Online Course on Machine Learning, Deep Learning and Neural Networks

Day 2

Conducted by

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#iitKLIV
Kharagpur Learning, Imaging and
Visualization Research Group
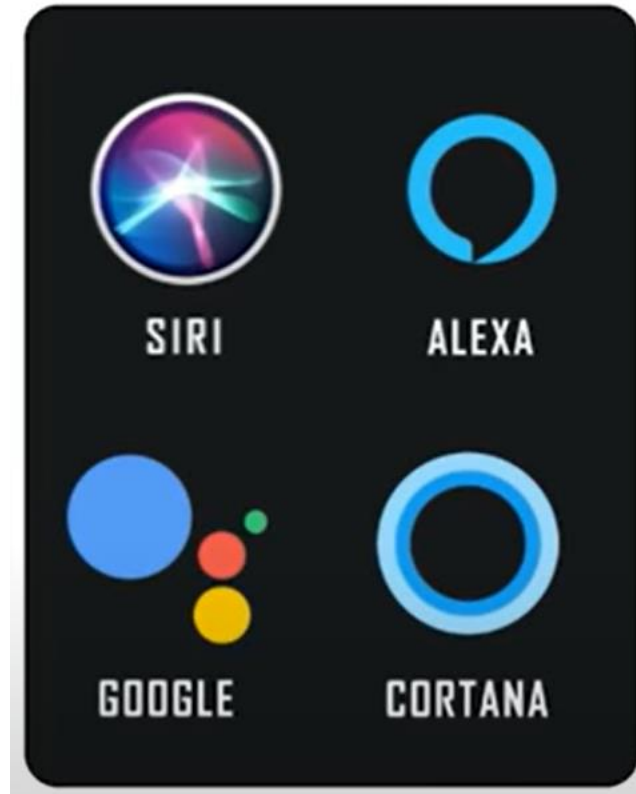www.iitkliv.github.io

Agenda

1. Recap

2. Difference between Supervised and Unsupervised Learning

3. Difference between Classification and Regression

4. One simple algorithm for Unsupervised Learning

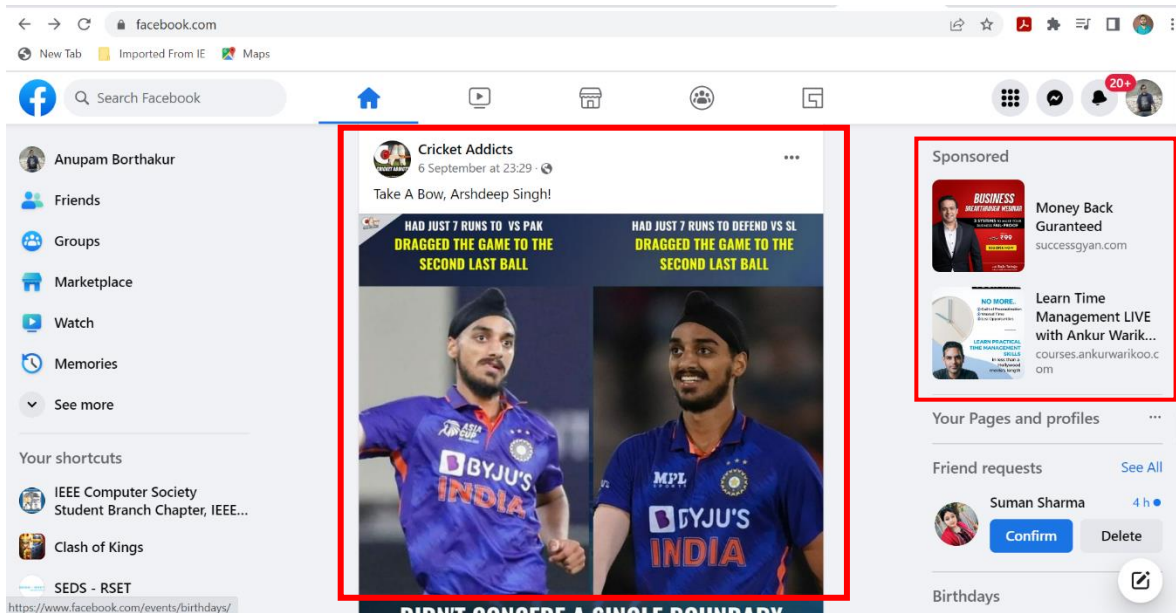# Applications of Machine Learning in our day to day life
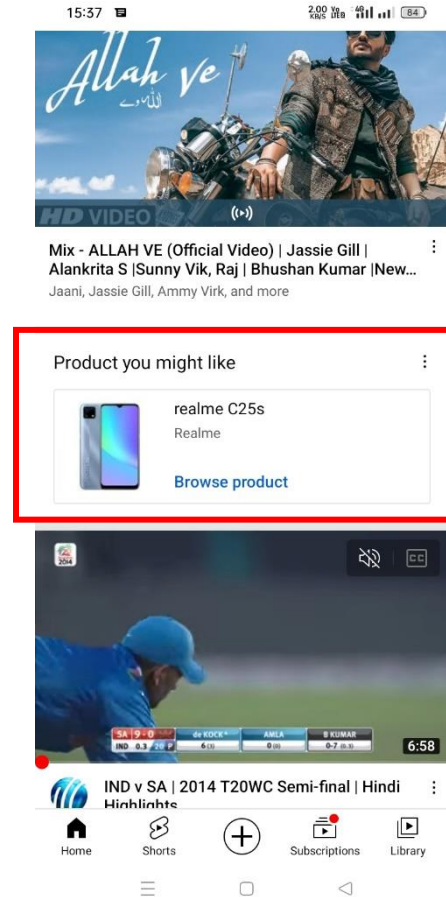
Google Maps

