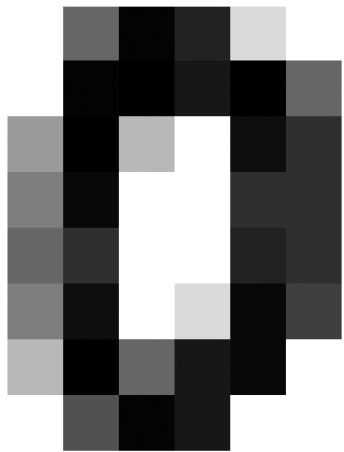
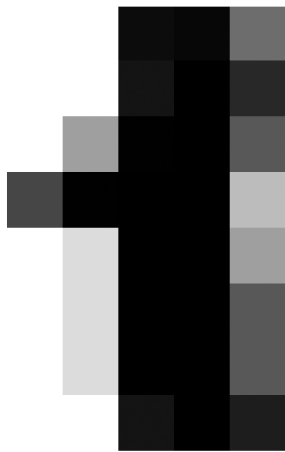


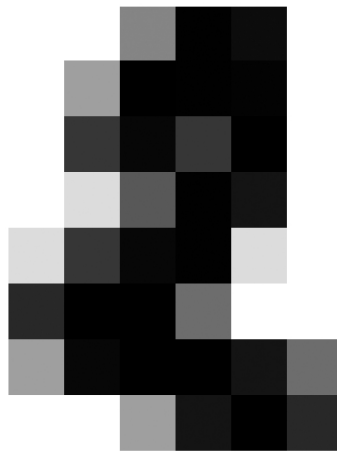
Training: 0



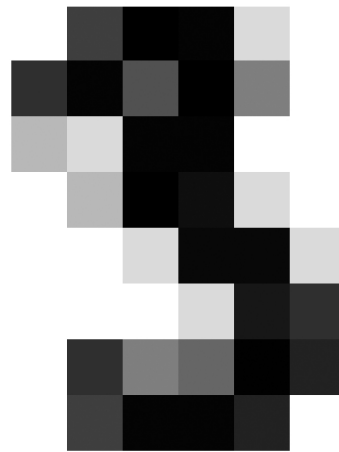
Training: 1

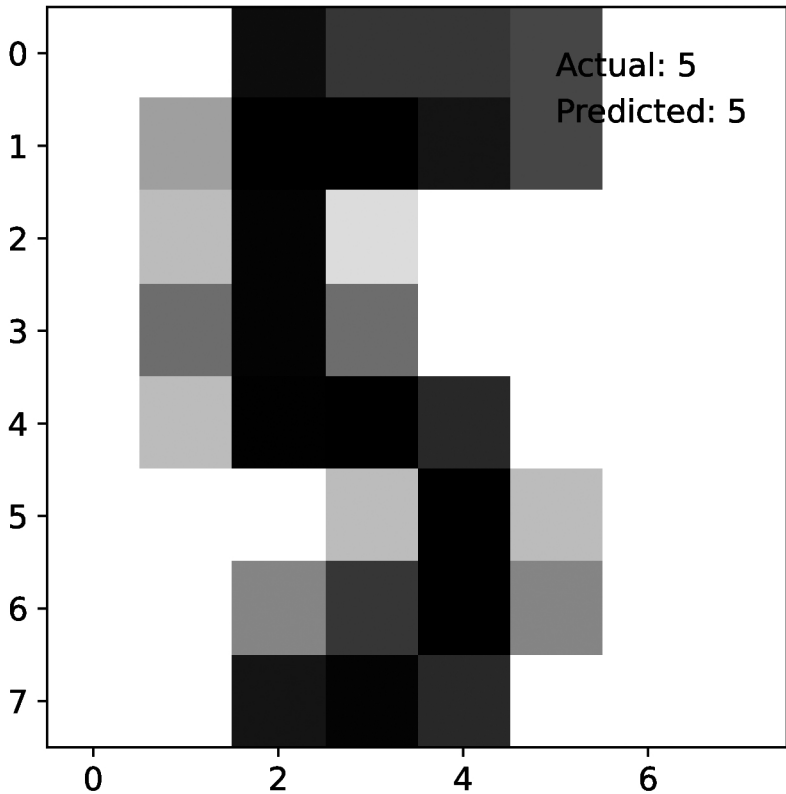


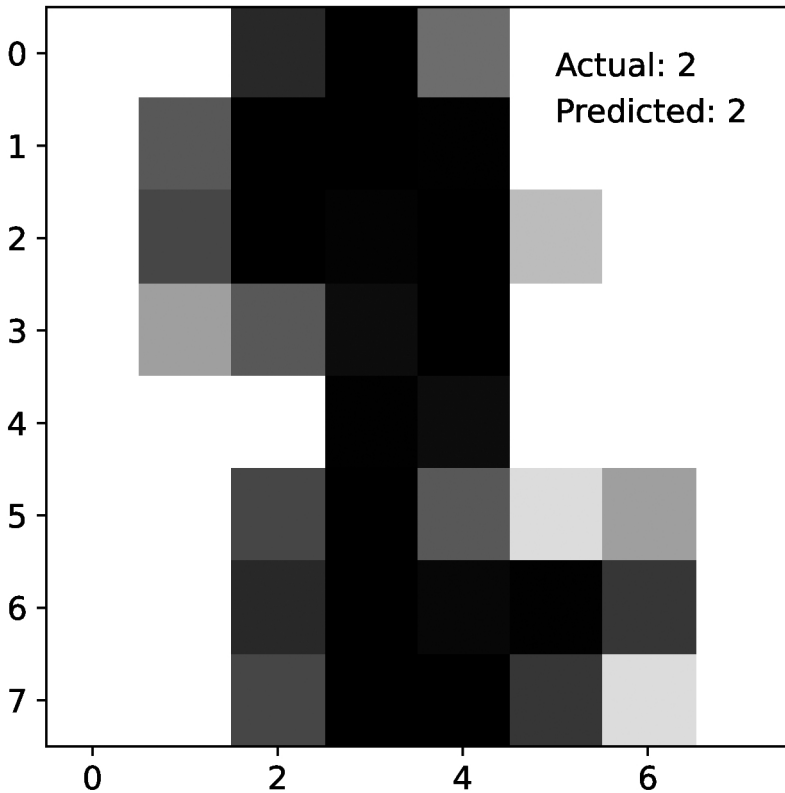
Training: 2

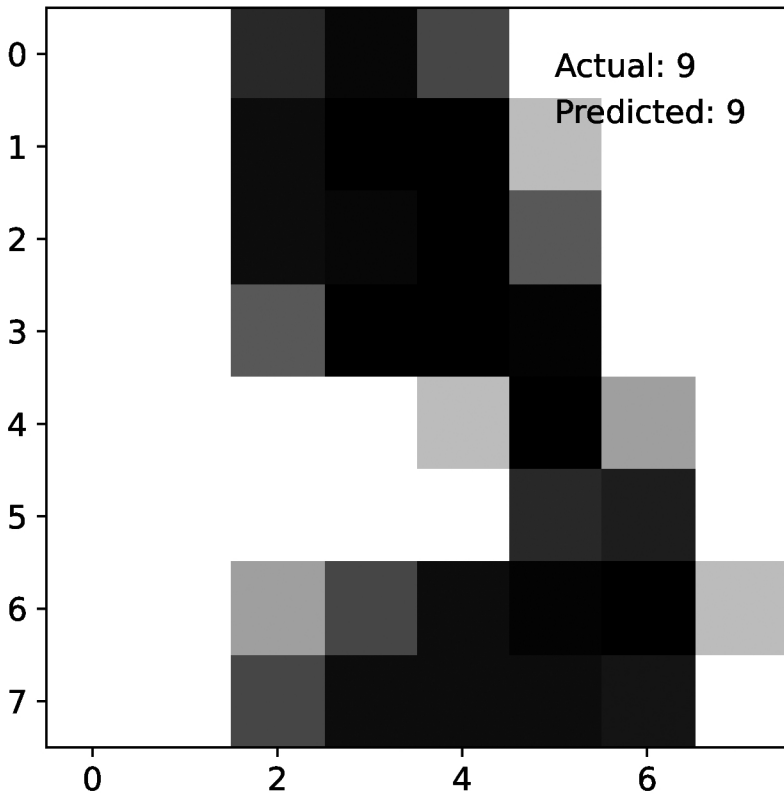


