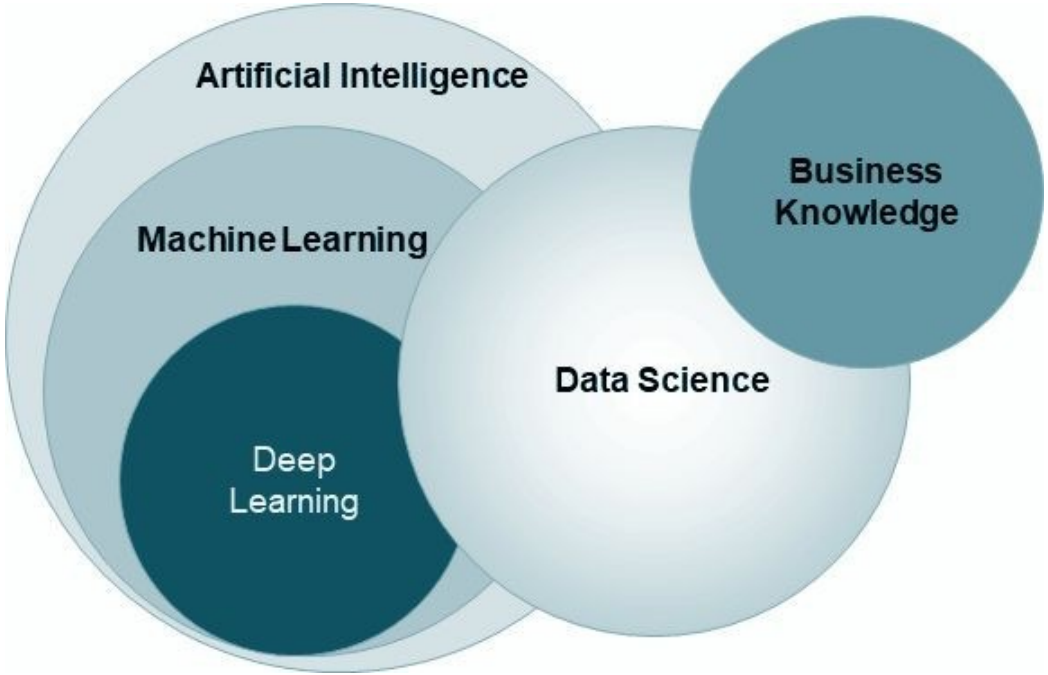
Introduction to Machine Learning

By ABHISHEK MISHRA

What is Data Science?



How do humans learn?

A baby can learn to identify a bird with features like wings, it can fly or not

A mantis has wings and it can fly, so it must also be a bird, ain't it?

Look for new features. Gather more instances. Rectify past mistakes.

Machine Learning

Learning is any process by which a system improves performance from experience

Machine Learning is concerned with computer programs that automatically improve their performance through experience

