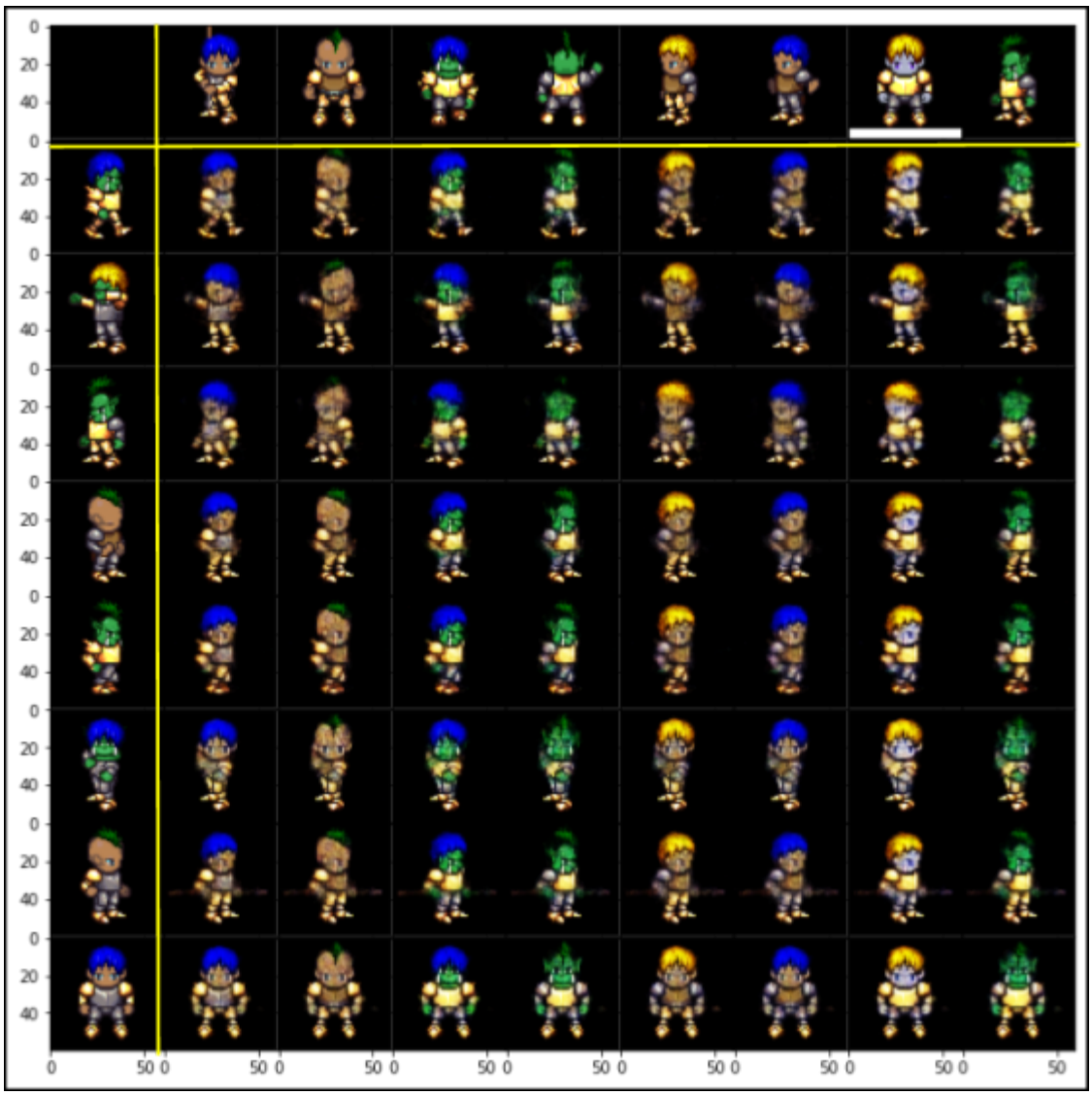
Q2.1 Implemented architecture - As depicted in paper
Loss Used -
Reconstruction Loss (MSE)
KL Divergence Loss
Reverse Cycle (L1)
Optimizer Used - Adam

