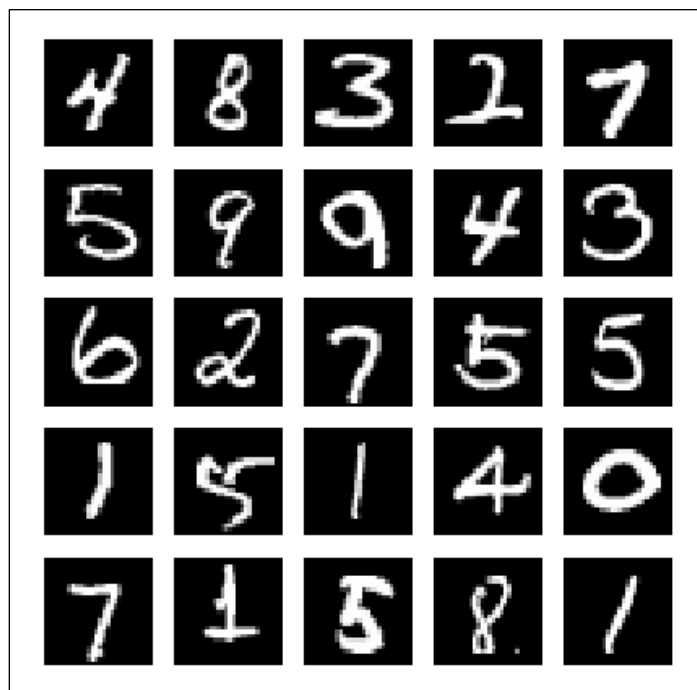
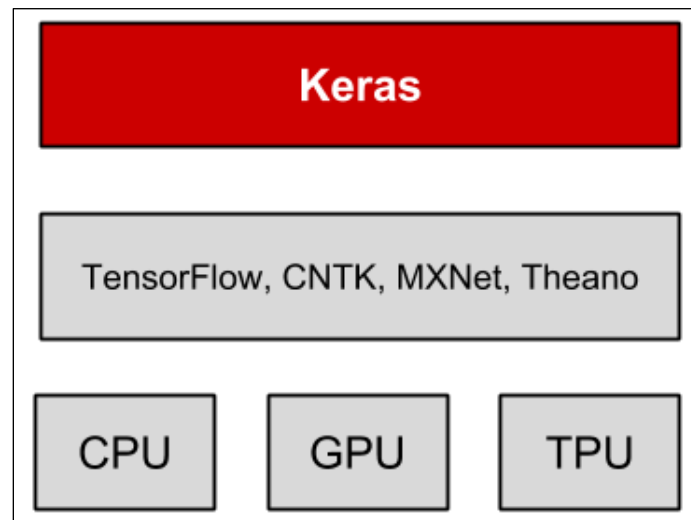
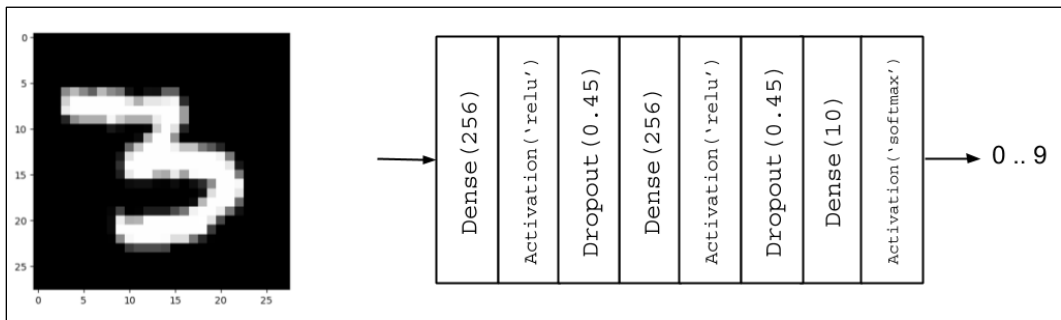
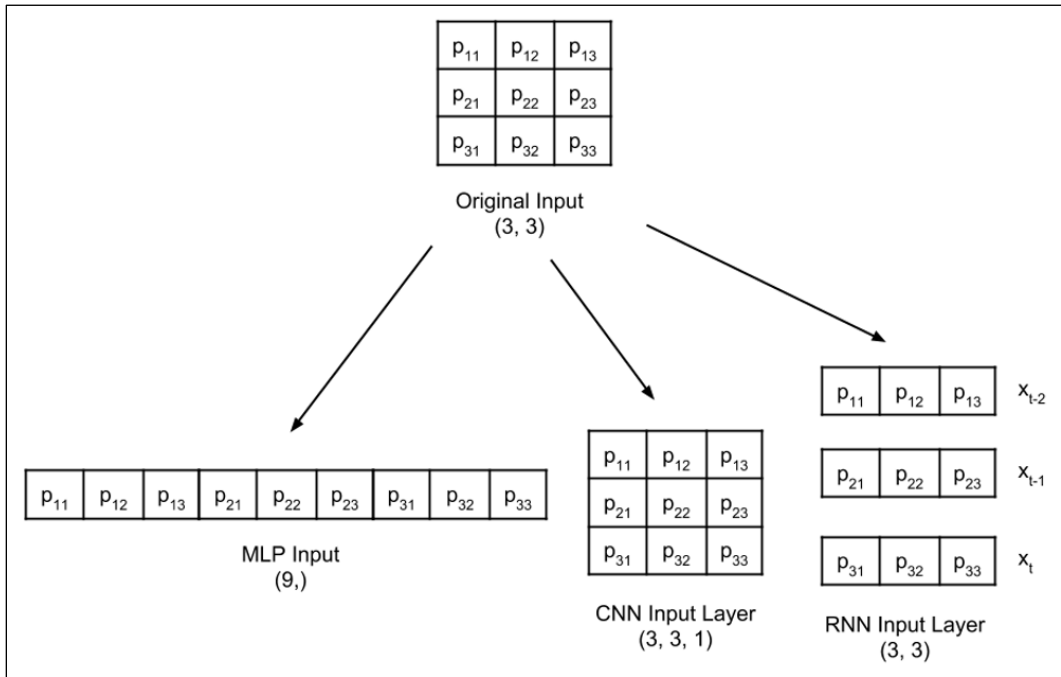
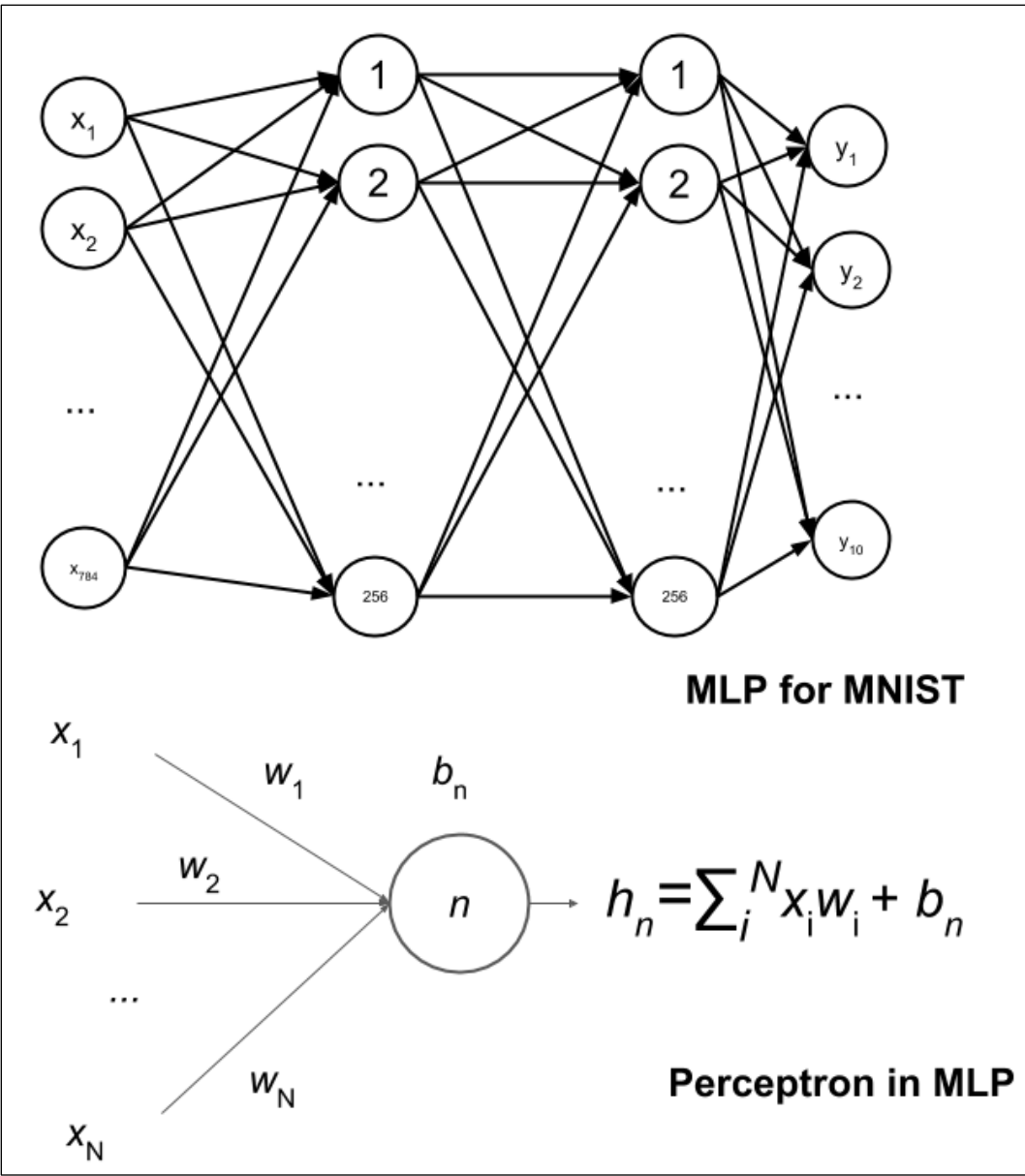
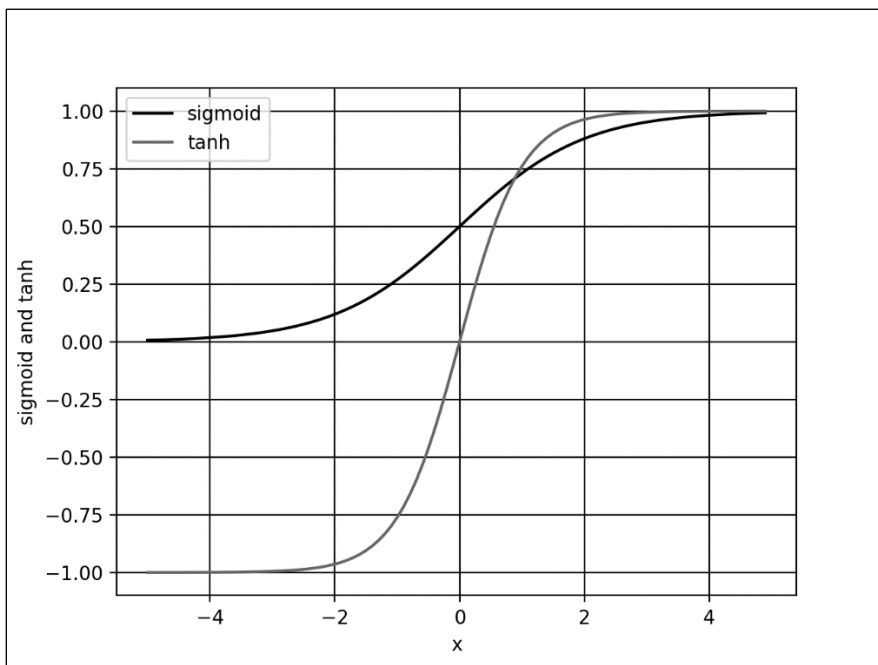
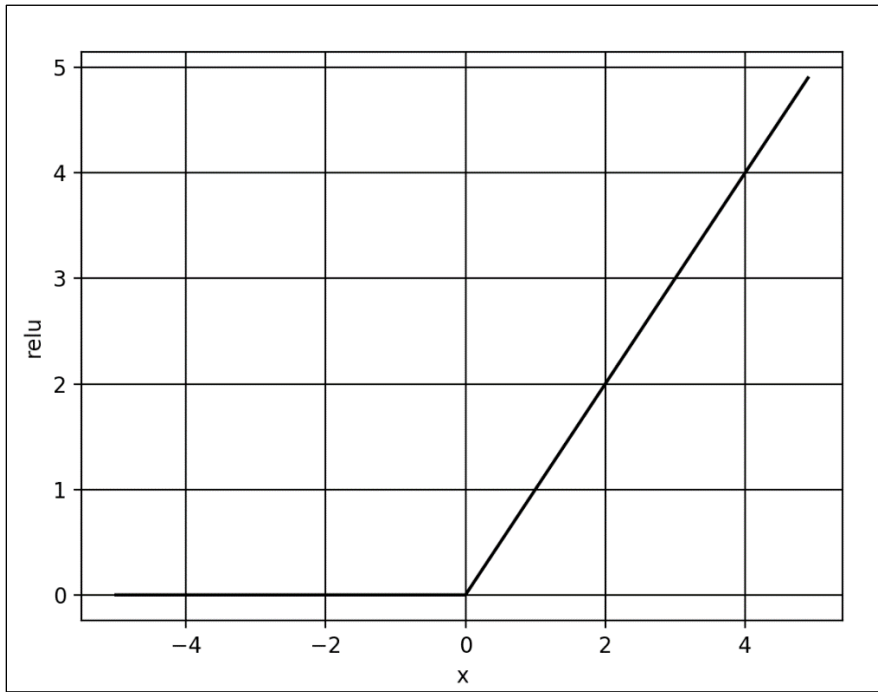


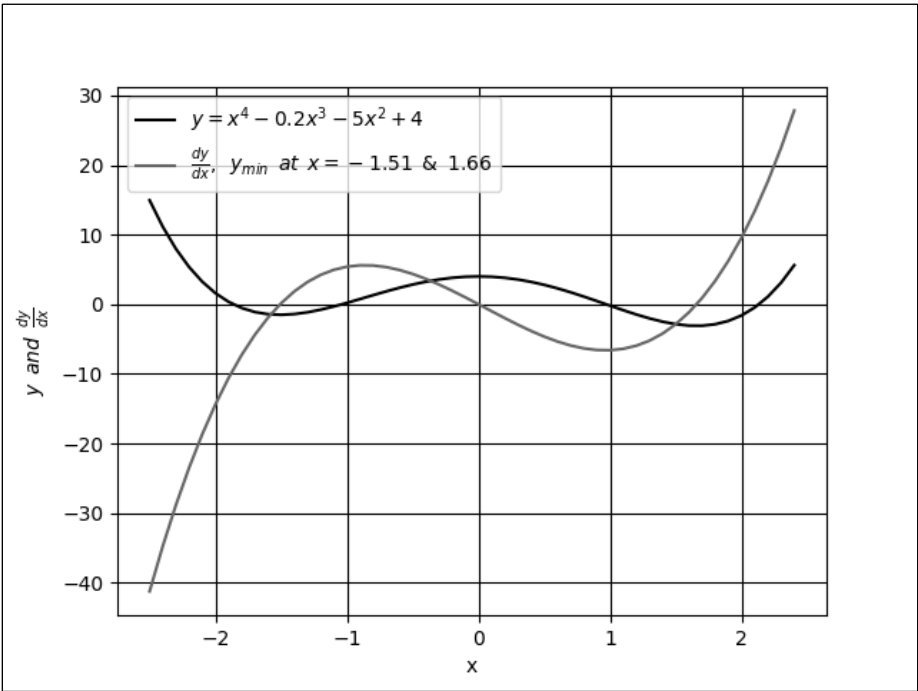
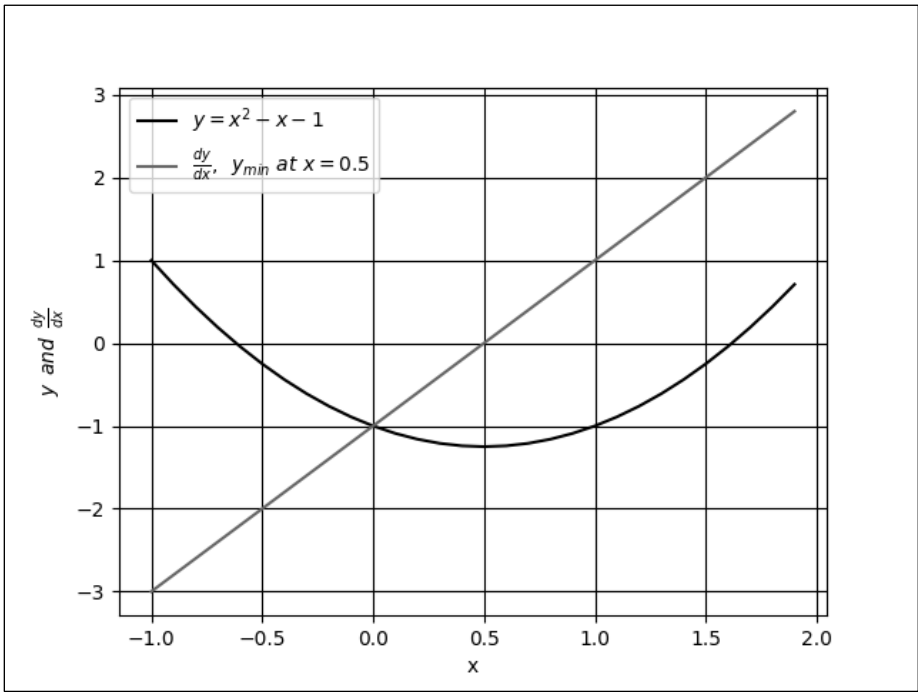
Chapter 1: Introducing Advanced Deep Learning with Keras

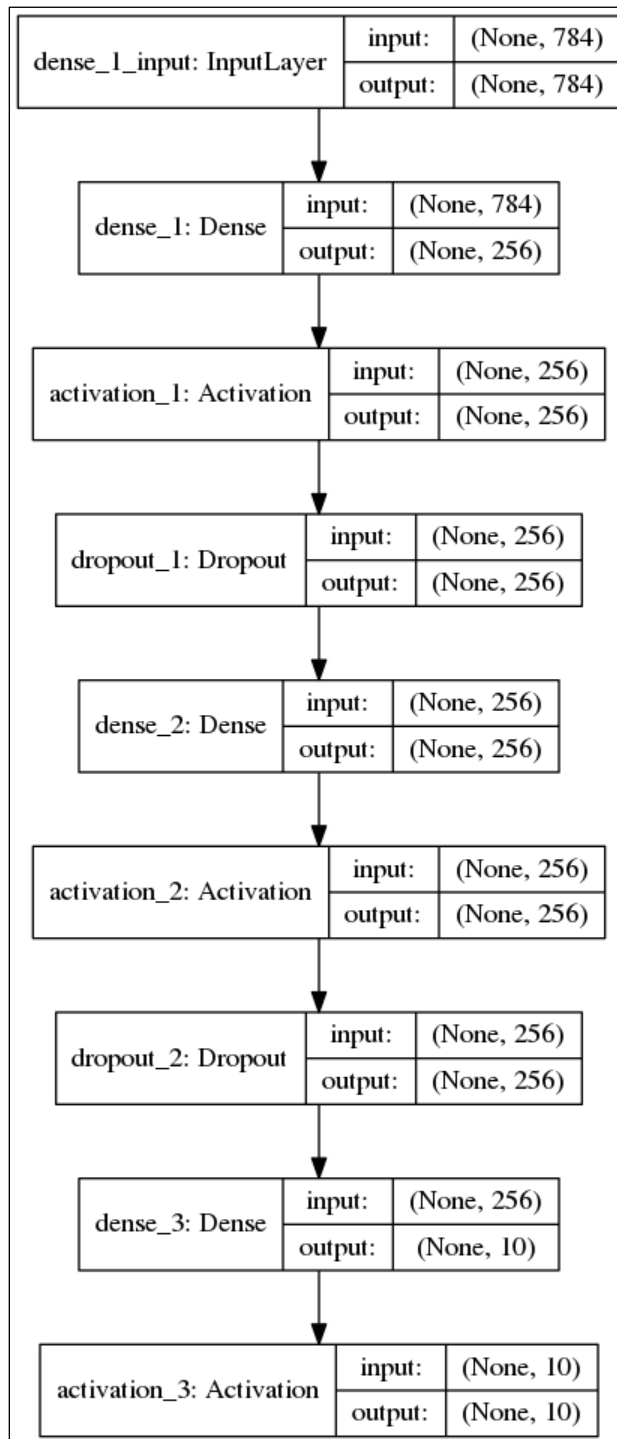


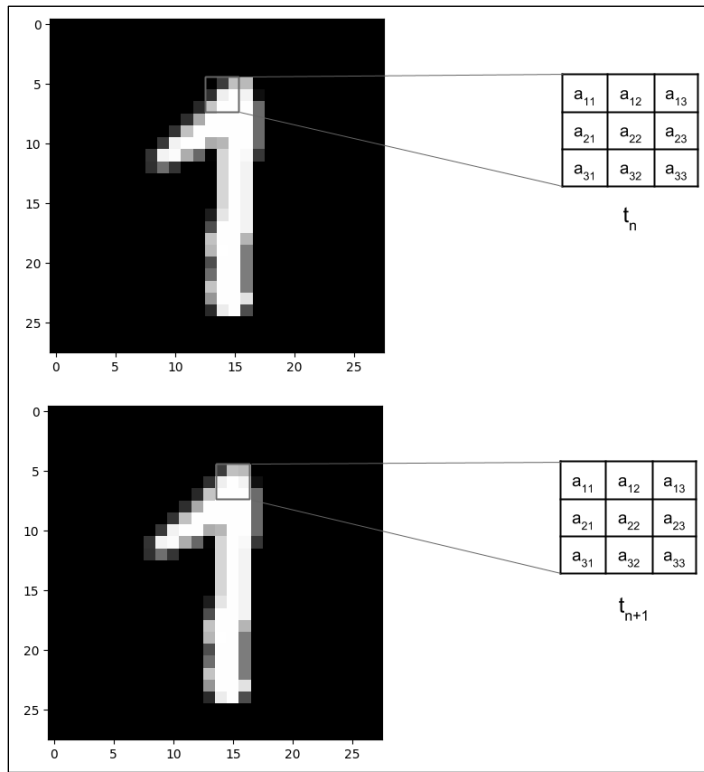
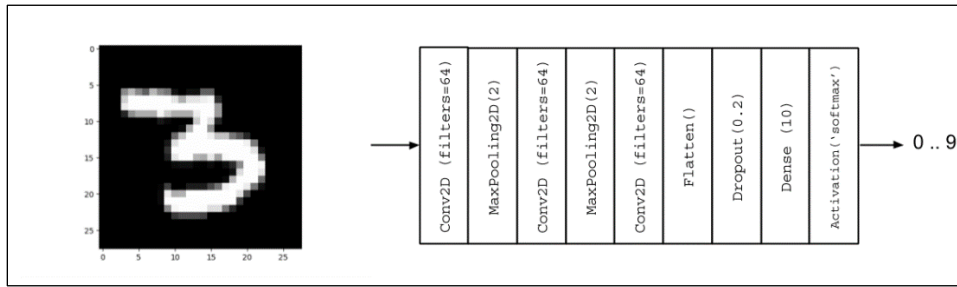






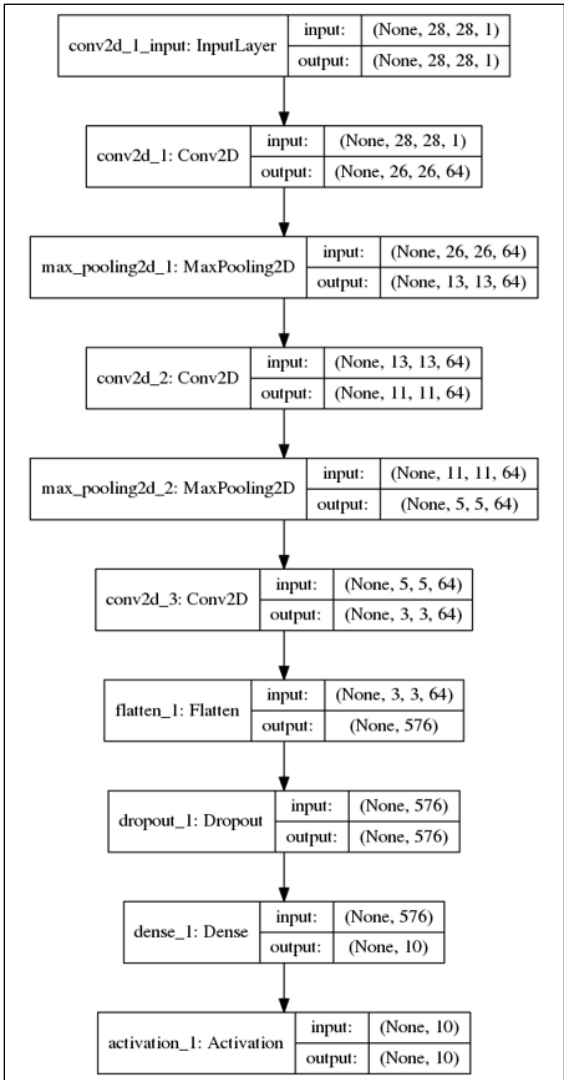
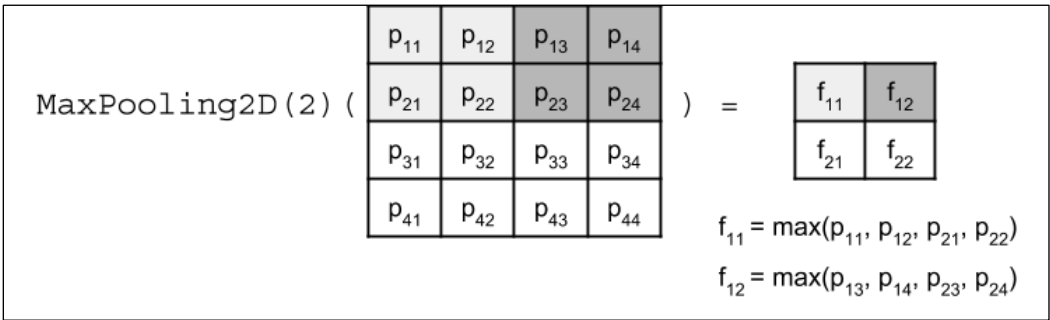


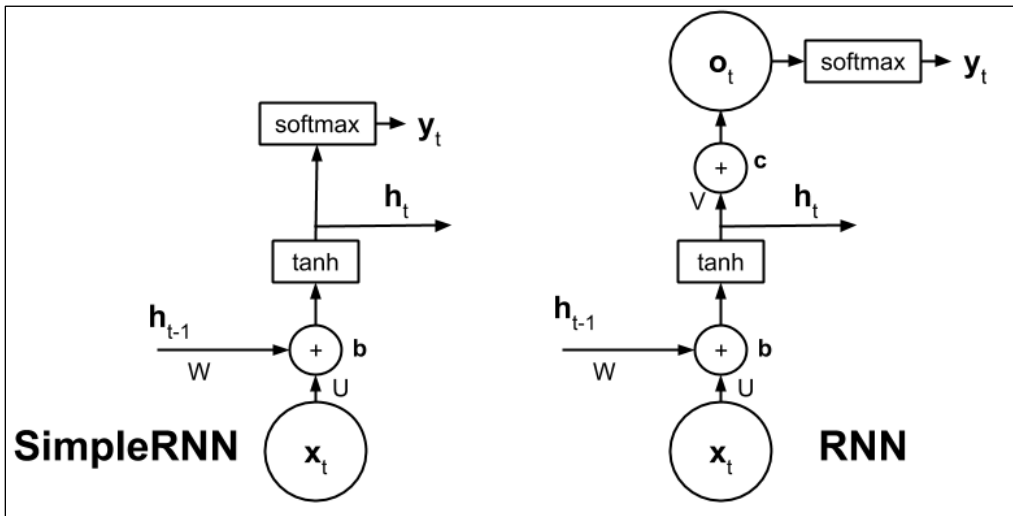
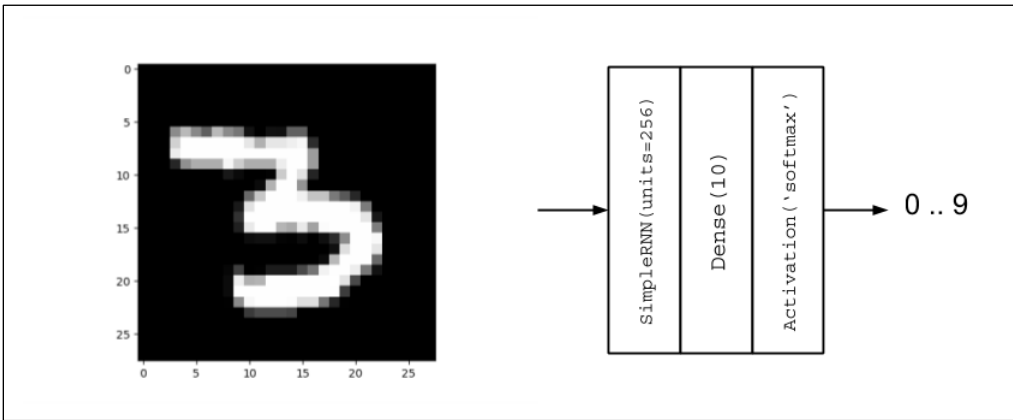


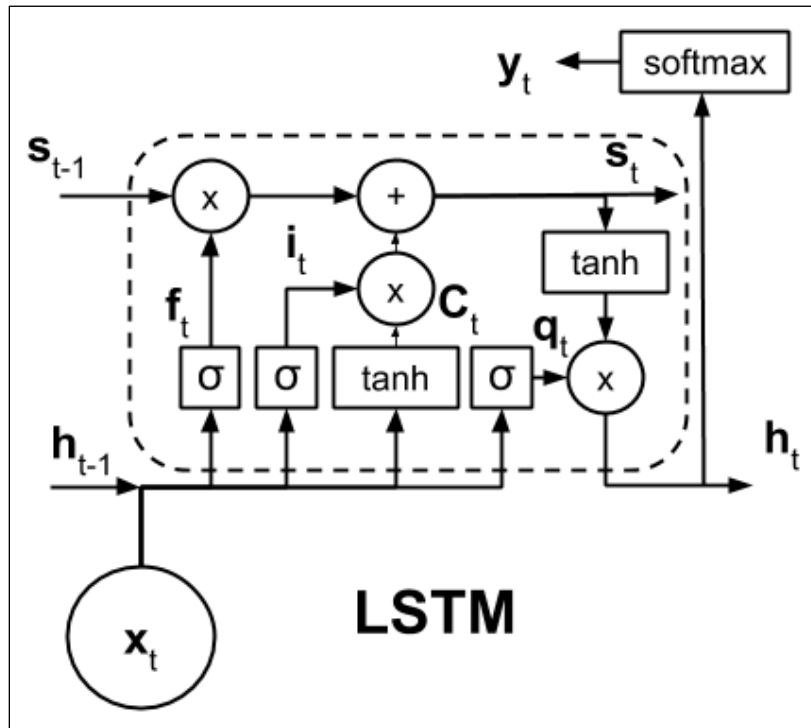
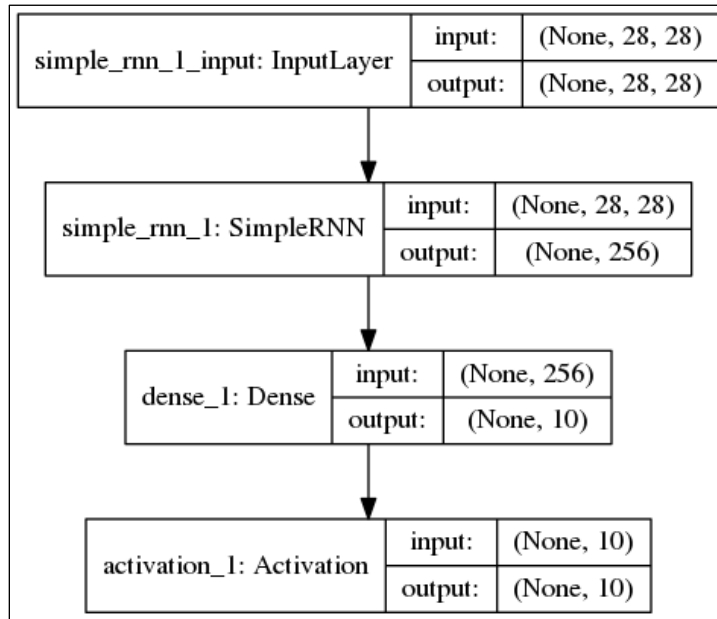


$$\begin{bmatrix} p_{11} & p_{12} & p_{13} & p_{14} & p_{15} \\ p_{21} & p_{22} & p_{23} & p_{24} & p_{25} \\ p_{31} & p_{32} & p_{33} & p_{34} & p_{35} \\ p_{41} & p_{42} & p_{43} & p_{44} & p_{45} \\ p_{51} & p_{52} & p_{53} & p_{54} & p_{55} \end{bmatrix} \otimes \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} = \begin{bmatrix} f_{11} & f_{12} & f_{13} \\ f_{21} & f_{22} & f_{23} \\ f_{31} & f_{32} & f_{33} \end{bmatrix}$$