From Heuristics to Machine Learning

Heuristics

Machine Learning

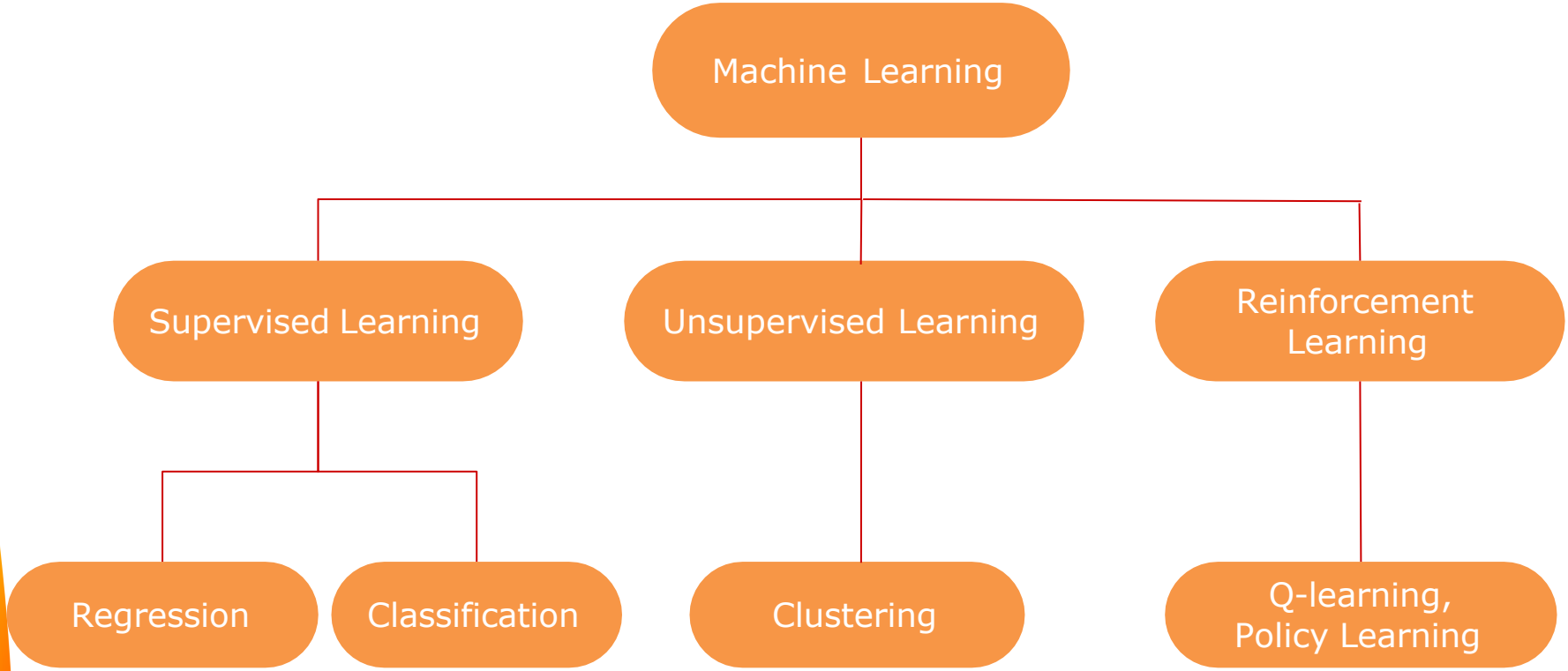
Revisiting Bird Classification

Features/Input Variables

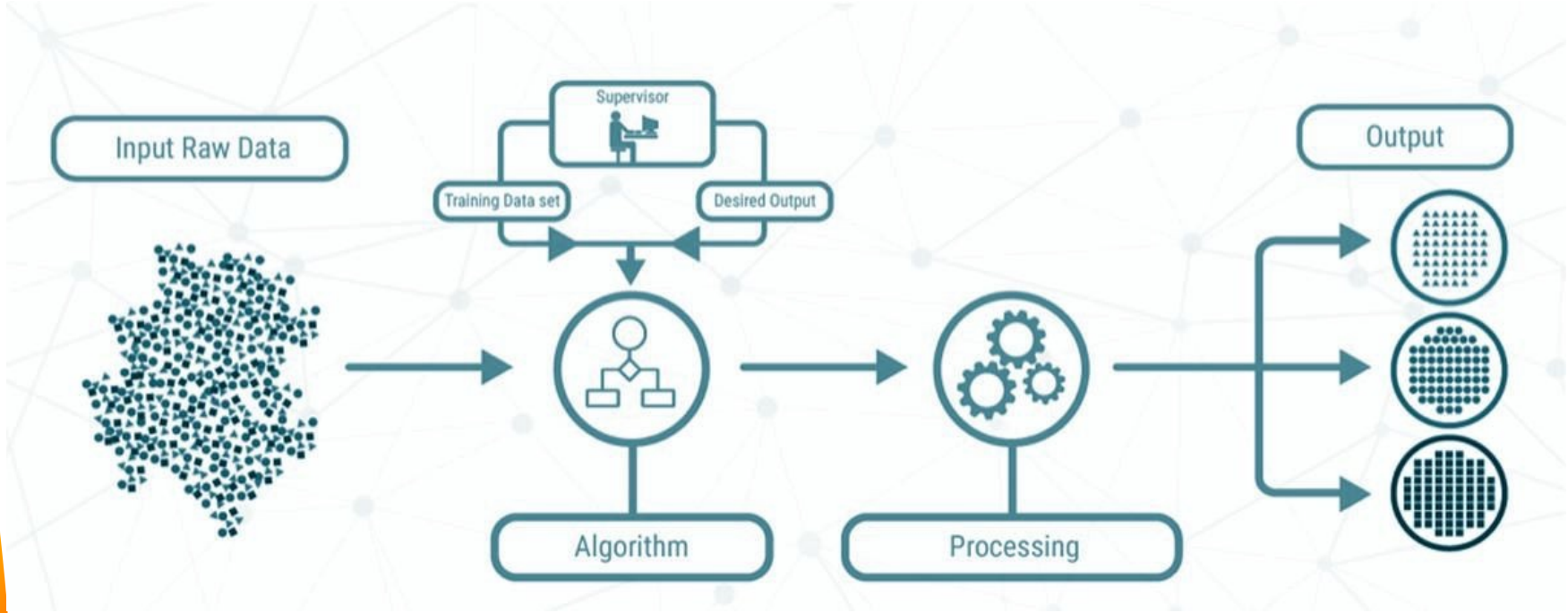
Dependent Variable

Has Wings	Can Fly	Has Backbone	Has Chitin	Bird or Not
Yes	Yes	Yes	No	Bird
Yes	Yes	Yes	No	Bird
Yes	Yes	No	Yes	Not Bird

