**Final Project**

## **Steps followed:**

1. Connect to Google Drive using the drive.mount() function from the google.colab library and changes the working directory to the folder where the final project files are stored.
2. Import the necessary libraries required for data analysis and model building, including os, numpy, pandas, tensorflow, random, matplotlib, and sklearn.
3. Download the MNIST dataset from Kaggle using the kaggle datasets download command.
4. Unzip the downloaded file and places it in the appropriate directory using the !unzip command.
5. Define a show\_images function that displays a grid of images with their corresponding labels.
6. Load the MNIST dataset using the mnist.load\_data() function from tensorflow.keras.datasets and splits the data into training and testing sets.
7. Preprocesse the data by dividing each pixel value by 255 to normalize the pixel values to a range between 0 and 1.
8. Define a convolutional neural network (CNN) model architecture using keras.Sequential() and adds layers using keras.layers.Dense().
9. Compile the CNN model using model.compile() with adam optimizer, sparse\_categorical\_crossentropy loss, and accuracy metric.
10. Train the CNN model using model.fit() with the training set for 25 epochs and validation data using the testing set.
11. Use the trained model to make a prediction on the testing set using np.argmax() and display the predicted labels for the first five test images using the show\_images() function.
12. Calculate the accuracy of the model on the testing set using model.evaluate(), print the test accuracy, and calculates the confusion matrix using sklearn.metrics.confusion\_matrix().
13. Display the confusion matrix using matplotlib.pyplot.imshow().