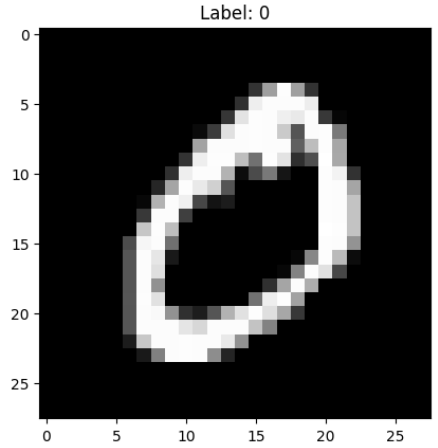
Task 1



List of Activations Functions:

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

Task 2

```python
import tensorflow as tf
from keras.layers import Conv2D, Activation, MaxPooling2D, Flatten, Dense, Dropout

model = tf.keras.models.Sequential()

# Stage 1: Conv3x3 & ReLU & MaxPooling
model.add(Conv2D(8, (3, 3), activation='relu', input_shape=(28, 28, 1), padding='same'))
model.add(MaxPooling2D((2, 2)))

# Stage 2: Conv3x3 & ReLU & MaxPooling
model.add(Conv2D(16, (3, 3), activation='relu', padding='same'))
model.add(MaxPooling2D((2, 2)))

# Stage 3: Conv3x3 & ReLU
model.add(Conv2D(32, (3, 3), activation='relu', padding='same'))

# Stage 4: Flatten
model.add(Flatten())

# Stage 5: Dense & ReLU & Dropout
model.add(Dense(128, activation='relu'))
model.add(Dropout(0.2))

# Stage 6: Dense & Softmax
model.add(Dense(10, activation='softmax'))

model.summary()
```

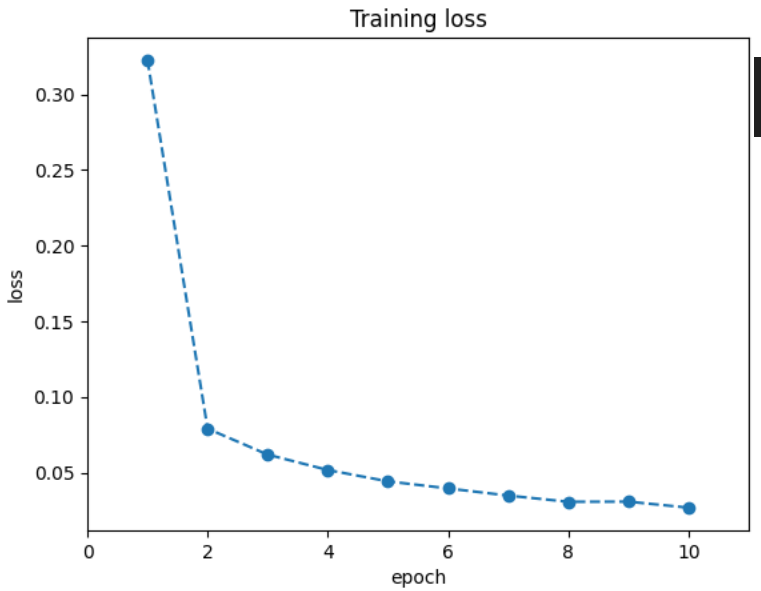
Task 3

a) Adam
Adam, short for Adaptive Moment Estimation, is an optimization algorithm used in training machine learning models. It computes adaptive learning rates for each parameter by estimating first and second moments of gradients, enhancing convergence efficiency.

b) Sparse Categorical Cross-Entropy
This loss function is applied in classification tasks where target labels are integers rather than one-hot encoded vectors. It measures the difference between the true class and the predicted probability distribution, aiding the model in learning to assign higher probabilities to correct classes.

Epoch : An epoch is one complete pass through the entire training dataset during the training phase. To achieve good performance in a model, usually multiple epochs are needed.

Task 4




```
Test accuracy: 98.61%
```

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