Voice Recognition

Finger Print Recognition

Importance of Data

Facebook

YouTube

Why its important to study ML now

- ✓ Abundant amount of data

- ✓ High Computational Resources

- ✓ Growing progress in the available platforms and algorithms

- ✓ Increase support from industry

  - ✓ Facebook: 10 Million Photos uploaded per hour

  - ✓ YouTube: 1 hour of video uploaded every minute

  - ✓ Google: 24 Peta bytes of data per day

  - ✓ Twitter 400 Million tweets per day
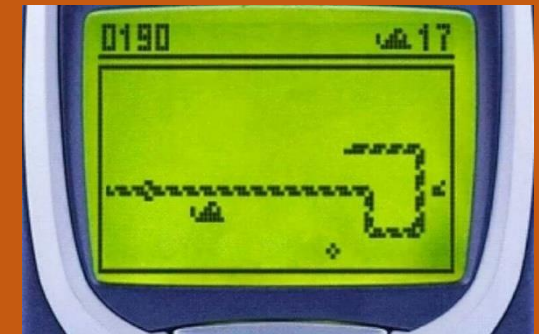
Types of Machine Learning

Supervised Learning

Un-supervised Learning

Reinforcement Learning

https://in.pinterest.com/pin/257690409914685423/

https://stock.adobe.com/in/images/teacher-pulling-her-student-ear/164847519

Supervised vs Unsupervised Learning

Supervised

Age	Class
14	T
24	A
17	T
30	A

**Teenager (T)
Adult (A)**

Unsupervised

Age

Age
14
24
17
30

Find patterns

New: 15 ➡ ❓

Supervised

Age	Class
14	T
24	A
17	T
30	A

Teenager (T)
Adult (A)