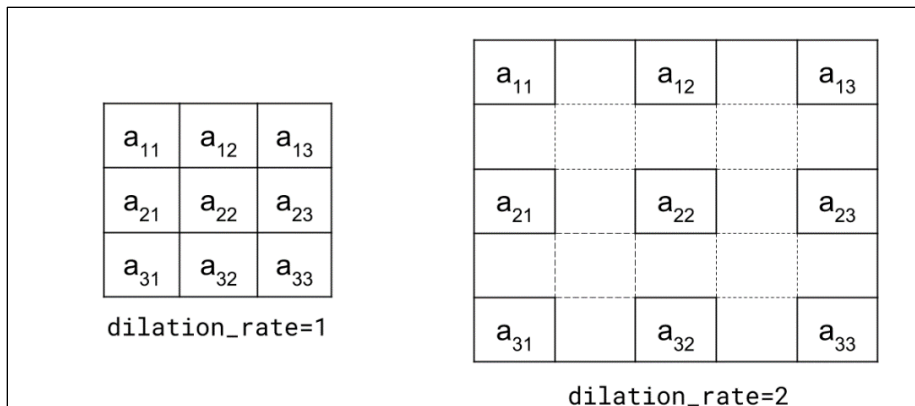
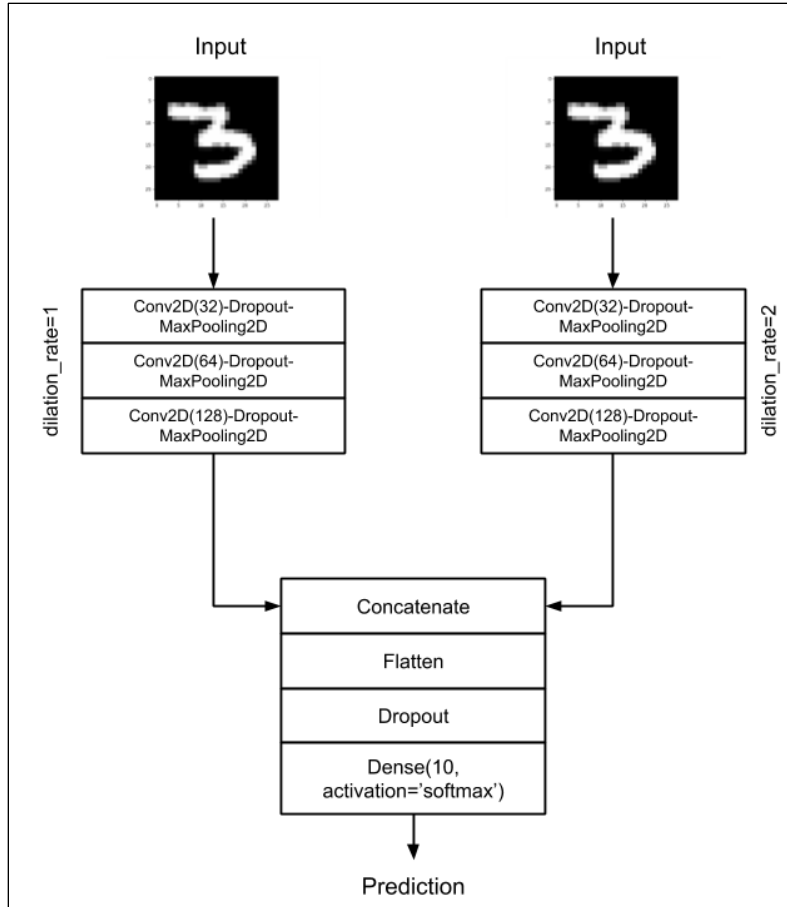
$$f_{11} = p_{11}a_{11} + p_{12}a_{12} + p_{13}a_{13} + p_{21}a_{21} + p_{22}a_{22} + p_{23}a_{23} + p_{31}a_{31} + p_{32}a_{32} + p_{33}a_{33}$$

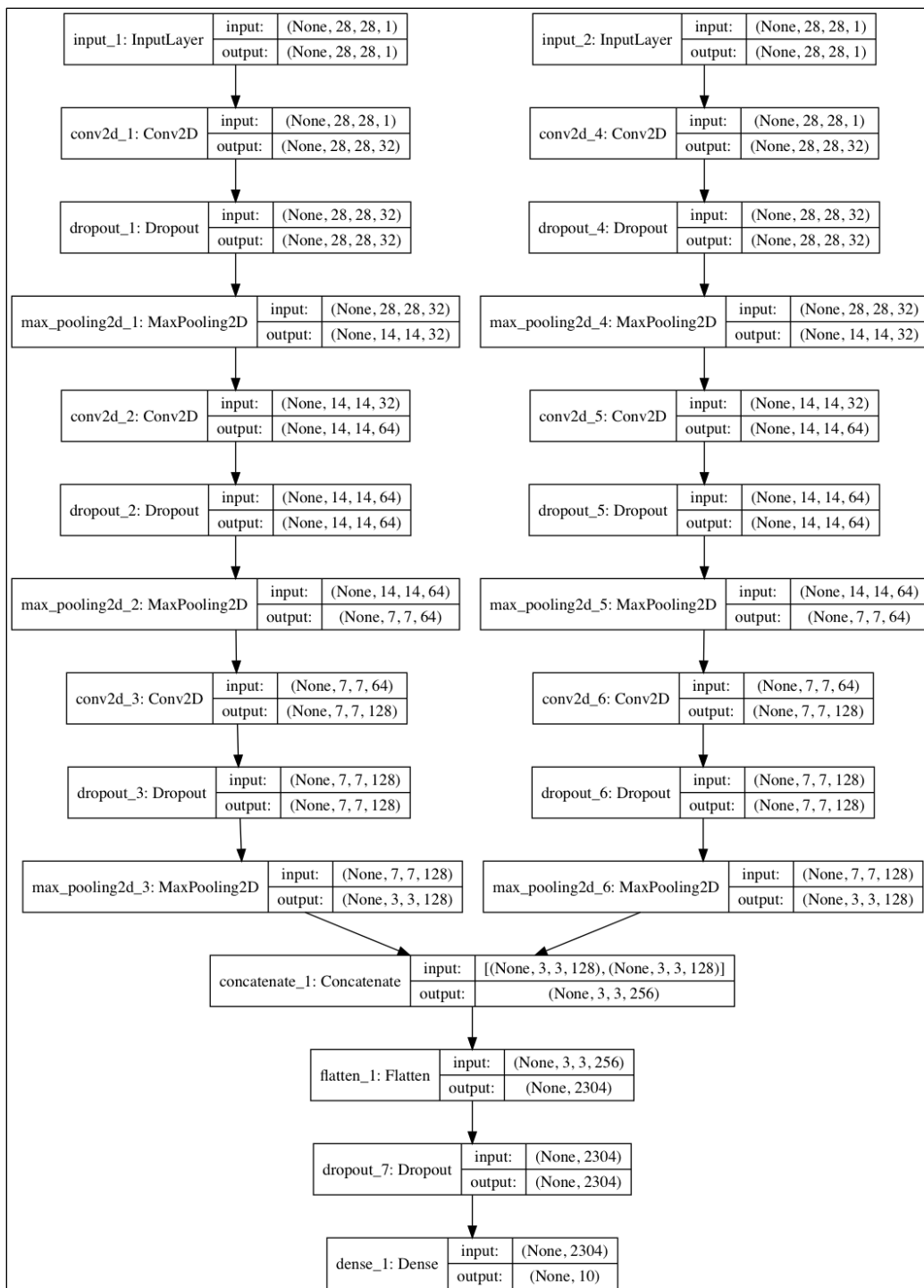


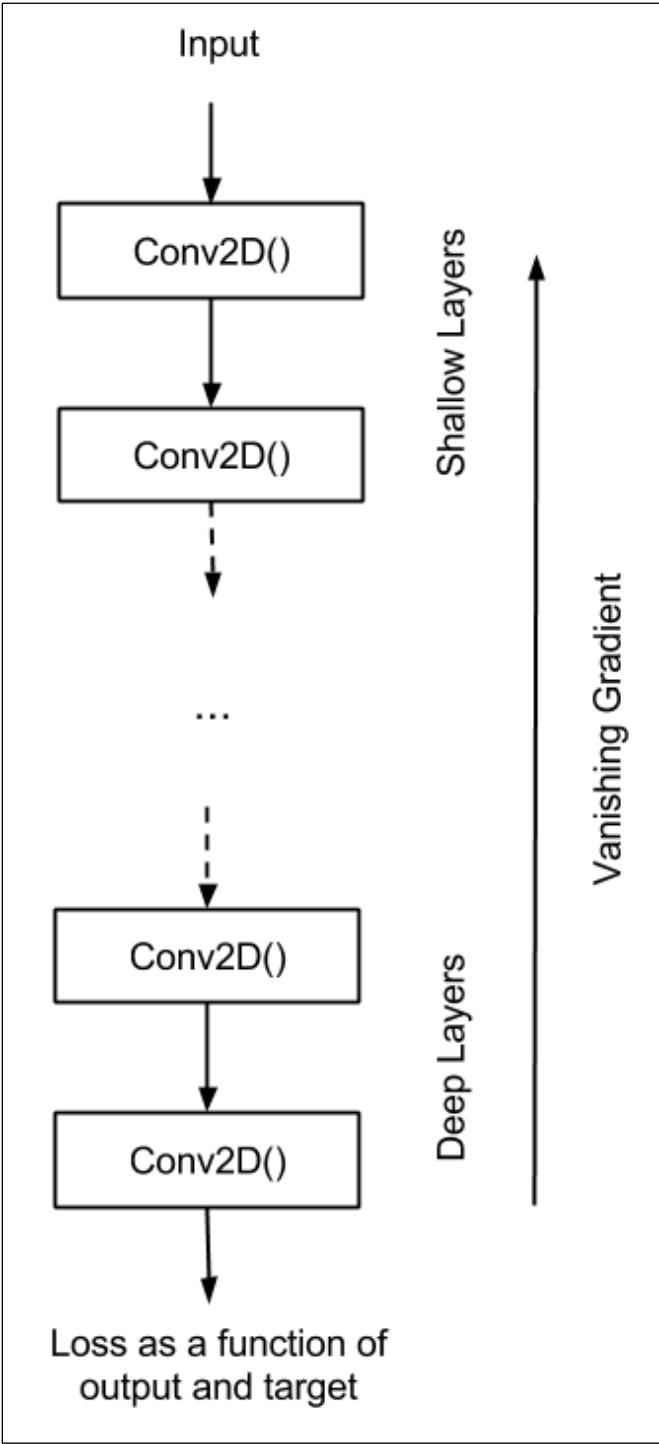


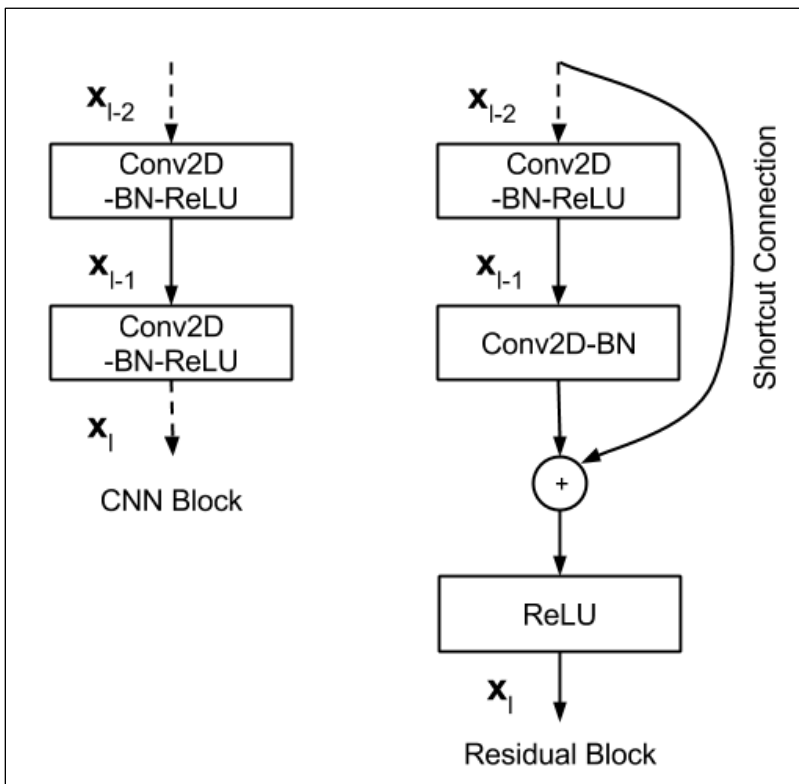
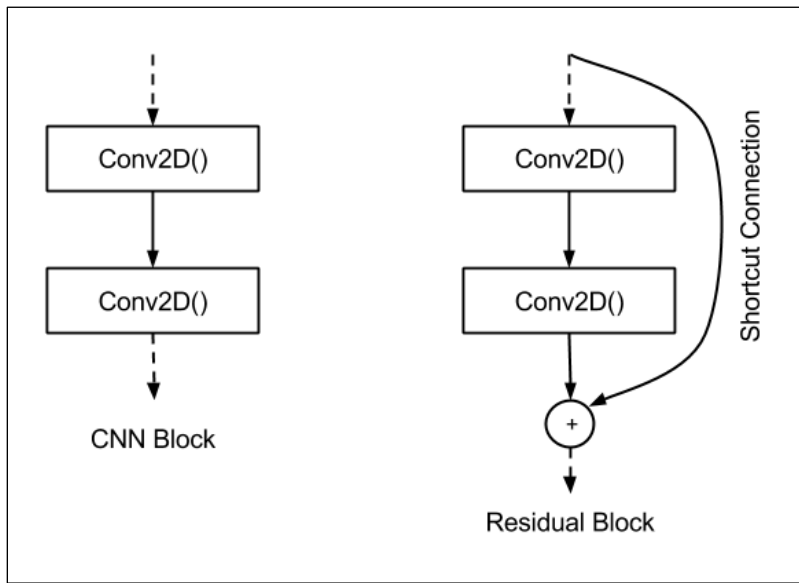


Chapter 2: Deep Neural Networks

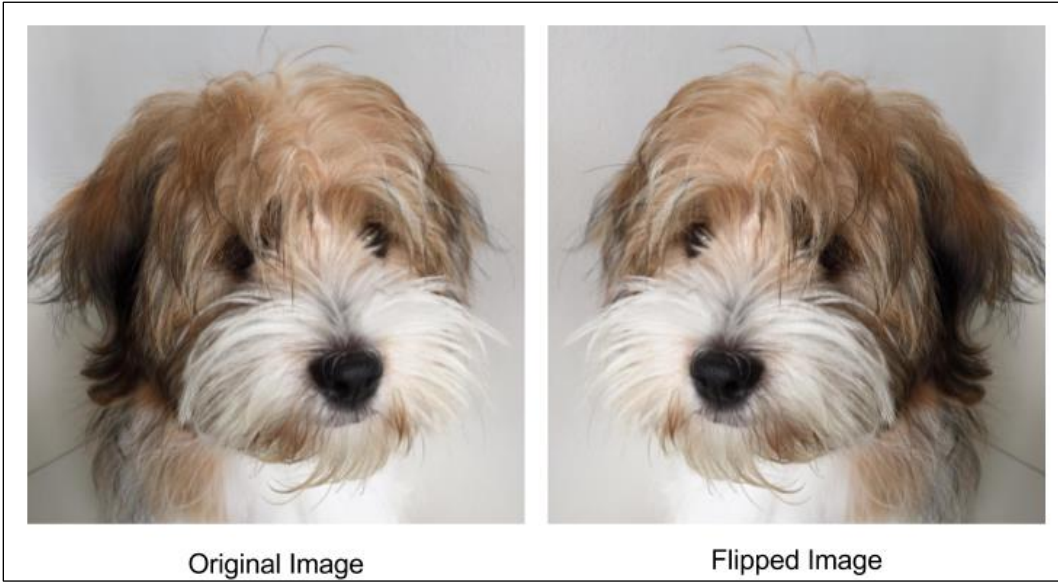
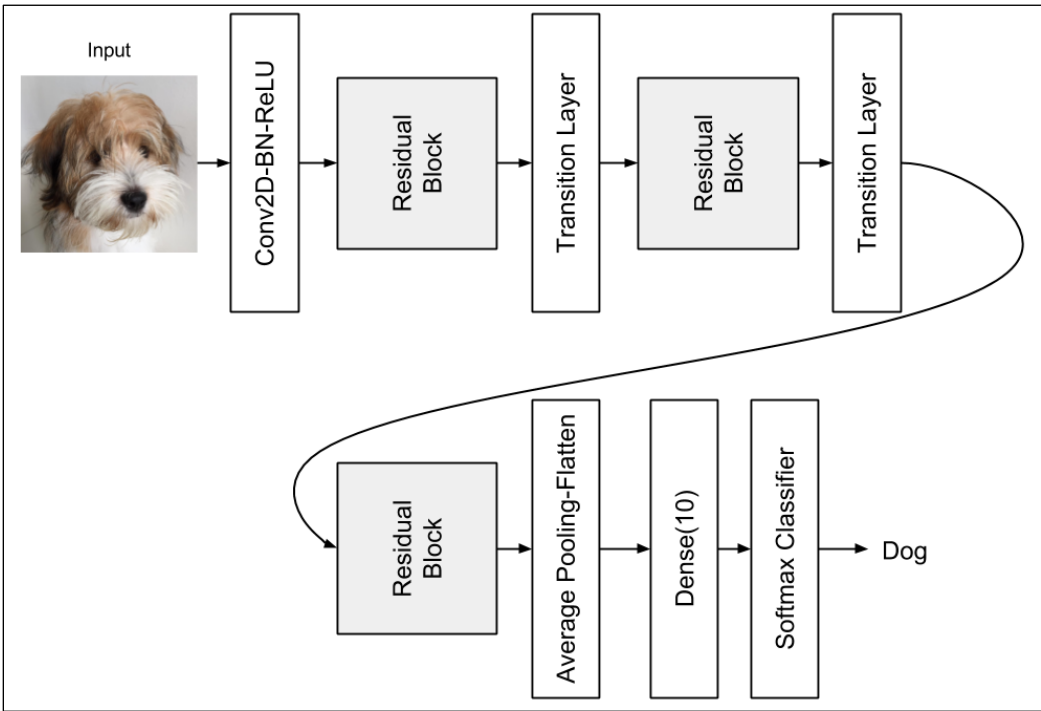


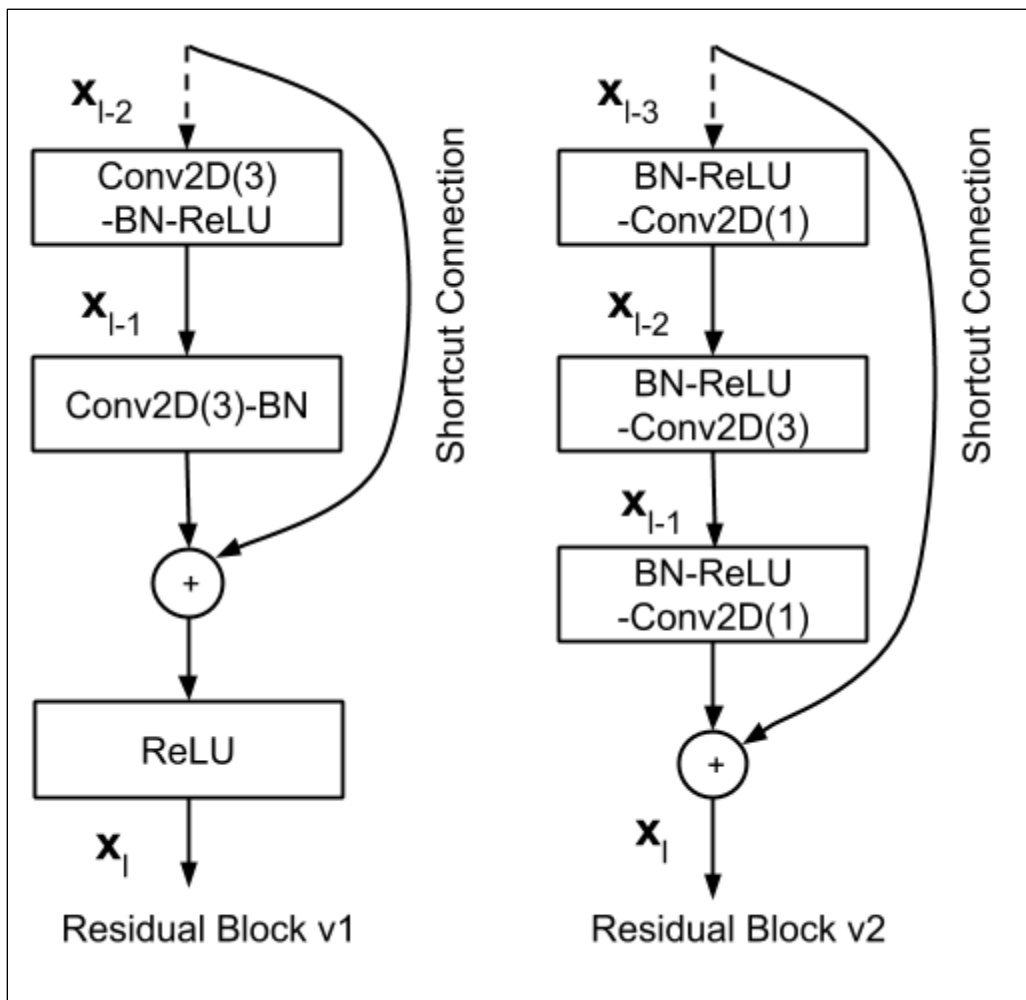


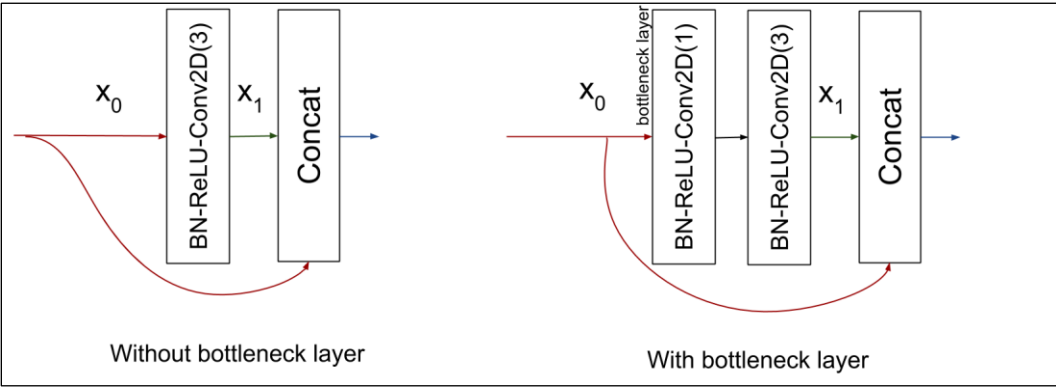
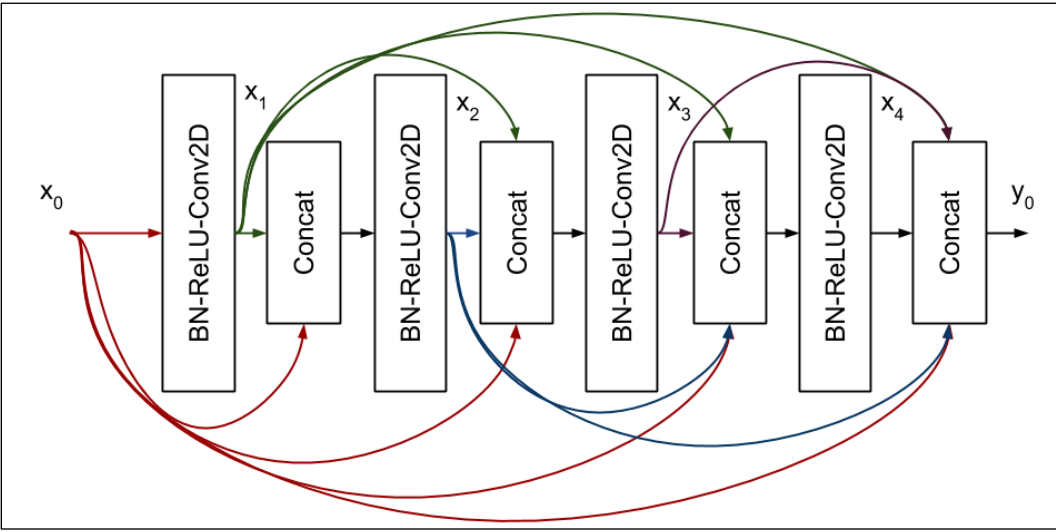


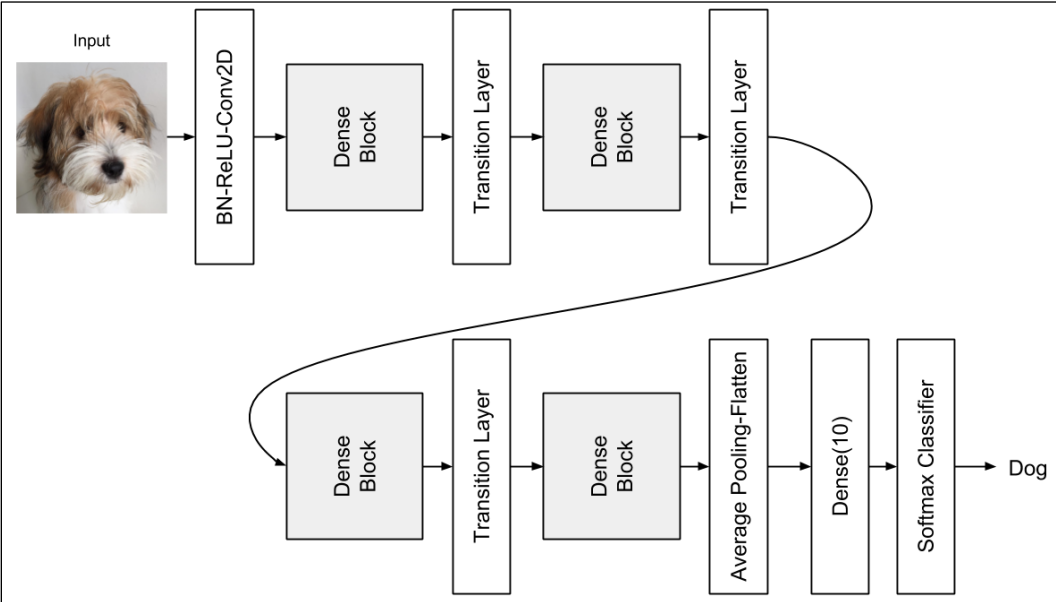
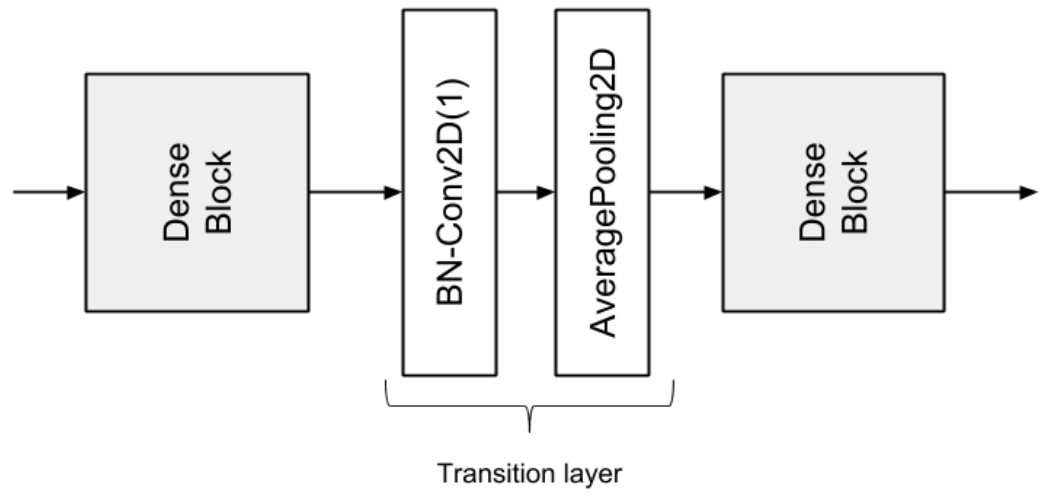




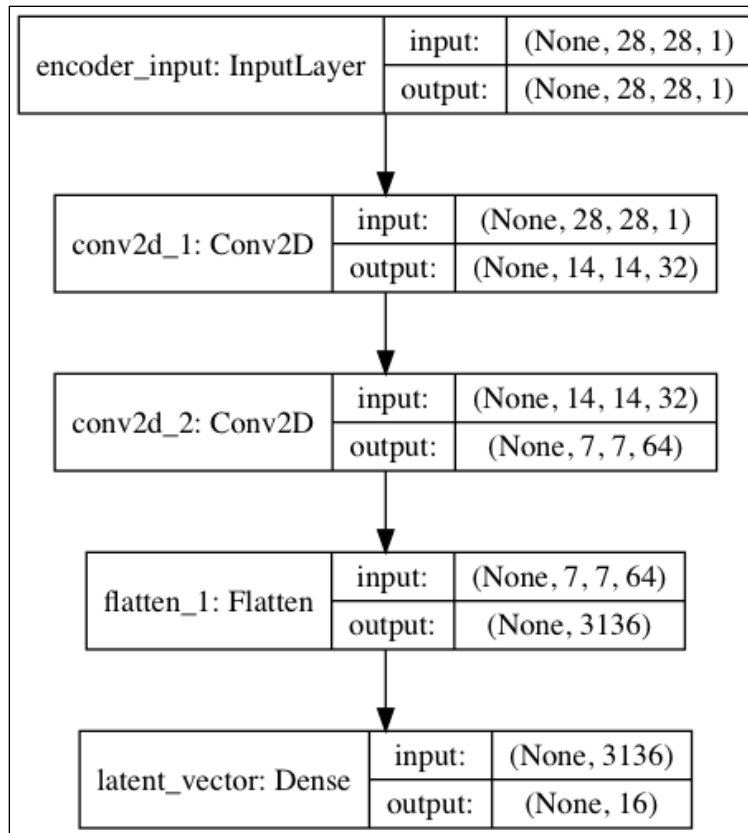
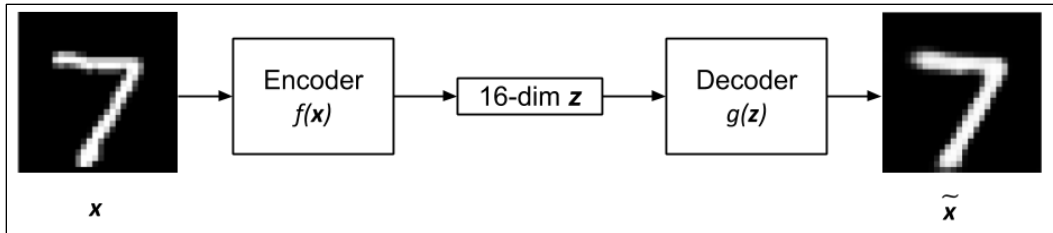
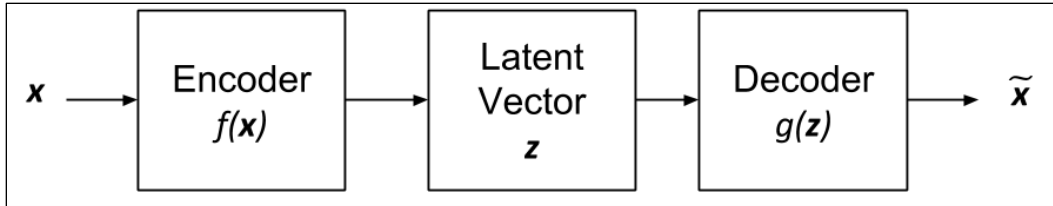


