```python
model = tf.keras.Sequential()

from keras.models import Sequential
from keras.layers import Conv2D, Input, Activation, Dense, Flatten, Dropout, MaxPooling2D

model.add(Conv2D(8, (3, 3), input_shape=(28,28,1), padding="same", activation="relu"))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Conv2D(16, 3, input_shape=(14,14), padding="same", activation="relu"))
model.add(MaxPooling2D(pool_size=(2, 2)))

model.add(Conv2D(32, 3, input_shape=(7,7), padding="same", activation="relu"))

model.add(Flatten())

model.add(Dense(128, input_shape=(1, 1568), activation="relu"))
model.add(Dropout(0.2))

model.add(Dense(10, input_shape=(1, 128), activation="softmax"))

model.summary()
```

```
model.evaluate(x_test, y_test)

313/313 [==============================] - 4s 13ms/step - loss: 0.0643 - accuracy: 0.9838
[0.06429149210453033, 0.9837999939918518]
```

TASK 1 :
List of 5 activation functions:
1.**Sigmoid** ; 2.**Tanh** ; 3.**Rectified Linear Unit (ReLU)** ; 4.**Softmax** ; 5.**Binary Step Function**

TASK 3 :
a. What is adam?
Ans: Adam is an optimizer that stores the result of the Stochastic Gradient Descent (SGD) function, which determines the gradient every epoch number using samples drawn at random from the training data set. This function leads to a faster convergence.

```python
adam = tf.keras.optimizers.SGD(learning_rate=0.01, momentum=0.975, decay=2e-06, nesterov=True)
```

b. What does sparse_categorical_crossentropy mean?
Ans. Sparse_categorical_crossentropy is a loss function to compute the amount that the multi-class classification model should seek to minimize during training. Here, the expected output label is assigned as integer value (0, 1, 2, 3…).

c. What does "epoch" mean?
Ans. The number of complete passes of the entire training dataset passing through the training or learning process of the algorithm. The internal model parameters of the dataset are updated at each epoch iteration.

Label: 3
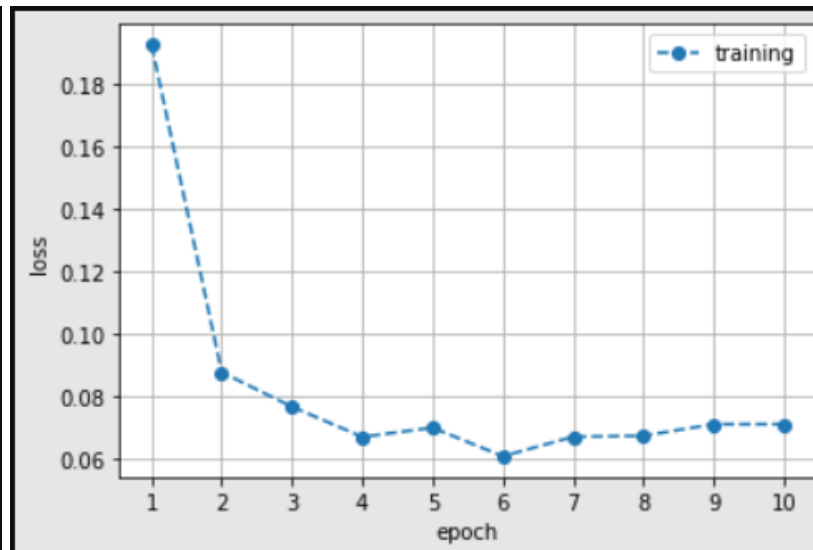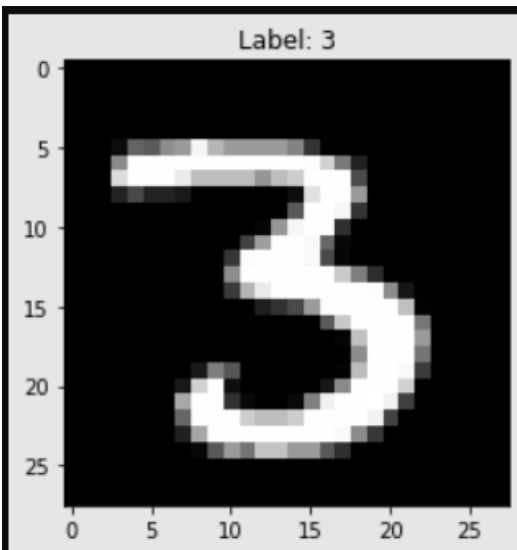
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