Decision Surface

New: 15 ❓
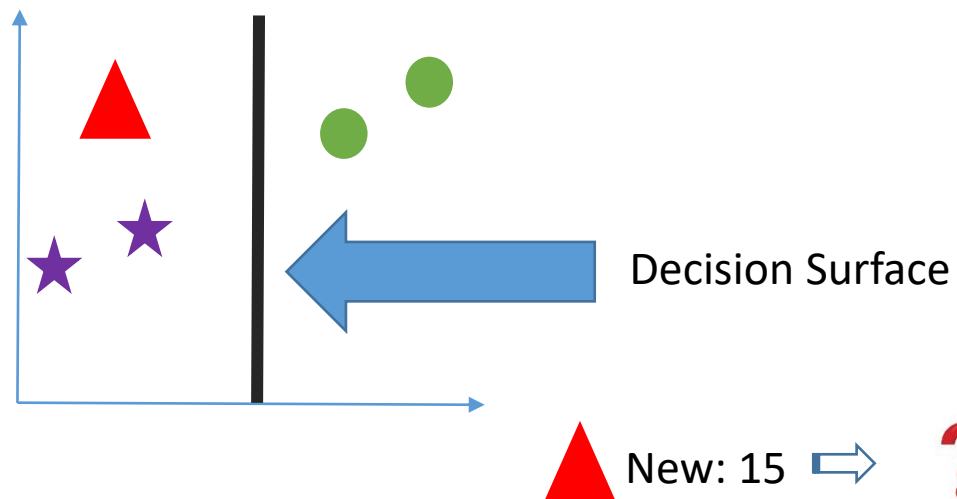
Unsupervised

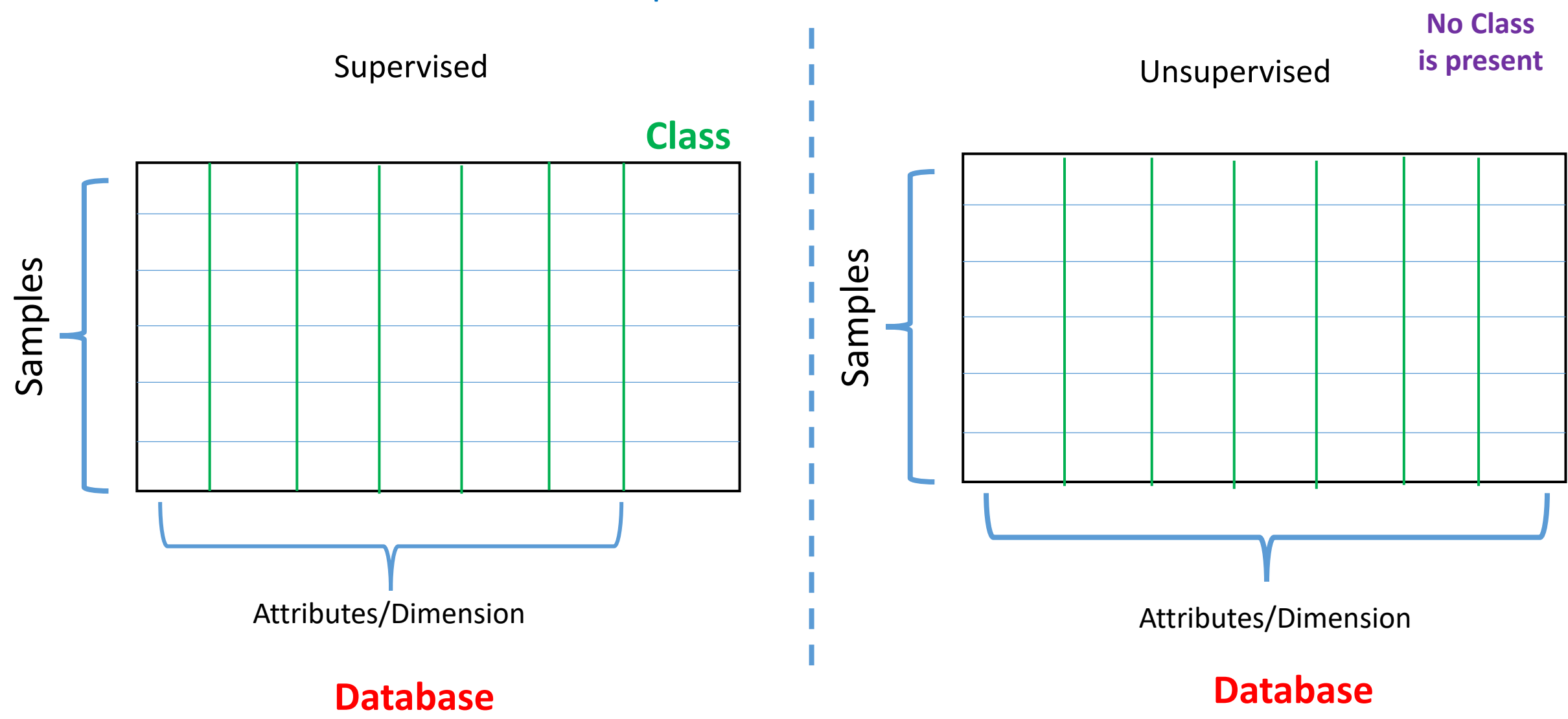| Age |
|-----|
| 14 |
| 24 |
| 17 |
| 30 |