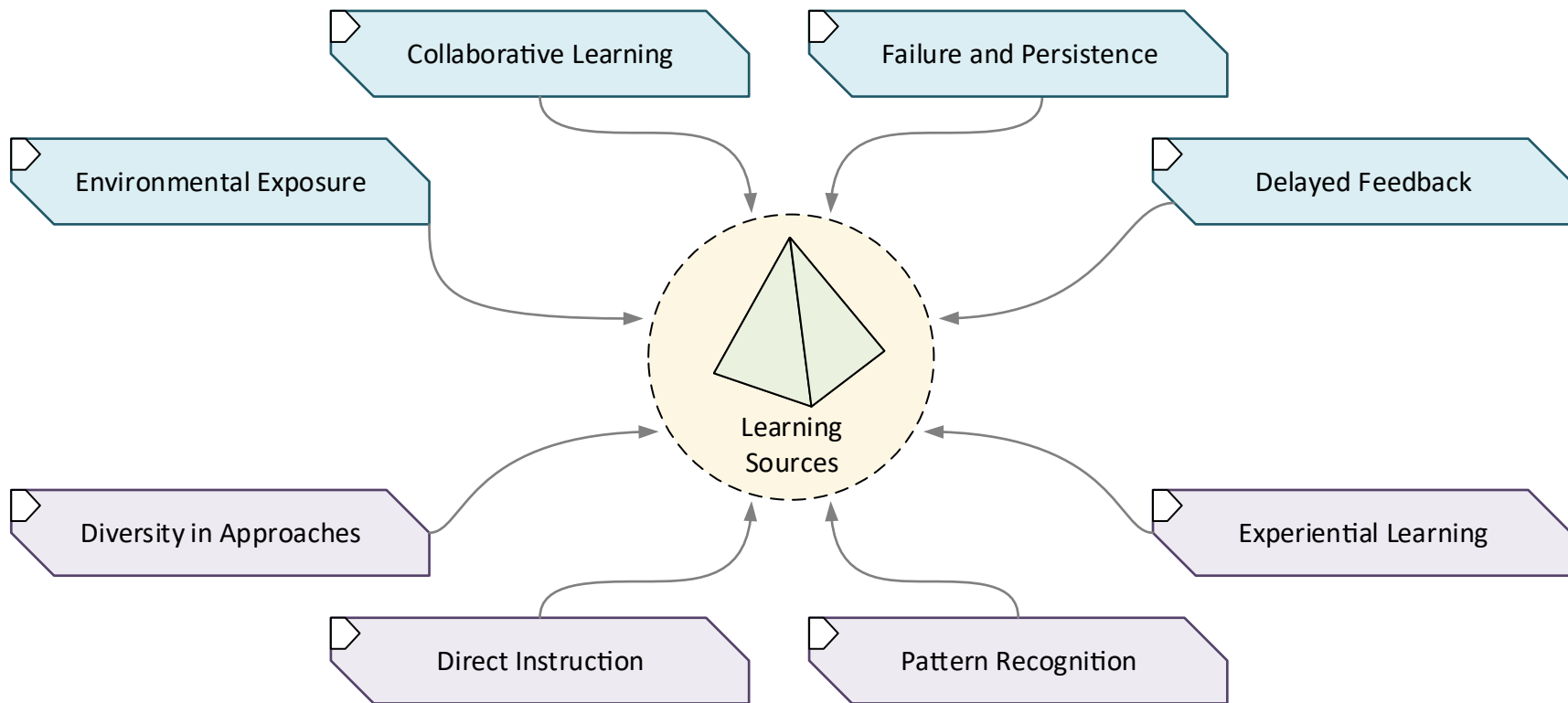
Training: 3



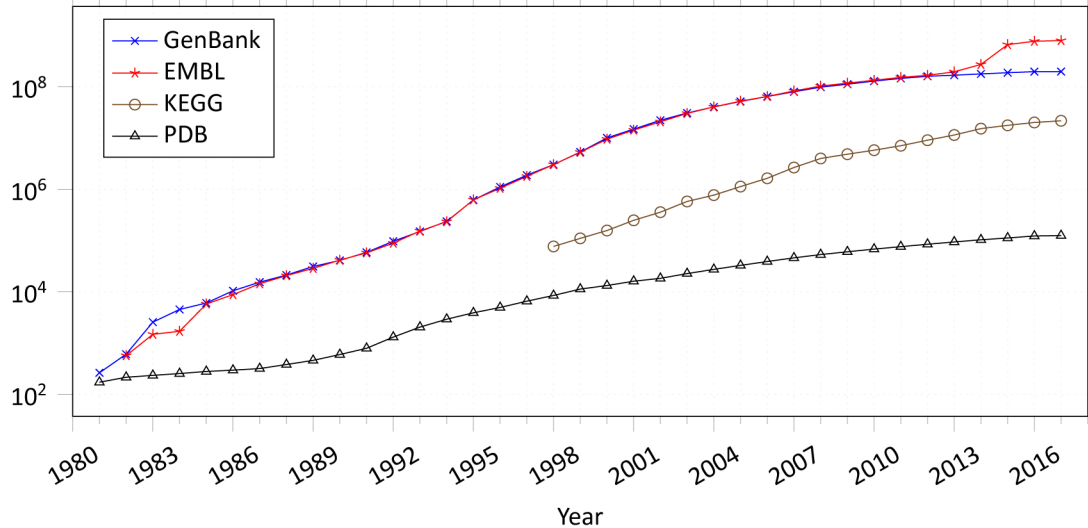


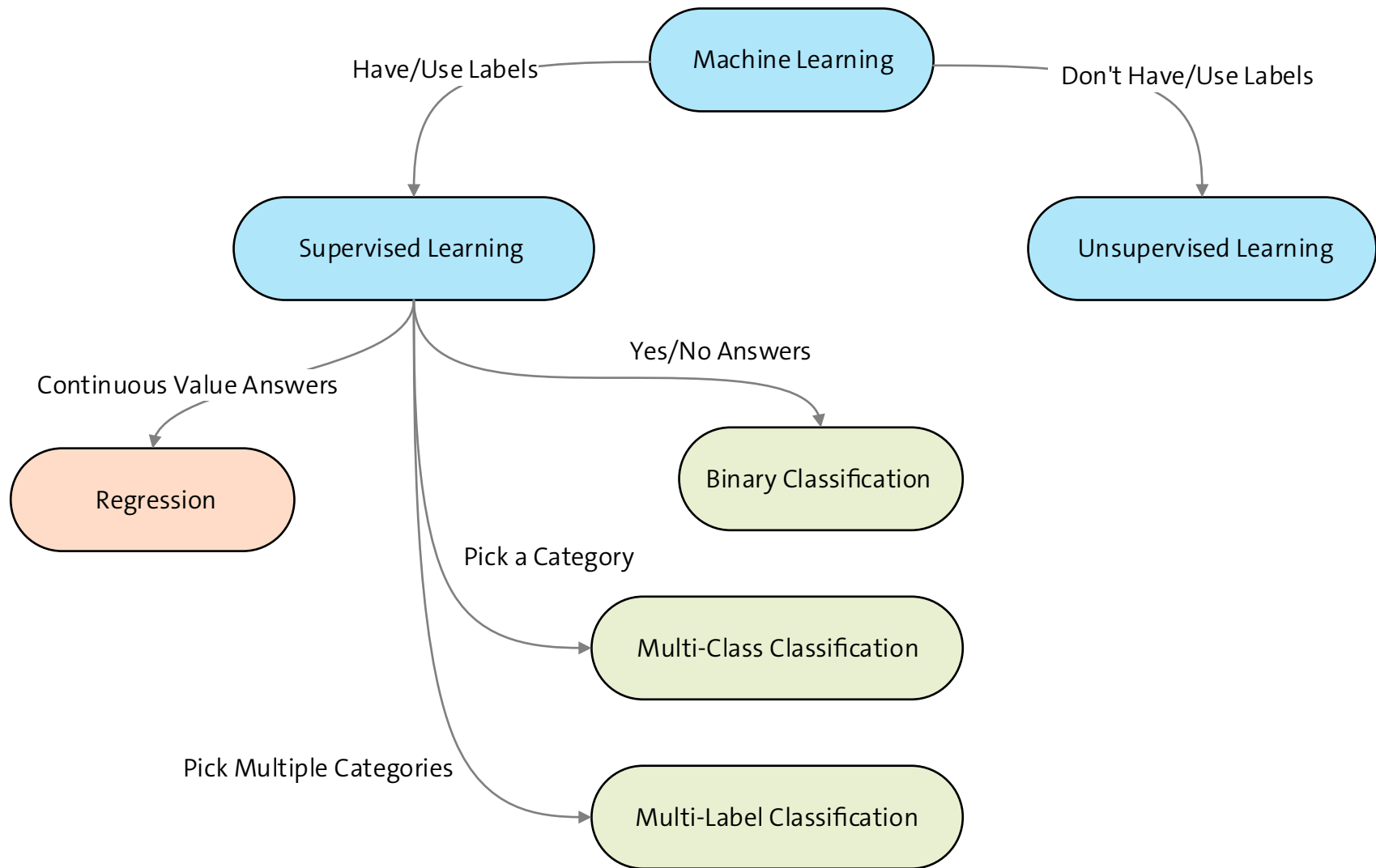




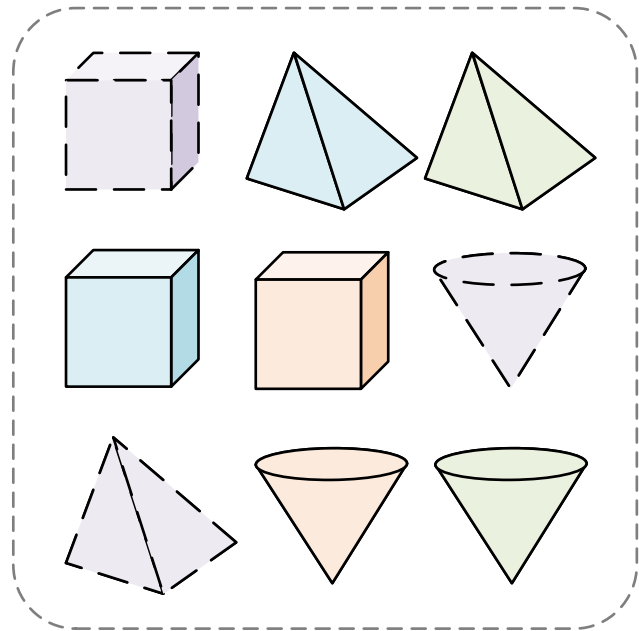


Number of Entries in Database

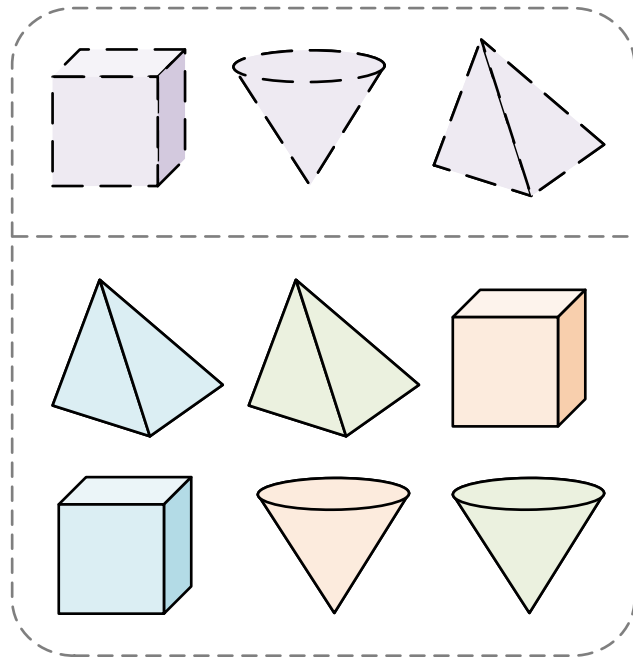




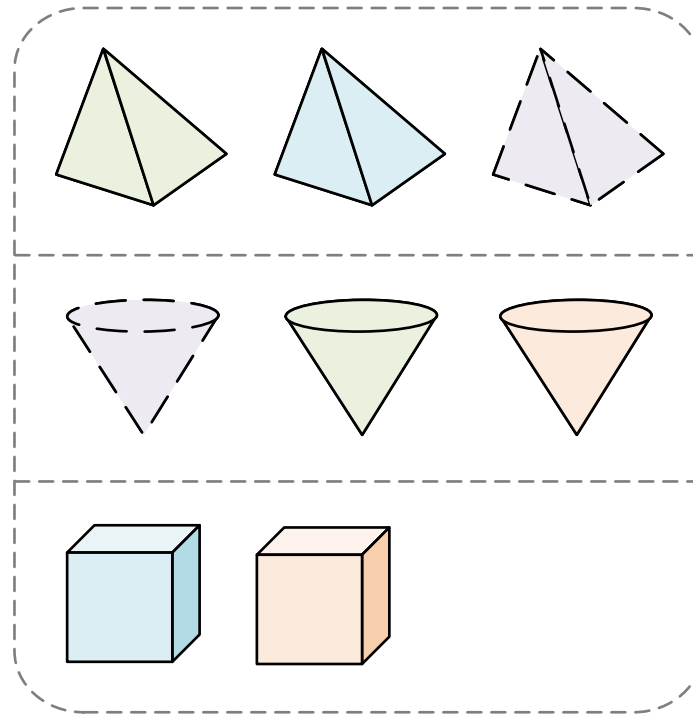
Original



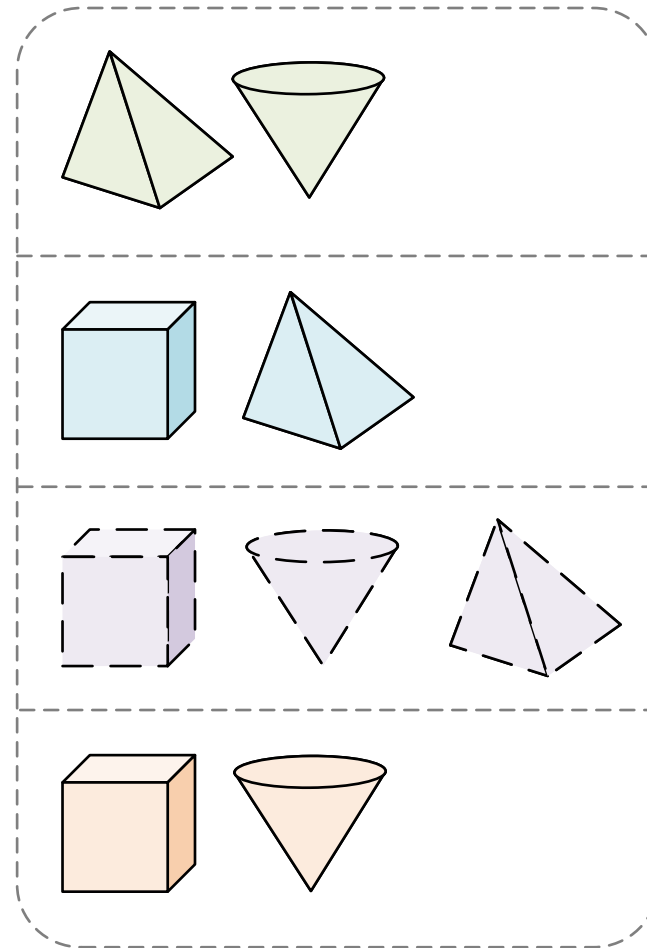