Tasks in Machine Learning



Supervised Learning



Datasets in Supervised Learning

Feature 1	Feature 2	…..	Feature K	Dependent Variable

Observations or Examples or Instances

Applications of Supervised Learning

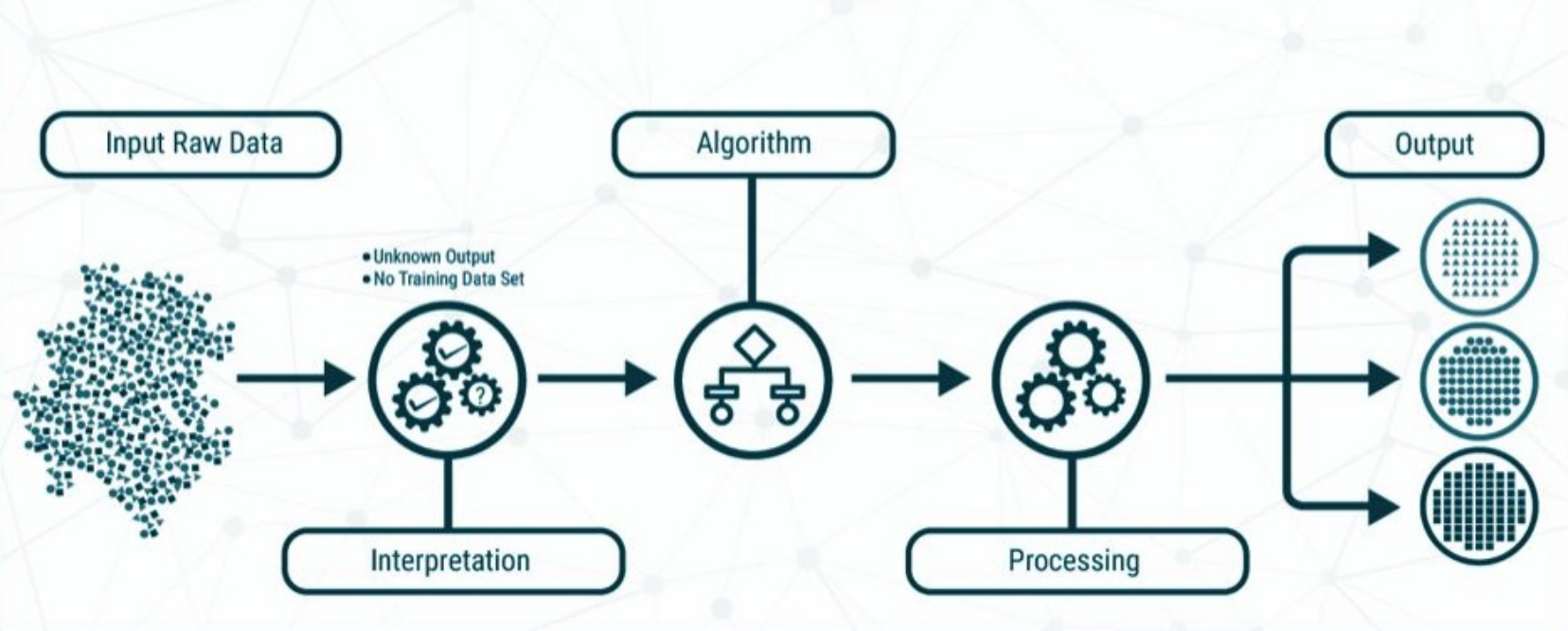
Regression

- Real Estate Prediction
- Weather Forecasting
- Financial Portfolio Prediction
- ETA

