Calculation of Number of Parameters in the CNN Network

1. Convolutional Layer (CONV1)

$$\text{Filter dimensions} = 2 \times 1$$
$$\text{Number of filters} = 1$$
$$\text{Weights} = 2$$
$$\text{Biases} = 1$$
$$\text{Total parameters in CONV1} = 2 + 1 = 3$$

2. Average Pooling Layer (AVGPOOL1)

$$\text{Total parameters in AVGPOOL1} = 0$$

3. Fully Connected Layer (FC1)

$$\text{Input dimensions to FC1} = 1 \times 393$$
$$\text{Number of units in FC1} = 20$$
$$\text{Weights} = 393 \times 20 = 7860$$
$$\text{Biases} = 20$$
$$\text{Total parameters in FC1} = 7860 + 20 = 7880$$

4. Output Layer (Z)

$$\text{Input to Z} = 20$$
$$\text{Number of output units} = 1$$
$$\text{Weights} = 20$$
$$\text{Biases} = 1$$
$$\text{Total parameters in Z} = 20 + 1 = 21$$

Total Number of Parameters

$$\text{Total parameters in the network} = 3 + 0 + 7880 + 21 = 7904$$