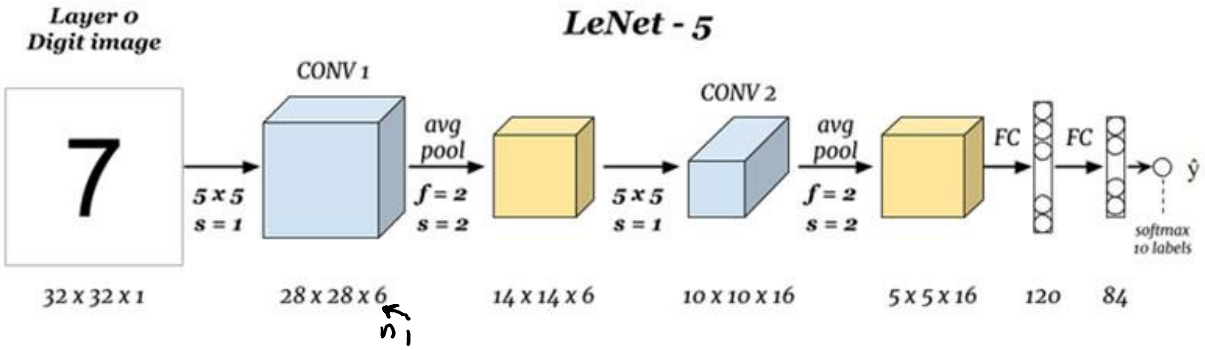
Assignment 3

Use the ReducedMNIST which is a reduced version of the MNIST data set.

- **ReducedMNIST training**: 1000 examples for each digit.
- **ReducedMNIST test**: 200 examples for each digit.

1. Use the ReducedMNIST data to train a CNN from the images without any use of a feature extraction step. Use the following structure to start with.
   (Hint: you have to adjust your parameters to fit 28x28 images instead of 32x32, and use **ReLU** function as an activation function).



   a. Retrain the network with these changes: Use n1 = 8 instead of 6 filters in the first Convolutional layer and Use **Sigmoid** as your activation function. do any necessary changes you may need. Calculate the accuracy for the **testing data only**, also calculate the processing time for the training and for the testing.

2. Compare among the results that you have obtained in this assignment and that you have obtained in Assignment 2 regarding (fill the following table).

		Features					
		DCT		PCA		created features	
Classifier		**Accuracy**	**Processing Time*** **	**Accuracy**	**rocessing Time****	**Accuracy**	**Processing Time*** **
K-means Clustering	1						
	4						
	16						
GMM	1						
	4						
	16						
SVM	Linear						
	nonlinear*						
in the CNN no features are needed							
		Accuracy	Training Time	testing time			
CNN	n1**=6						
	n1=8						

*mention which kernel
** number of filters in the first convolutional layer
** training Time