PRIOR KNOWLEDGE

TEAM ID	PNT2022TMID07046
PROJECT NAME	A Novel Method for Handwritten Digit Recognition System

One should know the following Concepts:

1. Supervised and unsupervised learning Machine Learning: Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy Types of Machine Learning:

1. Supervised learning:

● In supervised learning, the model can predict with the help of a labeled dataset.

● We train the machines using the "labeled" dataset, and based on the training, the machine predicts the output. Here, the labeled data specifies that some of the inputs are already mapped to the output.

● First, we train the machine with the input and corresponding output, and then we ask the machine to predict the output using the test dataset.

Categories of Supervised Learning:

1. Classification: Classification algorithms are used to solve classification problems in which the output variable is categorical. The classification algorithms predict the categories present in the dataset.

2. Regression: Regression algorithms are used to solve regression problems in which there is a linear relationship between input and output variables. These are used to predict continuous output variables

2. Unsupervised learning

● In unsupervised learning, the model can predict with the help of an unlabeled dataset.

● The machine is trained using the unlabeled dataset and predicts the output without supervision.

● In unsupervised learning, the models are trained with data that is neither classified nor labeled, and the model acts on that data without any supervision.

2. Regression Classification and clustering

Clustering: Clustering is an unsupervised technique. With clustering, the algorithm tries to find a pattern in data sets without labels associated with it. This could be a clustering of buying behavior of customers. Features for this would be the household income, age, and clusters of different consumers could then be built.

Classification: Classification algorithms look at existing data and predict what new data belongs to. Regression: Regression models are used to predict a continuous value. Example: Predicting prices of a house given the features of the house like size, price, etc

3. Artificial Neural Networks

Artificial neural network refers to a biologically inspired sub-field of artificial intelligence modeled after the brain. An Artificial neural network is usually a computational network based on biological neural networks that construct the structure of the human brain. Similar to how a human brain has interconnected neurons, artificial neural networks also have neurons linked to each other in various layers of the networks. These neurons are known as nodes. An Artificial Neural Network in the field of Artificial intelligence attempts to mimic the network of neurons that makes up a human brain so that computers will have the option to understand things and make decisions in a human-like manner. The artificial neural network is designed by programming computers to behave simply like interconnected brain cells.

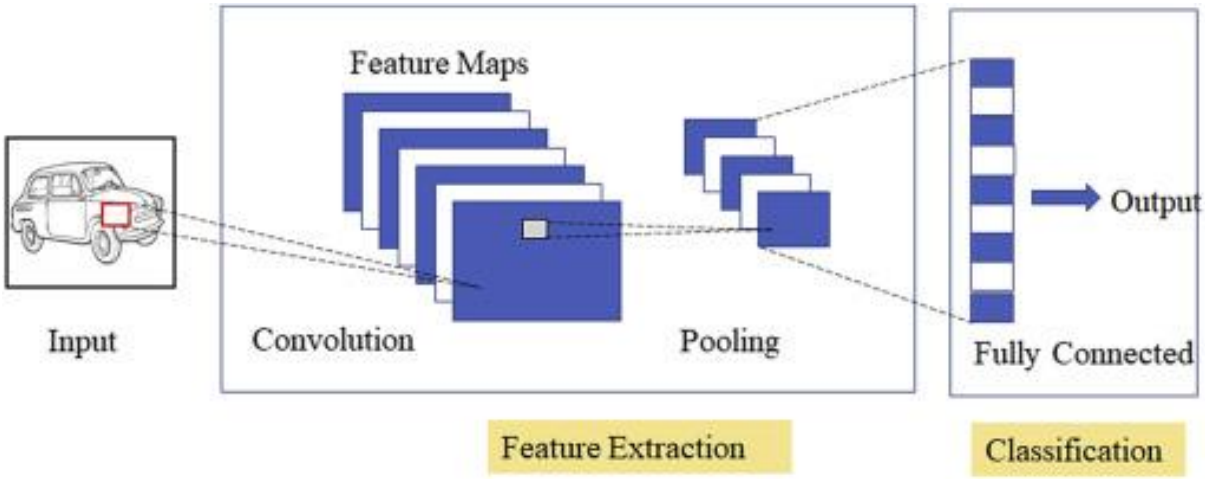
Artificial Neural Network primarily consists of three layers:

Input Layer: As the name suggests, it accepts inputs in several different formats provided by the programmer.

Hidden Layer: The hidden layer presents in-between input and output layers. It performs all the calculations to find hidden features and patterns. Output Layer: The input goes through a series of transformations using the hidden layer, resulting in output conveyed using this layer.

4. Convolution Neural Networks

A Convolutional Neural Network is a Deep Learning algorithm that can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image, and be able to differentiate one from the other.



5. Flask Flask is used for developing web