

Machine learning Notes

Section-1:

Main Points are following from section – 1:

- Machine learning is the process of **finding patterns** in data to understand something more or to **predict** some kind of future event.

Three Major Steps:

- Data collection
- Data modelling
- Deployment

Explanation of Deployment:

- Deployment is taking your set of instructions and using it in an application. This application could be anything from **recommending products** to customers on your online store to a hospital trying to better predict disease presence.

6 Steps for machine learning project:

1. Problem definition
2. Data (Is our data **structured** or **unstructured**? **Static** or **streaming**?)
3. Evaluation
4. Features
5. Modelling
6. Experimentation

Types of Machine Learning:

- Supervised learning
- Un-Supervised learning
- Transfer learning
- Reinforcement learning

1. Problem definition—Rephrase your business problem as a machine learning problem

- The three most used in business applications are supervised learning, unsupervised learning and transfer learning.
- **Supervised learning**
 - Supervised learning, is called supervised because you have **data** and **labels**.
 - A machine learning algorithm tries to learn what patterns in the **data lead to the labels**.
 - The supervised part happens during **training**. If the algorithm guesses the wrong label, it tries to correct itself.
 - Example of heart disease -> The algorithm says, “based on what I’ve seen before, it looks like this **new patients’** medical records are **70% aligned** to those who have **heart disease**.”
- **Unsupervised learning**
 - Unsupervised learning is when you have data but no labels.
 - The data could be the **purchase** history of your online video game store customers. Using this data, you may want to group **similar** customers together so you can offer them **specialized** deals.
 - You could use a machine learning algorithm to group your customers by purchase history.
 - **Clustering**
 - After inspecting the **groups**, you provide the **labels**. There may be a group interested in **computer** games, another group who prefer **console** games and another which only buy **discounted older** games. This is called clustering.
- ❖ What’s important to remember here is the algorithm did not provide these labels. It found the patterns between similar customers and using your domain knowledge, you provided the labels.

- **Transfer learning**

- Transfer learning is when you take the information an **existing** machine learning model has learned and **adjust** it to your own **problem**.
 - Training a machine learning model from scratch can be **expensive and time-consuming**.
 - When machine learning algorithms find patterns in one kind of data, these patterns can be used in another type of data.
- ❖ If machine learning can be used in your business, it's likely it'll fall under one of these three types of learning. But let's break them down further into **classification, regression and recommendation**.

- **Classification**

- Do you want to predict whether something is one thing or another?
- Such as whether a customer will **churn** or **not churn**? Or whether a patient has **heart disease** or not?
- Note, there can be more than two things.
- **Two** classes are called **binary classification**.
- **More** than two classes are called **multi-class classification**.
- **Multi-label** is when an item can belong to more than one class.

- **Regression**

- Do you want to predict a **specific number** of something?
- Such as how much a house will sell for? Or how many customers will visit your site next month?

- **Recommendation**

- Do you want to recommend **something** to **someone**?
- Such as products to buy based on their previous purchases? Or articles to read based on their reading history?