

INTRODUCTION TO MACHINE LEARNING

LET'S HAVE A LOOK AT SOME USE CASES....

- Recommendation Systems
- Face Recognition
- Self Driving Cars
- Voice Assistants

Video player showing a scene from the film "Tere Mere Milan Ki Yeh Raina" (1973) featuring Simla S...

Video title: **Song: Tere Mere Milan Ki Yeh Raina Film: Abhimaan (1973) With Simla S...**

Channel: **madhukaw** · 107 videos

Subscribe button

Like button

About button

Share button

Add to button

Uploaded on Apr 20, 2010

No description available.

Buy "Tere Mere Milan Ki Yeh Raina" on

✓ Ad muted. [Undo](#)

We'll do our best to show you more relevant ads in the future.

Help us show you better ads by updating your [ads preferences](#).



3 Sick Bodybuilding Tips

by sixpackshortcuts
1,602,424 views

Ad



Ab To Hai Tum Sa Her Khushi Apni lata

by malikje1
45,661

FEATURED



Pink Interview on her husband and daughter

by MsSupergalaxy
Recommended for you



Abhimaan (1973): Loote Koi Man Ka Nagar

by tonguesonfire

YOUTUBE RECOMMENDATION SYSTEM



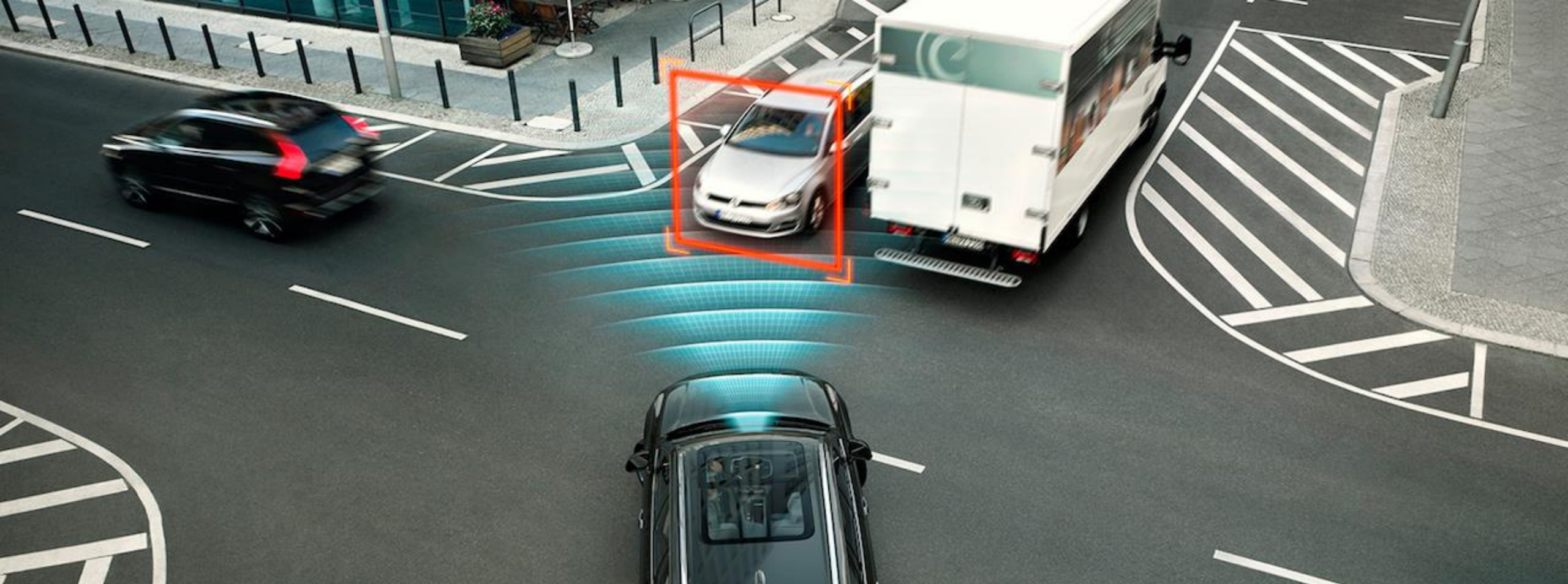
INSTORE RECOMMENDATION SYSTEMS



FACEBOOK IMAGE TAGGING



IPHONE X FACE RECOGNITION ID LOCK



SELF DRIVING CARS

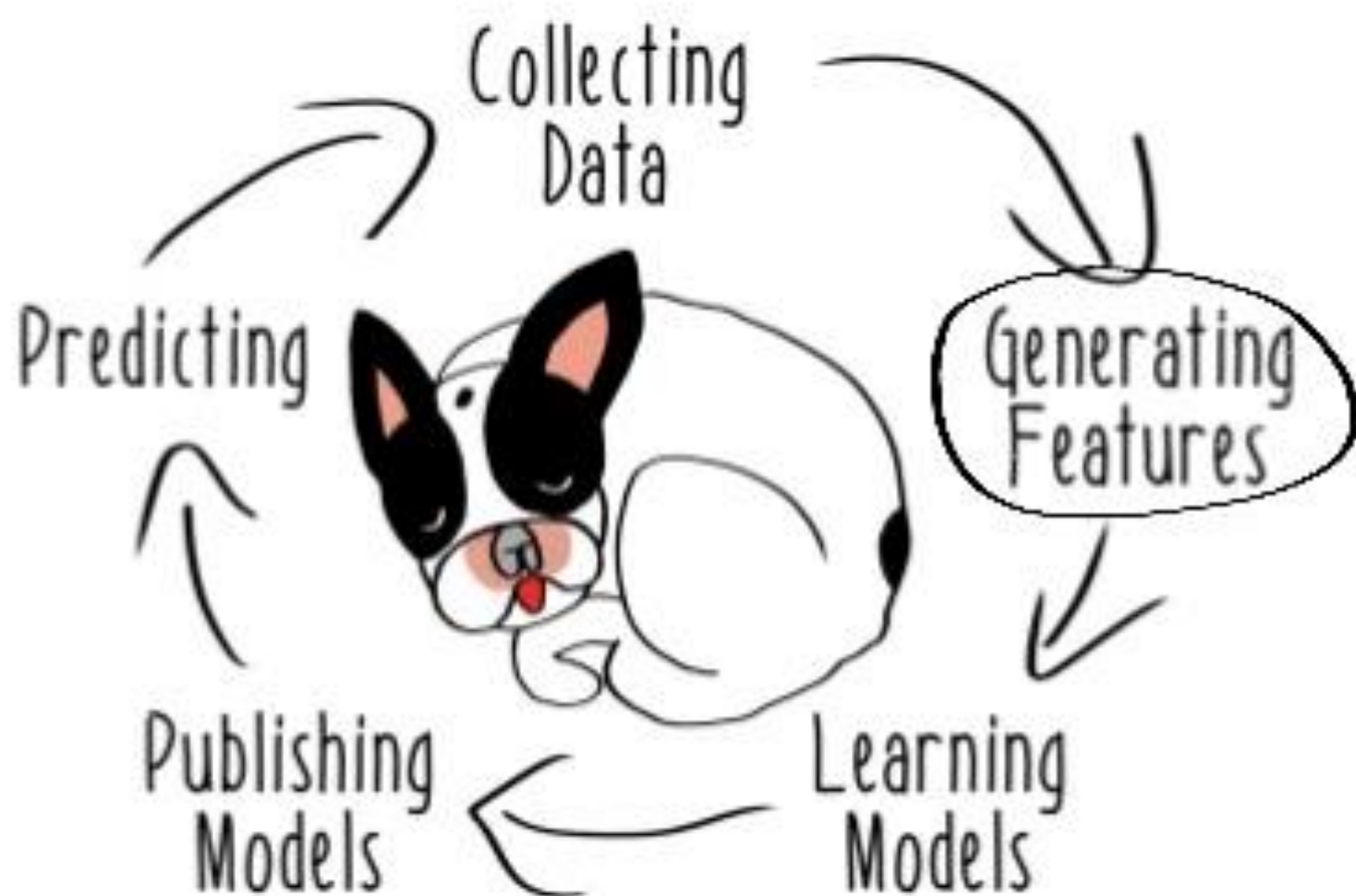


VOICE ASSISTANTS (SIRI, GOOGLE, ETC.)

BUT WHAT IS MACHINE LEARNING?

- Computational learning using algorithms to learn from and make **predictions** on data.
- Iteratively learn from data.
- Find hidden insights.
- Types of datasets:
 - 'Train the model on' --> TRAINING SET
 - 'Test the model on' --> TEST SET

Machine Learning Systems



MACHINE LEARNING METHODS...