Find patterns
- Groups
- Clusters

❓
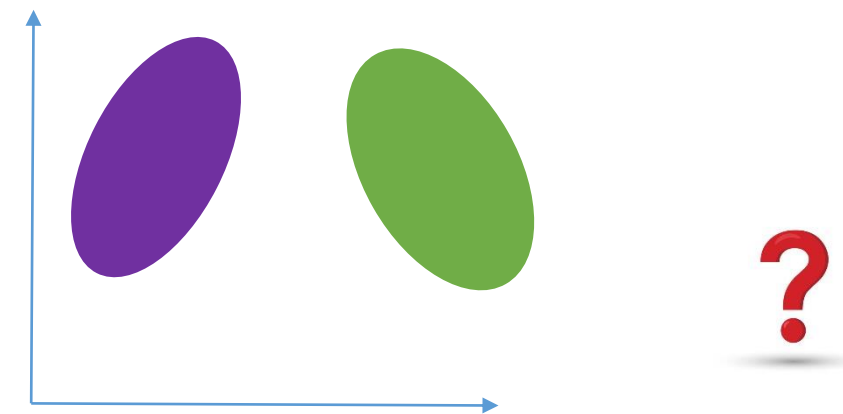
Simple Structure of a Database

Supervised

Class

Samples

Attributes/Dimension

Database

Unsupervised

No Class is present

Samples

Attributes/Dimension

Database

Supervised

	Age	Class
★	14	T
●	24	A
★	17	T
●	30	A

Decision Surface

Types of Supervised Learning

Supervised Learning

Classification

