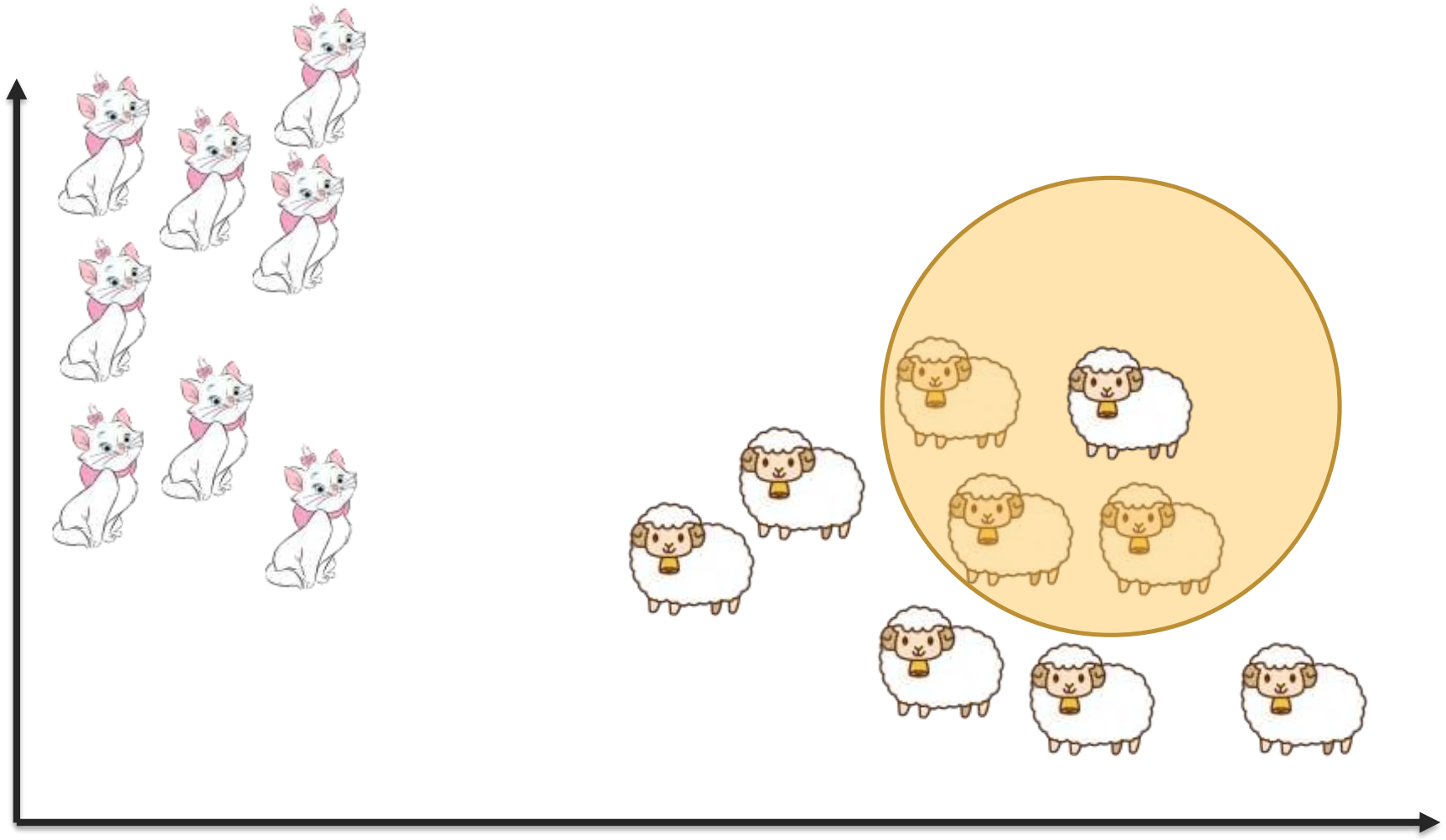
KNN

K Nearest Neighbors

- KNN is called Lazy algorithm
- No training is done

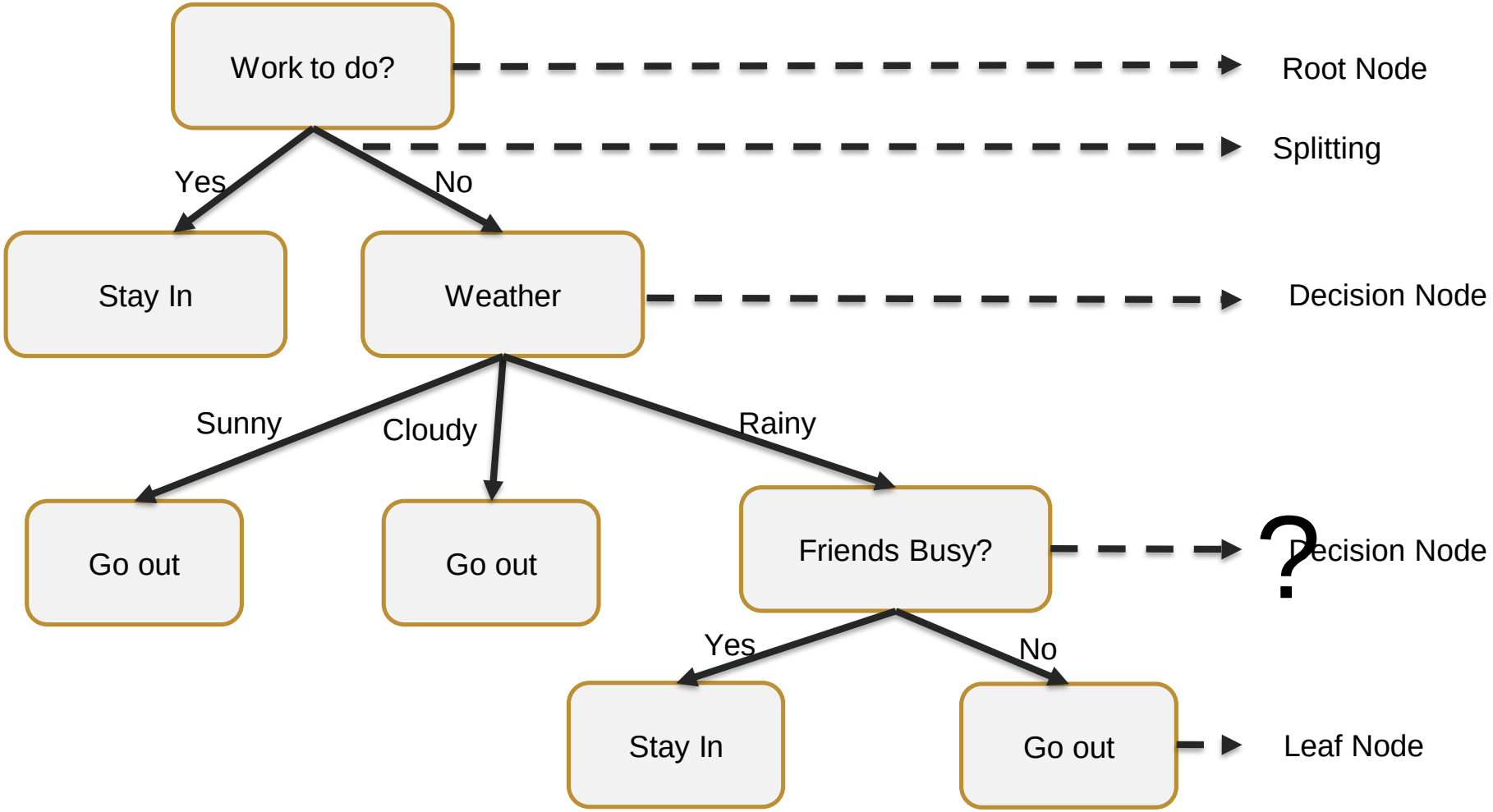
K=3



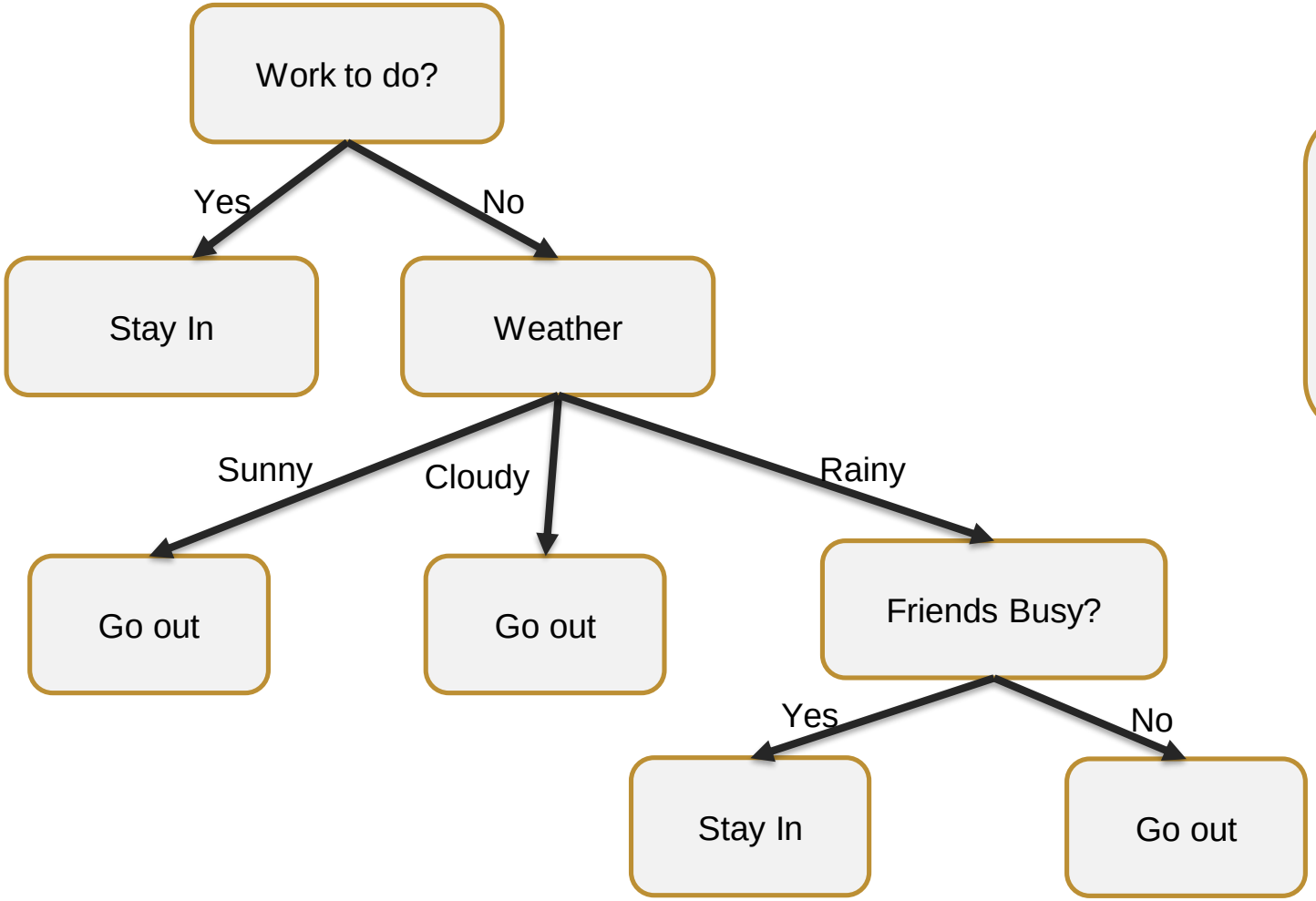


Decision Tree

Stay in or go out?



Stay in or go out?



Series of questions

- What question
- When is the right time to ask

Assignment

- Split your heart disease into train and test with a ratio of 70:30
- Train a logistic regression model and calculate the accuracy of your model
- Train a KNN model, Decision tree model on your data
- Calculate the accuracy of your KNN and Decision tree model
- Learn a bit of the math behind the KNN and Decision tree model