- Supervised methods
- Unsupervised methods

Supervised Learning



Unsupervised Learning



SUPERVISED METHODS

- Data comes with attributes that are to be predicted.
- Task is well-defined and structured.
- Classification and Regression are most common supervised methods.

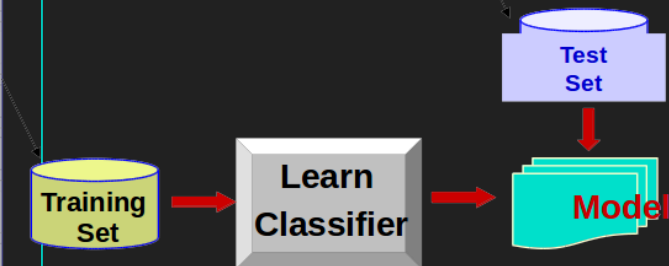
CLASSIFICATION

- Samples belong to two or more classes.
- Learn from already labeled data how to predict the class of unlabeled data.
- Discrete form of supervised learning.
- Example- Cats and Dogs, Sentiment Analysis

Tid	Refund	Marital Status	Taxable Income	Cheat
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes

categorical
categorical
continuous
class

Refund	Marital Status	Taxable Income	Cheat
No	Single	75K	?
Yes	Married	50K	?
No	Married	150K	?
Yes	Divorced	90K	?
No	Single	40K	?
No	Married	80K	?



REGRESSION

- Predict a value of a given continuous valued variable based on the values of other variables.
- Greatly studied in statistics, neural network fields.
- Examples:
 - Predicting sales amounts of new product based on advertising expenditure.
 - Predicting wind velocities as a function of temperature, humidity, air pressure, etc.
 - Time series prediction of stock market indices.

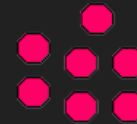
UNSUPERVISED METHODS

- Training data consists of a set of input without any corresponding target values.
- Clustering is a common unsupervised method.

CLUSTERING

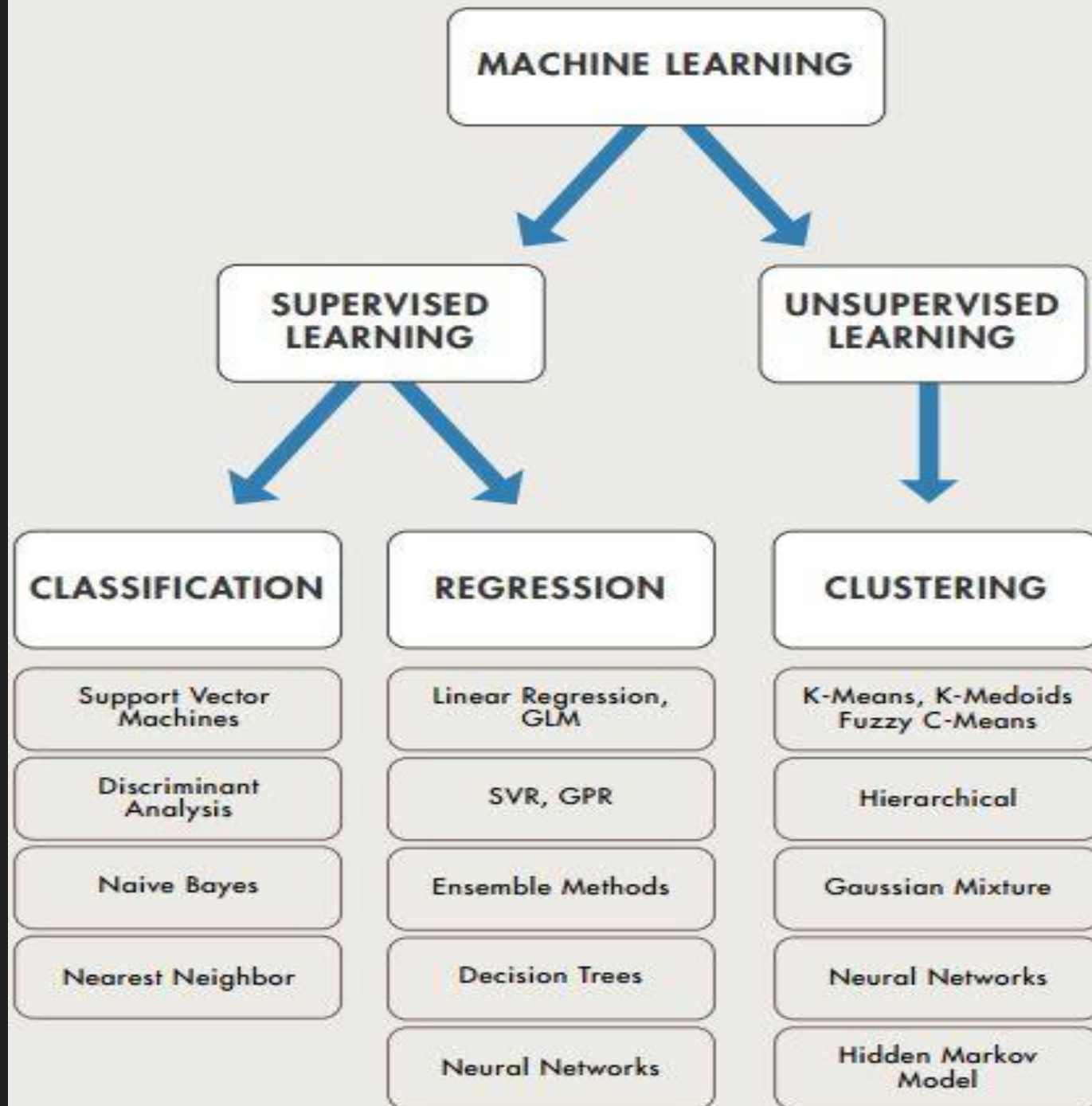
- Segregate groups with similar traits and assign them into clusters.
- Example- Clusters of customers with similar shopping habits.

