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cse(ds)
DI EXPERIMENT 4

CODE:--

```
import keras
from keras import layers
from keras.datasets import mnist
import numpy as np

(x_train,_),(x_test,_)= mnist.load_data()

x_train = x_train.astype('float32')/255.
x_test = x_test.astype('float32')/255.
x_train = x_train.reshape((len(x_train),np.prod(x_train.shape[1:])))
x_test = x_test.reshape((len(x_test),np.prod(x_test.shape[1:])))
print(x_train.shape)
print(x_test.shape)

encoding_dim = 32
input_img = keras.Input(shape=(784,))
encoded = layers.Dense(encoding_dim,activation='relu')(input_img)
decoded =layers.Dense(784,activation = 'sigmoid')(encoded)
autoencoder = keras.Model(input_img,decoded)

encoder = keras.Model(input_img,encoded)

encoded_input = keras.Input(shape=(encoding_dim,))
decoder_layer = autoencoder.layers[-1]
decoder = keras.Model(encoded_input,decoder_layer(encoded_input))

autoencoder.compile(optimizer='adam',loss='binary_crossentropy')

autoencoder.fit(x_train,x_train,epochs=20,batch_size=64,shuffle=True,validation_data=(x_test,x
_test))

encoded_imgs = encoder.predict(x_test)
decoded_imgs = decoder.predict(encoded_imgs)

import matplotlib.pyplot as plt
```

```
n = 10
plt.figure(figsize = (20,4))
for i in range(n):

  ax = plt.subplot(2,n,i+1)
  plt.imshow(x_test[i].reshape(28,28))
  plt.gray()
  ax.get_xaxis().set_visible(False)
  ax.get_yaxis().set_visible(False)

  ax=plt.subplot(2,n,i+1+n)
  plt.imshow(decoded_imgs[i].reshape(28,28))
  plt.gray()
  ax.get_xaxis().set_visible(False)
  ax.get_yaxis().set_visible(False)
  plt.show()
```

OUTPUT:-