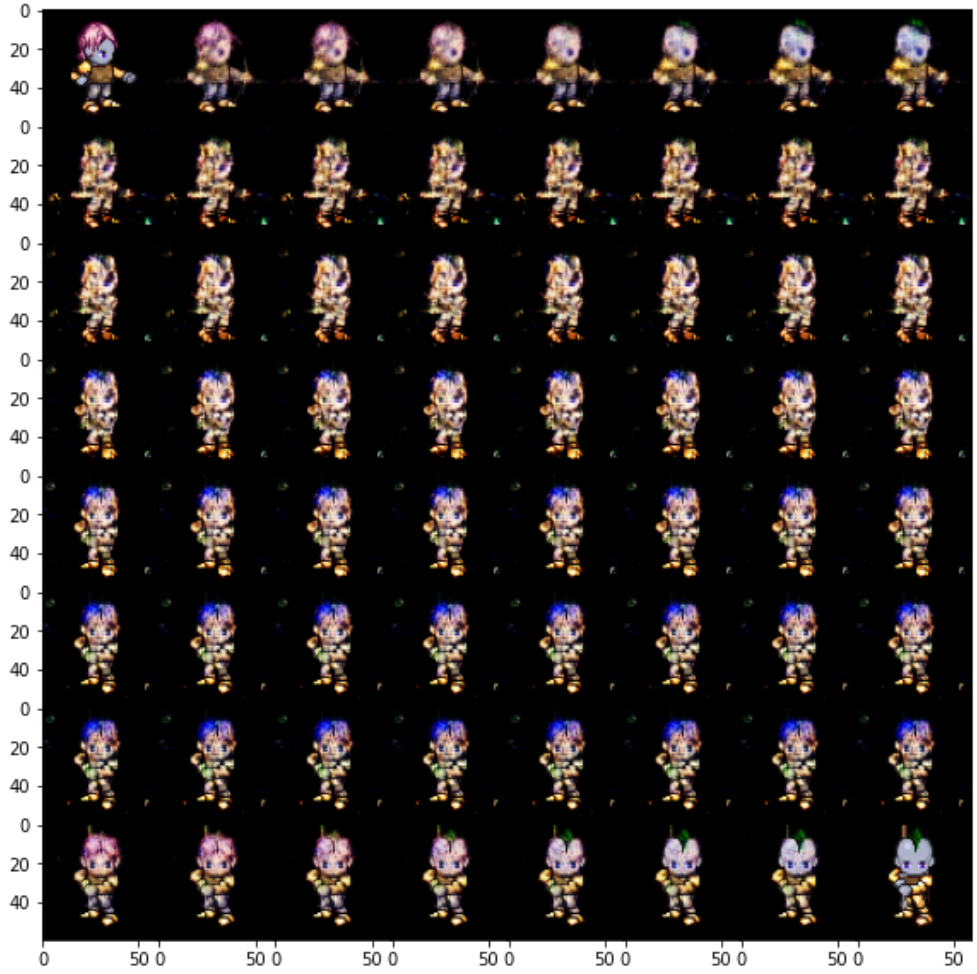
Q2.2 **Style transfer grid**



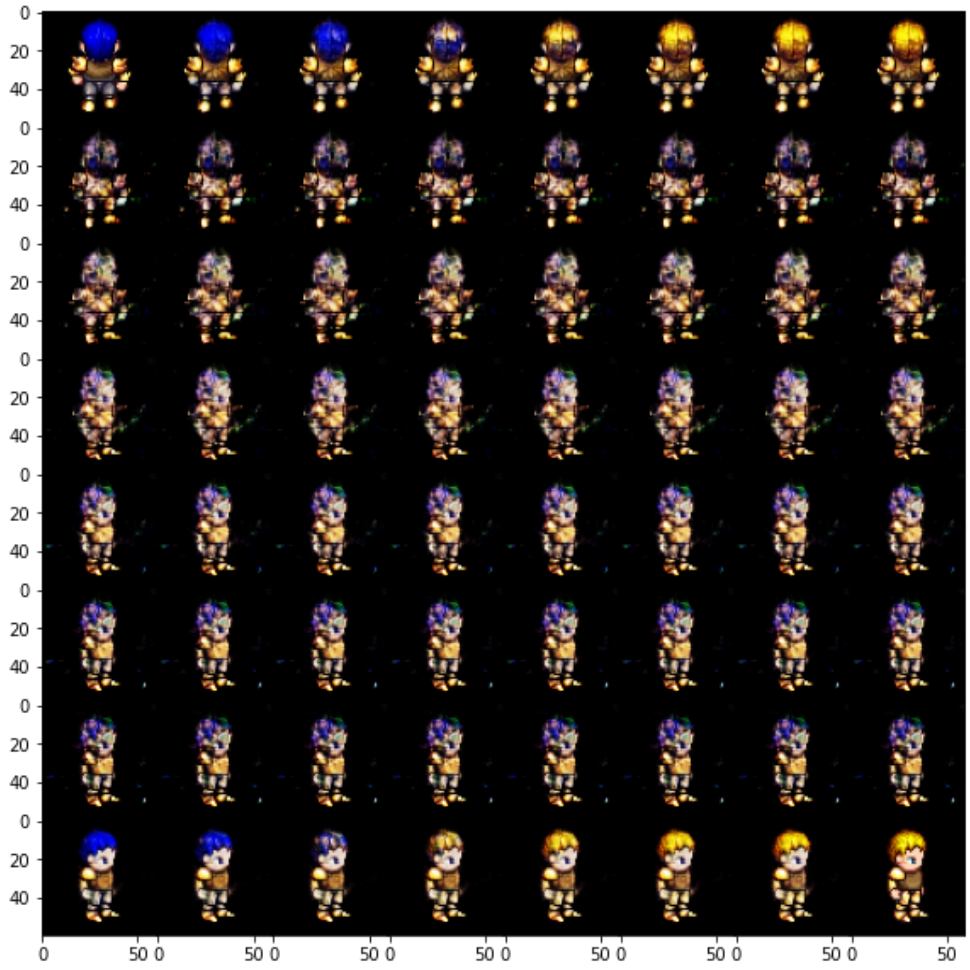
The top row and the first column are randomly selected from the test set. The remaining grid is generated by taking z from the character in the first column and s from the digit in the first row.Unspecified factors constant across rows and specified factors constant along columns.