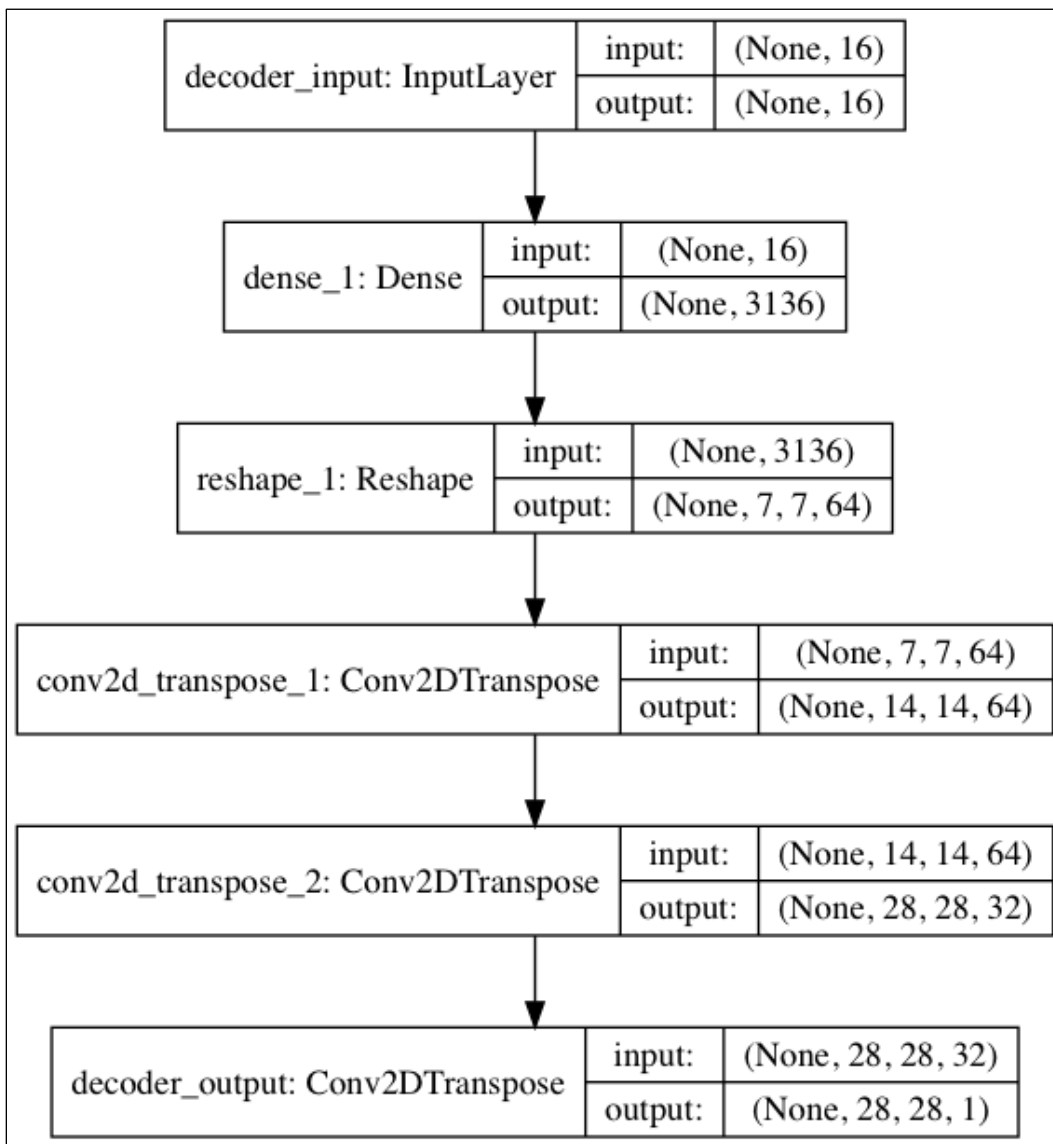


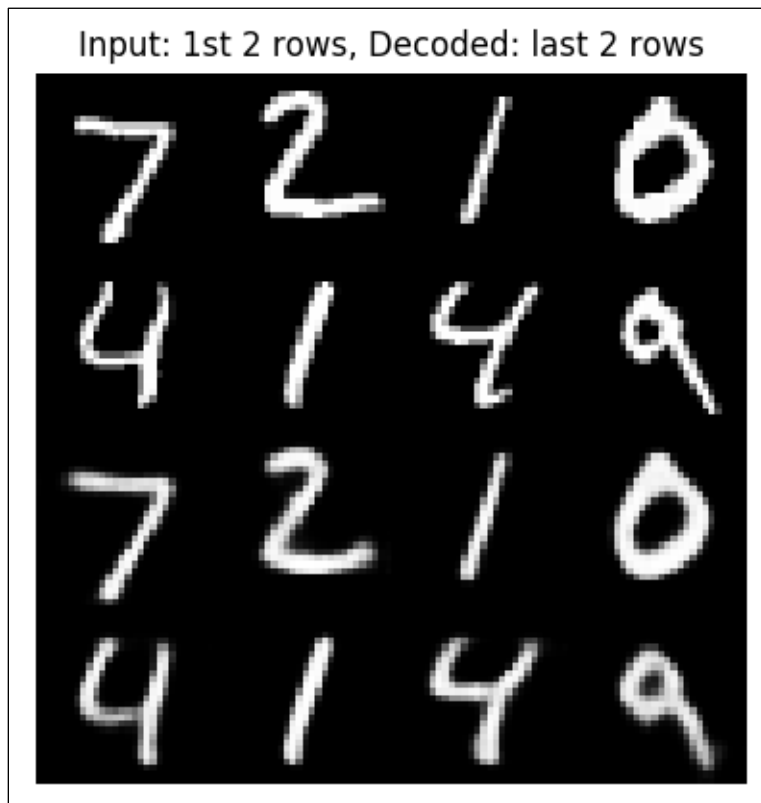
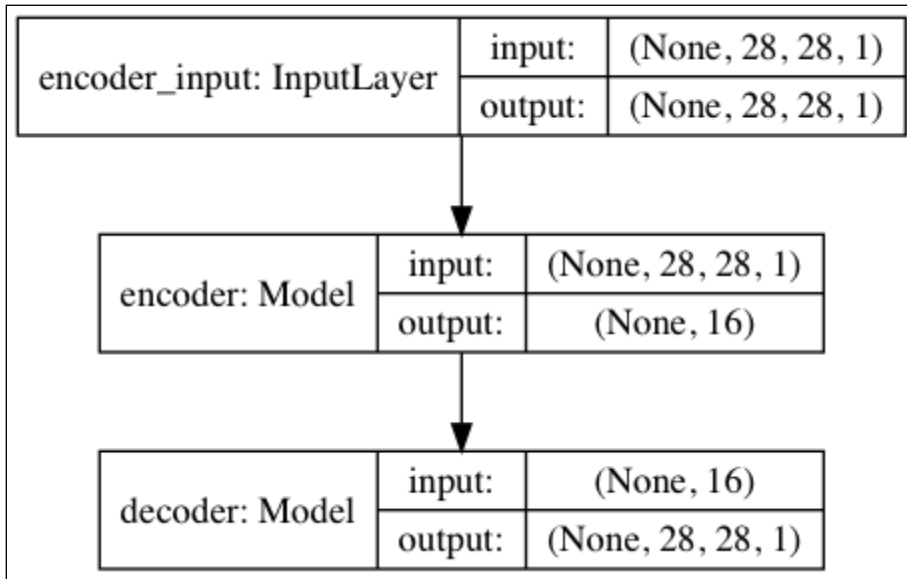


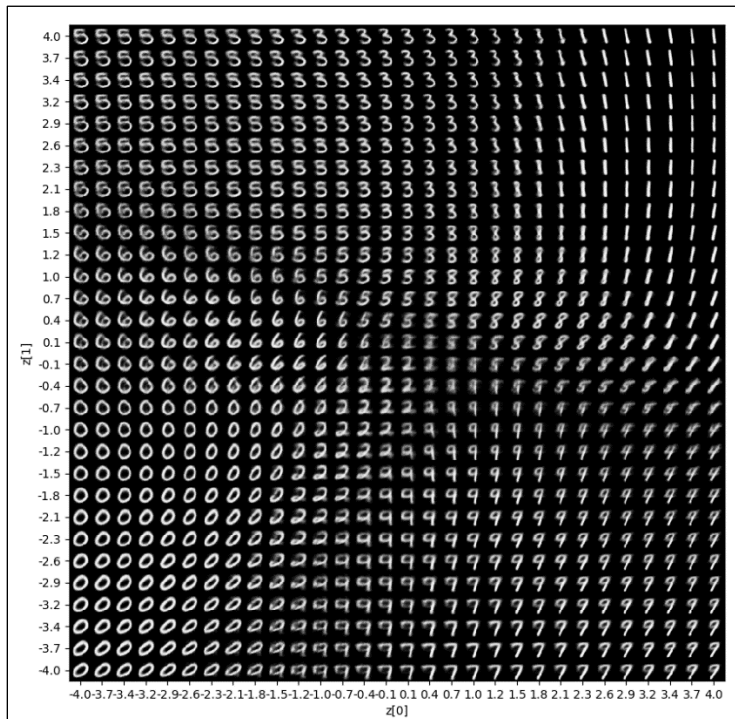
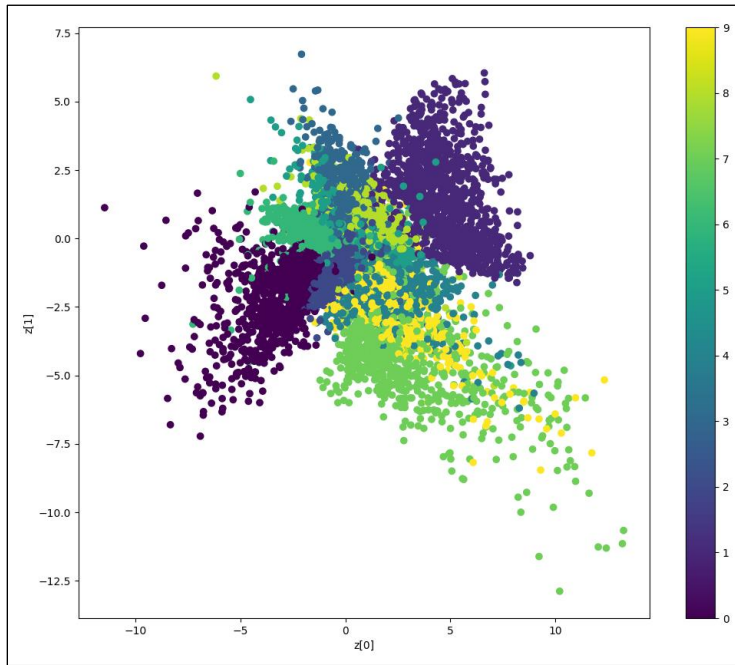


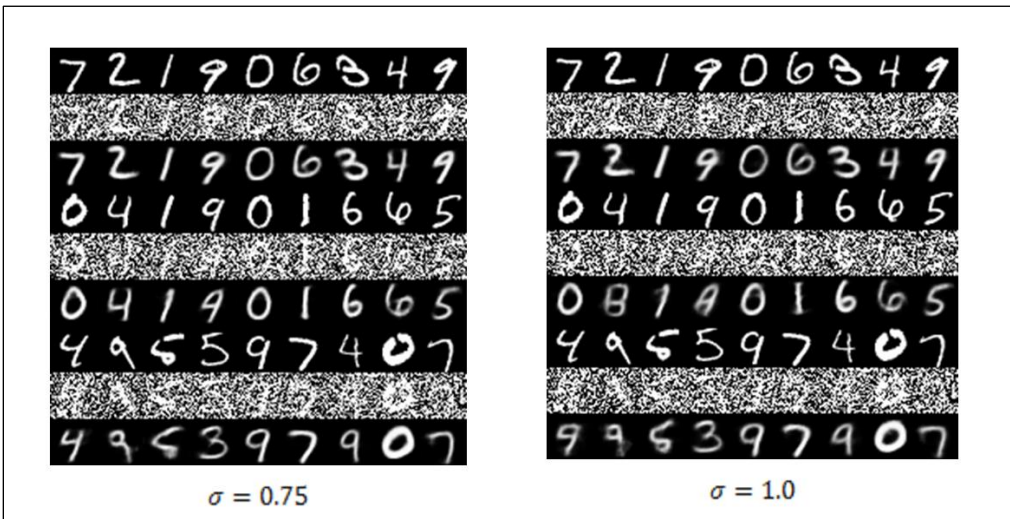
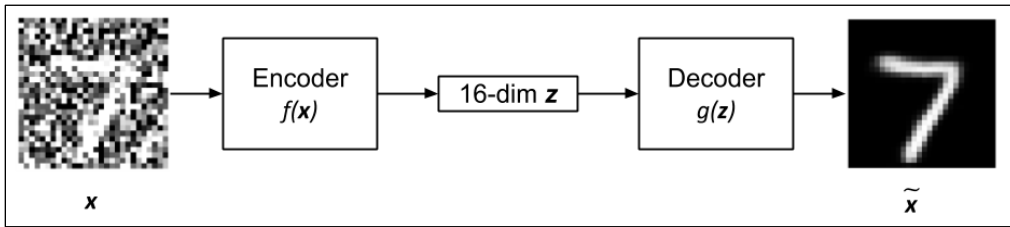
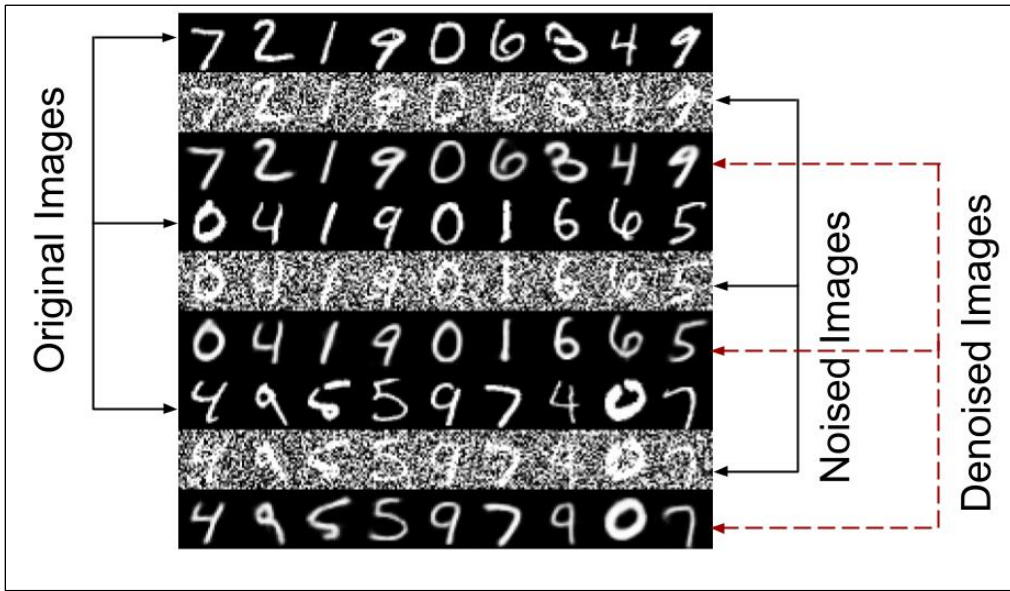
Chapter 3: Autoencoders

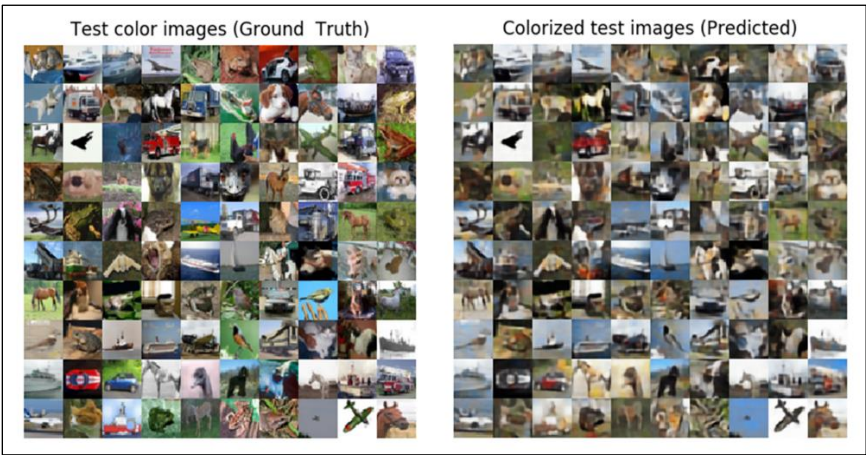
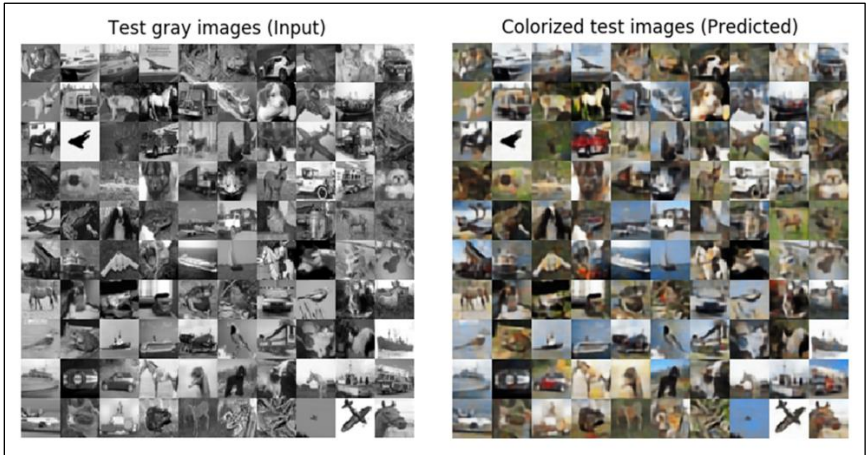




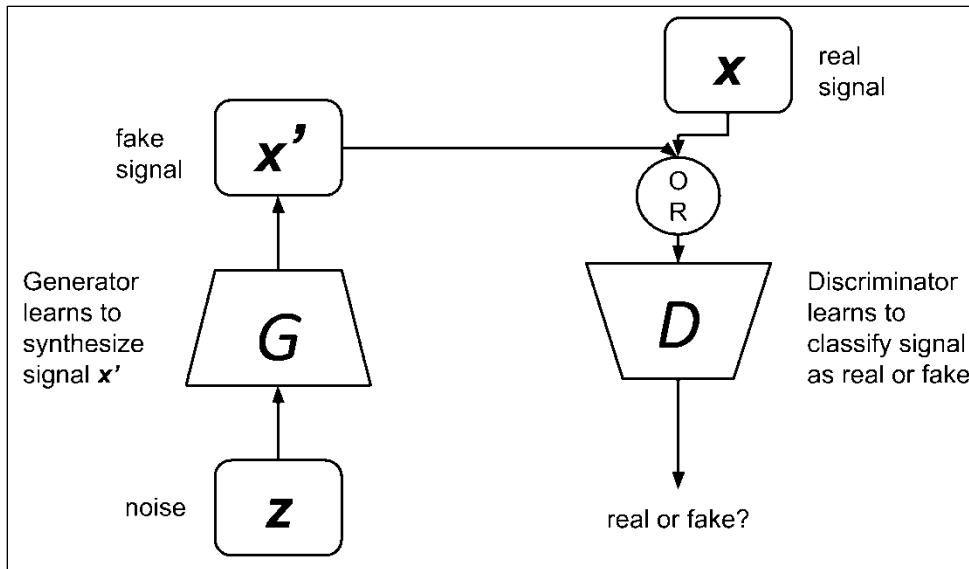
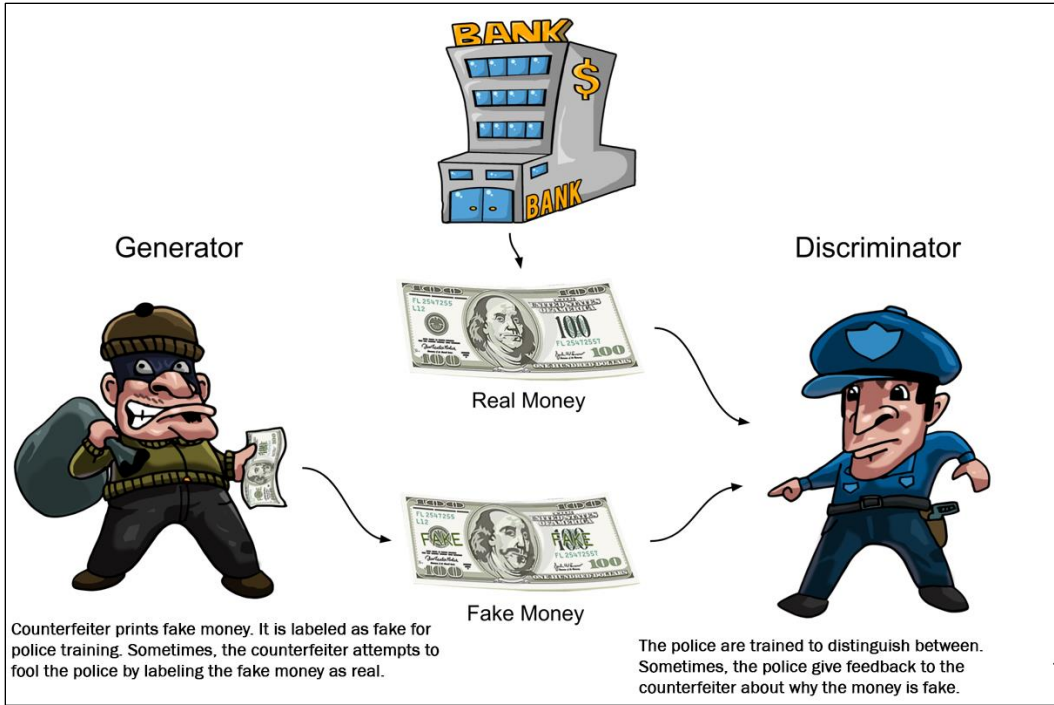


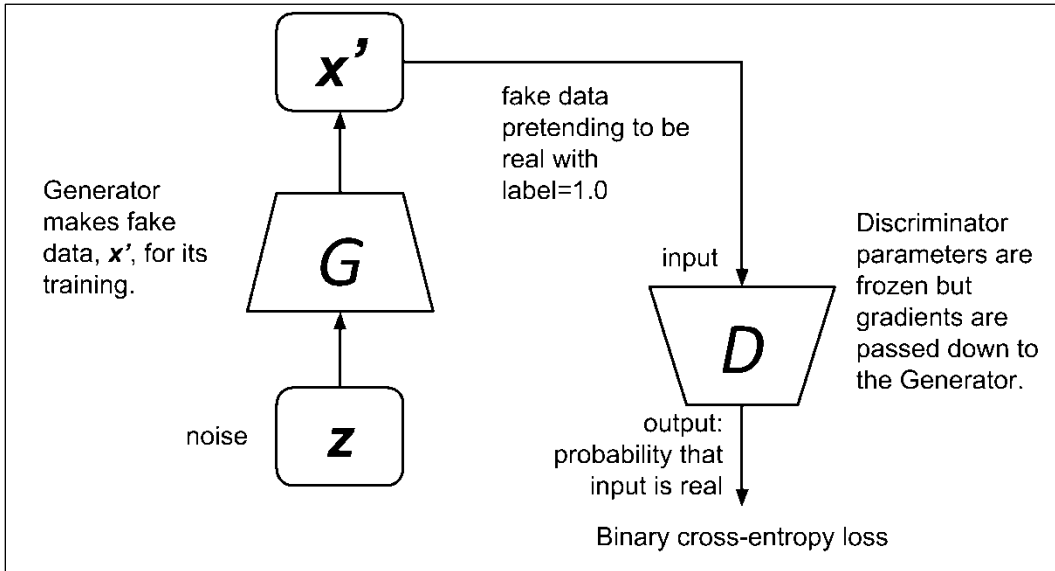
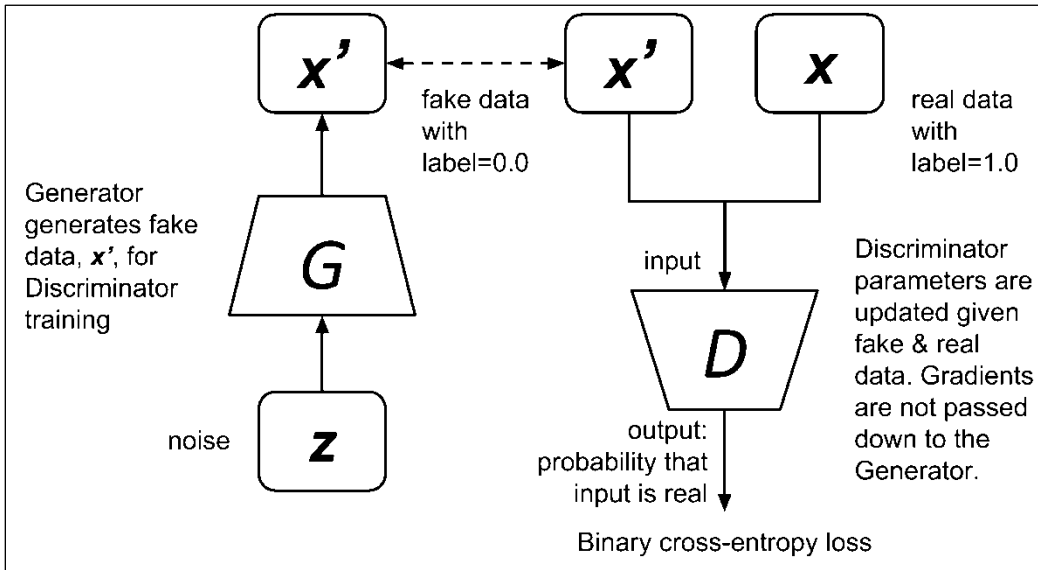


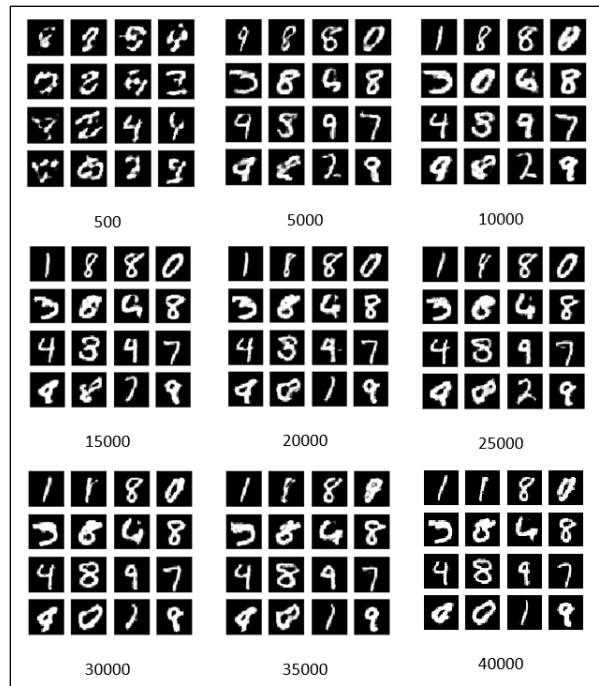
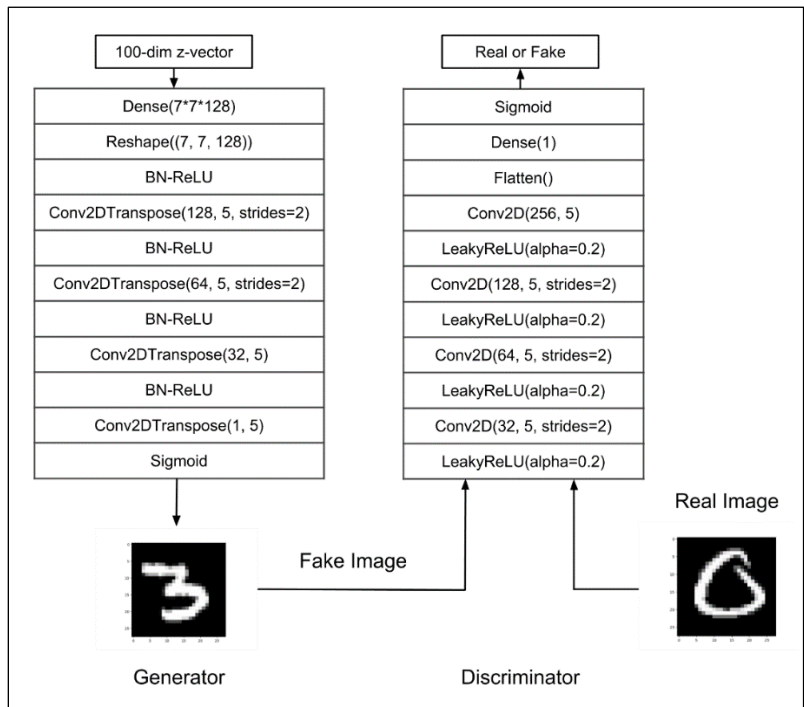