Grouped by Border

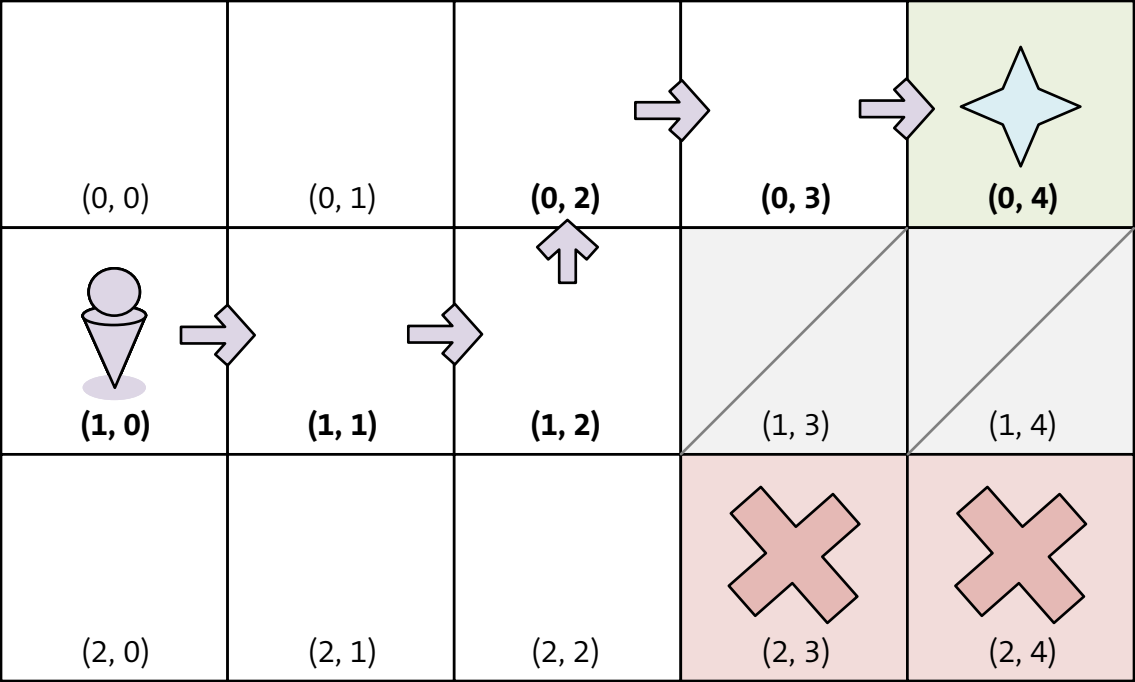


Grouped by Shape



Grouped by Colors

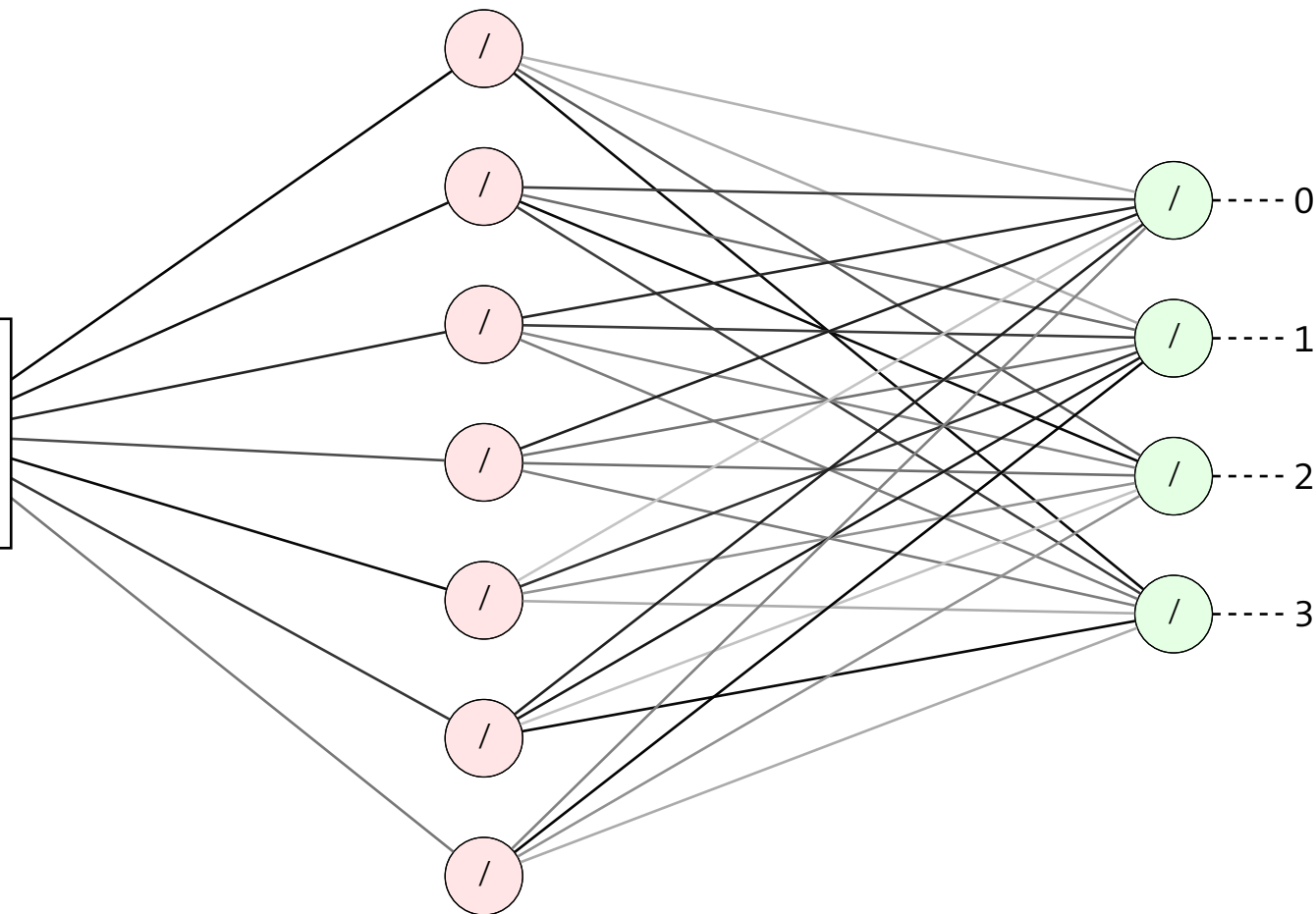
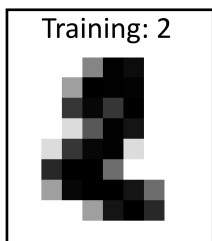




Input (8x8)

First Layer (128)

Output (10)





Drive



New



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My Drive



Computers



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colabo



Colaboratory



Pizarra colaborativa



Diagrama y pizarra colaborativa con IA



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MailMagic AI - e-mail respuestas colaborativas



Quadro branco colaborativo



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By: [Colaboratory team](#)

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Editor >

☐ Show desktop notifications for completed executions

AI Assistance >

☐ New notebooks use private outputs (omit outputs when saving)

Colab Pro >

GitHub >

Default page layout
horizontal ▼

Miscellaneous >

Custom snippet notebook URL

☐ Use a temporary scratch notebook as the default landing page.