Regression

Types of Supervised Learning

Supervised Learning

- **Classification**
  Output having labels(discrete value)
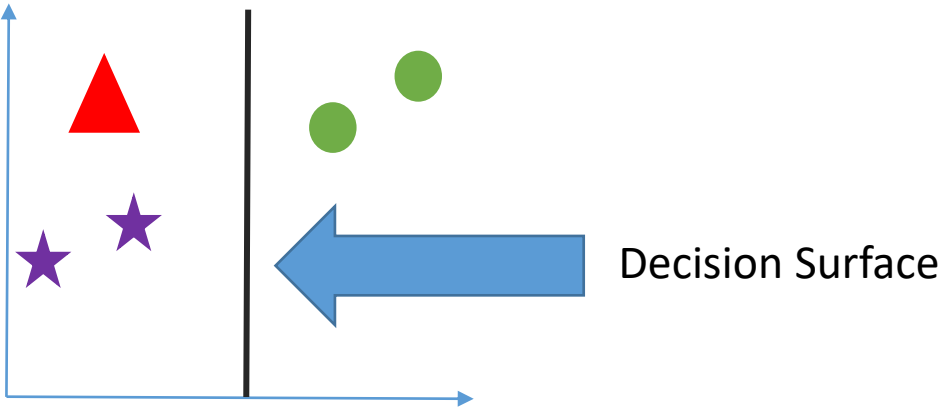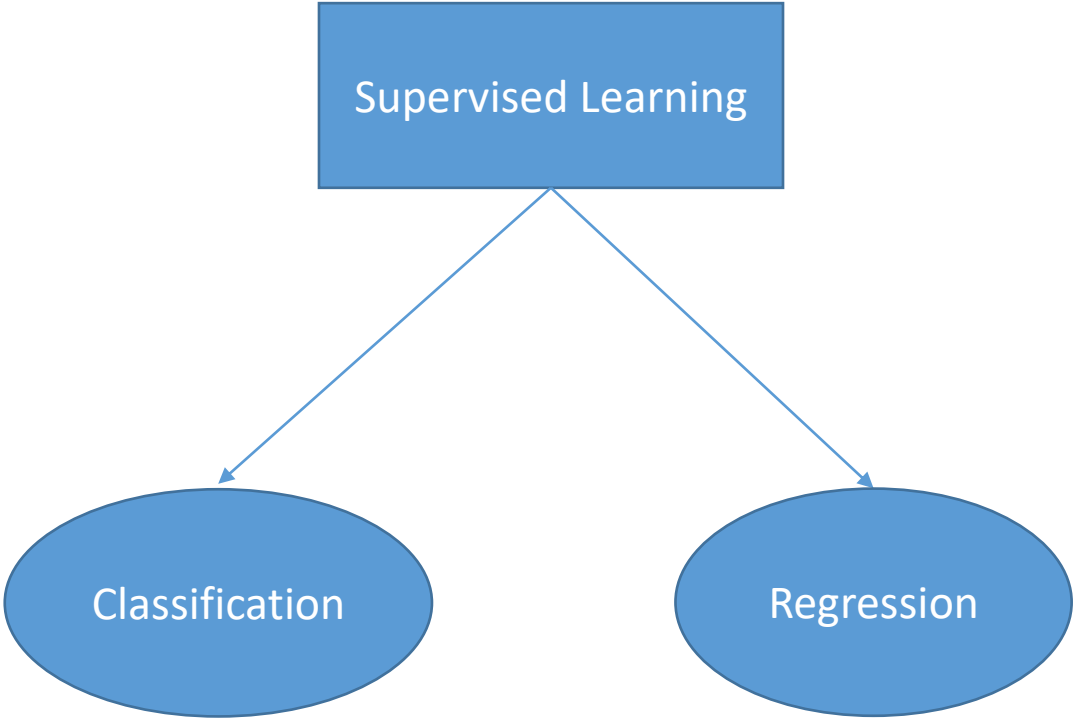
- **Regression**
  output having continuous value.
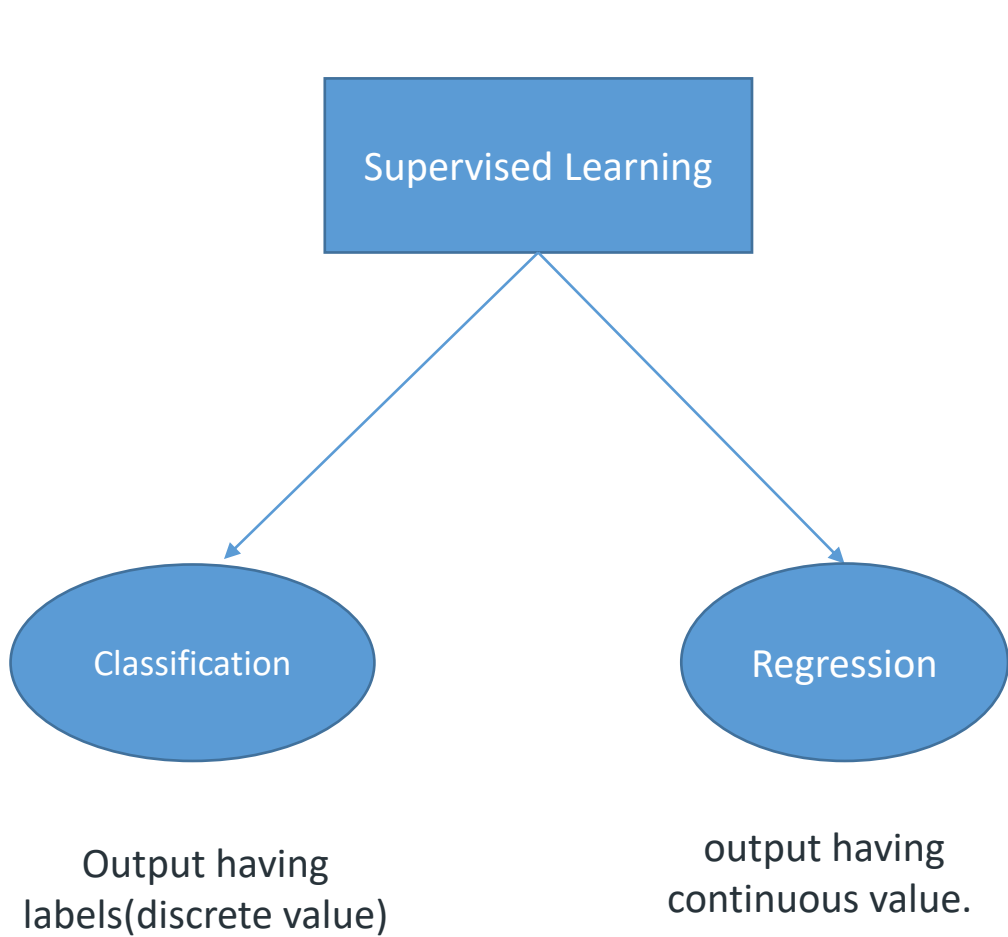
Age	Class
14	T
24	A
17	T
30	A
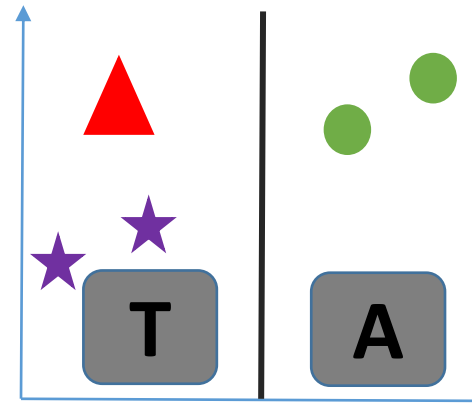
Classification