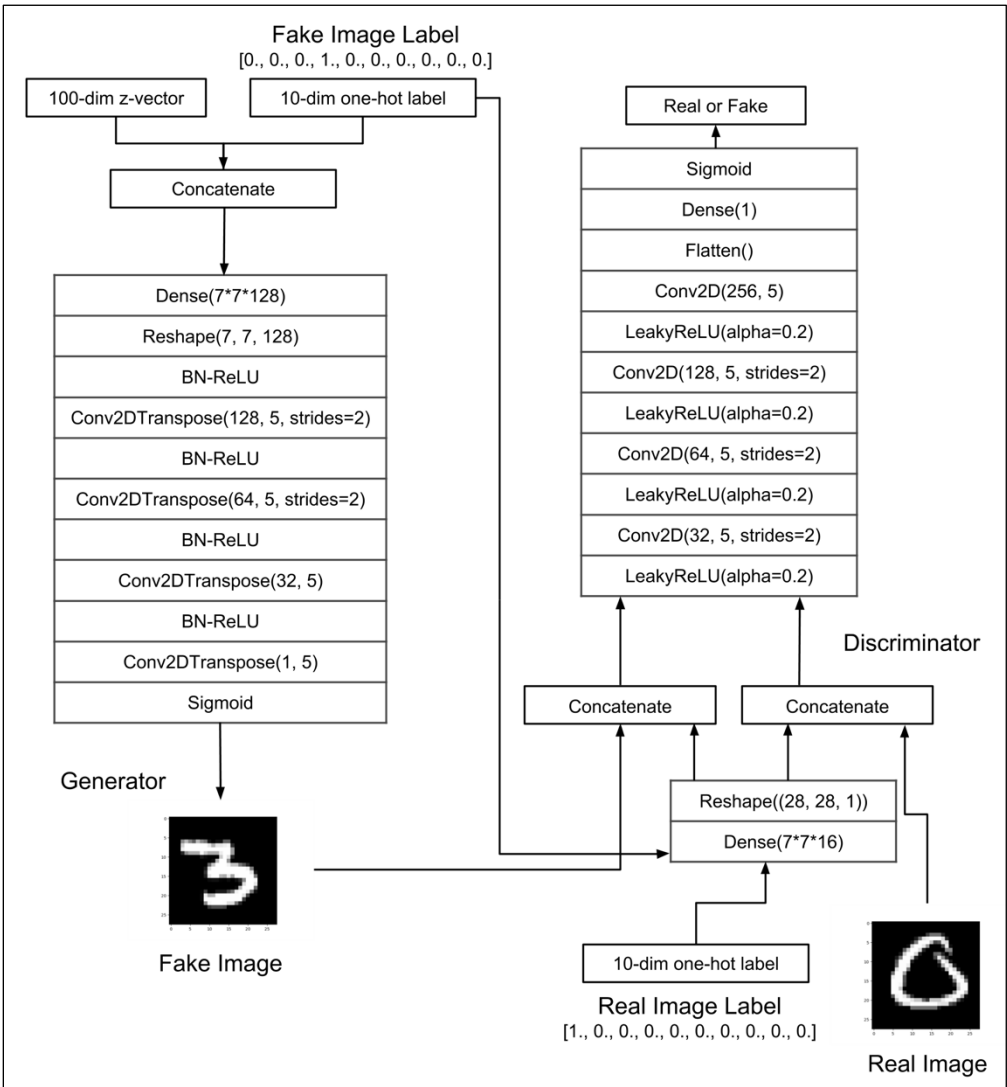


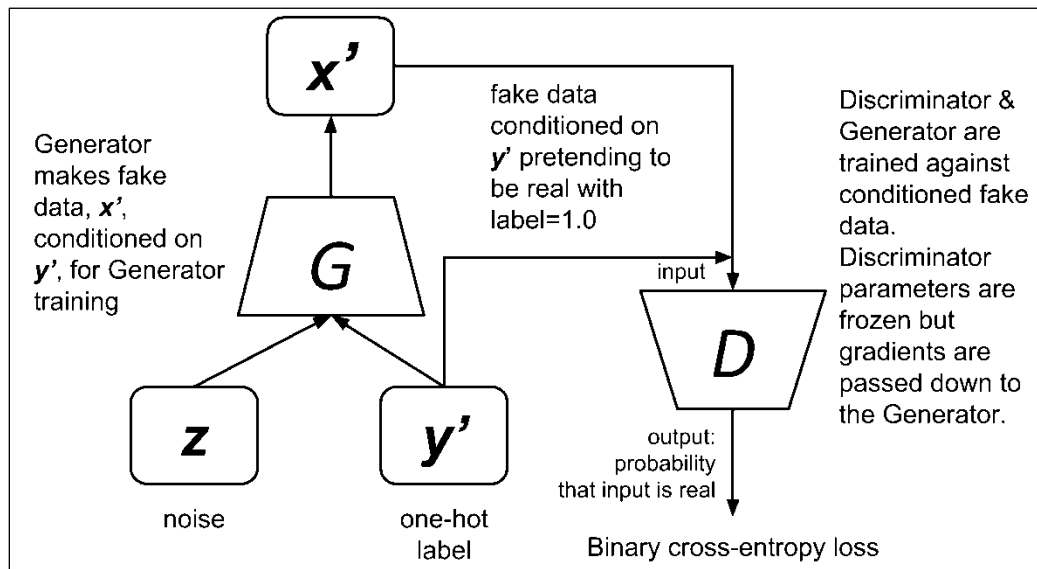
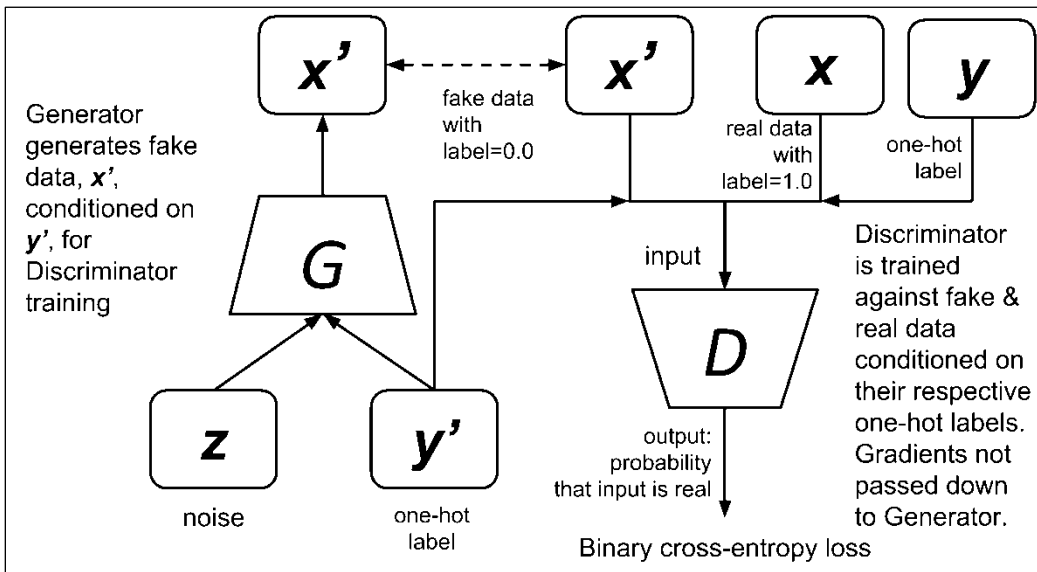
Chapter 4: Generative Adversarial Networks (GANs)





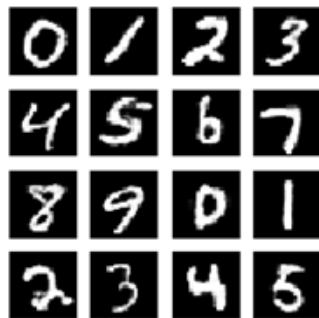




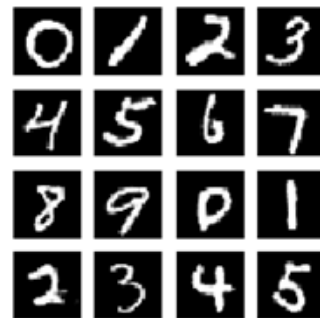




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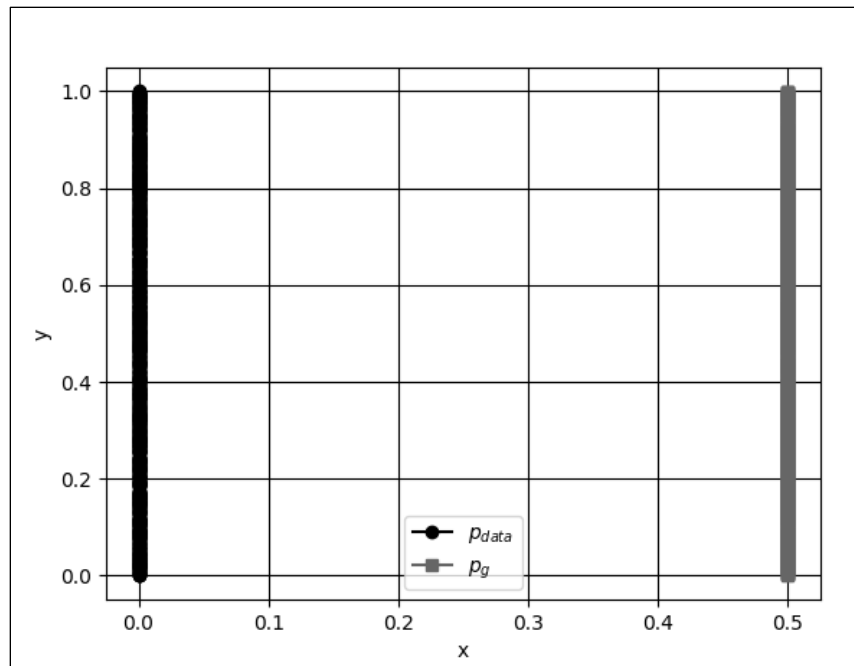
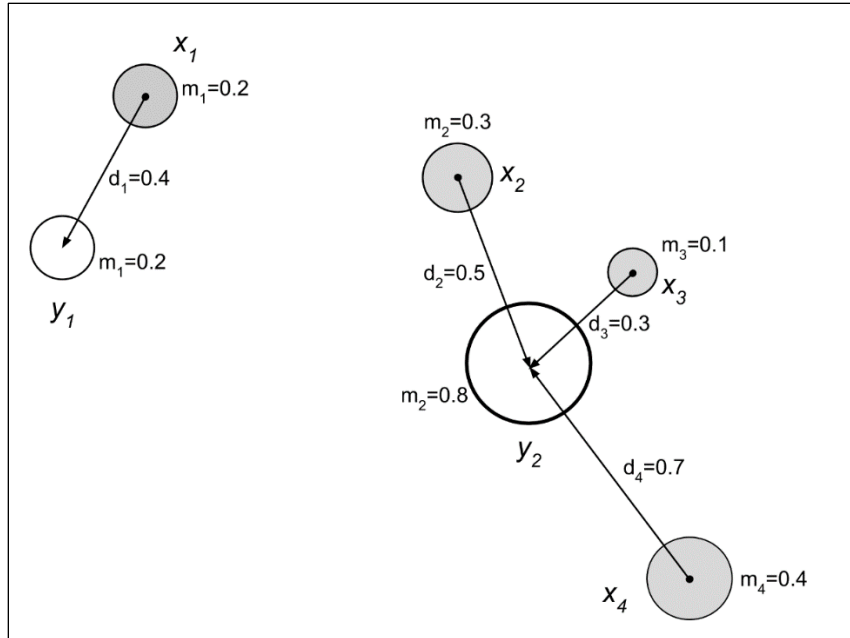


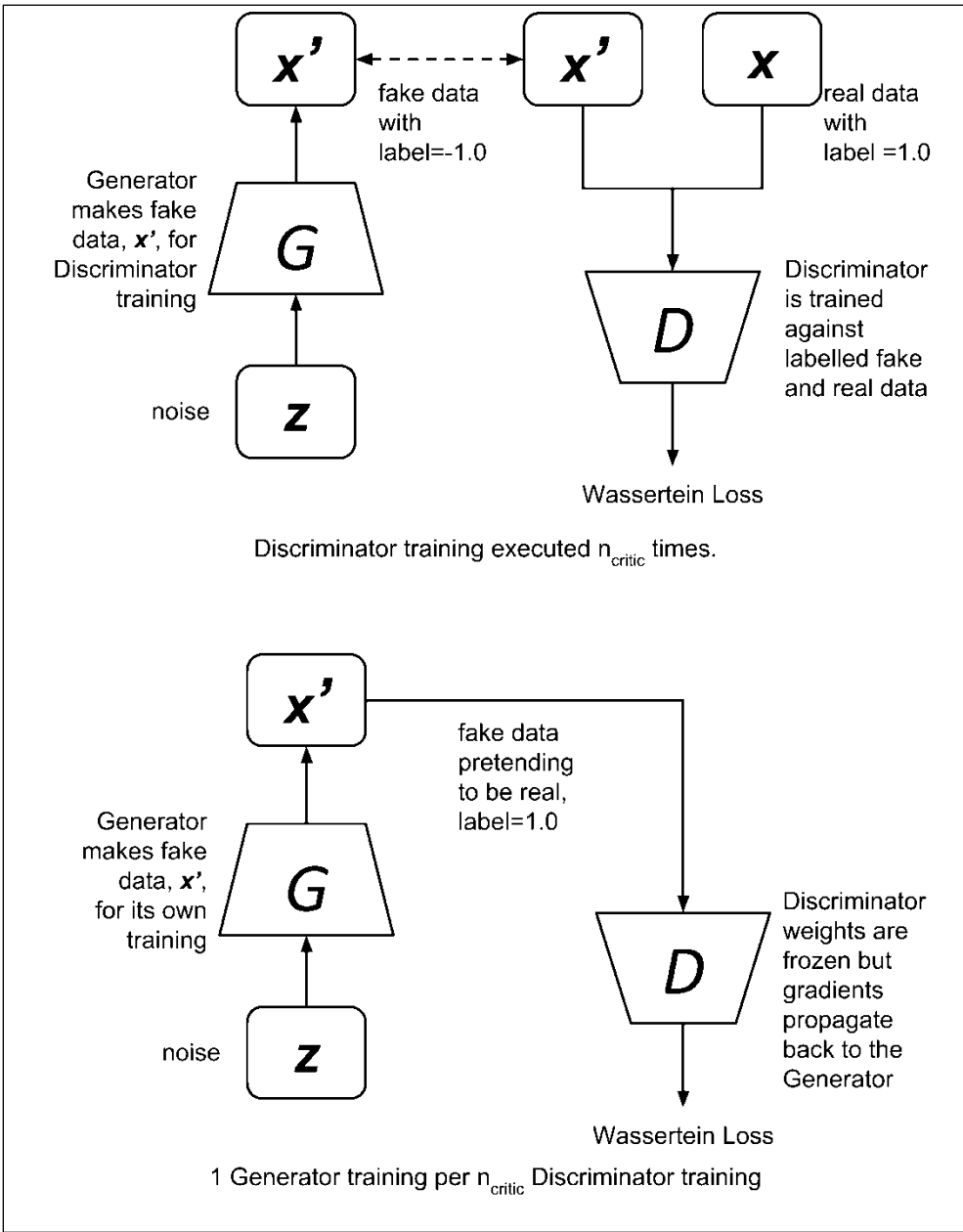
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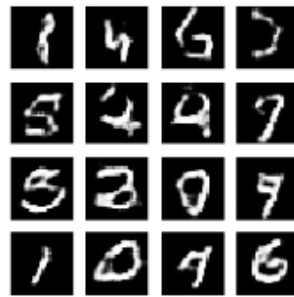
Chapter 5: Improved GANs







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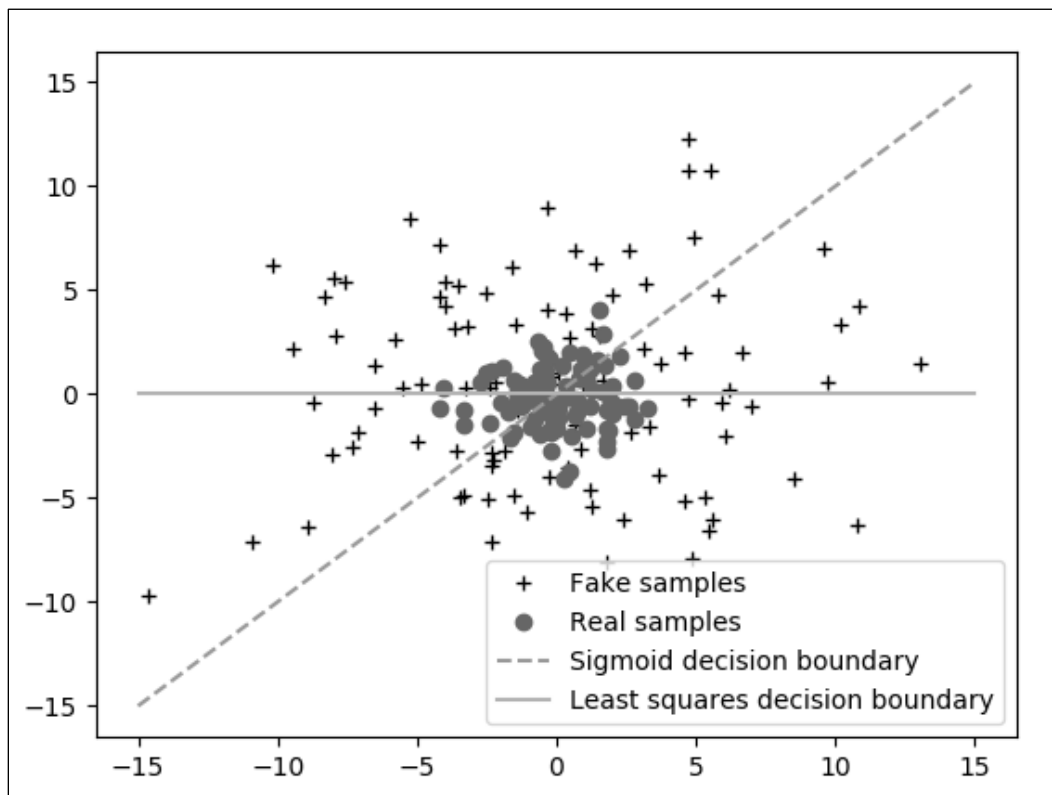
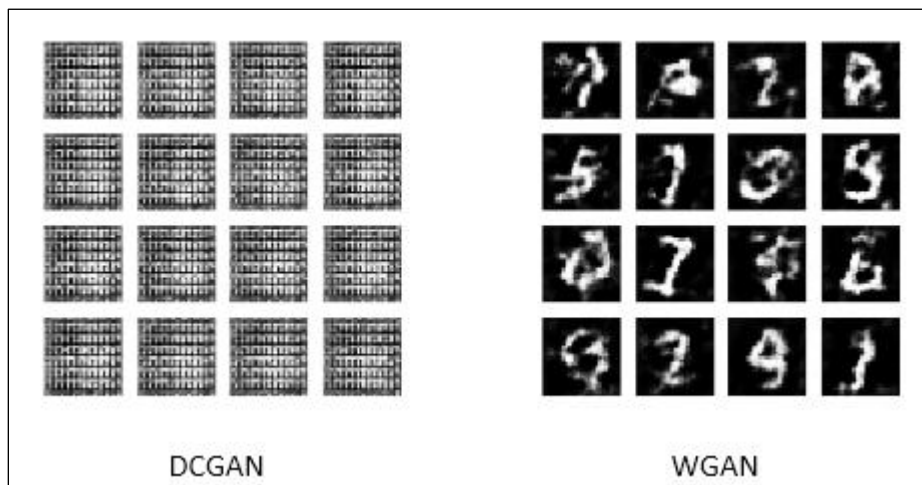
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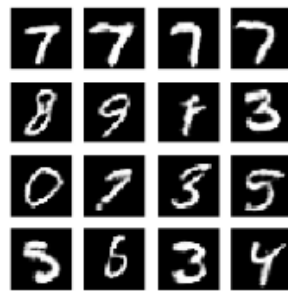


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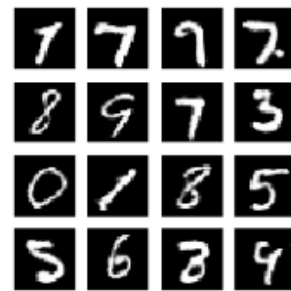




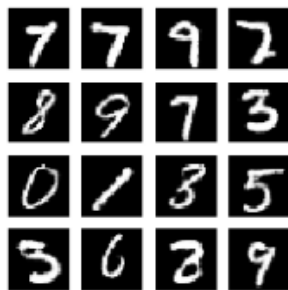
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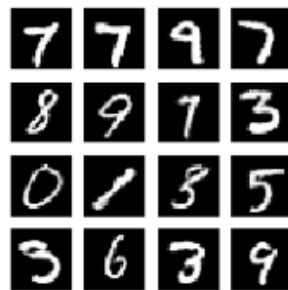
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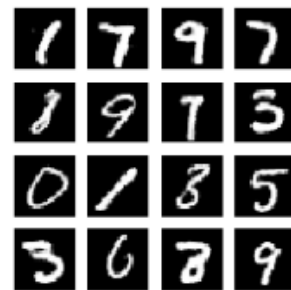
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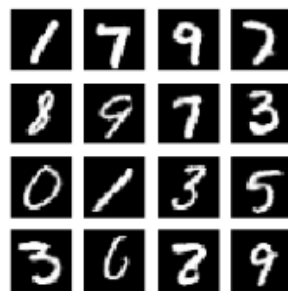
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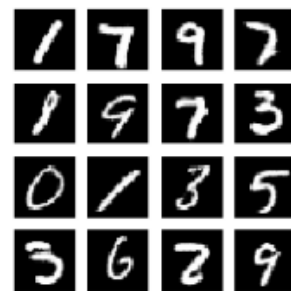
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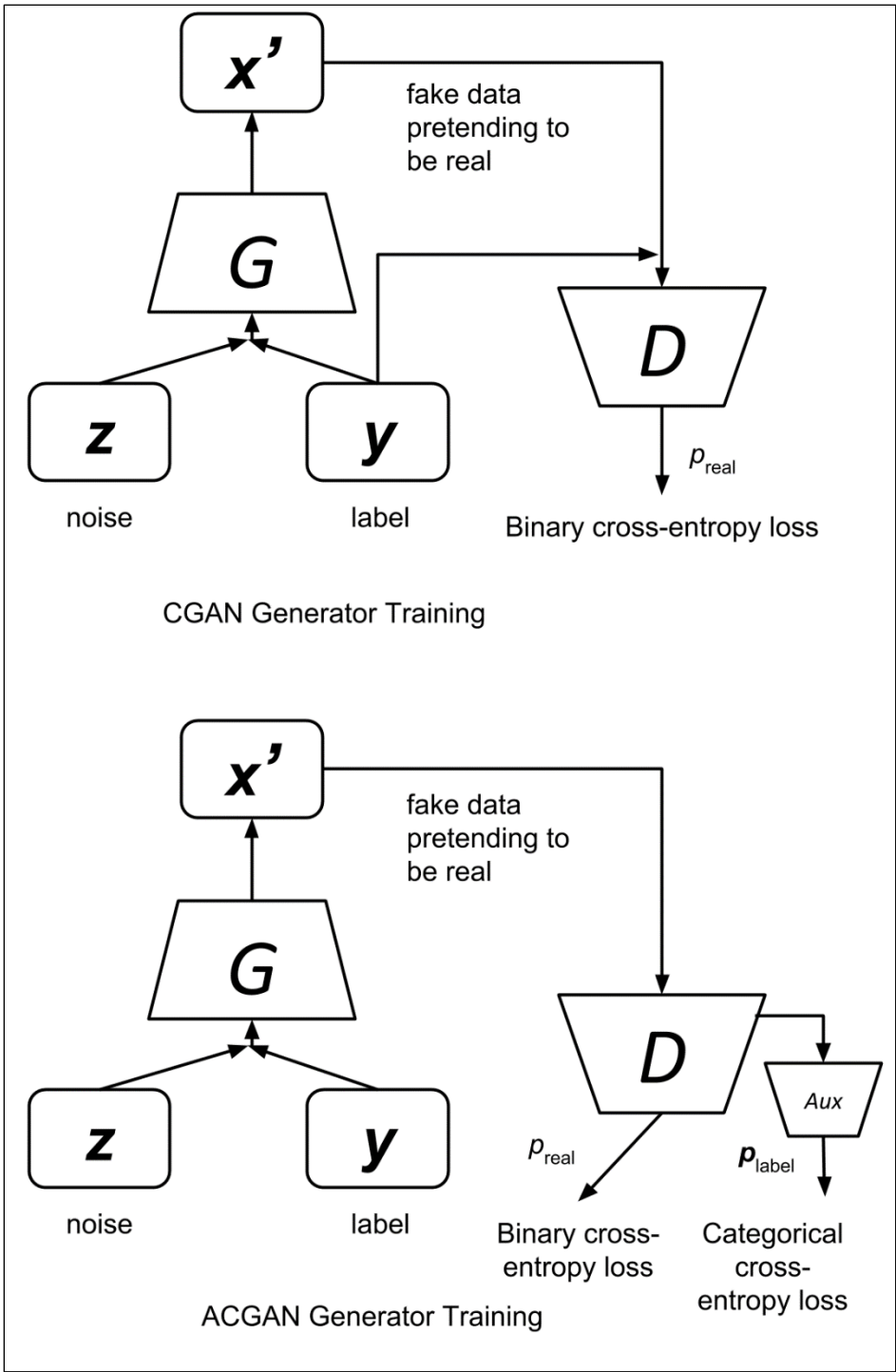
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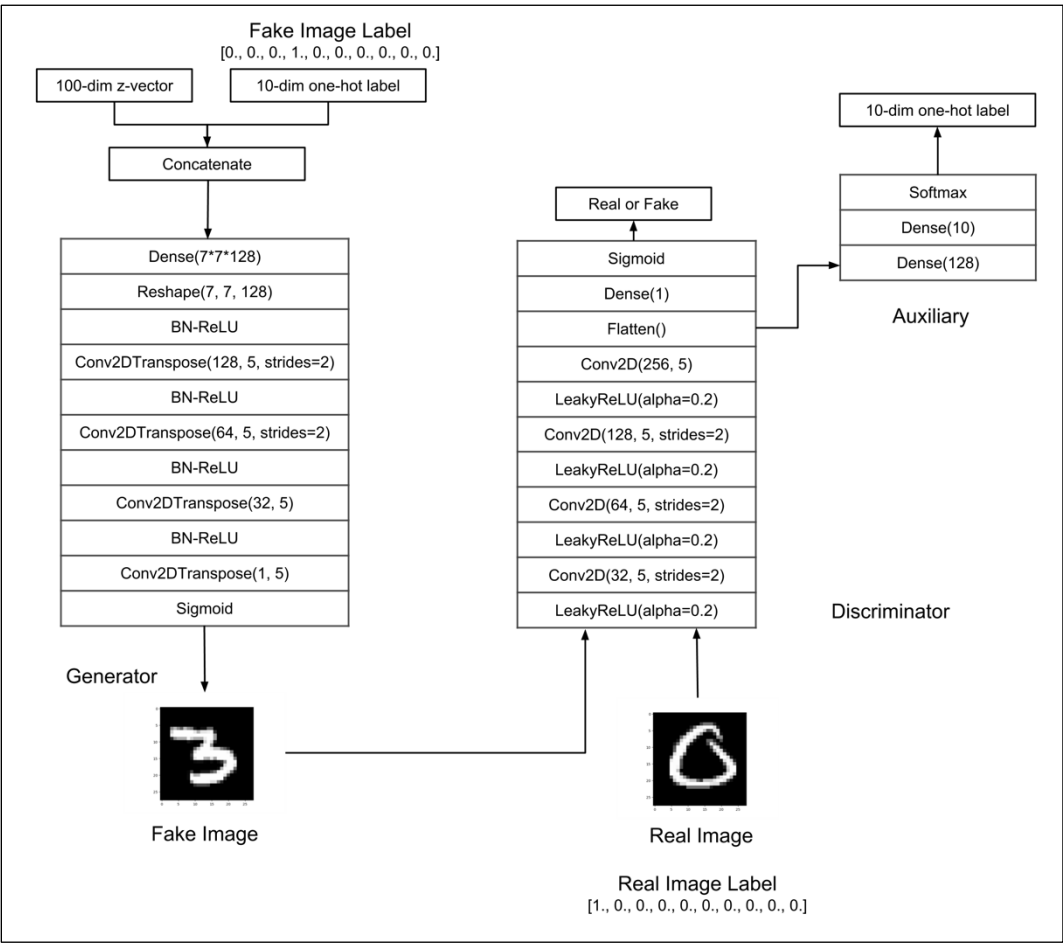


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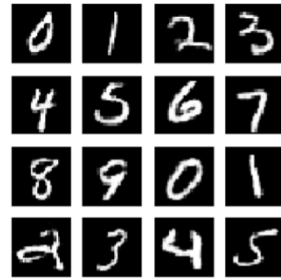