0s

```
[1] x = 25
```

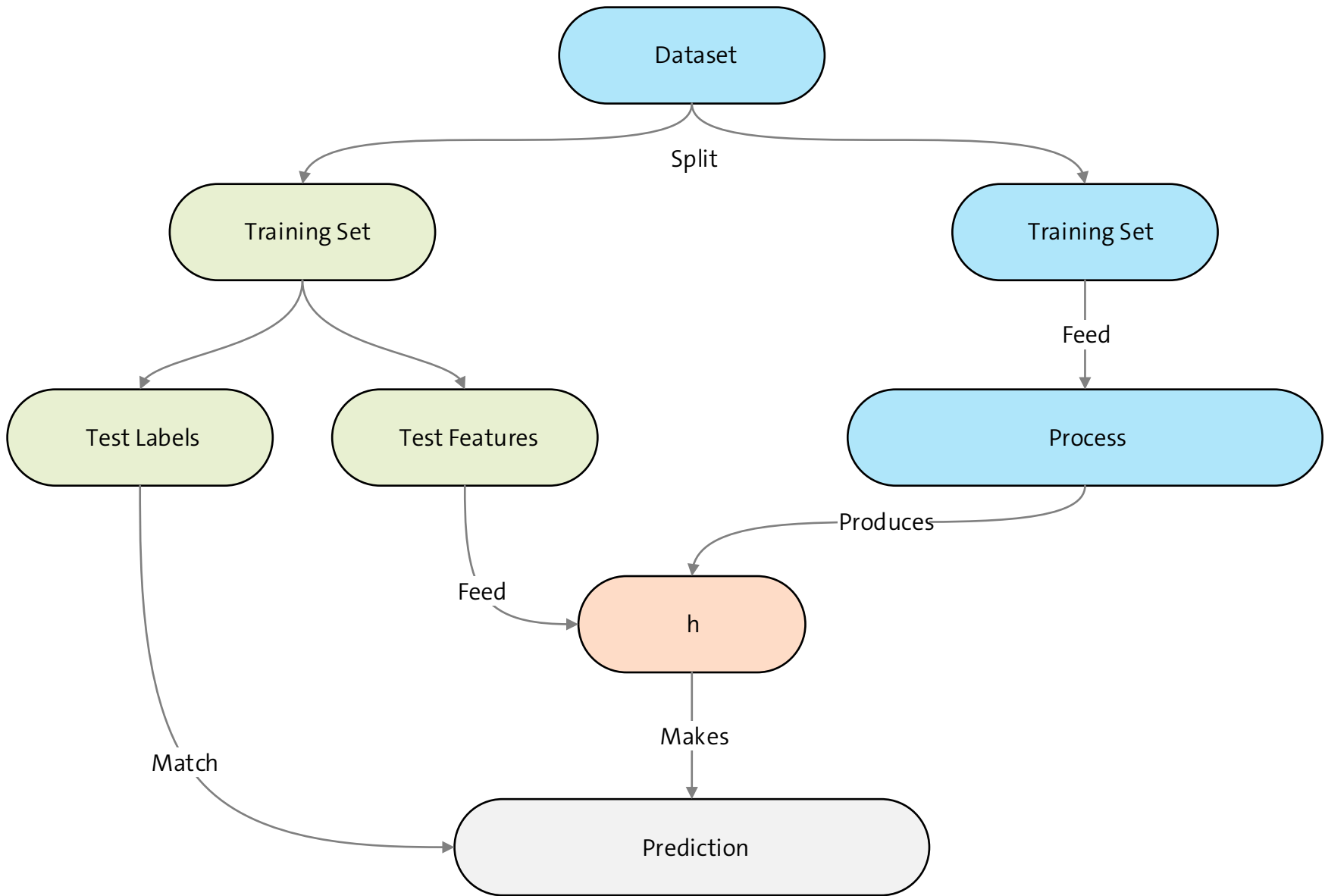


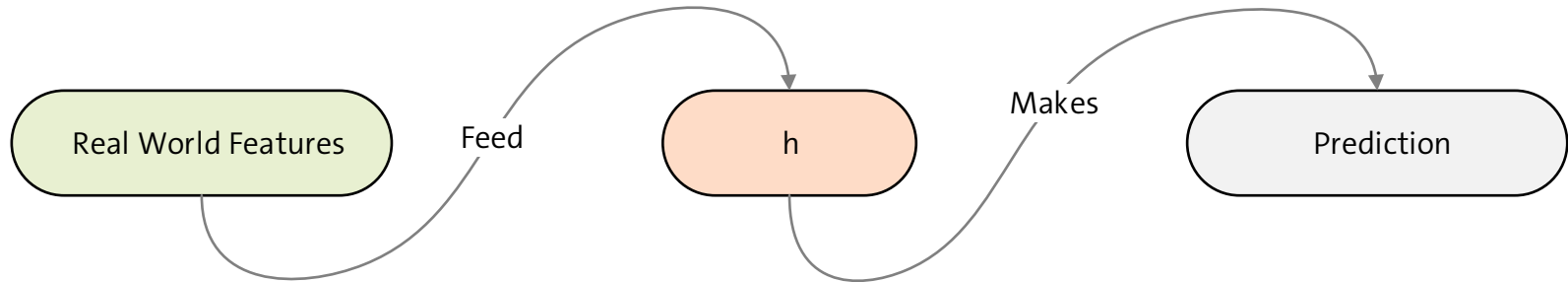
0s

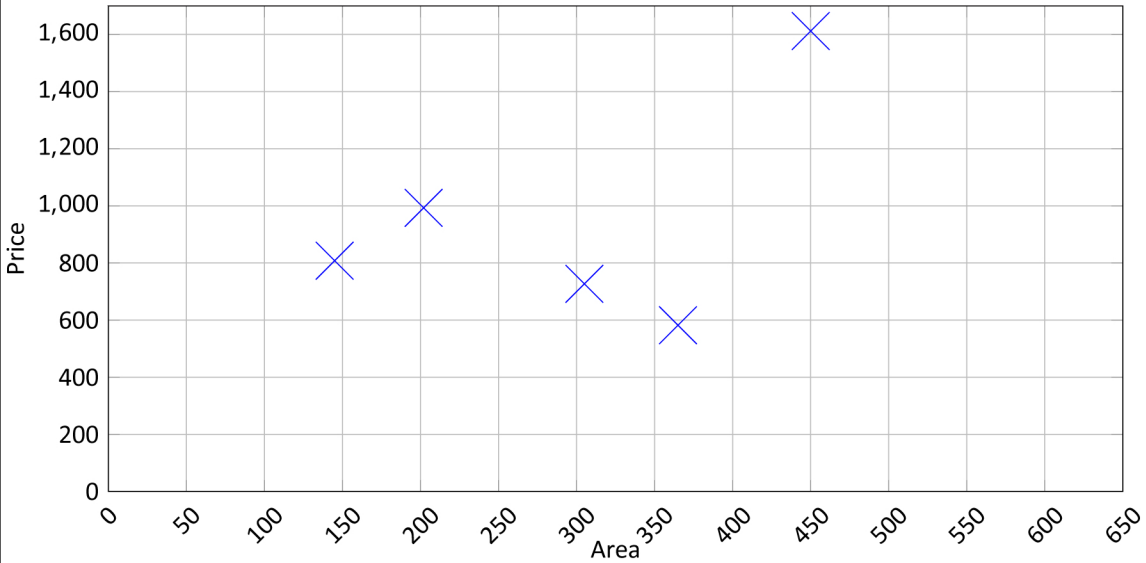
```
