

## Homework 8

### Task 2 :

#### Adding Convolutional Layers :

```
[11]: model = models.Sequential()

model.add(layers.Conv2D(32, (3, 3), activation='relu', input_shape=(28, 28, 1)))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))
model.add(layers.MaxPooling2D((2, 2)))
model.add(layers.Conv2D(64, (3, 3), activation='relu'))
```

#### Flattening the output and adding Dense Layers:

```
[12]: model.add(layers.Flatten())
model.add(layers.Dense(64, activation='relu'))
model.add(layers.Dense(10, activation='softmax'))

#### Compiling the Model :
model.compile(optimizer='adam',
              loss='sparse_categorical_crossentropy',
              metrics=['accuracy'])

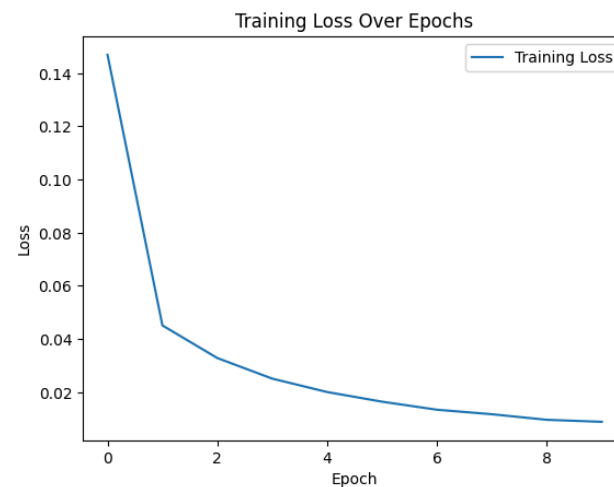
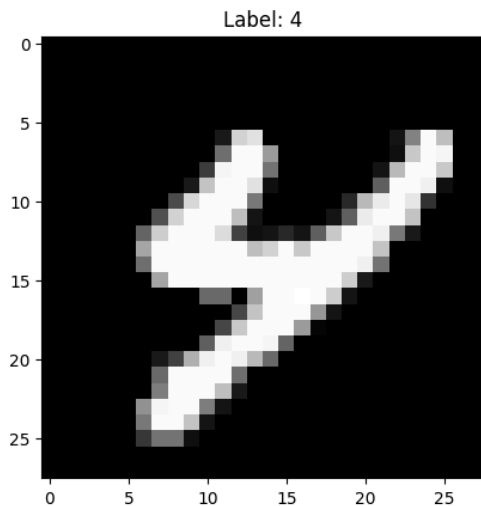
model.summary()
```

Five commonly used activation functions:

1. ReLU (Rectified Linear Unit)
2. Sigmoid
3. Tanh (Hyperbolic Tangent)
4. Softmax
5. Leaky ReLU

a) Adam: Adam is an optimization algorithm used in training neural networks. It stands for "Adaptive Moment Estimation" and combines the best properties of the AdaGrad and RMSProp algorithms to handle sparse gradients on noisy problems.

b) Sparse Categorical Crossentropy: This is a loss function used in multi-class classification tasks where the classes are mutually exclusive. It's used when the labels are integers (sparse), as opposed to one-hot encoded vectors.



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313/313 [=====] - 0s 1ms/step  
Test Loss: 0.046370960772037506  
Test Accuracy: 0.9894999861717224