Q2.3 Linear Interpolation of images

Pair - 1


0
20
40
0
20
40
0
20
40
0
20
40
0
20
40
0
20
40
0
20
40
0
20
40
0
20
40
0 50 0 50 0 50 0 50 0 50 0 50 0 50

Pair - 2



2 pairs of randomly selected images from the test set were interpolated.
1st row and 1st column produced better quality of images as compared to other intermediate images. Styles across rows remain constant and identity across columns remains constant. Quality of images improved to a
to a great extent.

Q2.4.

Trained classifier obtaining s and z from encoder. Using z, classification accuracy much less as compared to s thus proving z has very less identity features and mostly has style features whereas s has 95% accuracy thus it has identity features.

Classifier used - SVM

z dim	s dim	z train acc	s train acc	z test acc	s test acc
512	64	42.1	95.2	30.1	94.3

Q2.5.

Prediction Network Architecture -

Trained a prediction network to generate z from s.

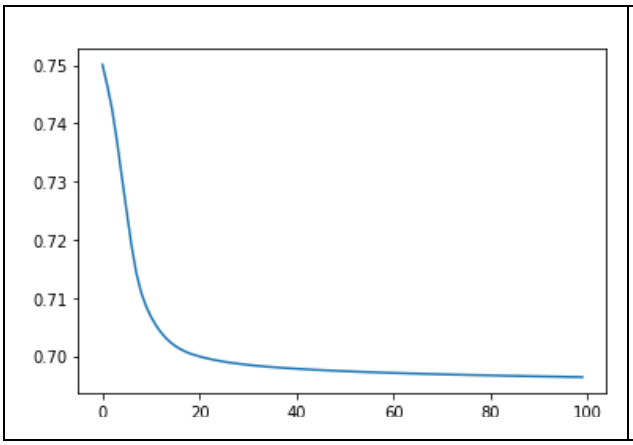
z -> s:
Fully Connected(Style_embedding_size, Style_embedding_size)
ReLU()
Fully Connected(Style_embedding_size, Class_embedding_size)
ReLU
Fully Connected(Class_embedding_size, Class_embedding_size)
ReLU
Fully Connected(Class_embedding_size, Class_embedding_size)

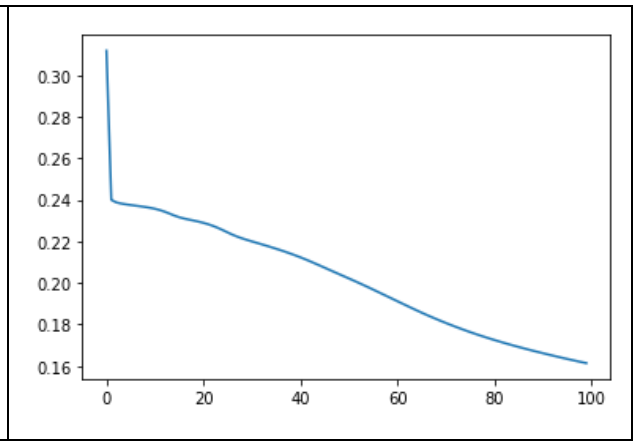
Trained a prediction network to generate s from z.

s -> z:
Fully Connected(Class_embedding_size, Class_embedding_size)
ReLU()
Fully Connected(Class_embedding_size, Style_embedding_size)
ReLU
Fully Connected(Style_embedding_size, Style_embedding_size)
ReLU
Fully Connected(Style_embedding_size, Style_embedding_size)