Floor	Bedroom	Years	Price
2	3	15	40 lakh
1	2	7	24 lakh
3	3	12	60 lakh
2	2	8	30 lakh
1	1	10	15 lakh

Price of a house?
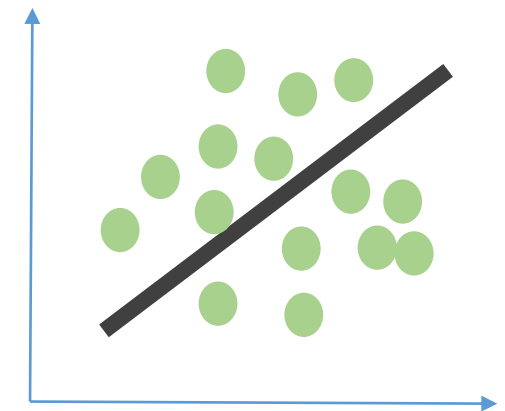
Regression

Classification vs Regression

Classification

Who will win?

Regression

Predict weather for next 1 week?
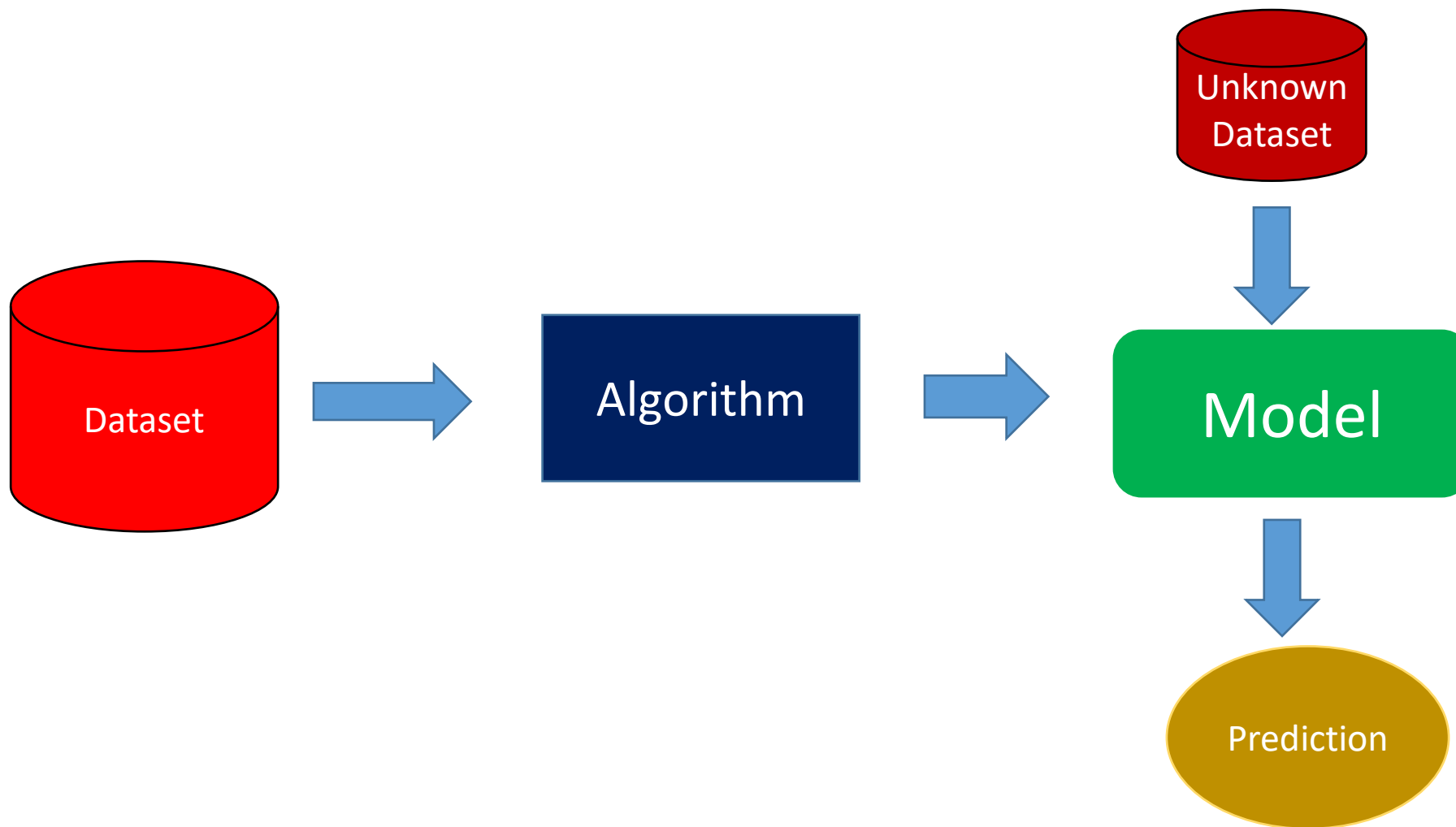

Regression

Predict the stock price?

Classification

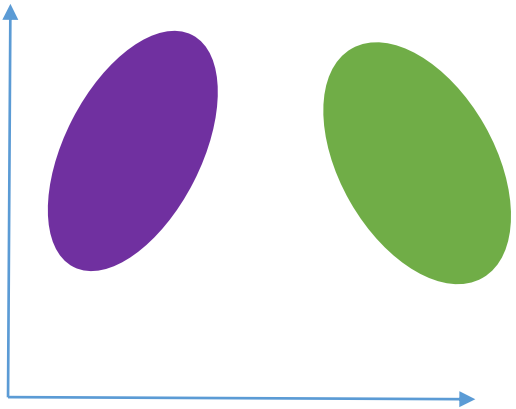Will Modi win in 2024 election?