Intracluster distances
are minimized



Intercluster distances
are maximized





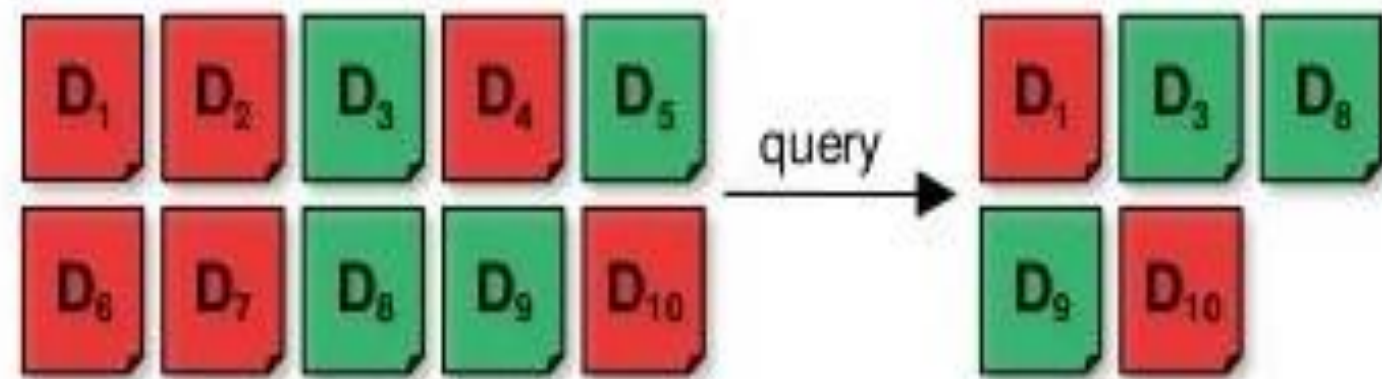
EVALUATION OF MODEL

Commonly used metrics:

- Accuracy: Proportion of the total number of predictions that are correct.
- Precision: Fraction of relevant instances among the retrieved instances.
- Recall: Fraction of relevant instances that have been retrieved over the total amount of relevant instances.

$$\text{precision} = \frac{|\{\text{relevant documents}\} \cap |\{\text{retrieved documents}\}|}{|\{\text{retrieved documents}\}|}$$

$$\text{recall} = \frac{|\{\text{relevant documents}\} \cap |\{\text{retrieved documents}\}|}{|\{\text{relevant documents}\}|}$$



$$\text{precision} = \frac{3}{5} = 0.6$$

$$\text{recall} = \frac{3}{4} = 0.75$$

Resources

- Video Tutorial- <https://www.coursera.org/learn/machine-learning>
- Scikit Learn (Library for Machine Learning in Python) Tutorial- <https://github.com/amueller/scipy-2016-sklearn>
- Blog posts- <https://medium.com/machine-learning-for-humans/how-to-learn-machine-learning-24d53bb64aa1>

THANK YOU!