Question: Explain dimension reduction in machine learning.

Answer:-**Dimension reduction** refers to reducing the number of features used in training the machine learning model.Also know as PCA(Principal Component Analysis).

It is also used to combine several variables into a bigger(latent) variable.

It is called dimensionality reduction technique because it reduces the dimension of the feature metric. Ex:- It can converts the n-Dimensional array into 2-D array(explained in the sense of matrix and tensors)

**When**:-

1.When 2 or more variables are highly correlated.

2.When several features can be combine into one

**Why**:-

1.To train the machine learning model accurately

2. Machines can be trained effectively and efficiently by combining several features into one(this single variable has the ability to explain all underline/combined features) and this makes the model much faster as it reduces the number of features it's being trained upon.

3.Help reduce our data to be trained upon.

**Example**:-

Like If we have features like:-

1.I make friends easily

2.I love going outside

3. People like my company

These all features can be combined into one because all are a **level of extraversion indicator.**

How to implement:-

We can assign number rating to each features and take the combination of three into one new column(Level of Extraversion)

Example 2:-

Features:-

Engine Volume

Car size

Here these two values will be highly correlated so either we can use one of the variables or we can combine it into two.

Notes:- It is highly recommended to see the correlation between variables before combining.