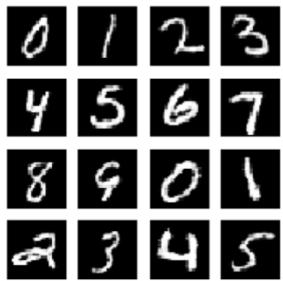
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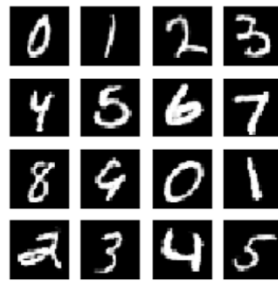
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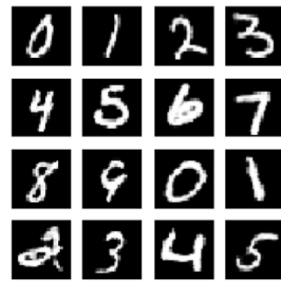
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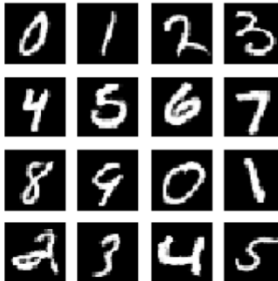
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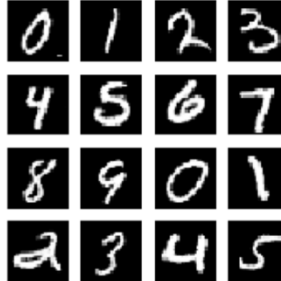
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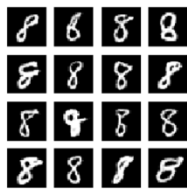
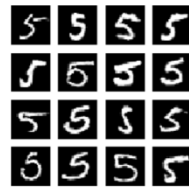
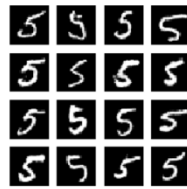
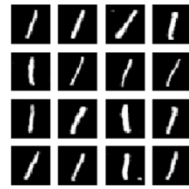
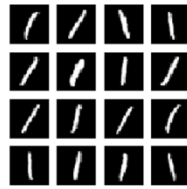
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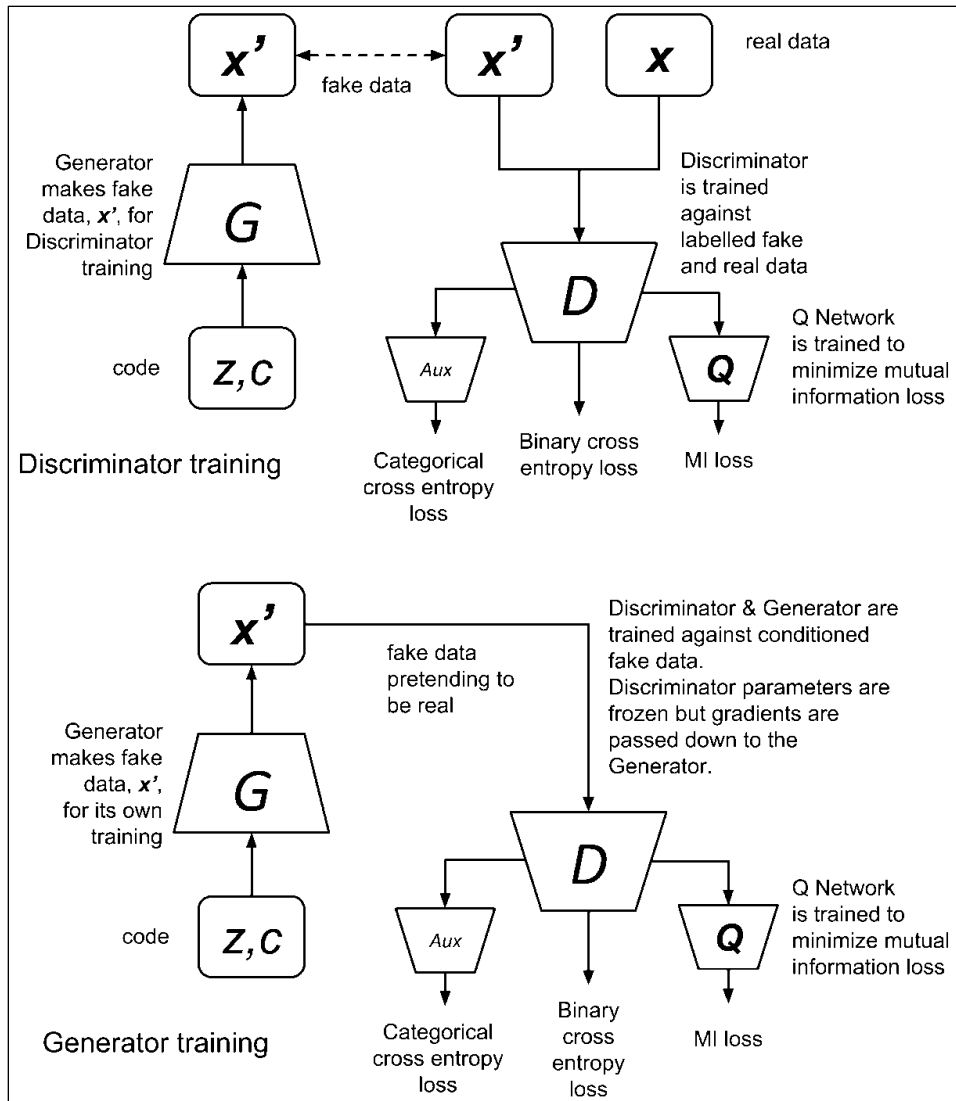
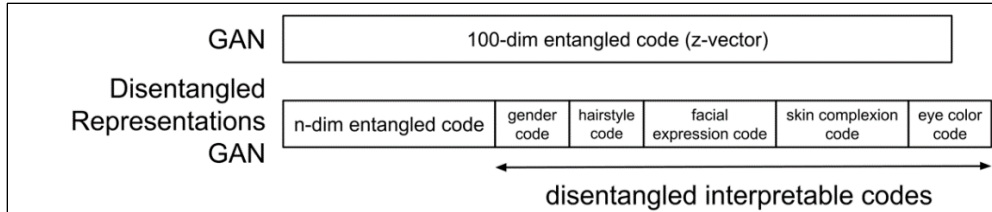
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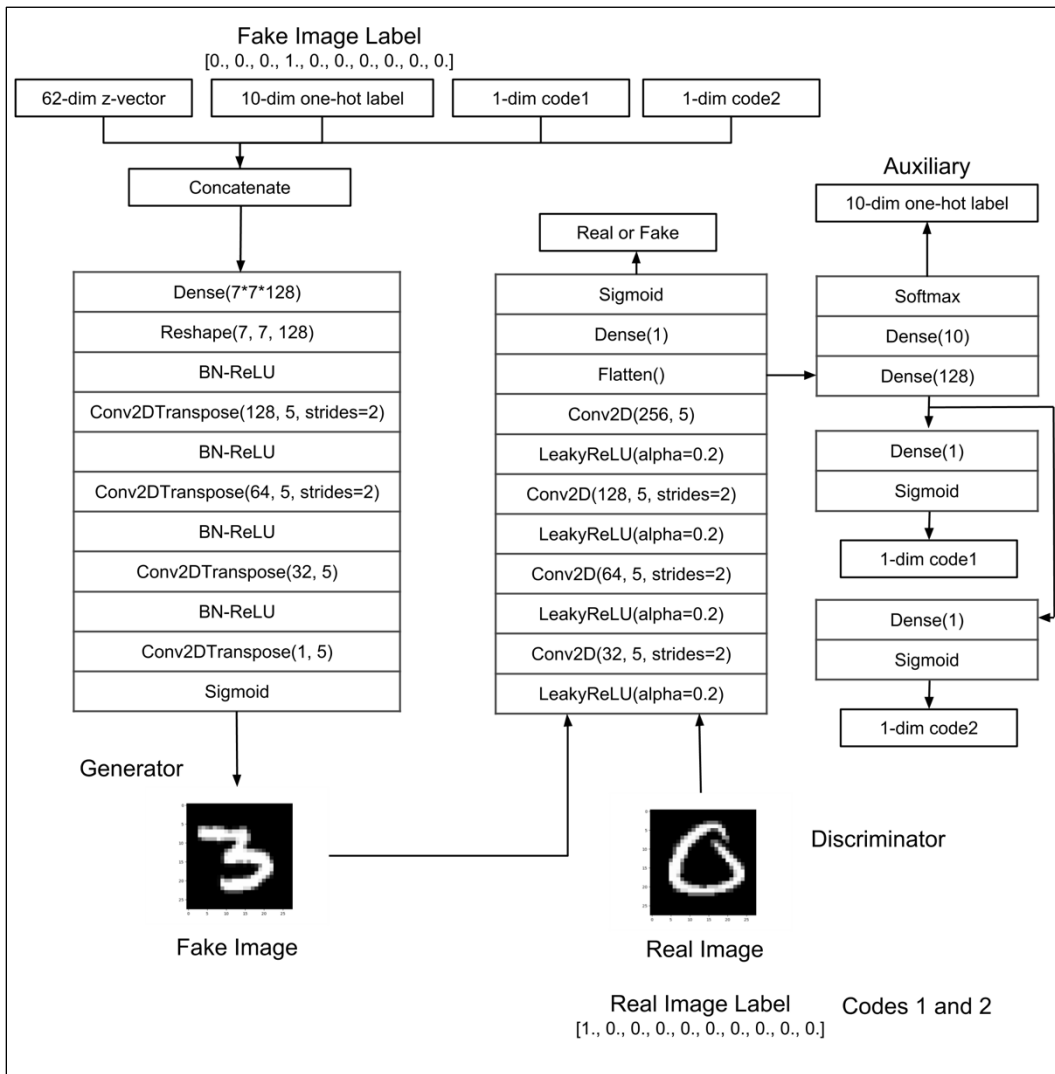
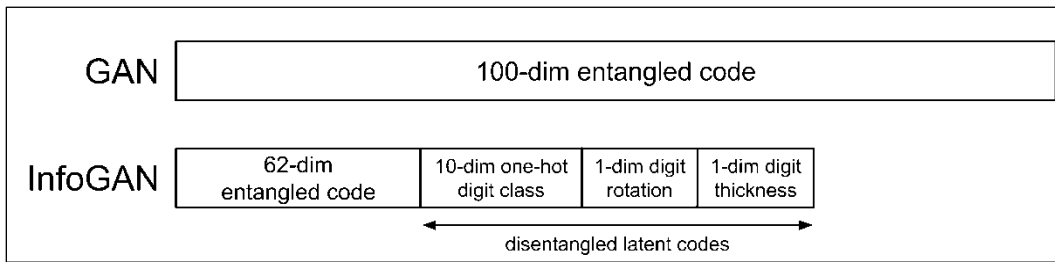
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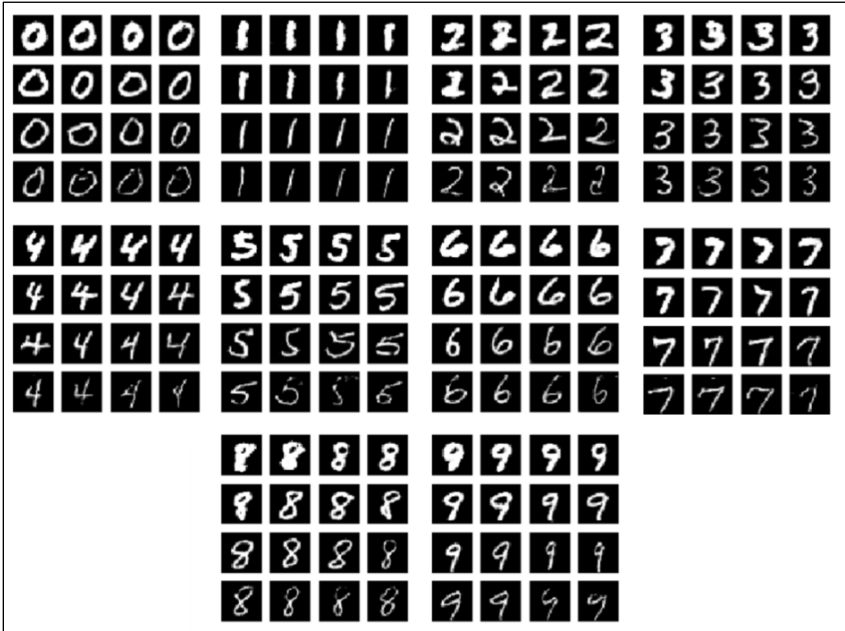
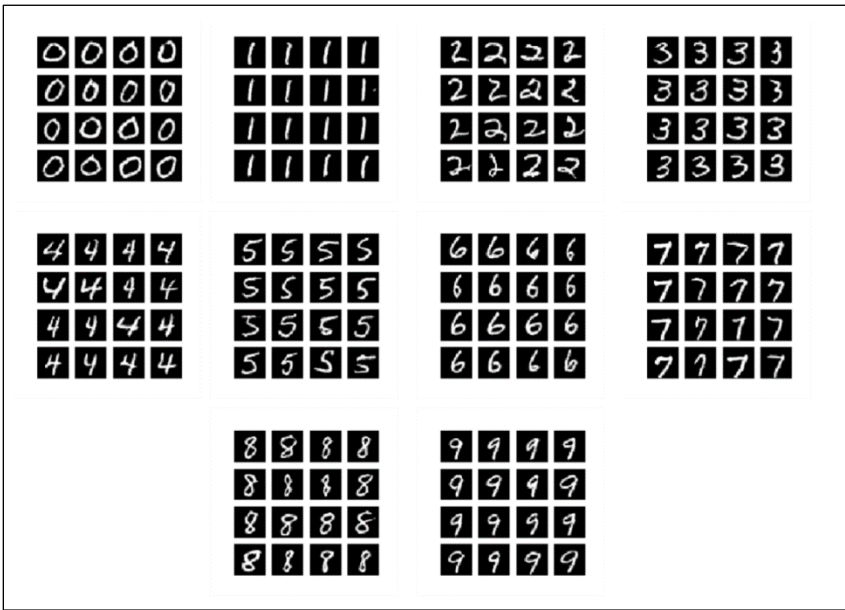
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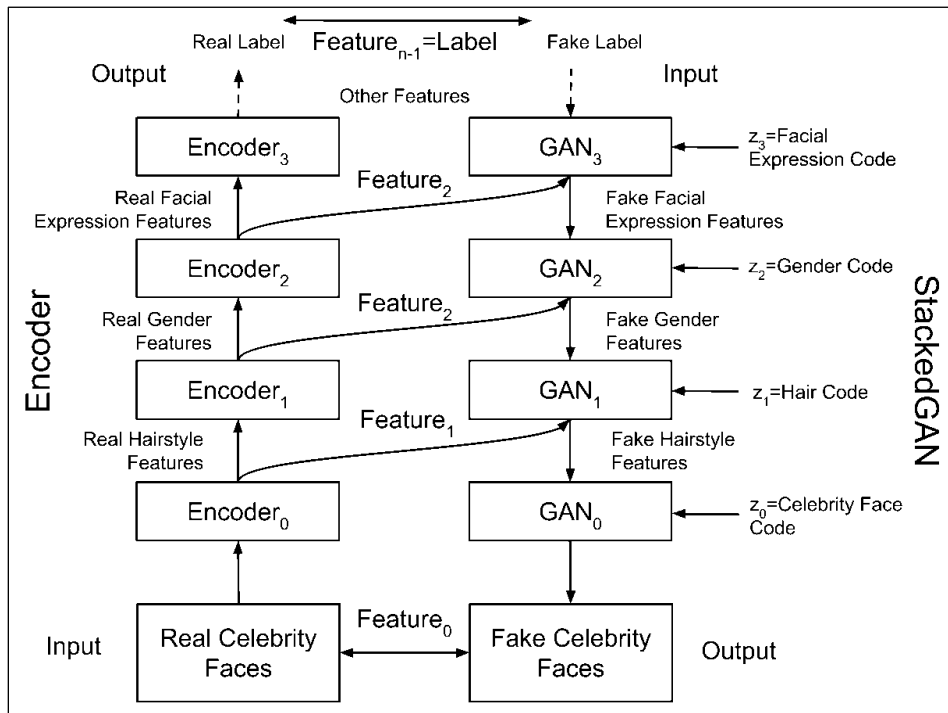
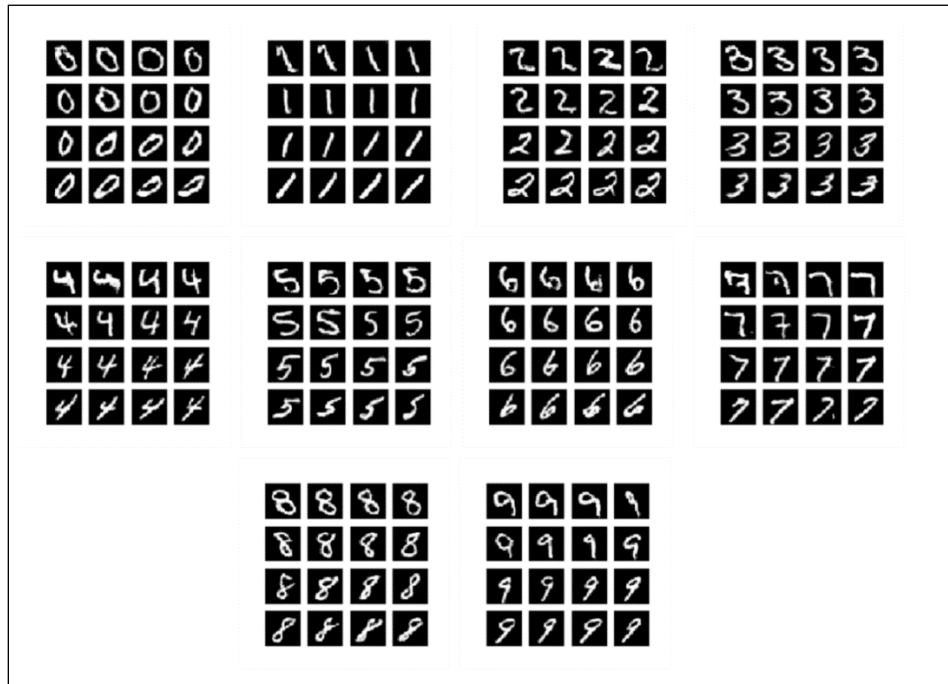
ACGAN

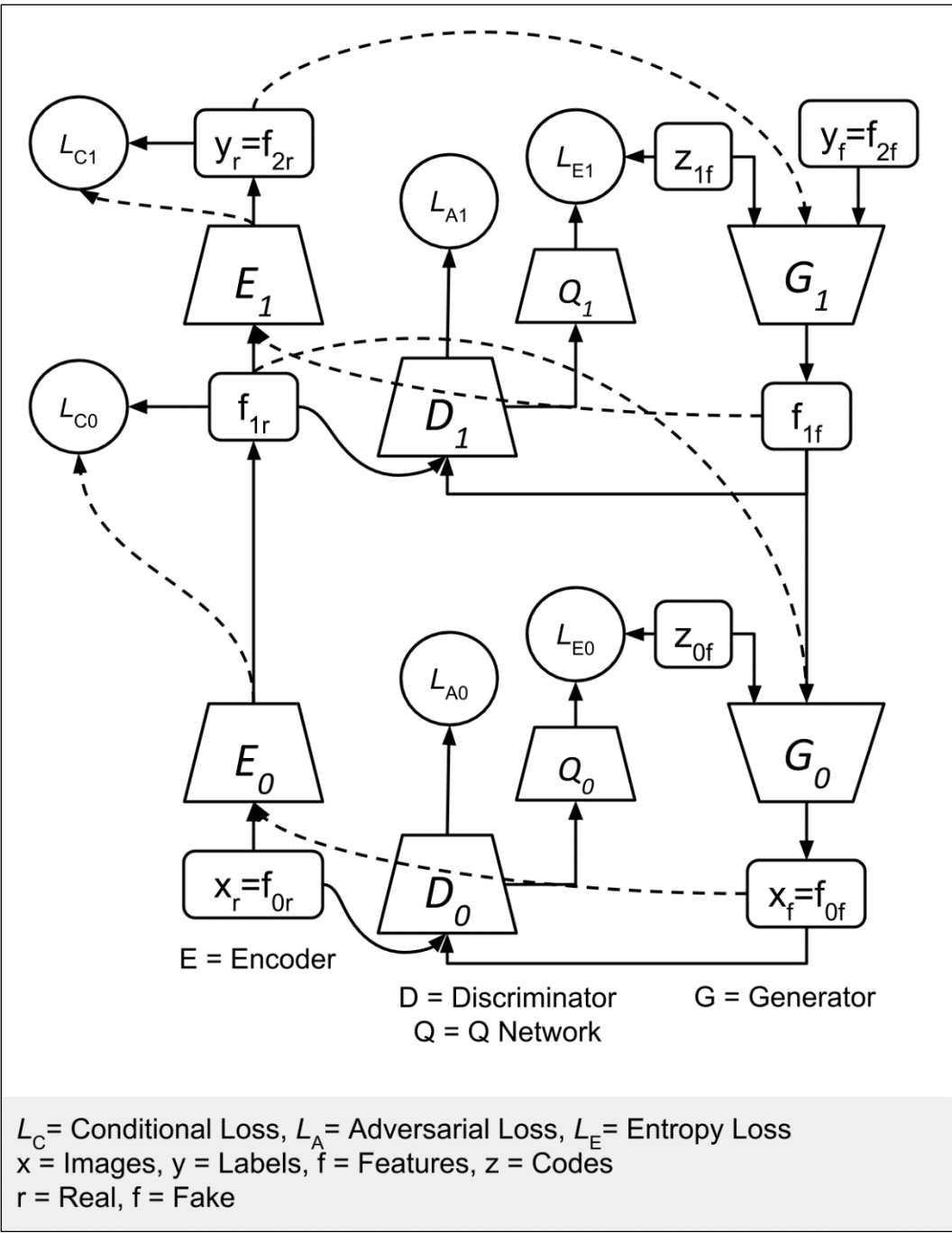
Chapter 6: Disentangled Representation GANs

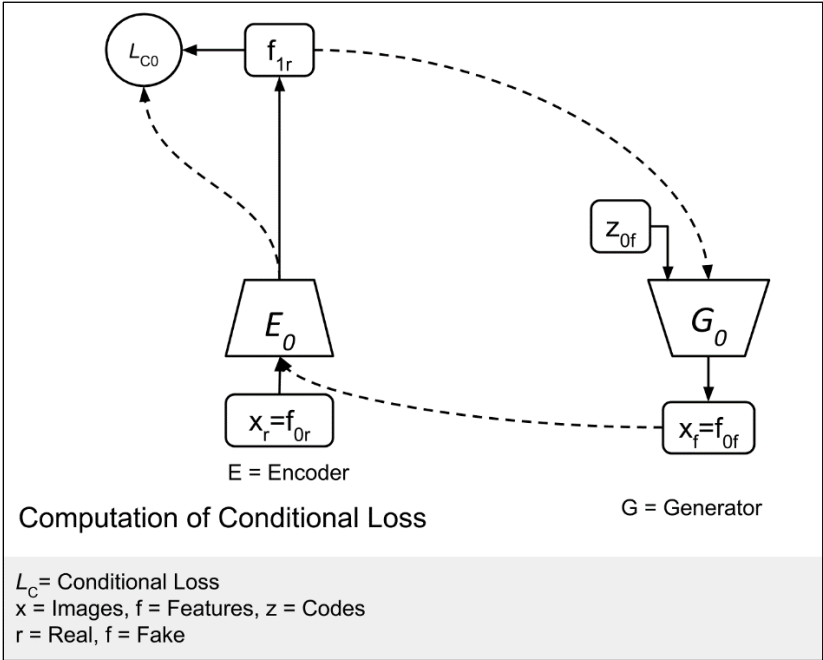
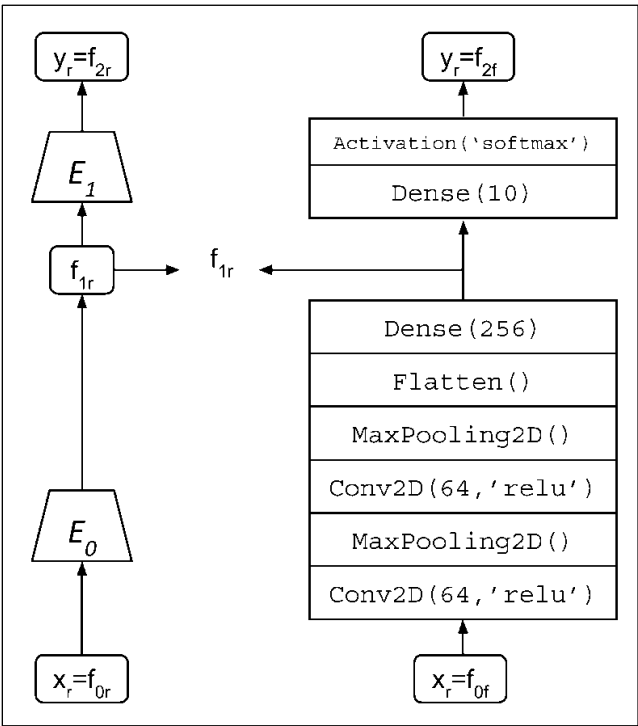




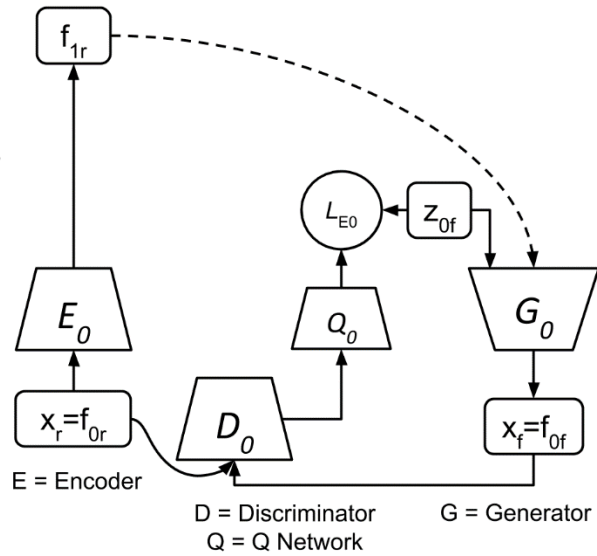






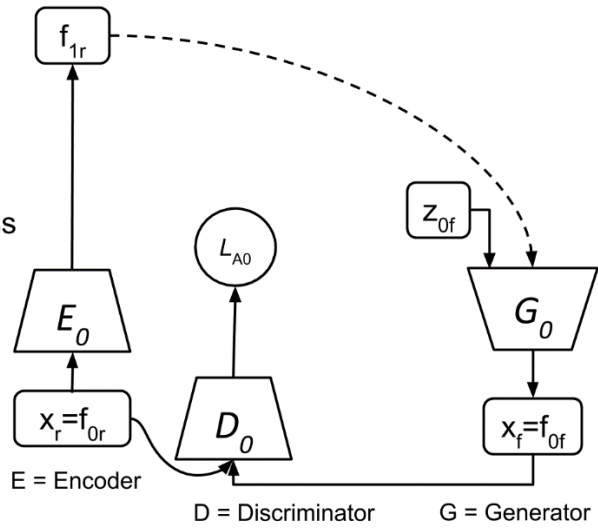


Computation of Entropy Loss

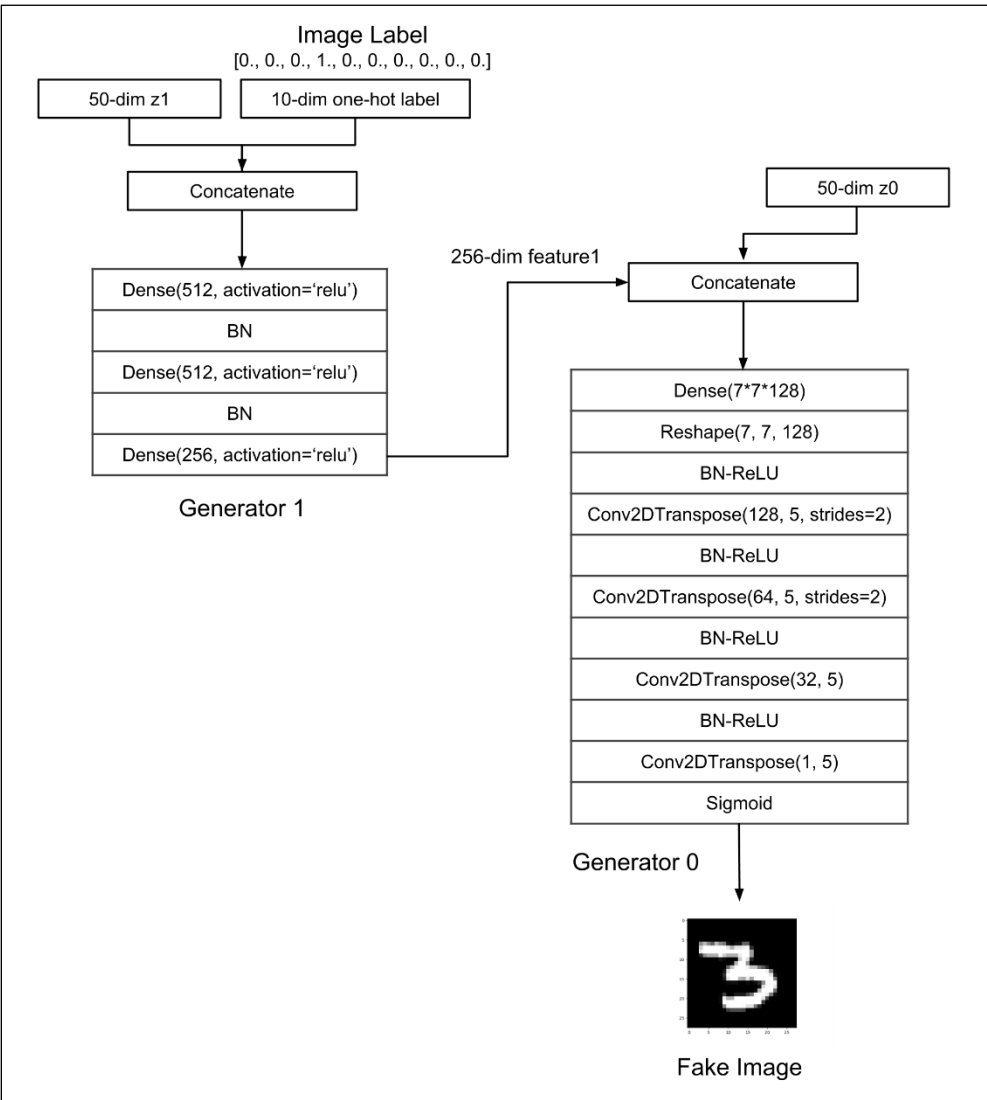


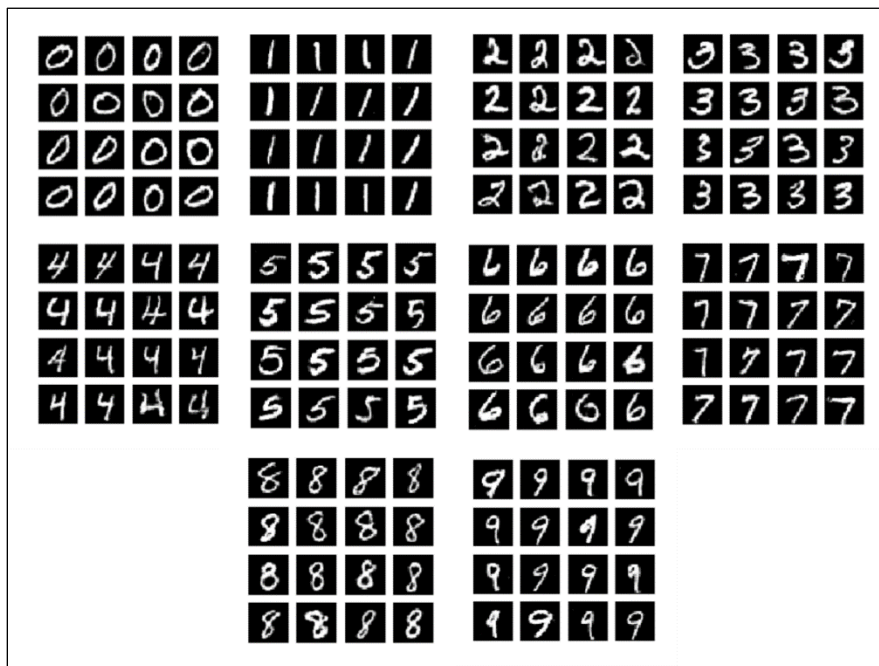
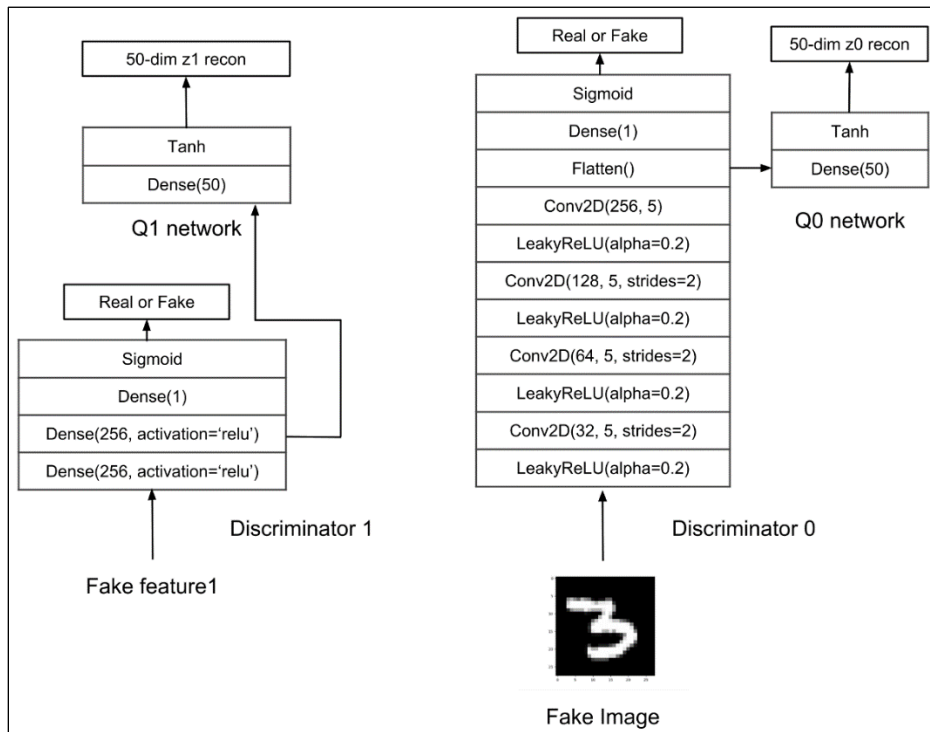
L_E = Entropy Loss
 x = Images, f = Features, z = Codes
 r = Real, f = Fake

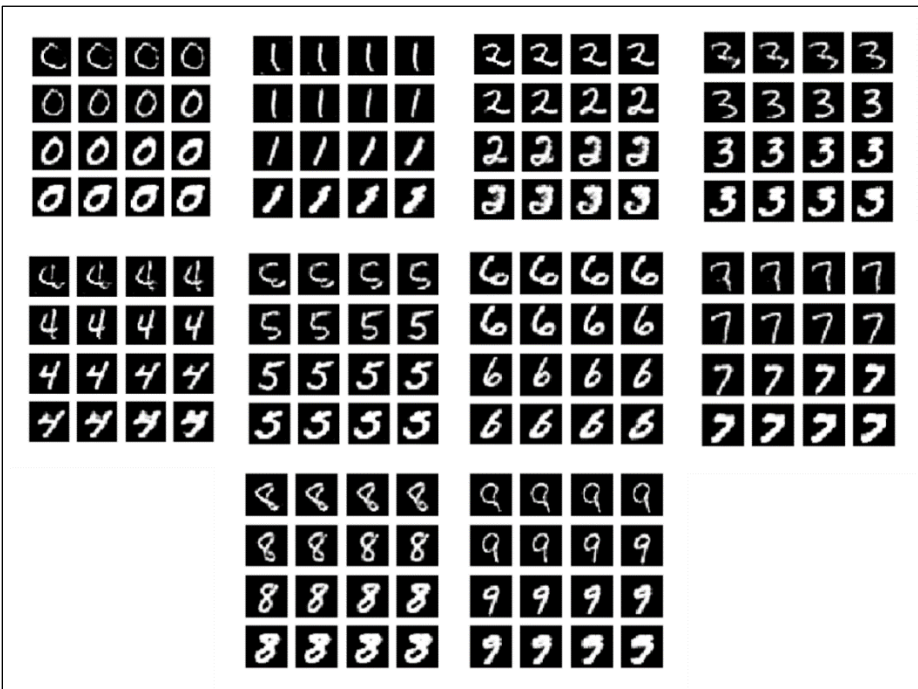
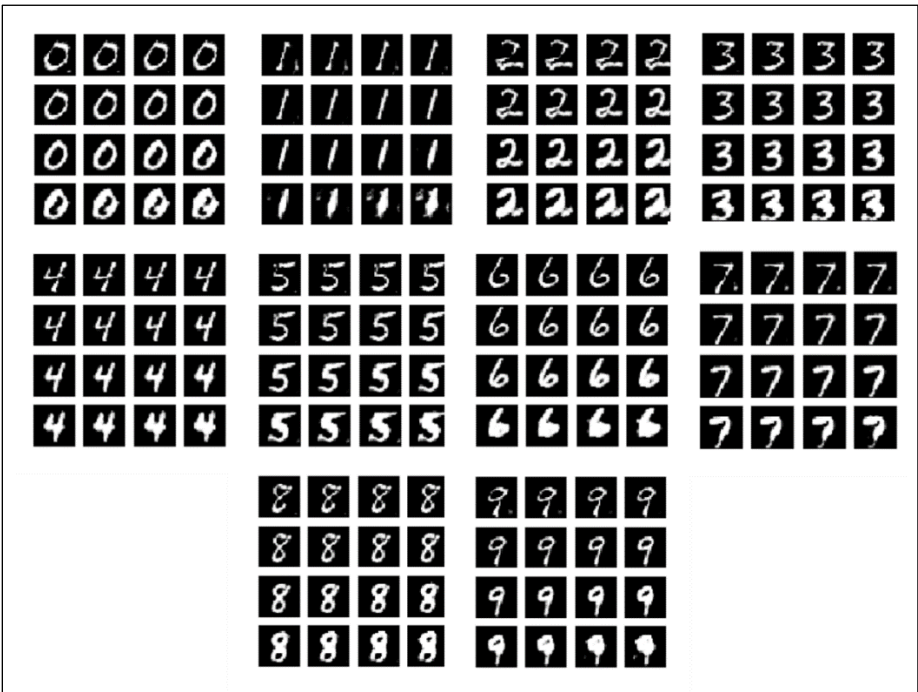
Computation of Adversarial Loss