[2] print(x)
```

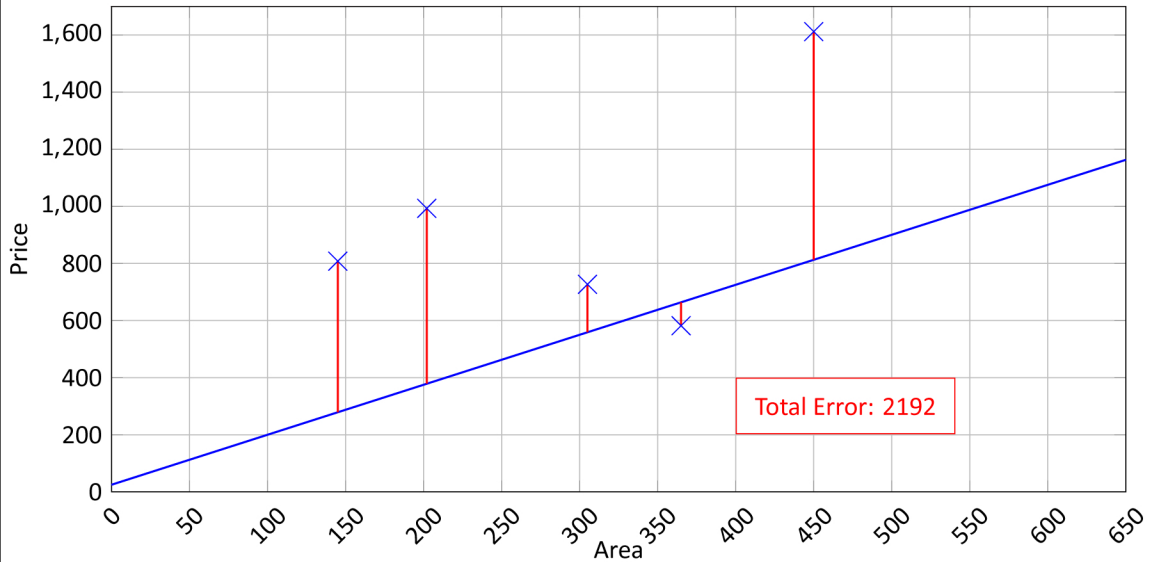


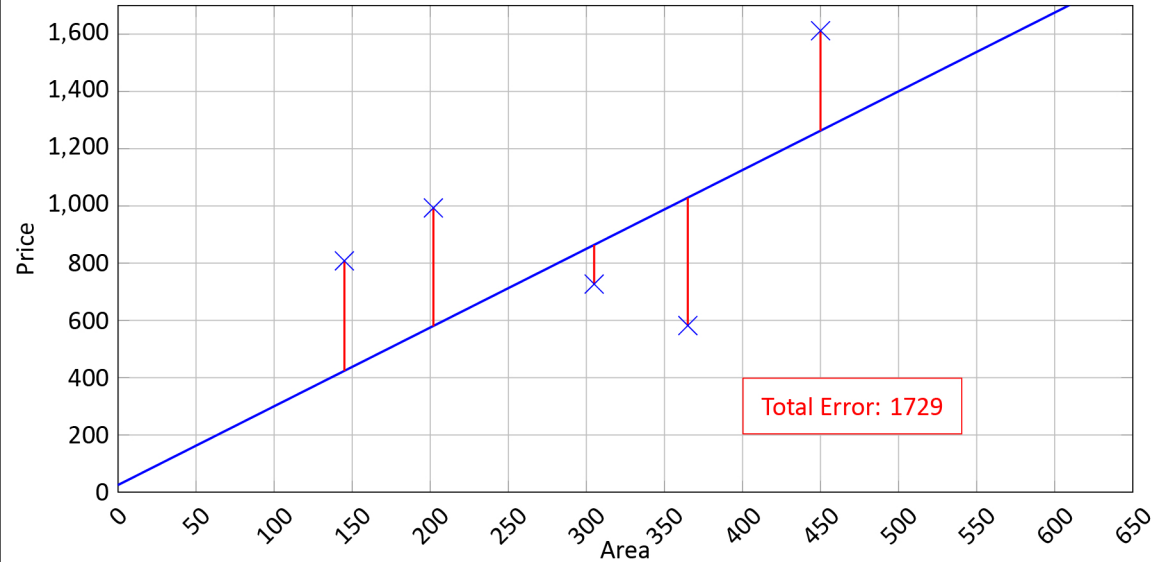
25

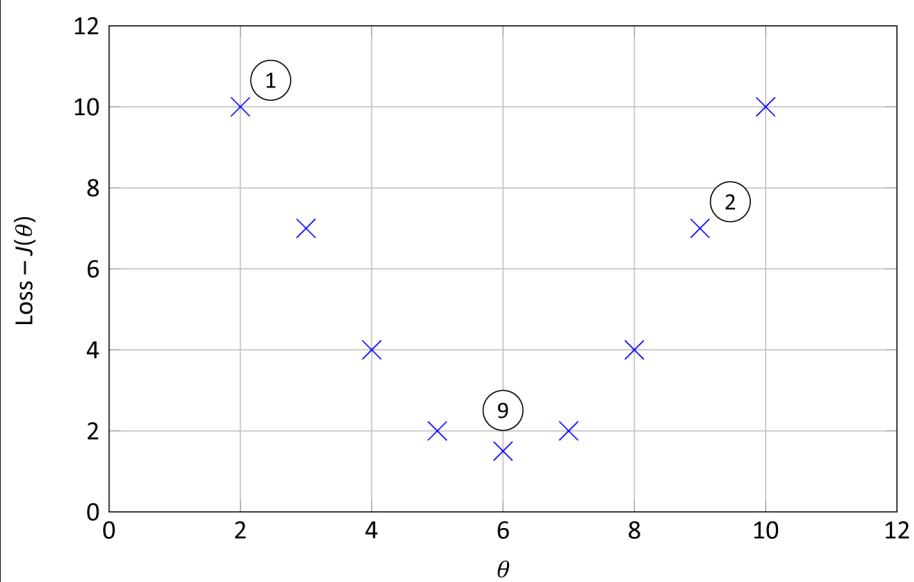