Simple Training Pipeline of Machine Learning
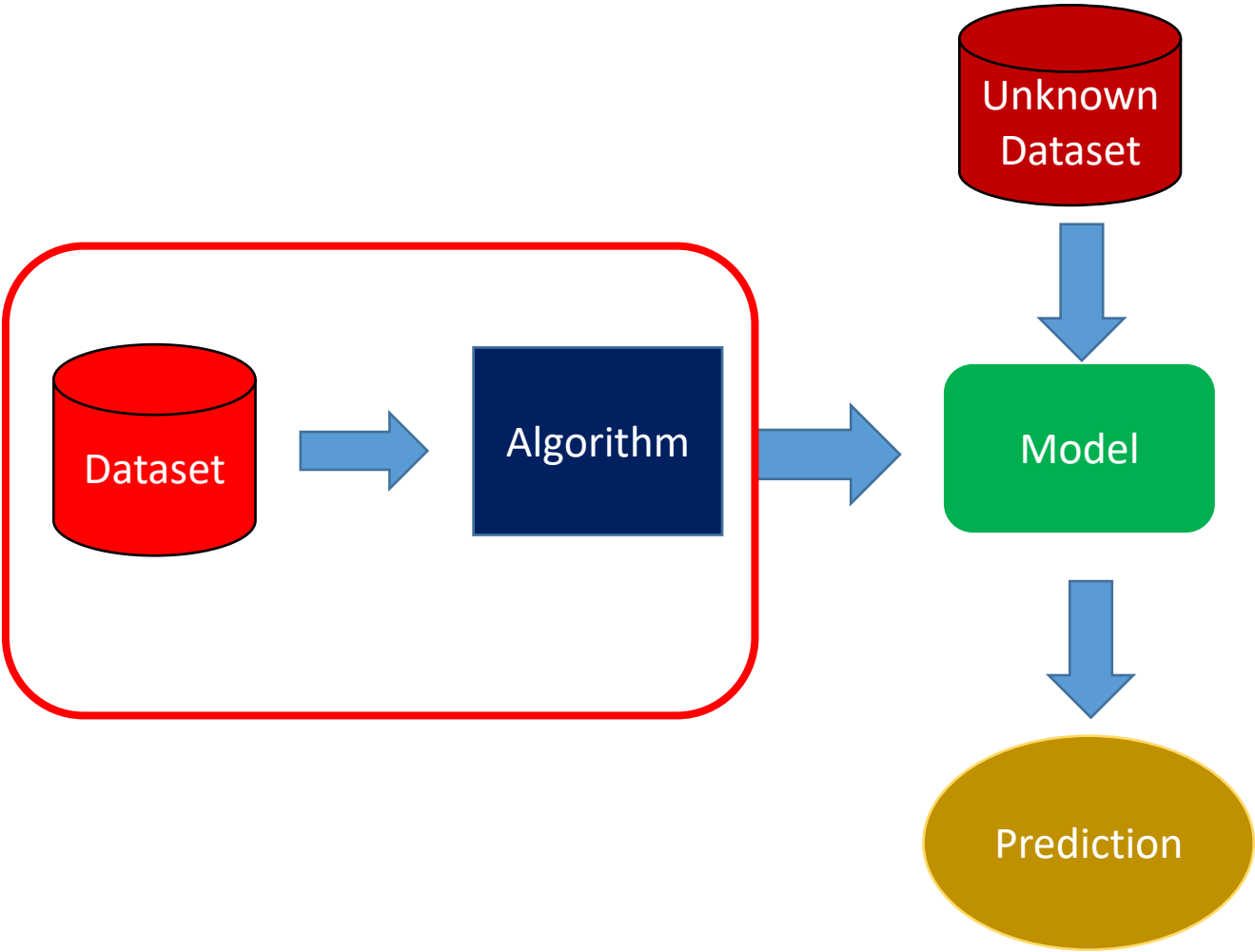
Unsupervised Learning

Input/Database

Age

14
24
17
30

Find patterns

Output/Model

Simple Training Pipeline of Machine Learning

Unknown Dataset

Dataset → Algorithm → Model

Model → Prediction

Unsupervised Learning

Data

Age

14
24
17
30

Find patterns

Model

Data

Age

14
24
17
30

Step 1: Choose a centroid (random)
Step 2: Find the distance for each of the points to that centroid
Step 3: Assign each point to the closet centroid