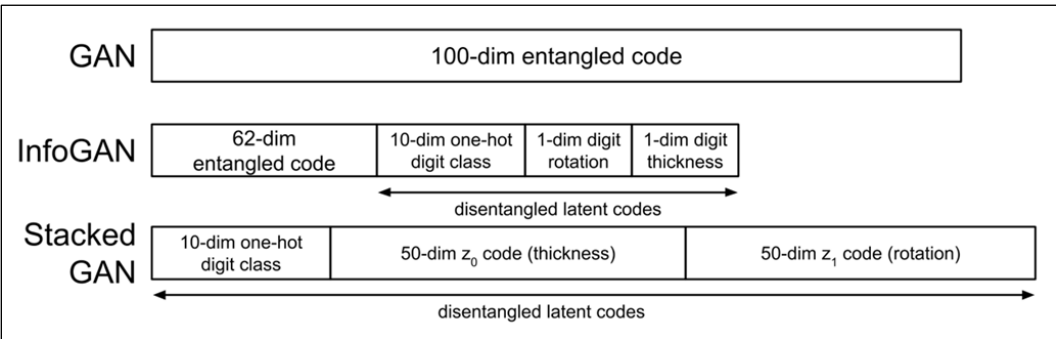


L_A = Adversarial Loss
 x = Images, f = Features, z = Codes
 r = Real, f = Fake



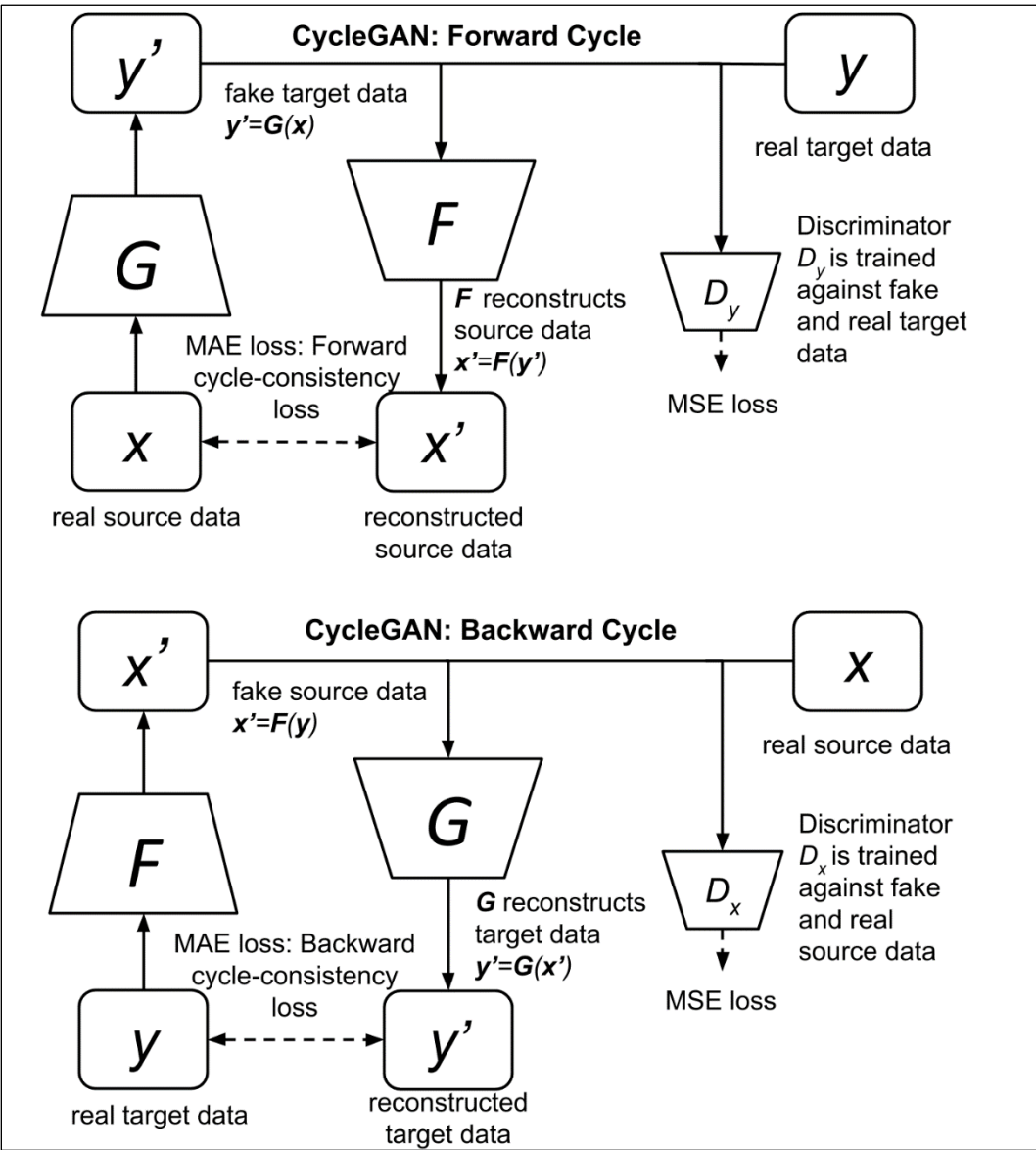


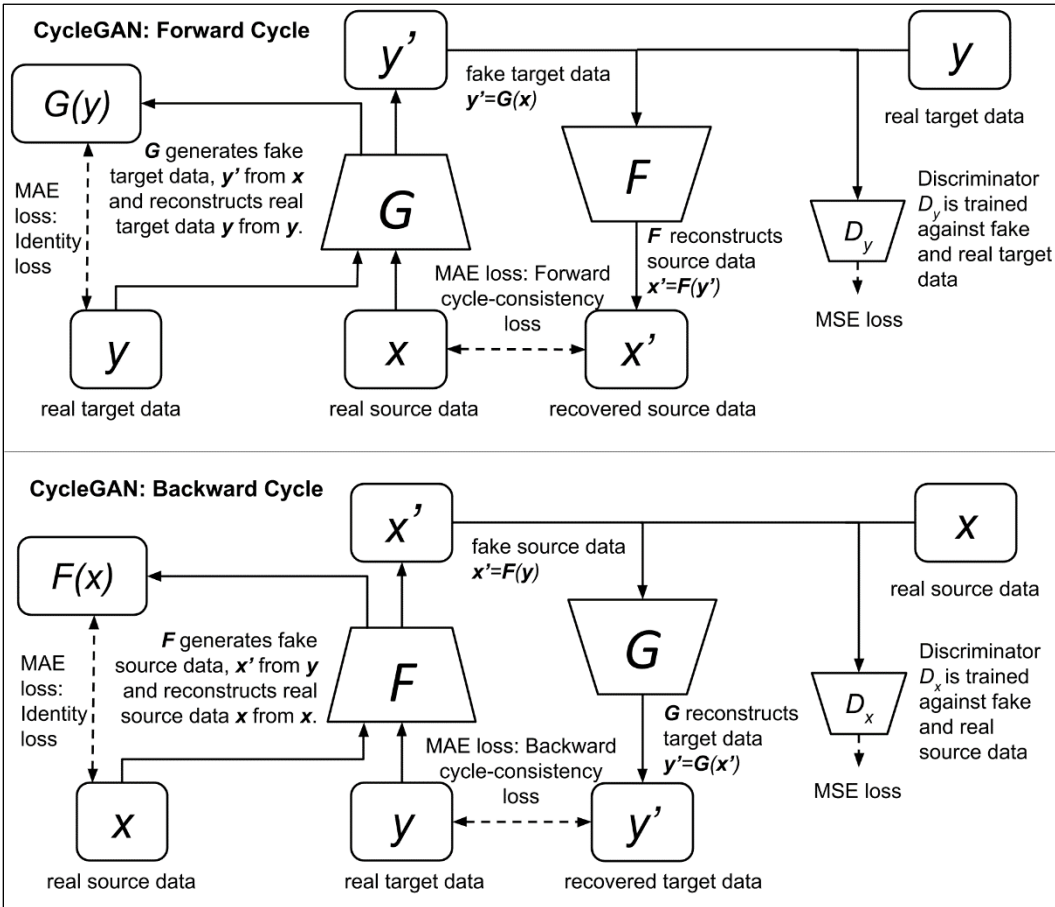


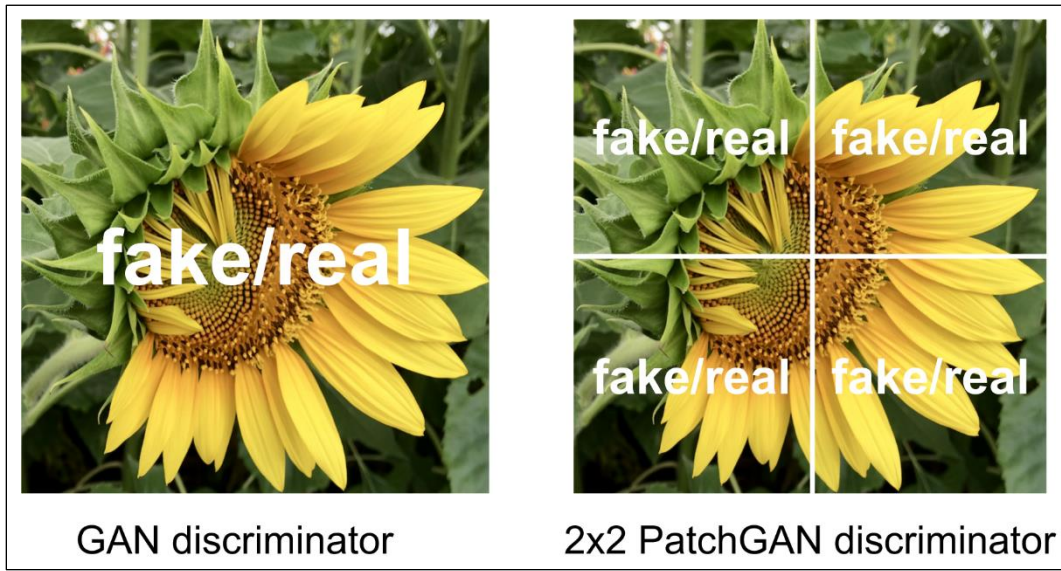
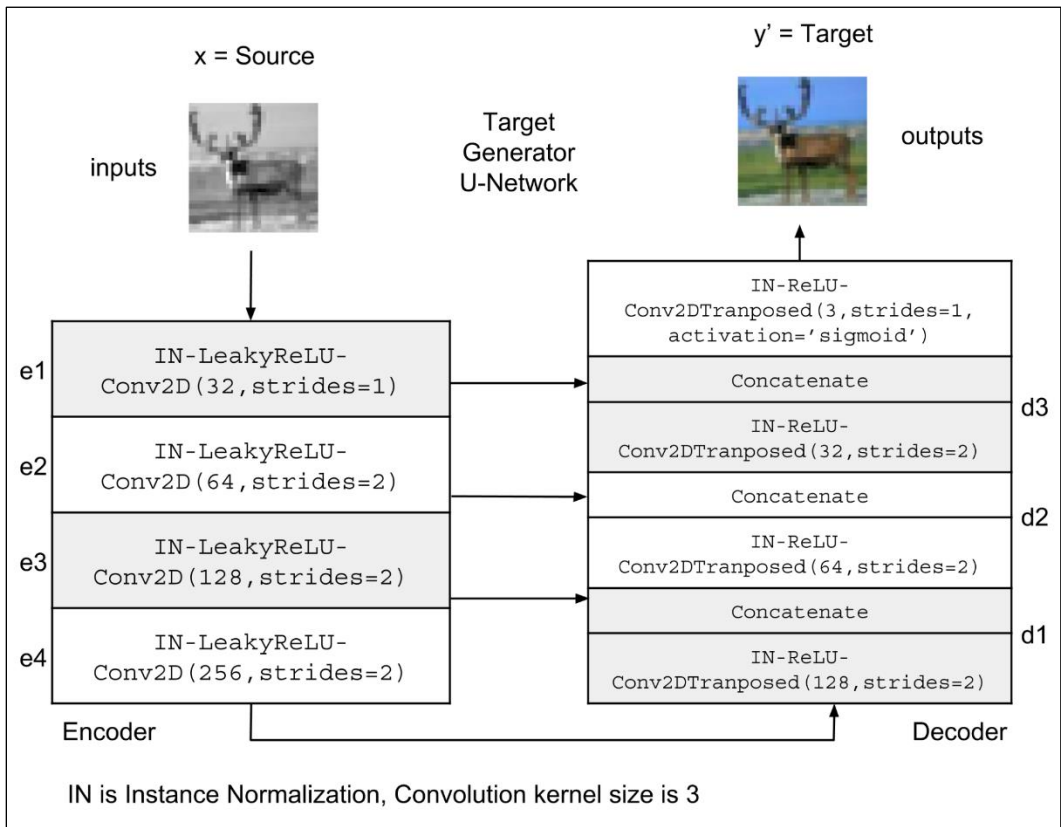


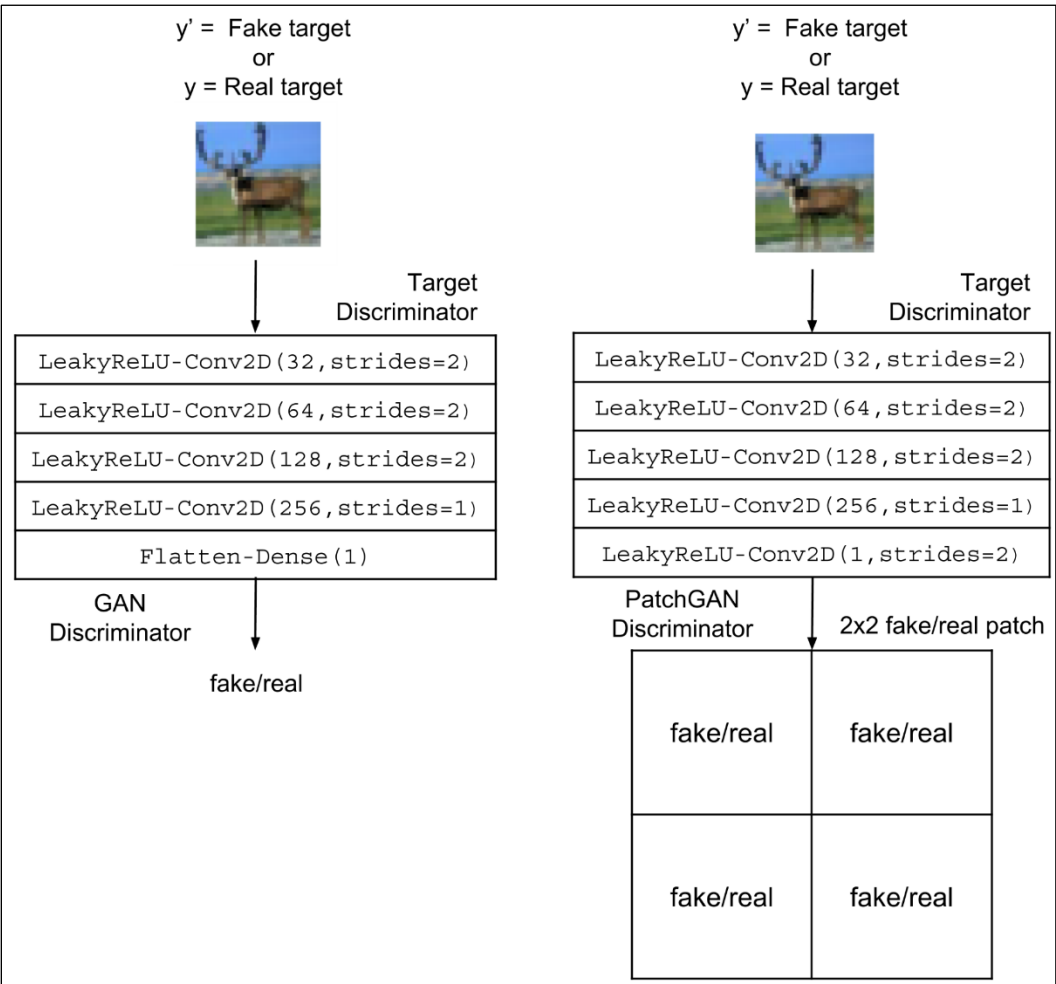
Chapter 7: Cross-Domain GANs



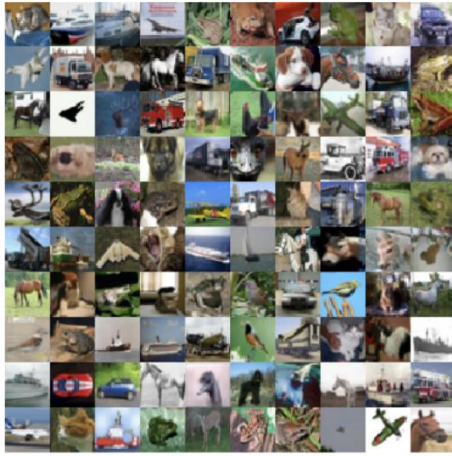






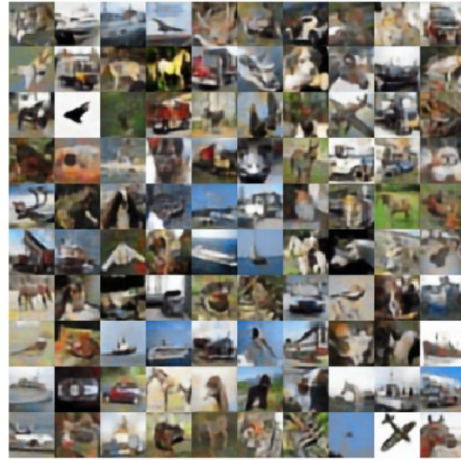


CIFAR10 test target images



Ground Truth

Colorized test images (Predicted)

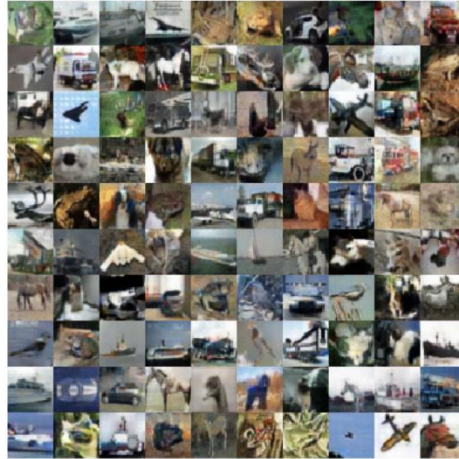


Colorization by AutoEncoder

CIFAR10 predicted target images. Step: 100,000 CIFAR10 predicted target images. Step: 100,000



Colorization by CycleGAN



Colorization by CycleGAN w/ PatchGAN

CIFAR10 test source images



Ground Truth

CIFAR10 predicted source images. Step: 100,000



RGB to Grayscale by CycleGAN

CIFAR10 predicted source images. Step: 100,000



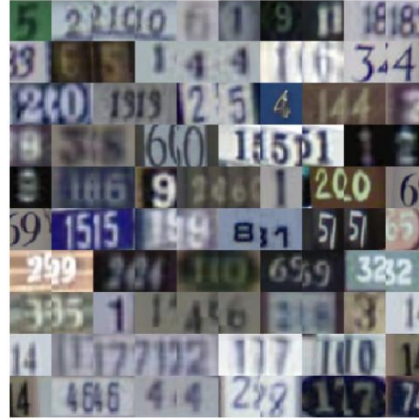
RGB to Grayscale by CycleGAN w/
PatchGAN

MNIST test source images



MNIST Digits

SVHN test target images



Street View House Number

MNIST test source images



MNIST Digits

SVHN predicted target images. Step: 100,000



MNIST in SVHN domain

SVHN predicted target images. Step: 100,000



MNIST in SVHN domain w/
PatchGAN

SVHN test target images



SVHN

MNIST predicted source images. Step: 100,000 MNIST predicted source images. Step: 100,000



SVHN in MNIST domain



SVHN in MNIST domain w/
PatchGAN

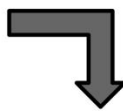
Test mnist source images



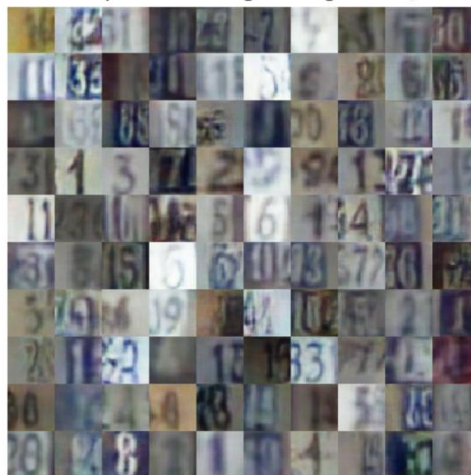
MNIST reconstructed source images.



MNIST to SVHN Forward Cycle



SVHN predicted target images.



SVHN test target images



SVHN reconstructed target images.



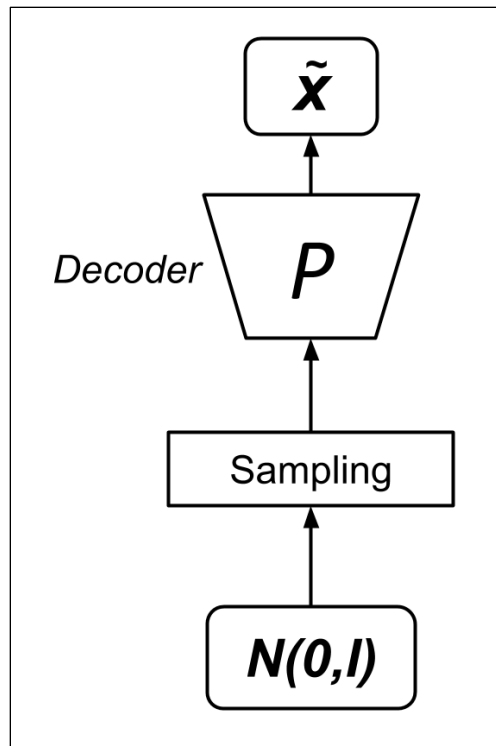
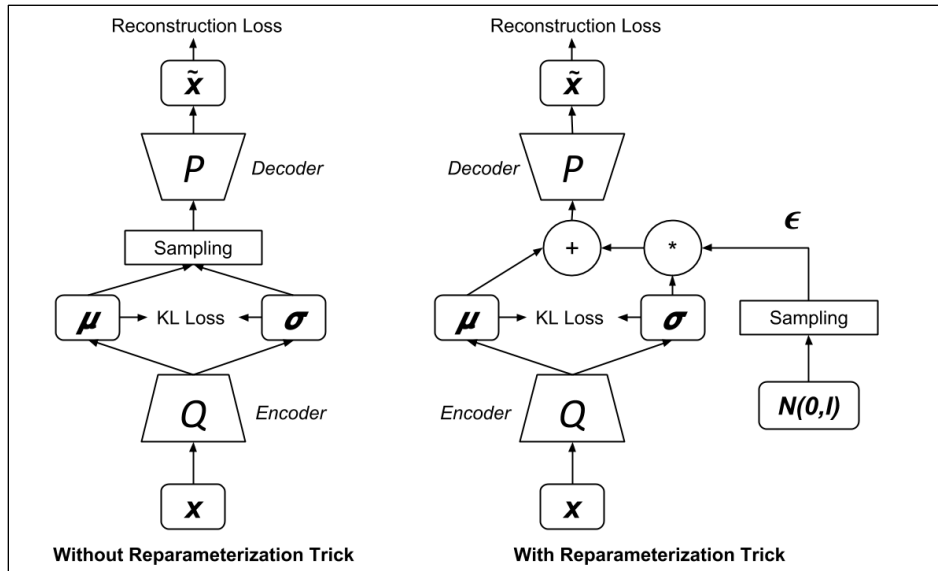
SVHN to MNIST Backward Cycle

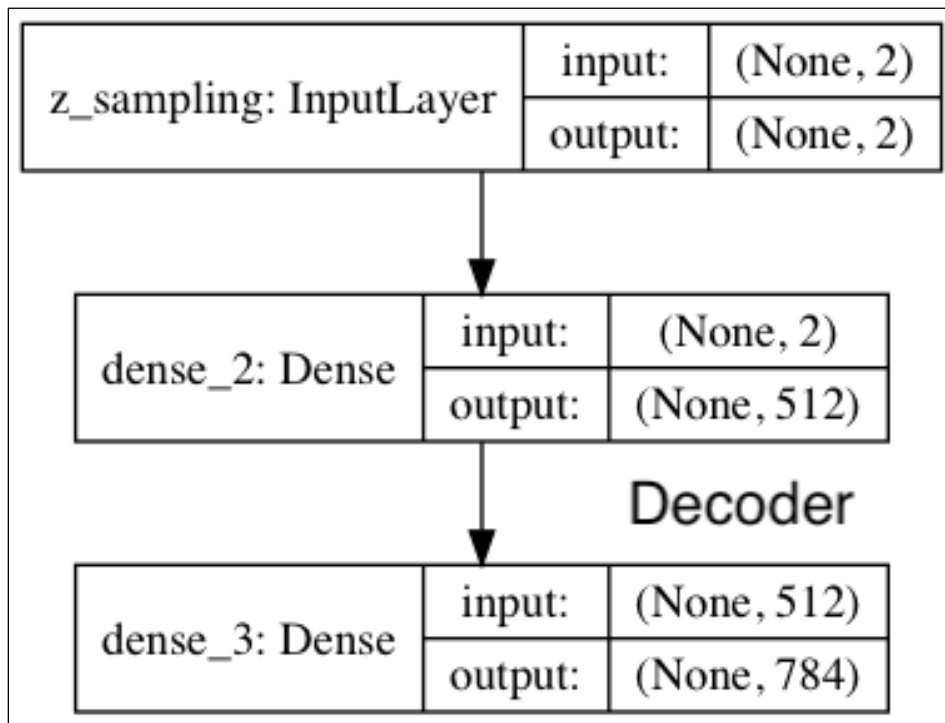
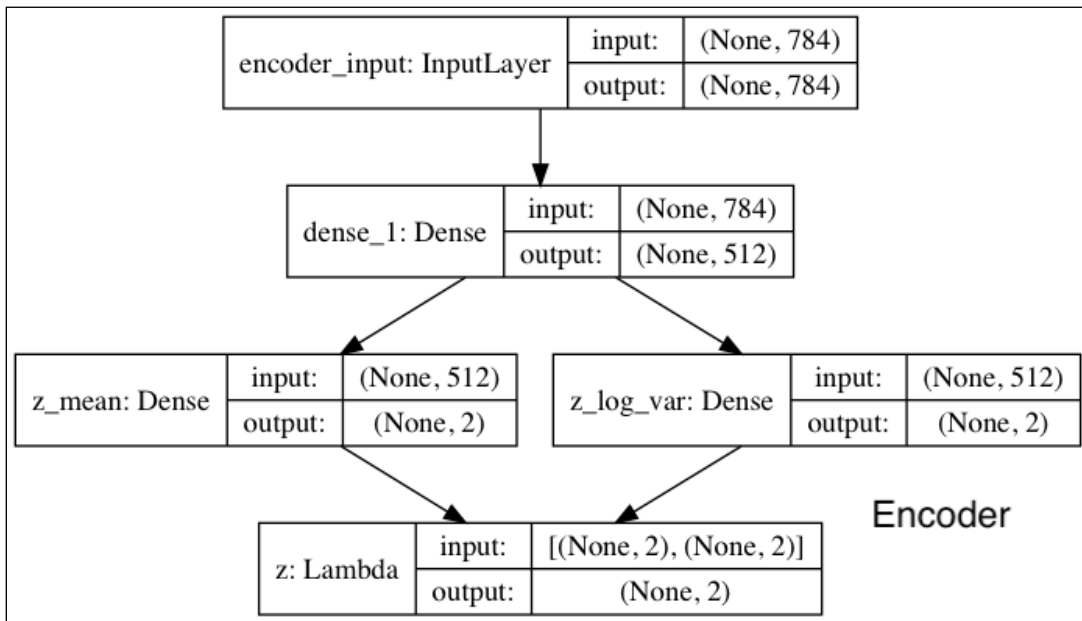


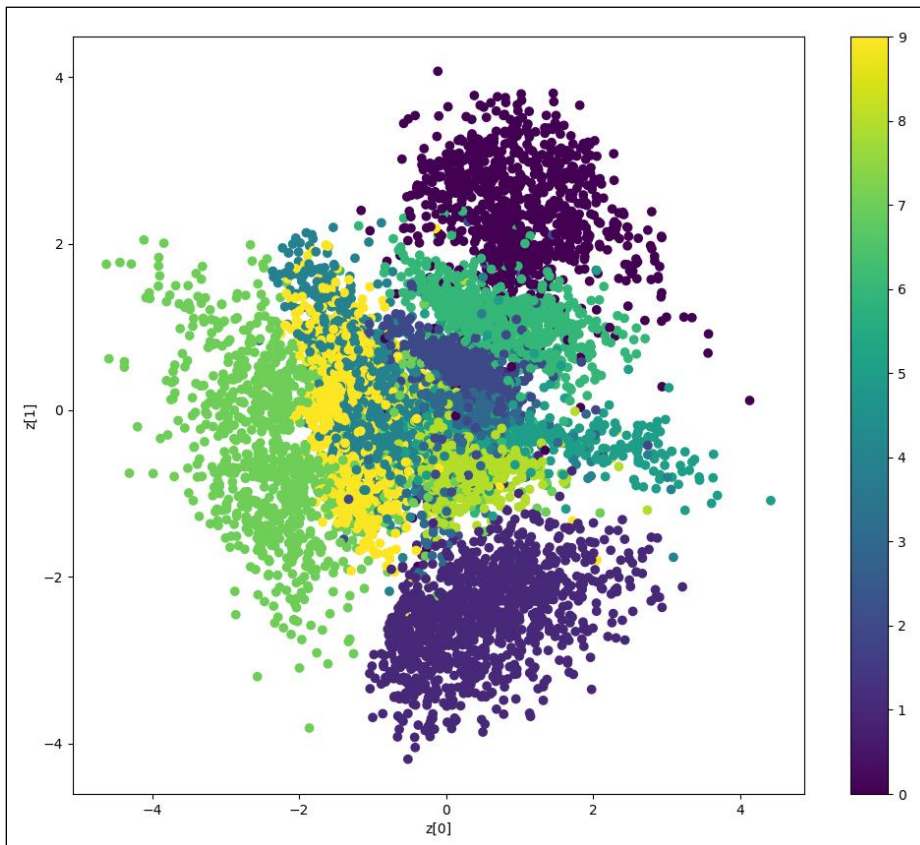
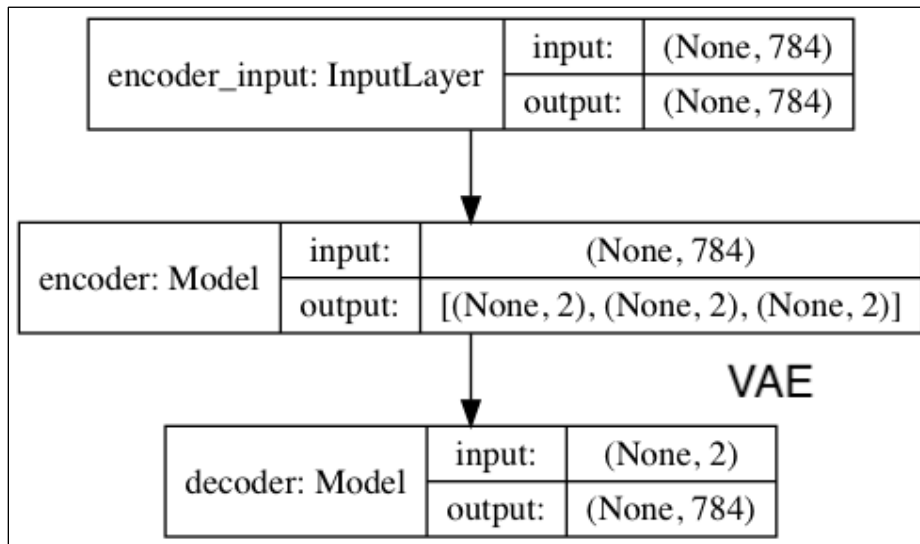
MNIST predicted source images.

