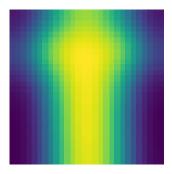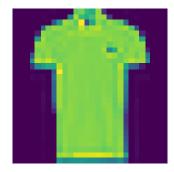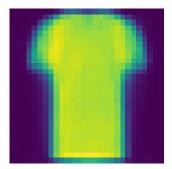Coursework 5

Image Deblurring with Autoencoders

1. Implement a two-layer fully connected network that maps each class of fashion MNIST database to itself. Fix the number of nodes in the hidden layer to 200, while output has the same number of channels as pixels in an image. For each class from 0 to 9 (T-shirt, Trouser, … boot), choose a sample image from the test set, show the original and reconstructed versions. Report the test mean squared error(MSE). You can explore different activation functions, batch size, learning rates etc. for a good result.

2. Use the fashion MNIST database to create a database of blurred images. Use the following command to blur images:

   Blurred_image = cv2.GaussianBlur(input_image, kernel_size,0)

   Use this command with kernel size of (15,15). This image blurring is done by convolving images with a gaussian low-pass filter.

3. Create a two-layer network to reconstruct original images from the blurred images. Find the optimum number of the nodes in the hidden layer by minimizing MSE. For each class from 0 to 9, choose a sample image from the blurred images of the test set and plot that image, the reconstructed image, and the original image, as shown above.