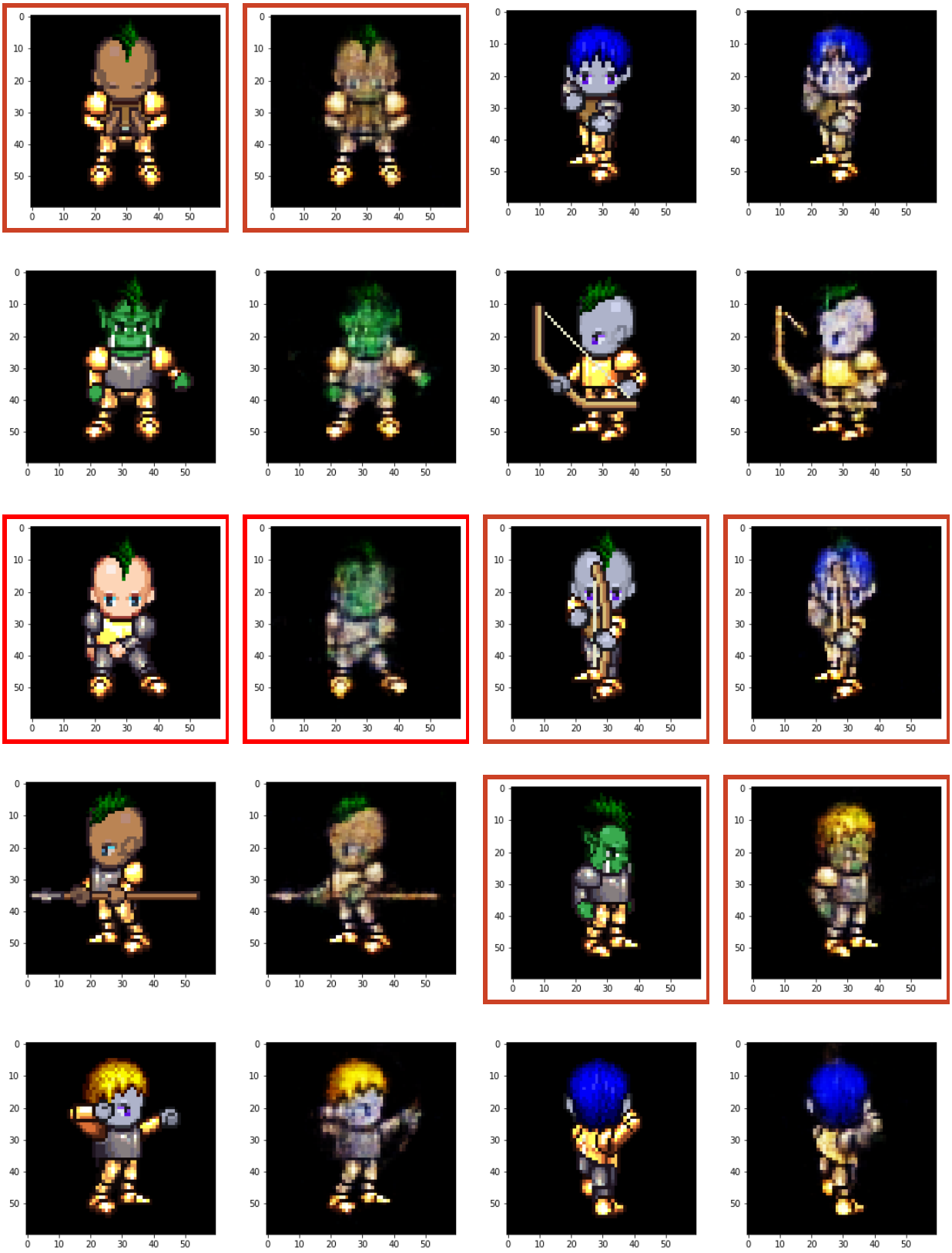
Loss Used - L1 Loss

Loss Vs Iterations - (left -specified -> unspecified, right - unspecified -> specified)





Original Image	Prediction Network	Original Image	Prediction Network



1st Pair - Eyes Open

2nd Pair - Wrong Face Colour
3rd Pair - Hair added
4th Pair - Hair and face changed
Misclassified images have been marked by red boxes. Out of 16 images only 4 are wrongly classified, we can safely assume that the prediction network did a good job in generating z and s features. The misclassified images have some resemblance (style) in their respective original image. The prediction network was trained only for 100 epochs, training it for more epochs can result in better image quality and probably fewer misclassifications.

Reference - https://github.com/ananyahjha93/cycle-consistent-vae

Link to best model's weight