Data

Centroid

14   30

Age

14	← Centroid
24	
17	
30	← Centroid

24 →

$|24 - 14| = 10$

$|24 - 30| = 6$

17 →

$|17 - 14| = 3$

$|17 - 30| = 13$

Algorithm

17
14

24
30

Model

Step 1: Choose a centroid (random)

Step 2: Find the distance for each of the points to that centroid
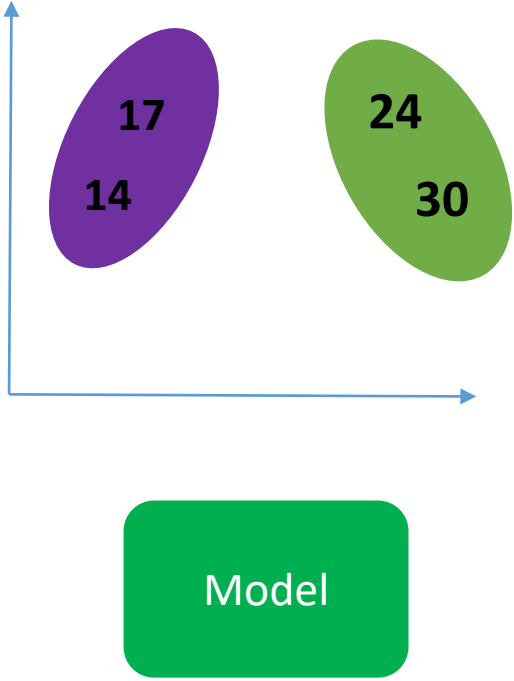
Step 3: Assign each point to the closet centroid

Identify which one is Supervised and which one is Unsupervised

Thank You

For your Attention!

Any Questions?