Deep Learning

Assignment 2

# Assignment Gdrive Link:

<https://drive.google.com/drive/folders/1Ew1Y4Wz3spnlNMfdpWObN8LM_sNgkSNf?usp=sharing>

# Assignment Description:

**Beta Variational Auto-encoders**

1. Analyze the VAE code shared to you. Try to vary the parameters and analyse the quality of images and report the same.

2. Try to vary beta value in variational auto-encoder and see how the image changes.

# Initial Run:

Latent\_dim: 12

Batch size: 64

Encoder Layers: 4 Conv2d + MaxPool2d layer and 3Dense layers (2 among them are mean and log\_variance)

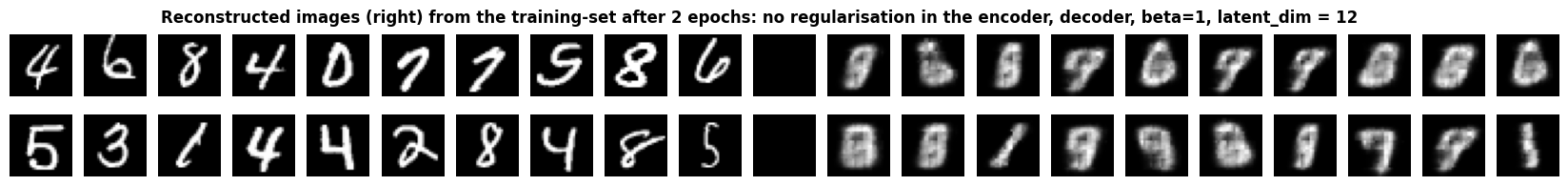
Decoder Layers: 3 dense layers, 5 Conv2dTranspose

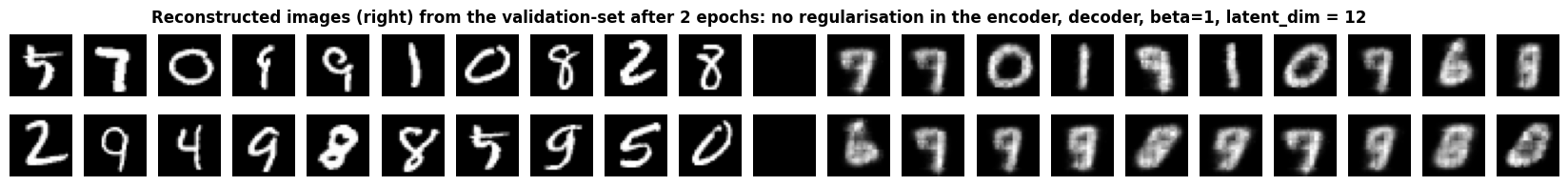
Loss function = reconstruction\_loss + beta \* kl\_divergence

Beta = 1

A graph of a model loss

Description automatically generated





A collage of images of letters

Description automatically generated

# Run 2:

Latent\_dim: 24

Epochs: 15

A graph of a model loss

Description automatically generated





A collage of numbers

Description automatically generated

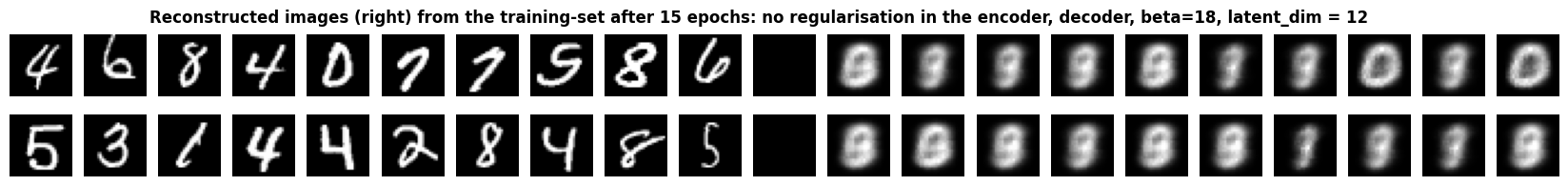
# Run 3:

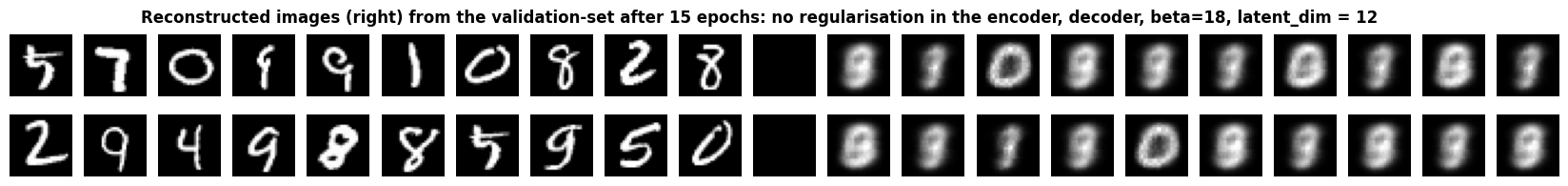
Beta = 18

Conv2d layer: no of filter changed

A graph of a graph

Description automatically generated





A collage of white numbers

Description automatically generated

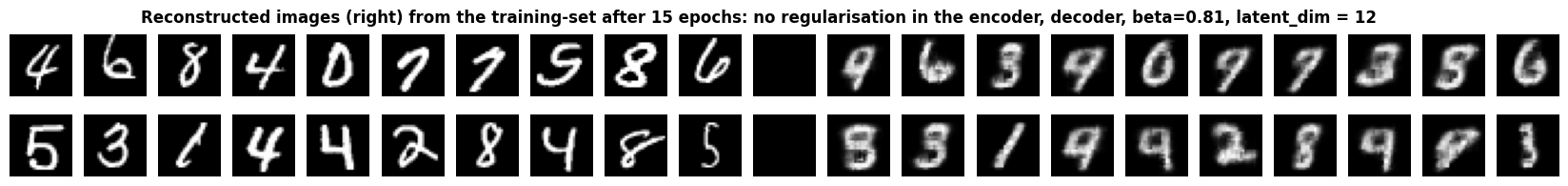
# Run 4:

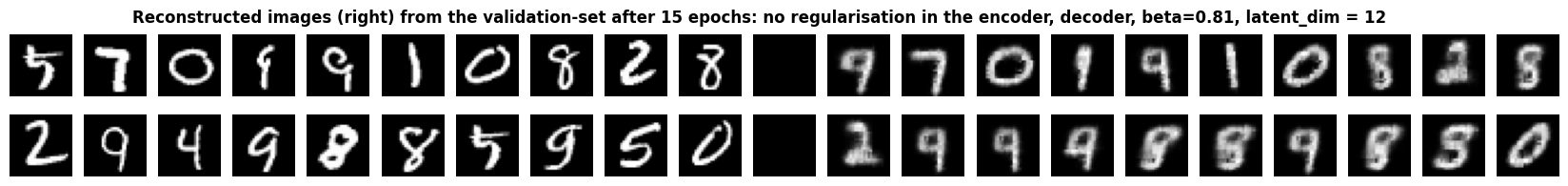
Beta = 0.81

Extra convolution layers added

A graph of a graph

Description automatically generated





A group of numbers in squares

Description automatically generated

# References:

* Beta\_VAE.ipynb Notebook <https://wilpbitspilaniacin0.sharepoint.com/:u:/r/sites/DeepLearningS2-23_SSZG529Regular/Shared%20Documents/General/Beta_VAE.ipynb?csf=1&web=1&e=B7252e>
* Assignment Description from Lecture Recording at 1:56 <https://wilpbitspilaniacin0.sharepoint.com/:v:/r/sites/DeepLearningS2-23_SSZG529Regular/Shared%20Documents/General/Recordings/Deep%20Learning%20(S2-23_SSZG529)(Regular)-20240416_191100-Meeting%20Recording.mp4?csf=1&web=1&e=SjTlwq&nav=eyJyZWZlcnJhbEluZm8iOnsicmVmZXJyYWxBcHAiOiJTdHJlYW1XZWJBcHAiLCJyZWZlcnJhbFZpZXciOiJTaGFyZURpYWxvZy1MaW5rIiwicmVmZXJyYWxBcHBQbGF0Zm9ybSI6IldlYiIsInJlZmVycmFsTW9kZSI6InZpZXcifSwicGxheWJhY2tPcHRpb25zIjp7InN0YXJ0VGltZUluU2Vjb25kcyI6Njk5Nn19>
* Keras <https://keras.io/api/>
* Python Pandas Docs <https://pandas.pydata.org/docs/reference/index.html#api>
* Matplotlib Docs <https://matplotlib.org/stable/api/index.html>
* Tensorflow Keras Docs <https://www.tensorflow.org/api_docs/python/tf/keras>