Classification

- Credit Card Fraud Detection
- Image Classification
- Spam Detection
- Insurance Decisioning

Unsupervised Learning



Datasets in Unsupervised Learning

Feature 1	Feature 2	…..	Feature K

No dependent variable available

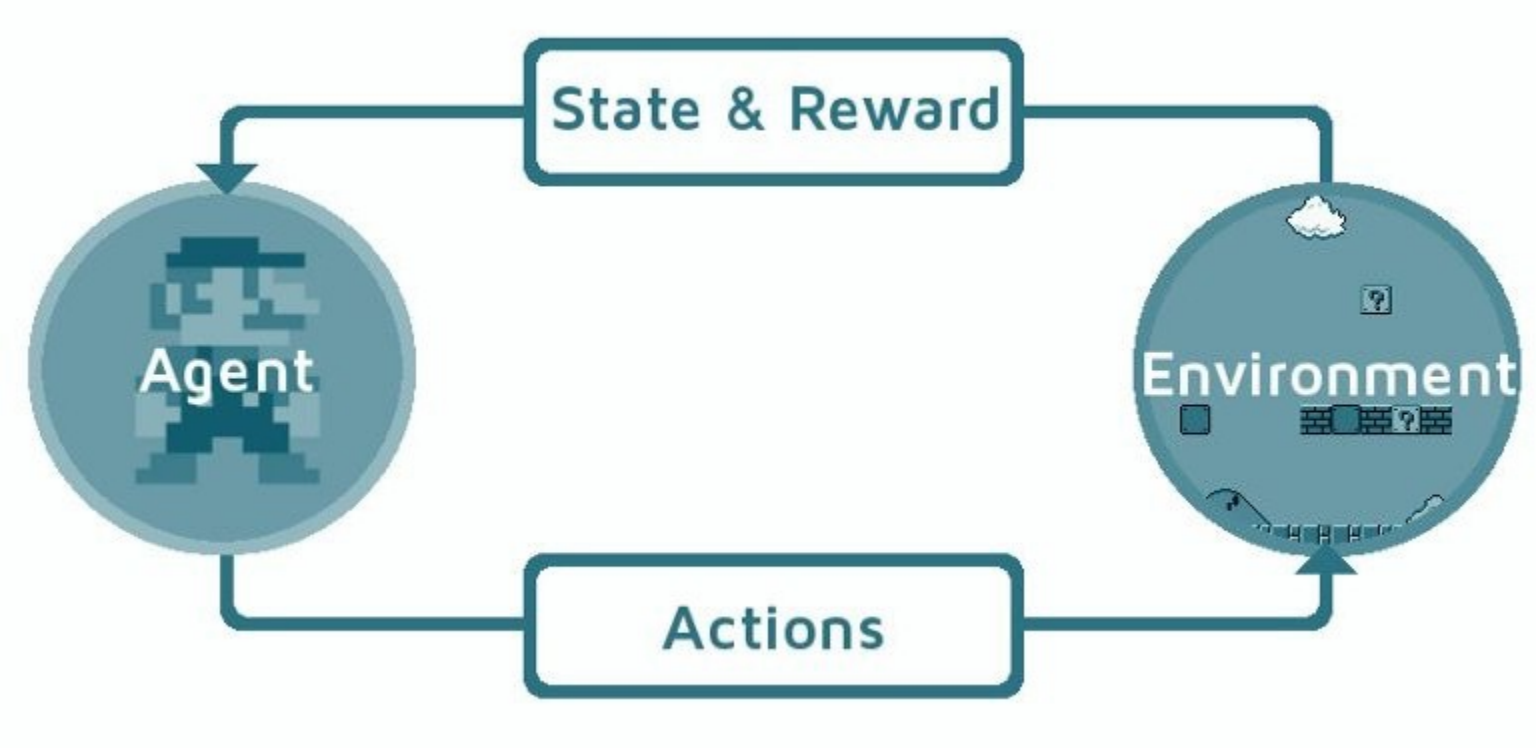
Observations or Examples or Instances

Applications of Unsupervised Learning

Clustering

- Document theme extraction
- Customer Segmentation
- Insurance Fraud detection
- Delivery Store Optimization

Reinforcement Learning



Applications of Reinforcement Learning

- Traffic Light Control
- Resource Management
- Robotics
- Games
- Bidding & Advertisement

Steps in Supervised ML Modeling