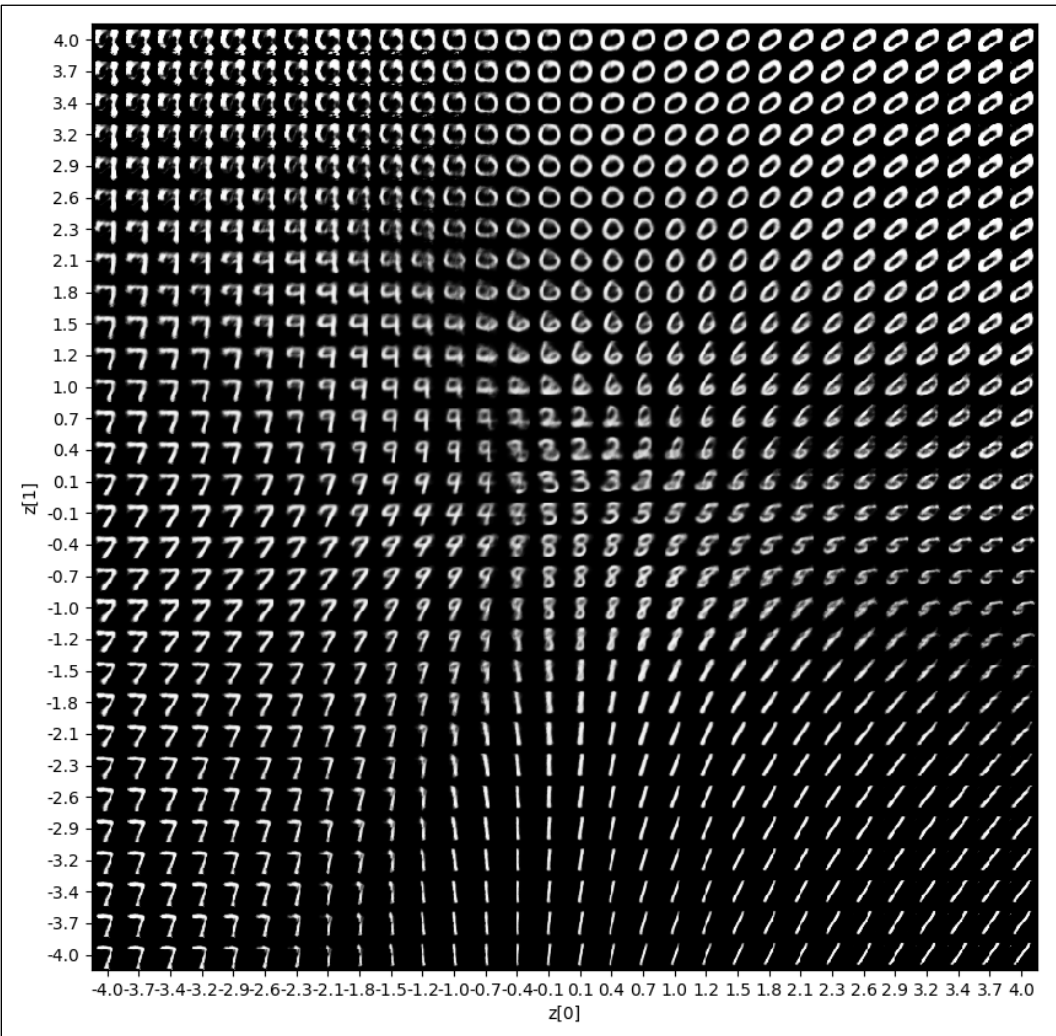


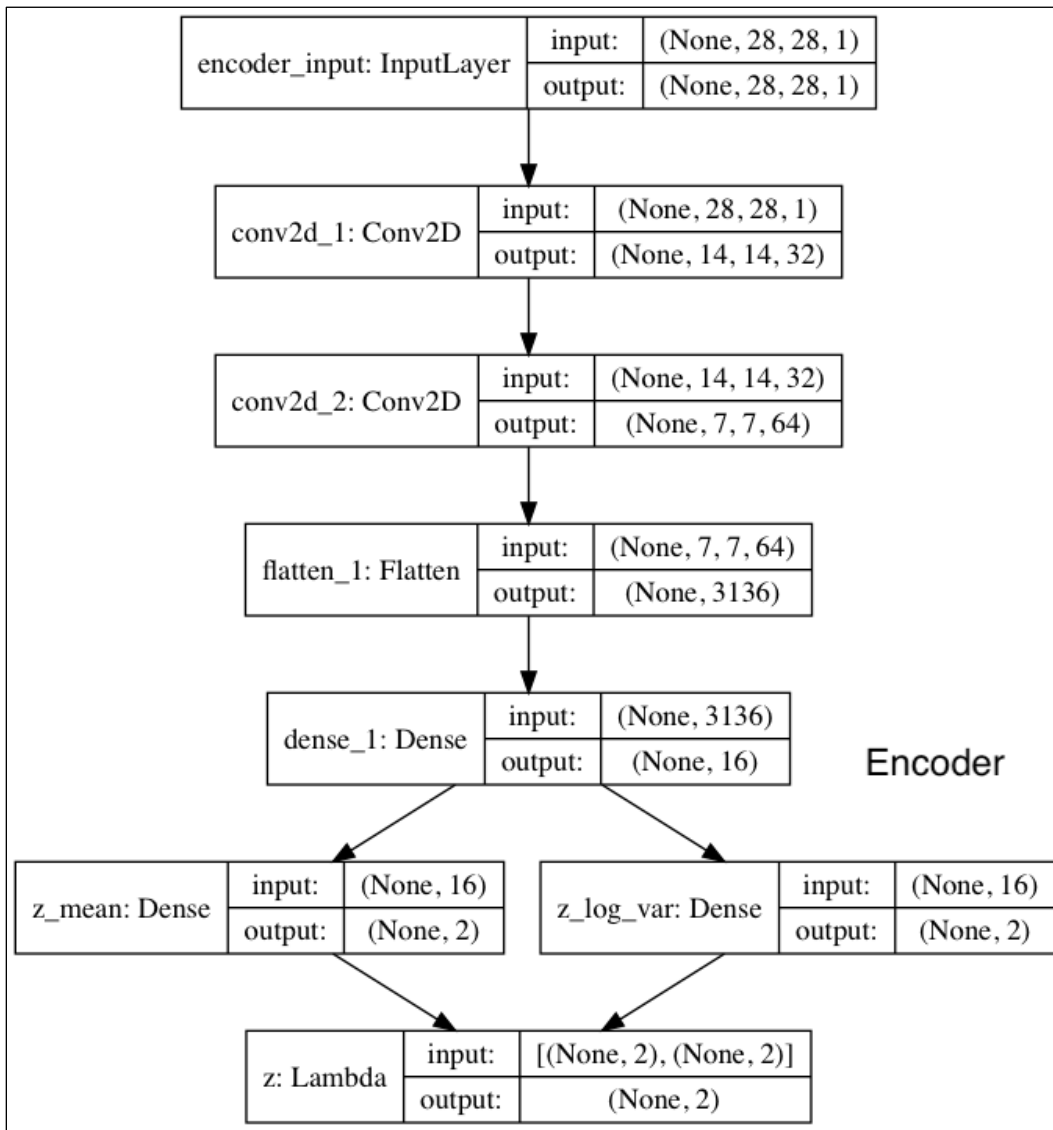
Chapter 8: Variational Autoencoders (VAEs)

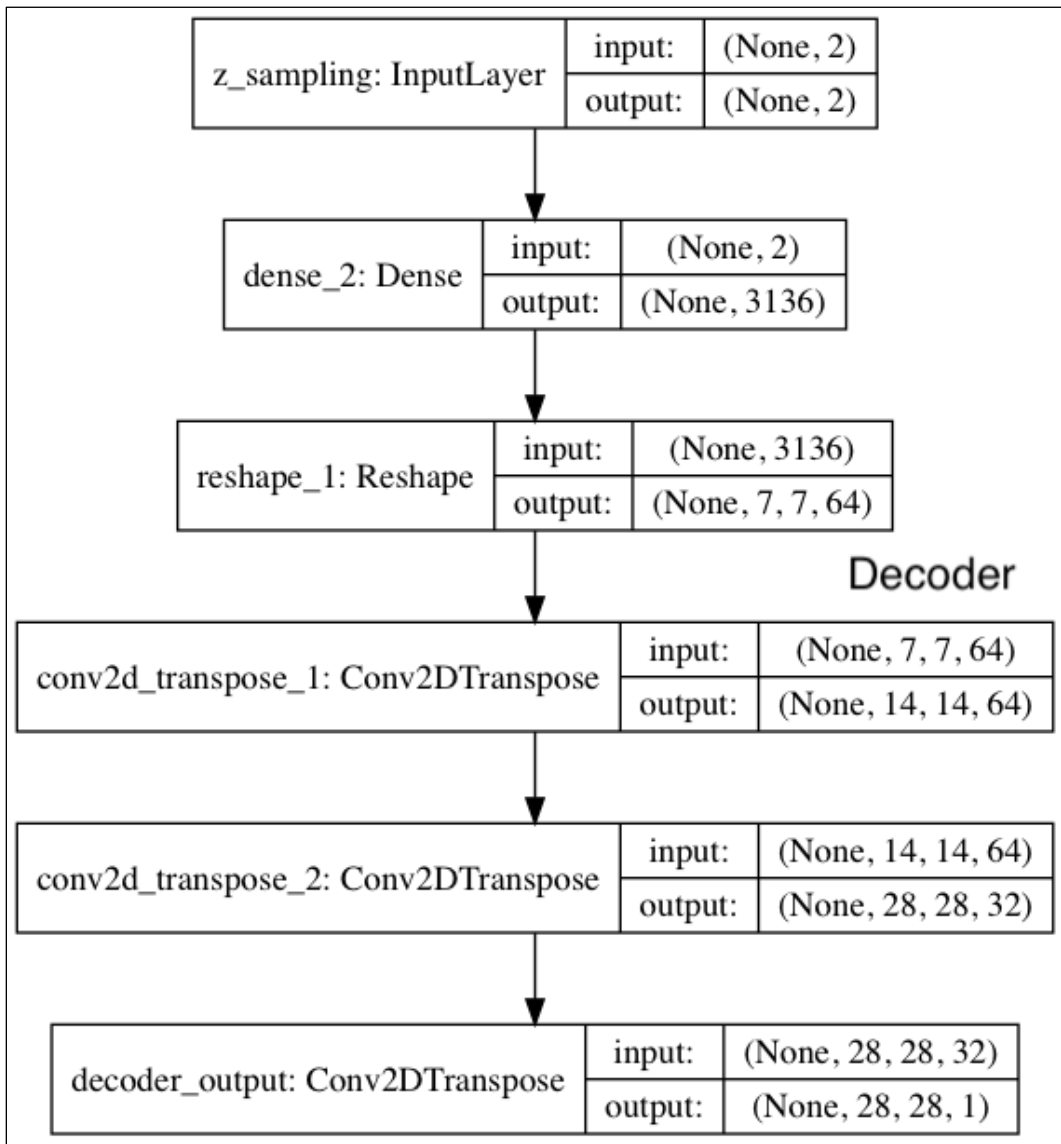


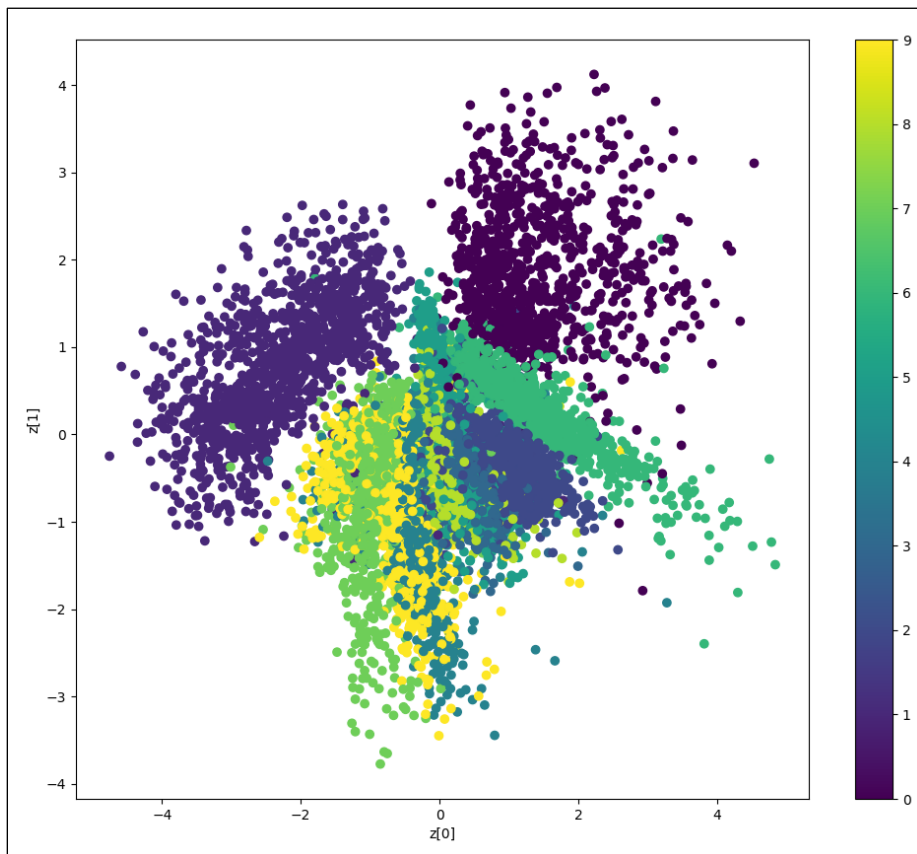
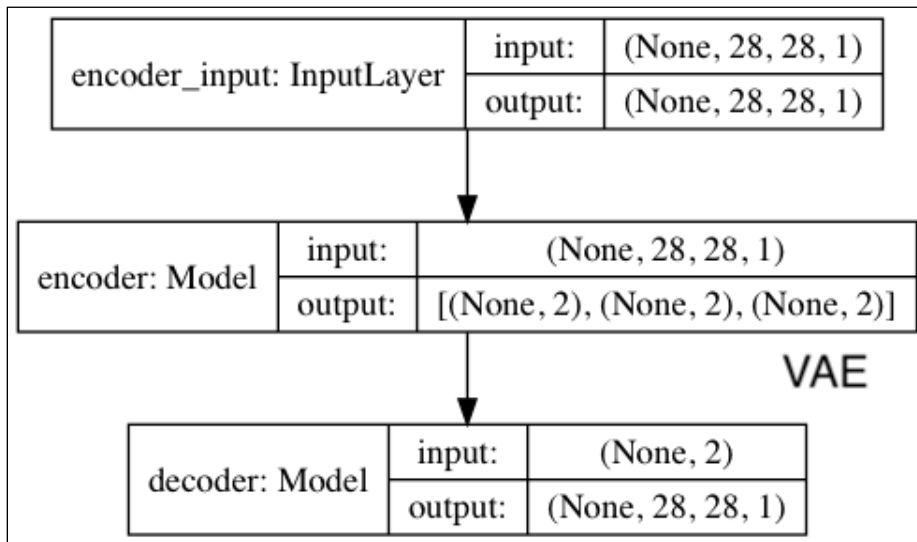


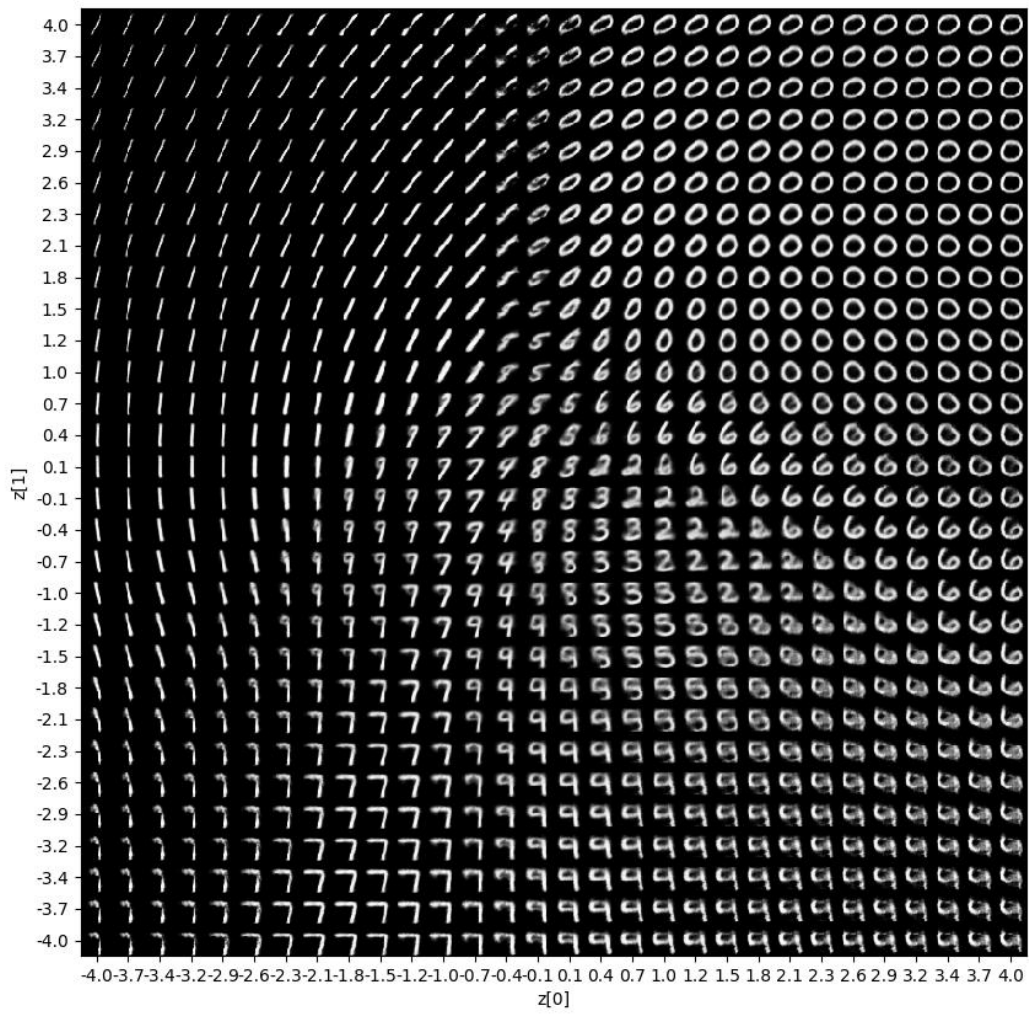


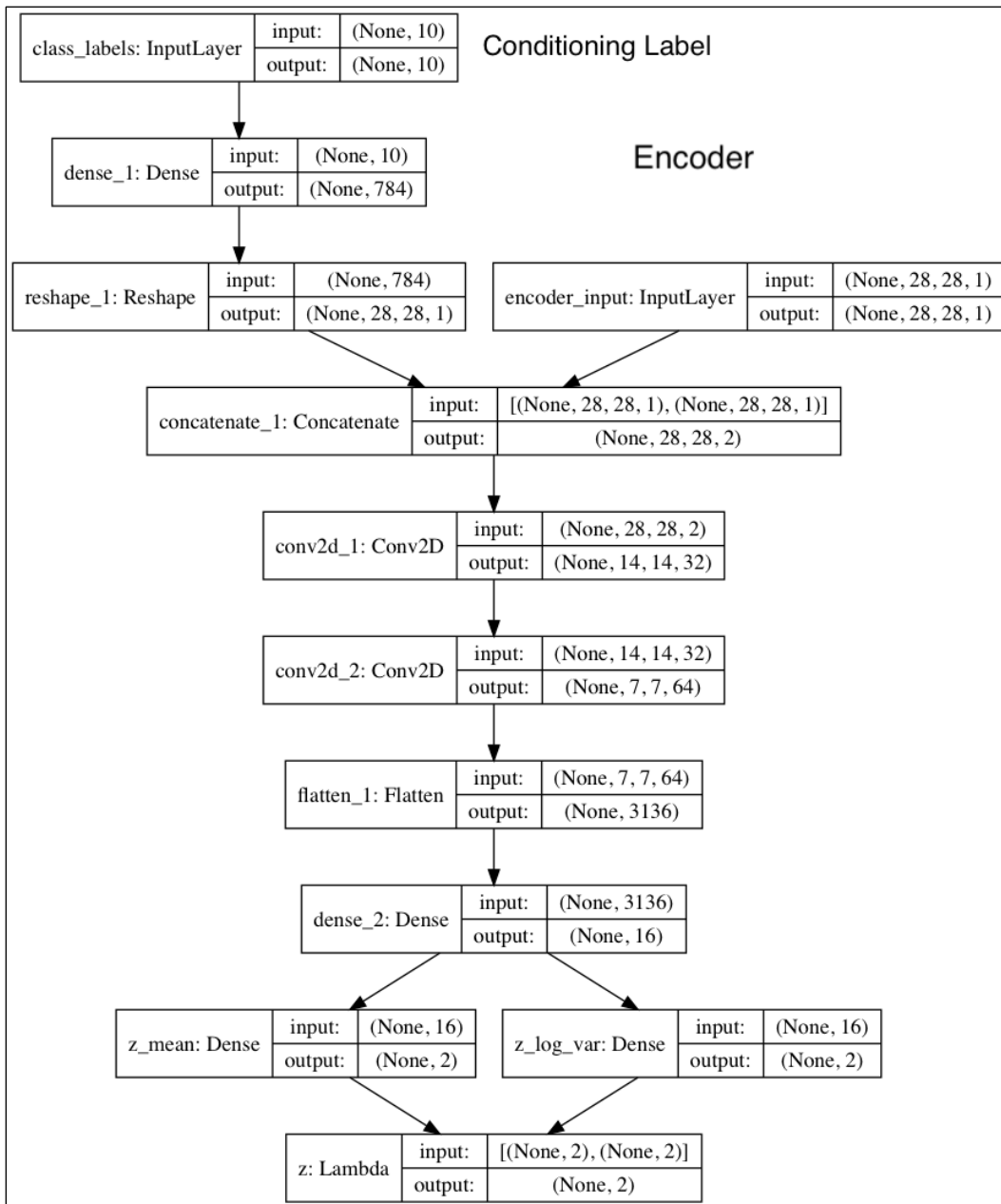


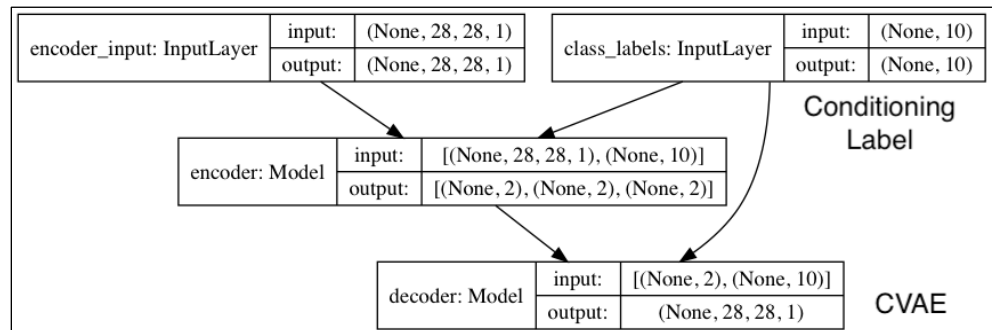
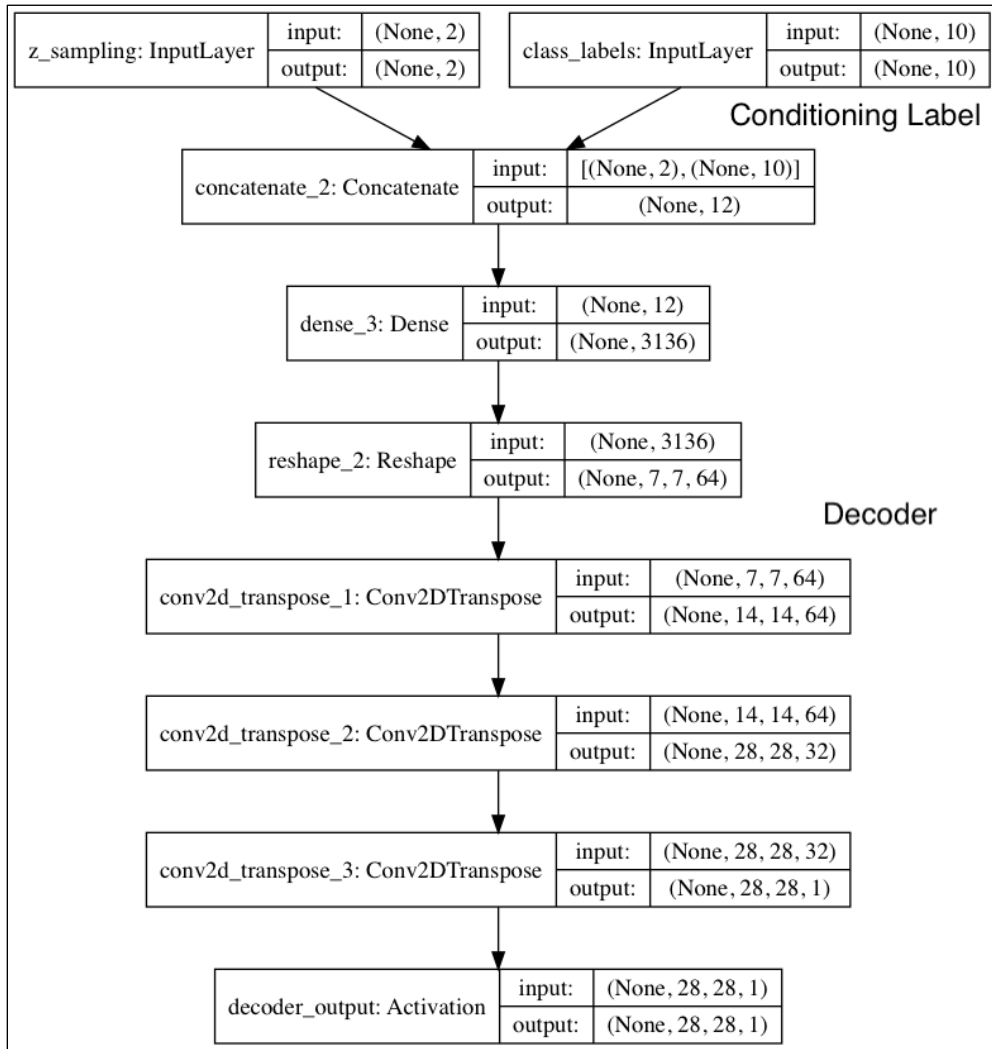


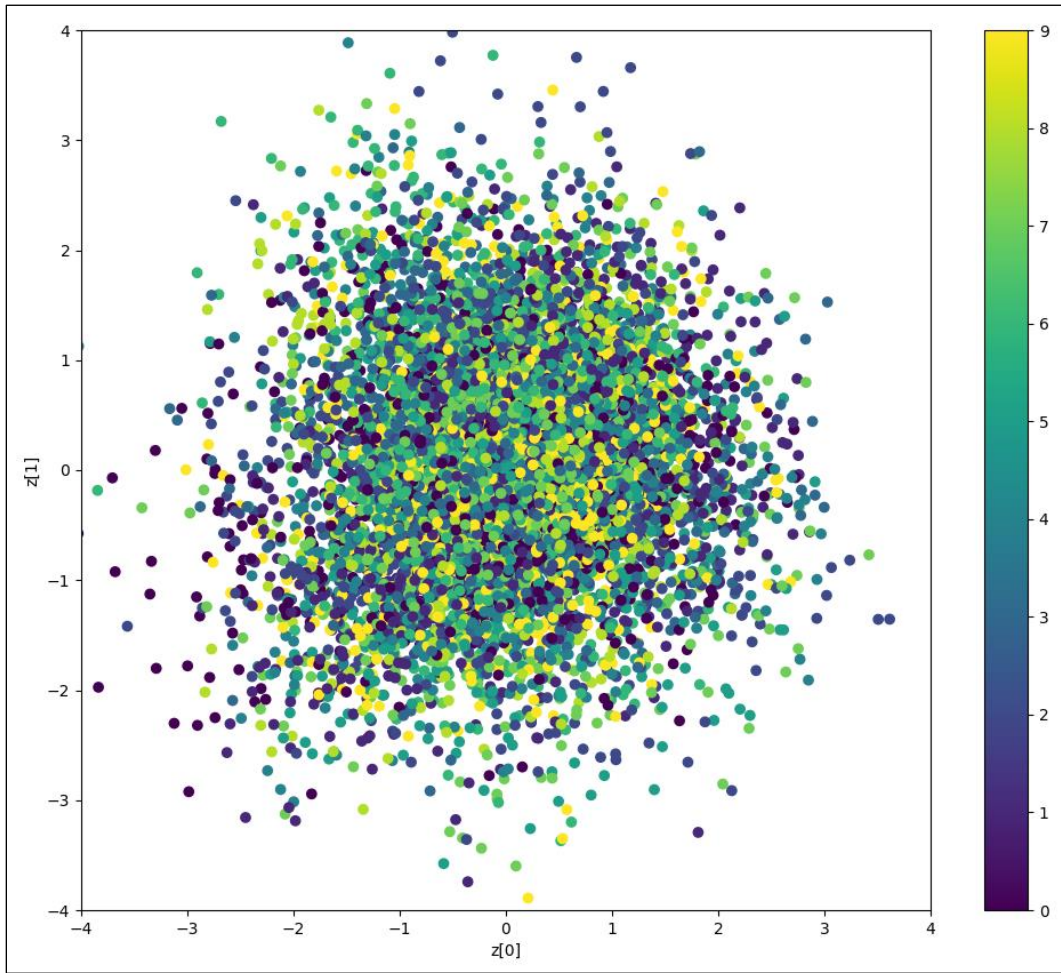


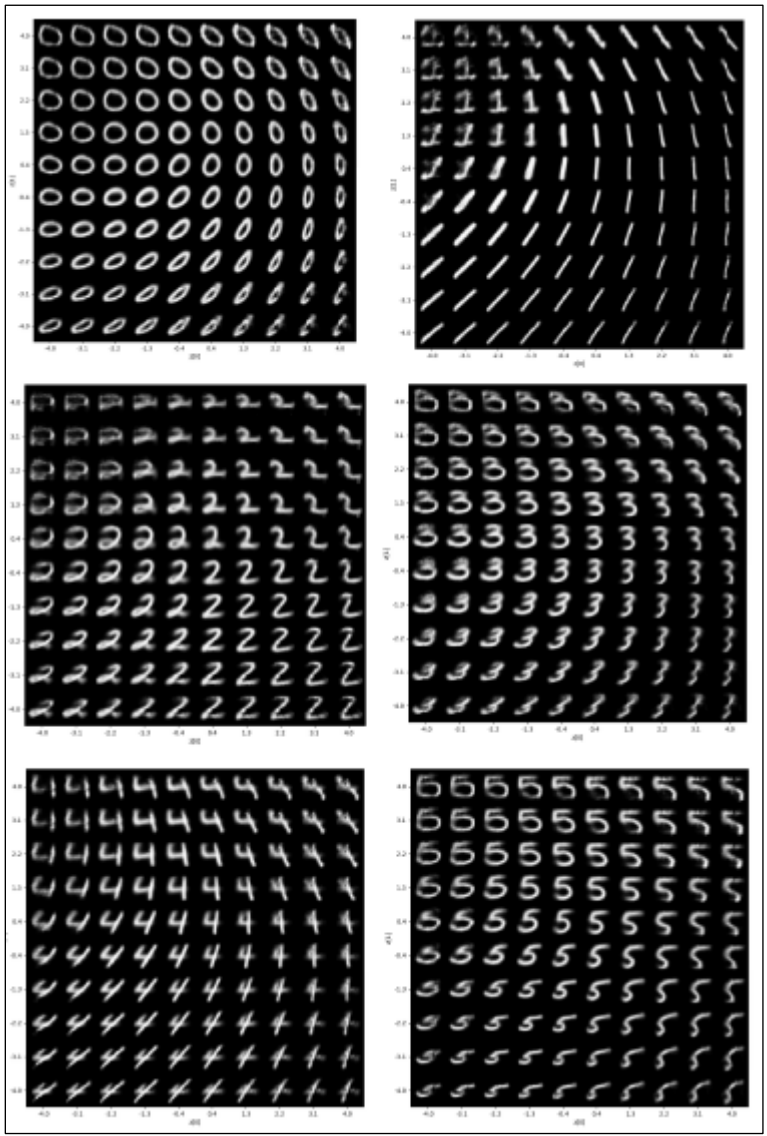


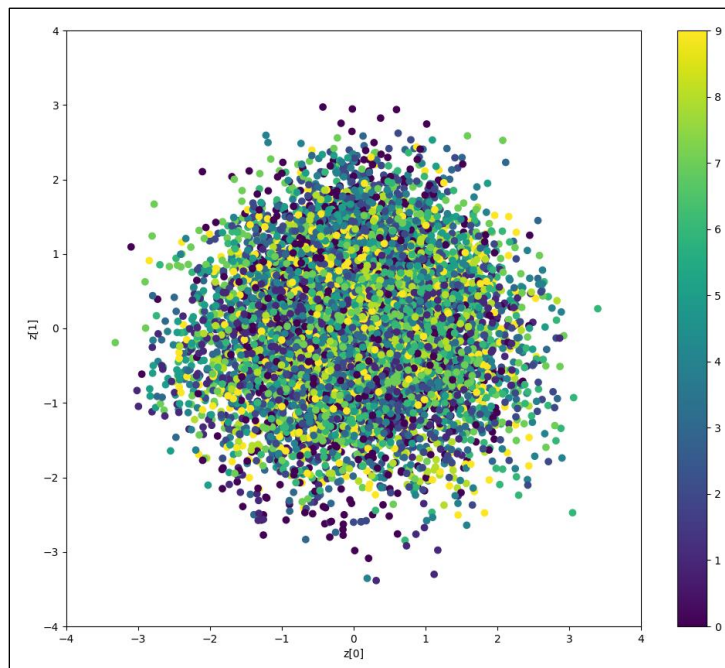
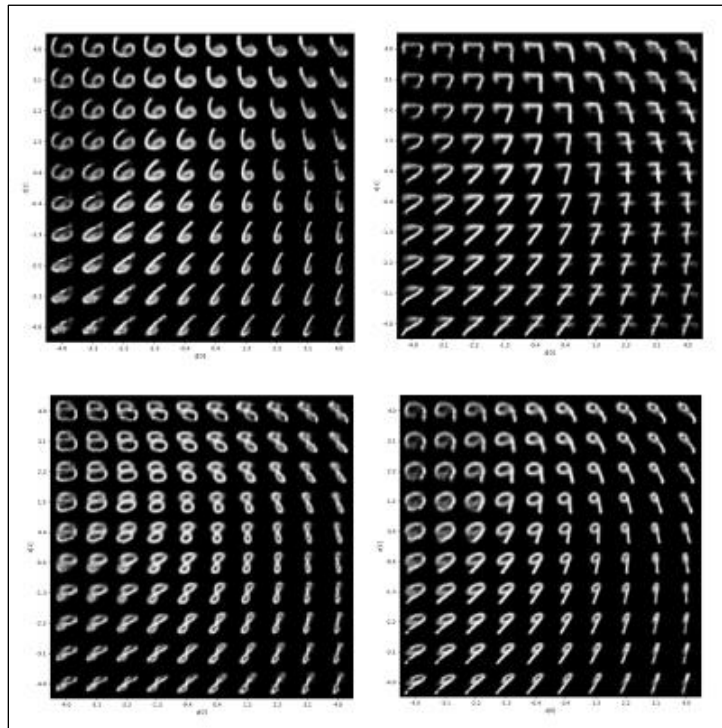


