WEEK 1 ASSIGNMENT

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# What is Machine Learning?

**Machine Learning (ML)** is a branch of artificial intelligence (AI) that focuses on creating algorithms and systems that can learn from data and make predictions or decisions without being explicitly programmed for each task. Instead of following fixed rules, a machine learning model identifies patterns and relationships in data, and uses that knowledge to handle new, unseen information. This learning process typically involves feeding large amounts of data into the model, allowing it to adjust its internal parameters to improve accuracy over time. ML is used in a wide variety of applications, from spam detection in emails and personalized recommendations on streaming platforms to medical diagnosis, financial forecasting, self-driving cars, and more. At its core, machine learning transforms data into insights and automation by allowing machines to **"learn"** and adapt like humans, but at a much larger scale and speed.

**Example:** If you want to train a computer system on how to recognize **apples** and **oranges**. You show many pictures of apples and oranges and label each one correctly. Over time, the computer learns the differences—like color, shape, or texture. Later, when you give it a new, unlabeled picture, it can guess whether it's an apple or an orange based on what it learned from the earlier examples. That’s machine learning in action!

# What is Supervised Machine Learning Algorithm?

Supervised ML is a type of learning where the algorithm is trained on a labeled dataset, meaning each input has a known output. The model learns the mapping from input to output and is evaluated on how accurately it predicts the labels on unseen data.

**The table below shows an example of a labelled dataset:**

| **Color** | **Weight (grams)** | **Size (cm)** | **Label** |
| --- | --- | --- | --- |
| Red | 150 | 7.0 | Apple |
| Orange | 160 | 7.5 | Orange |
| Green | 140 | 6.8 | Apple |
| Orange | 170 | 7.8 | Orange |

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# What is Regression and Classification in Machine Learning?

**Regression and classification** are two main types of problems that machine learning can solve, and both fall under **supervised learning**, where we train a model using data that already has the correct answers.

**Regression** is used when we want to predict a number or a continuous value. For example, if you want to predict the price of a house based on its size, number of rooms, and location, that's a regression problem. The answer isn't just a label like "cheap" or "expensive"—it's an actual number like ₹50,00,000. The model looks at past data with known prices and learns the pattern, so it can guess the price of a new house.

**Classification**, on the other hand, is used when we want to put things into categories. For example, if you're building a system to check whether an email is **spam** or **not spam**, or whether a photo shows a **cat** or a **dog**, you're doing classification. The answers here are labels or classes, not numbers. The model learns from examples of each class so that it can decide where new items belong.

In short, **regression = predicting numbers**, and **classification = predicting categories**. Both help machines make smart guesses based on what they've learned from data.