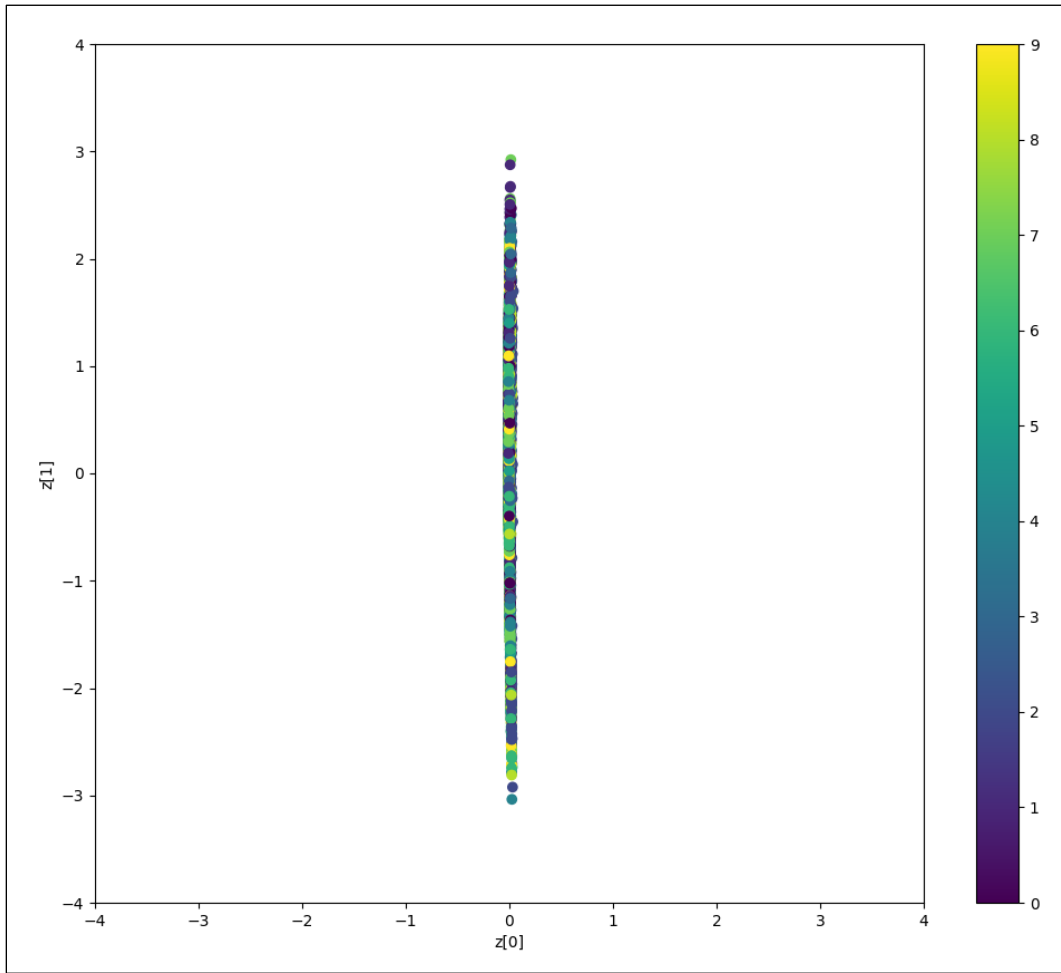








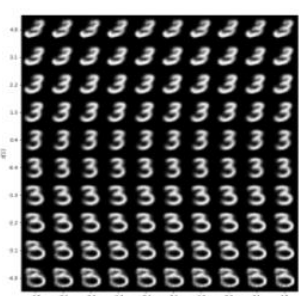
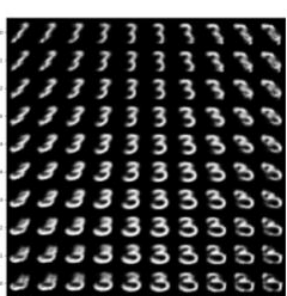
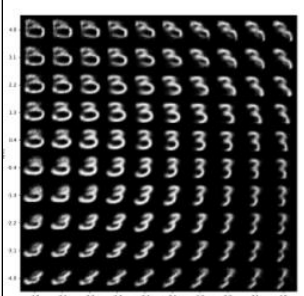
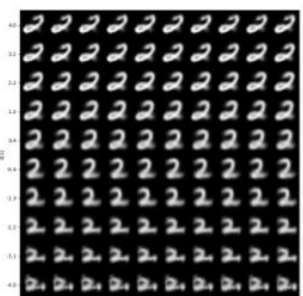
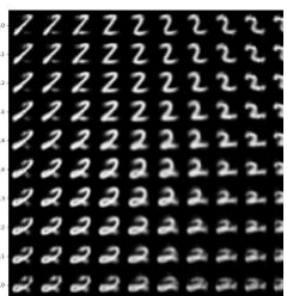
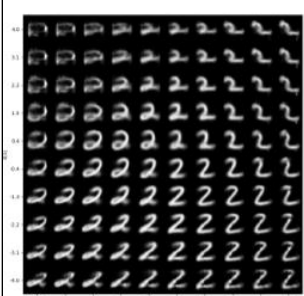
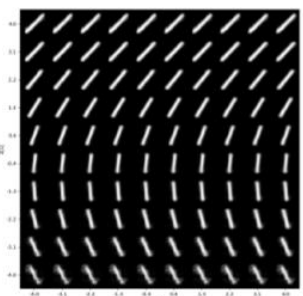
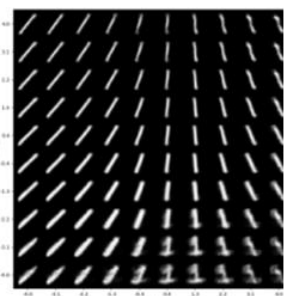
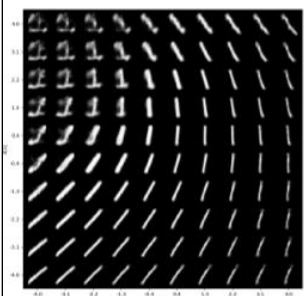
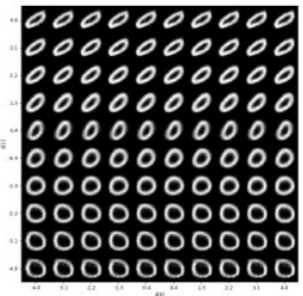
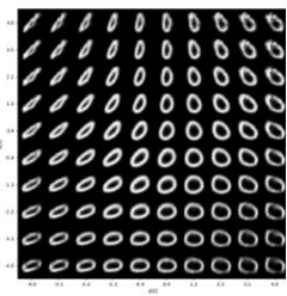
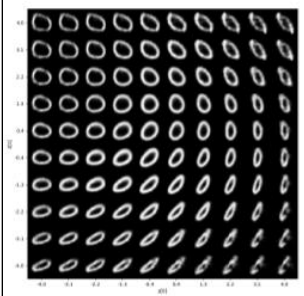




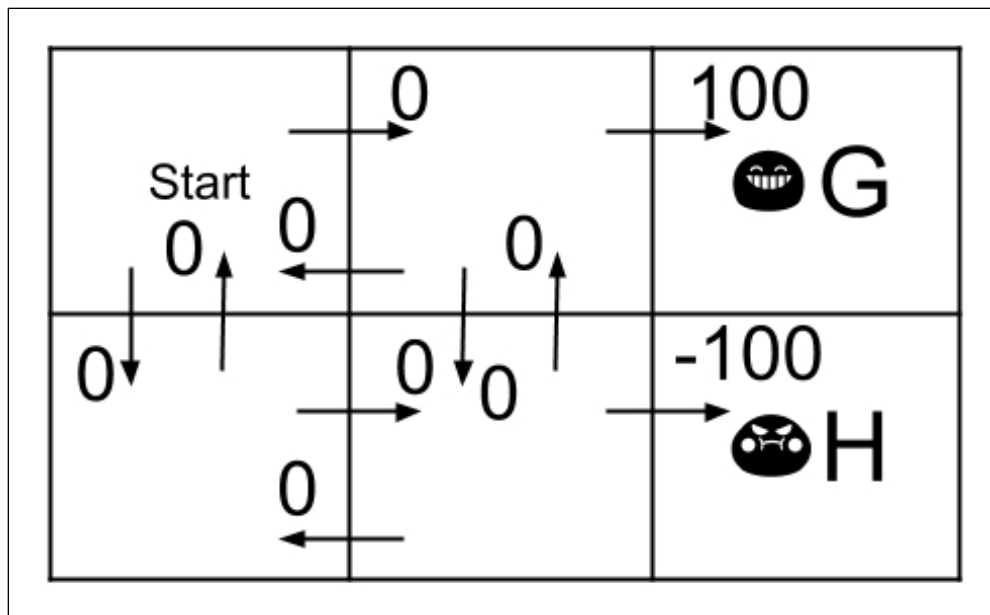
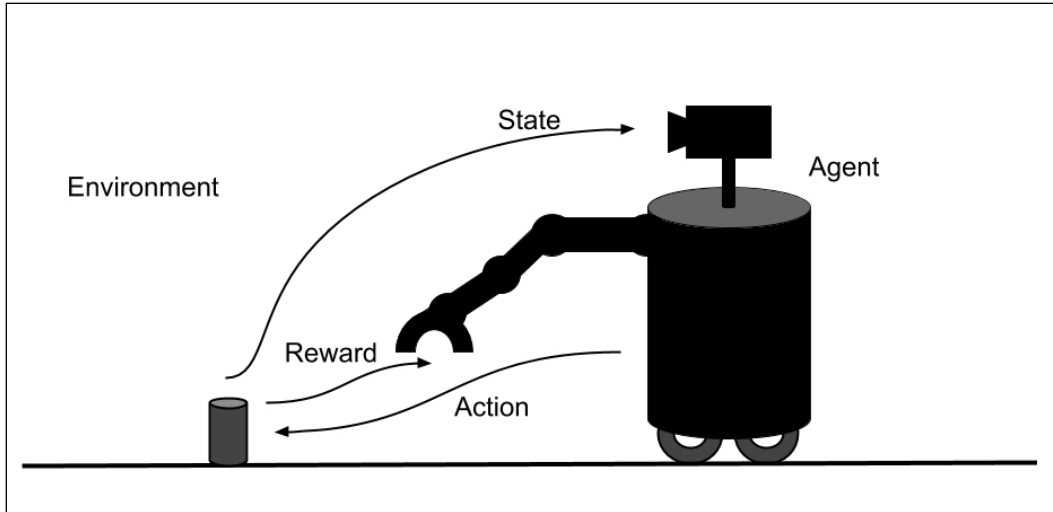
$\beta=1$

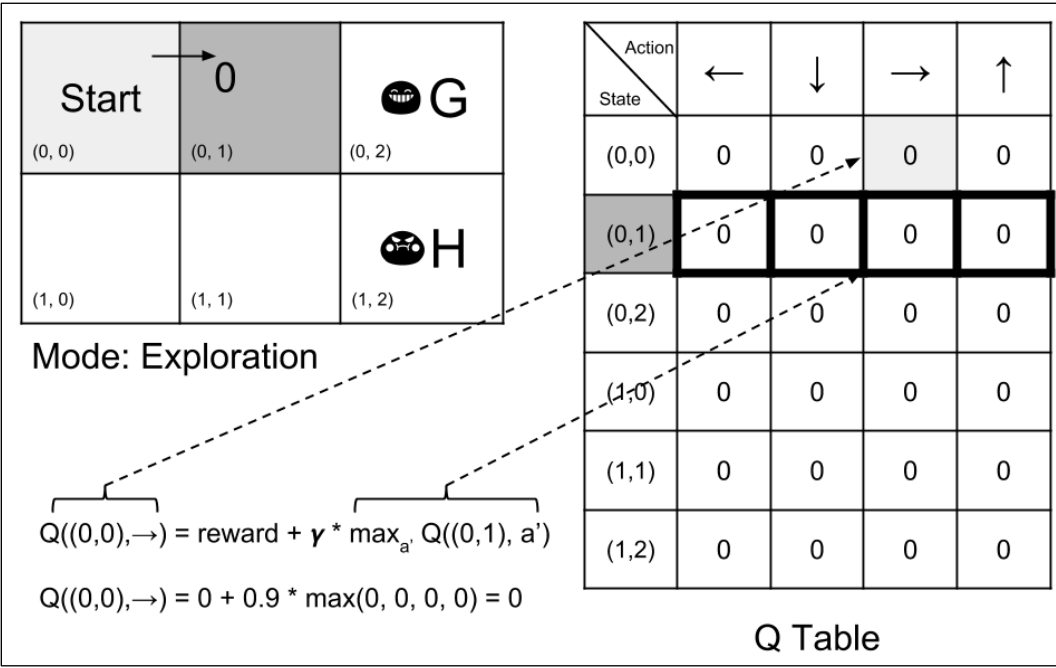
$\beta=7$

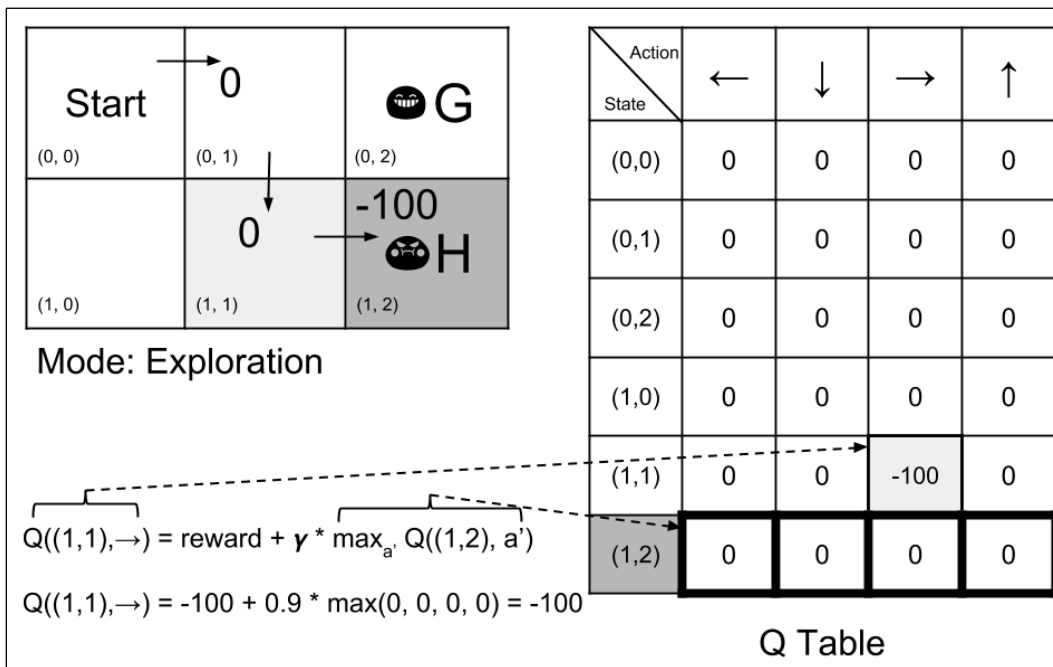
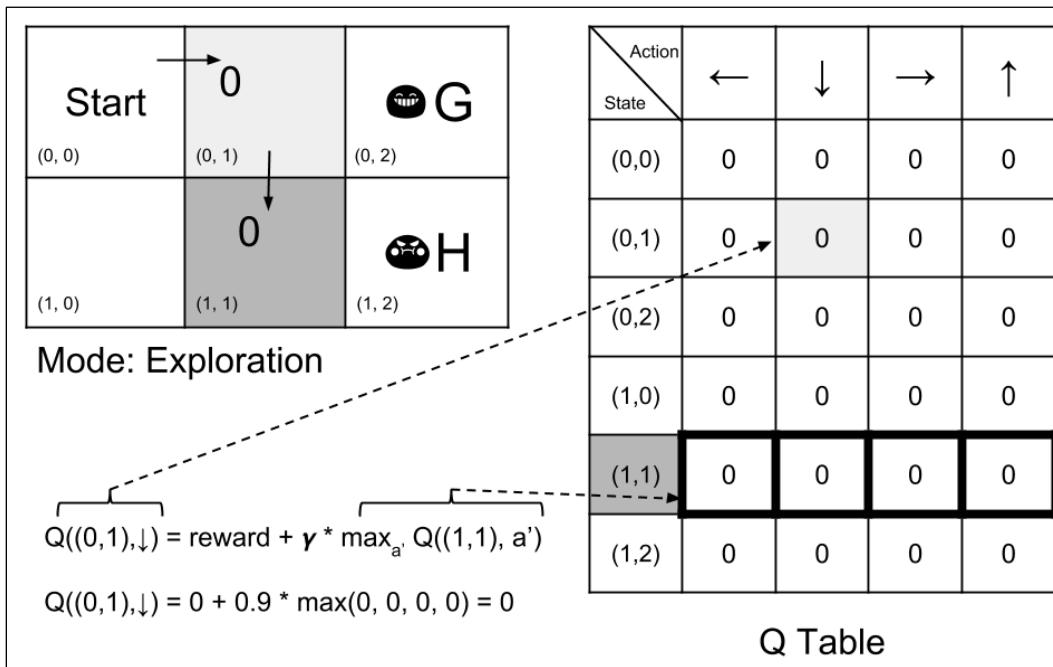
$\beta=10$

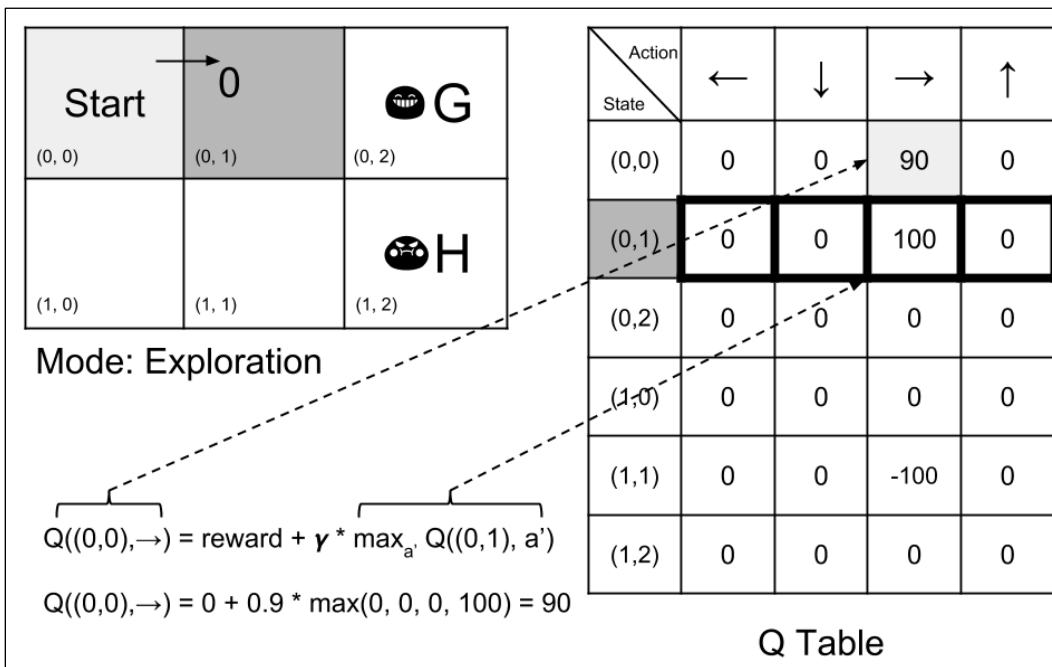
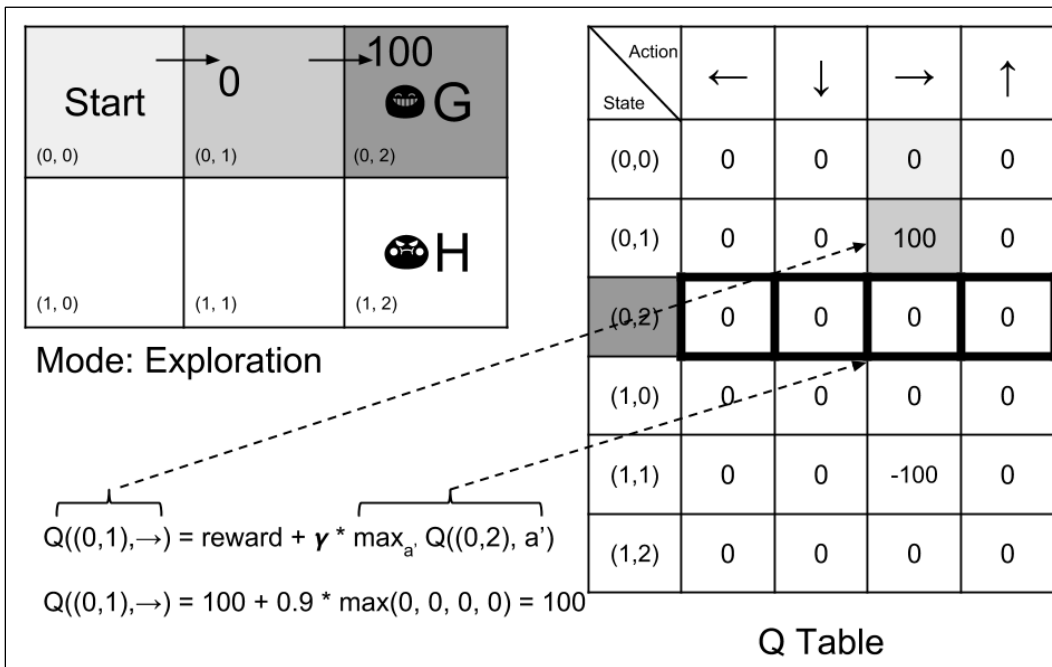


Chapter 9: Deep Reinforcement Learning









Start (0, 0)	→ 0 (0, 1)	→ 100 G (0, 2)
		H (1, 2)
(1, 0)	(1, 1)	(1, 2)

Mode: Exploitation

$\max_a Q((0,0),a') = 90 \rightarrow$ with $s'=(0,1)$

$\max_a Q((0,1),a') = 100 \rightarrow$ with $s'=(0,2)$ or Goal

Action \ State	←	↓	→	↑
(0,0)	0	0	90	0
(0,1)	0	0	100	0
(0,2)	0	0	0	0
(1,0)	0	0	0	0
(1,1)	0	0	-100	0
(1,2)	0	0	0	0

Q Table

Step 2 : Exploit (Right)

```

-----
|   |   | G |
-----
|   |   | H |
-----

```

Q-Table (Epsilon: 0.10)

```

[[ 81.    72.9   90.    81. ]
 [ 81.    81.   100.   90. ]
 [  0.     0.     0.     0. ]
 [ 72.9   72.9   81.    81. ]
 [ 72.9   81.  -100.   90. ]
 [  0.     0.     0.     0. ]]

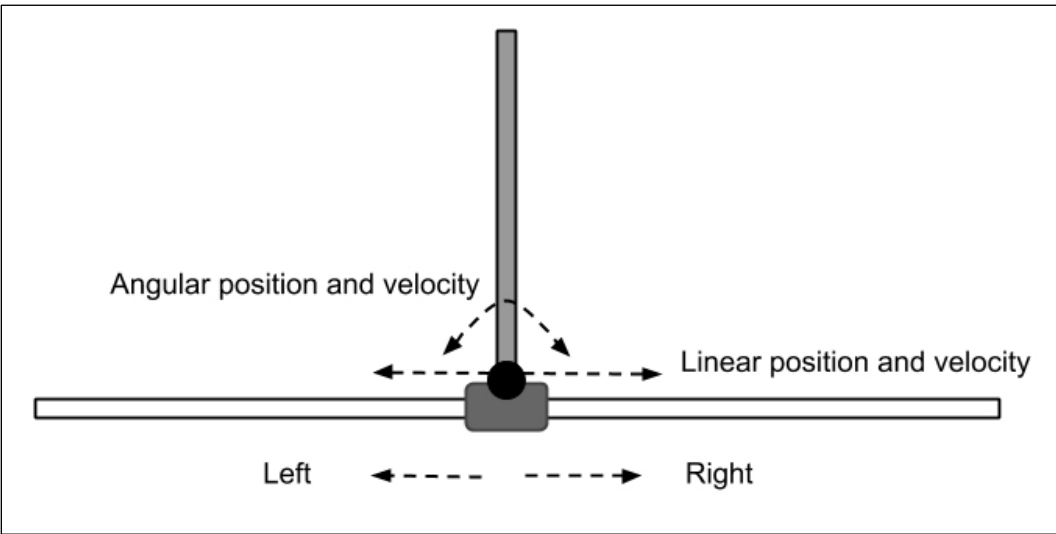
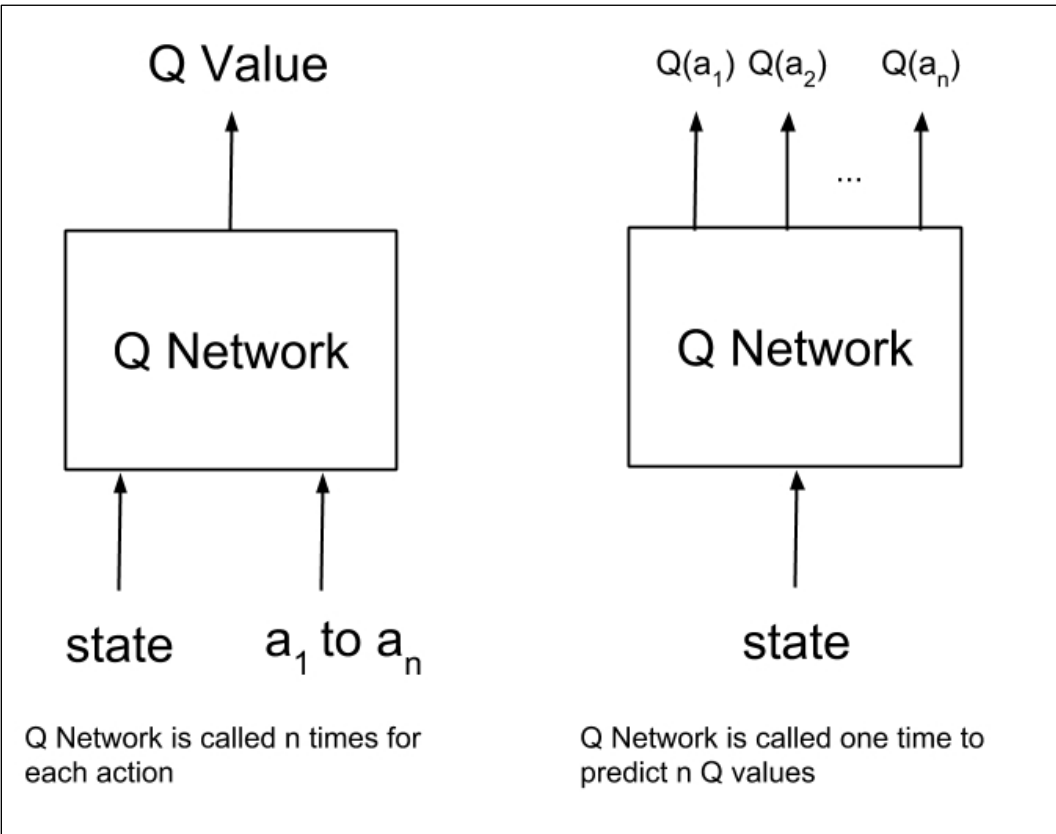
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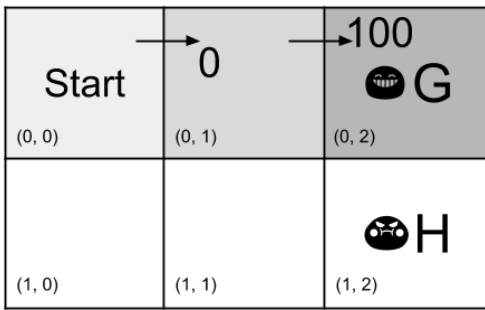
-----EPISODE DONE-----

Start 90	100	⊙G 0
81	90	⊙H 0

(Right)

SFFF
 FHFH
 FFFH
 HFFG





Mode: Exploitation

$\max_a Q((0,0),a') = 90 \rightarrow$ with $s'=(0,1)$

$\max_a Q((0,1),a') = 100 \rightarrow$ with $s'=(0,2)$ or Goal

Action \ State	←	↓	→	↑
(0,0)	0	0	90	0
(0,1)	0	0	100	0
(0,2)	0	0	0	0
(1,0)	0	0	0	0
(1,1)	0	0	-100	0
(1,2)	0	0	0	0

Q Table

Chapter 10: Policy Gradient Methods