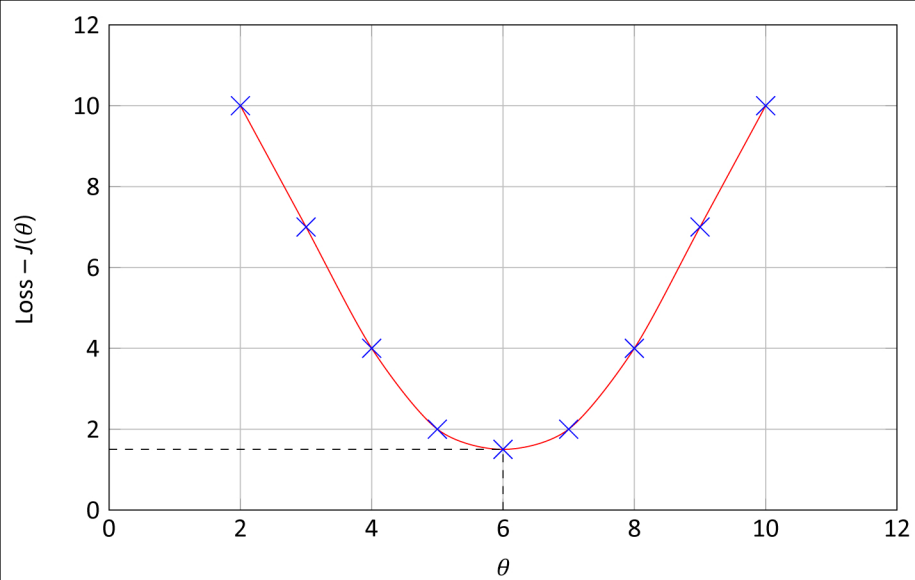


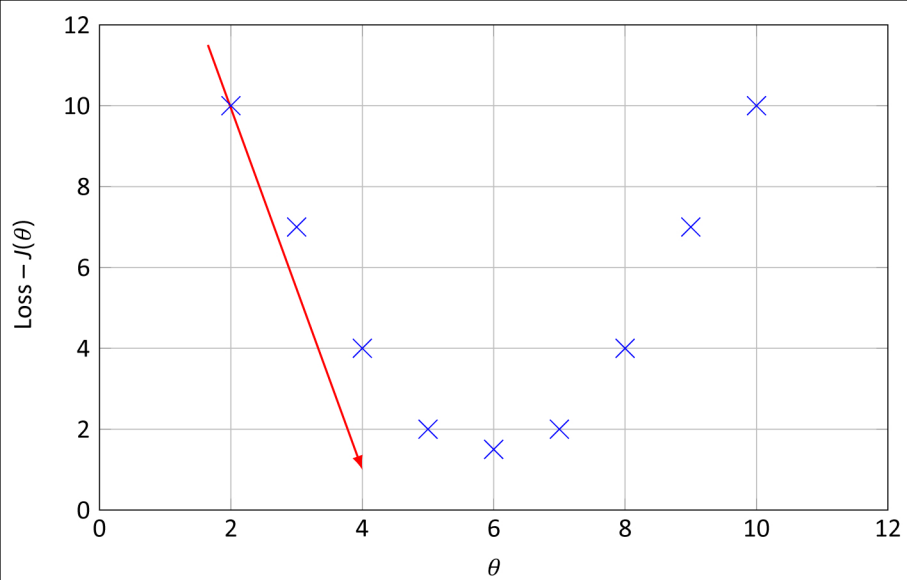


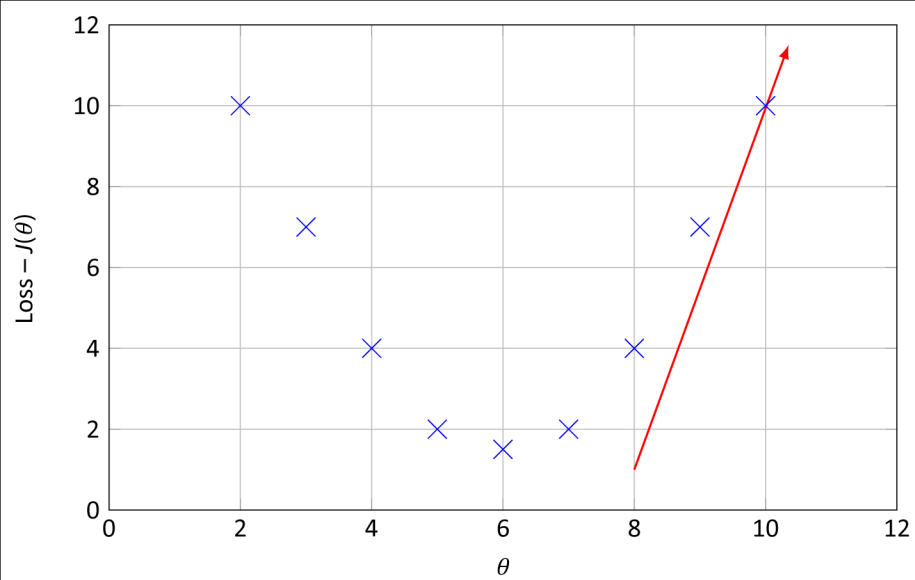


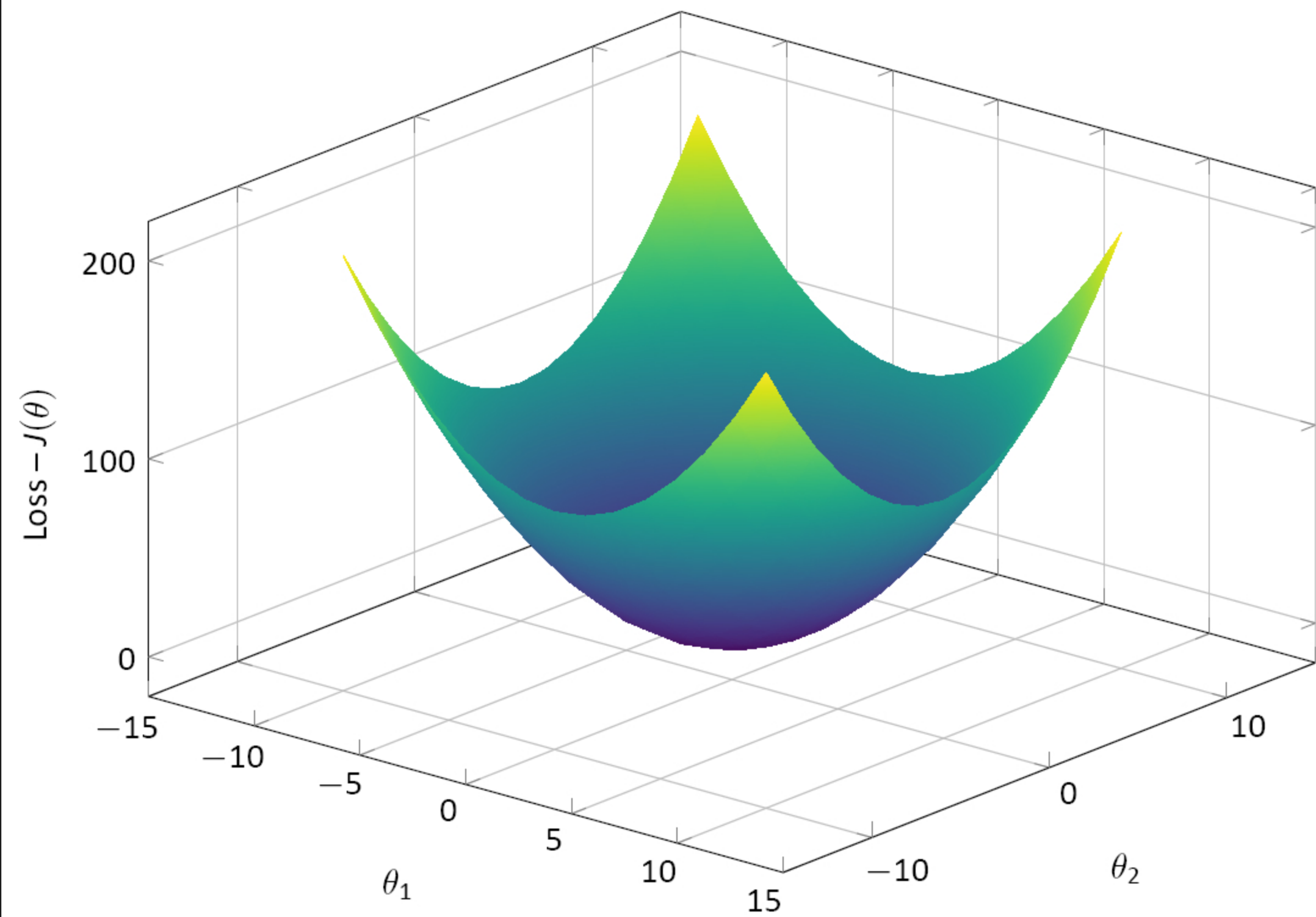


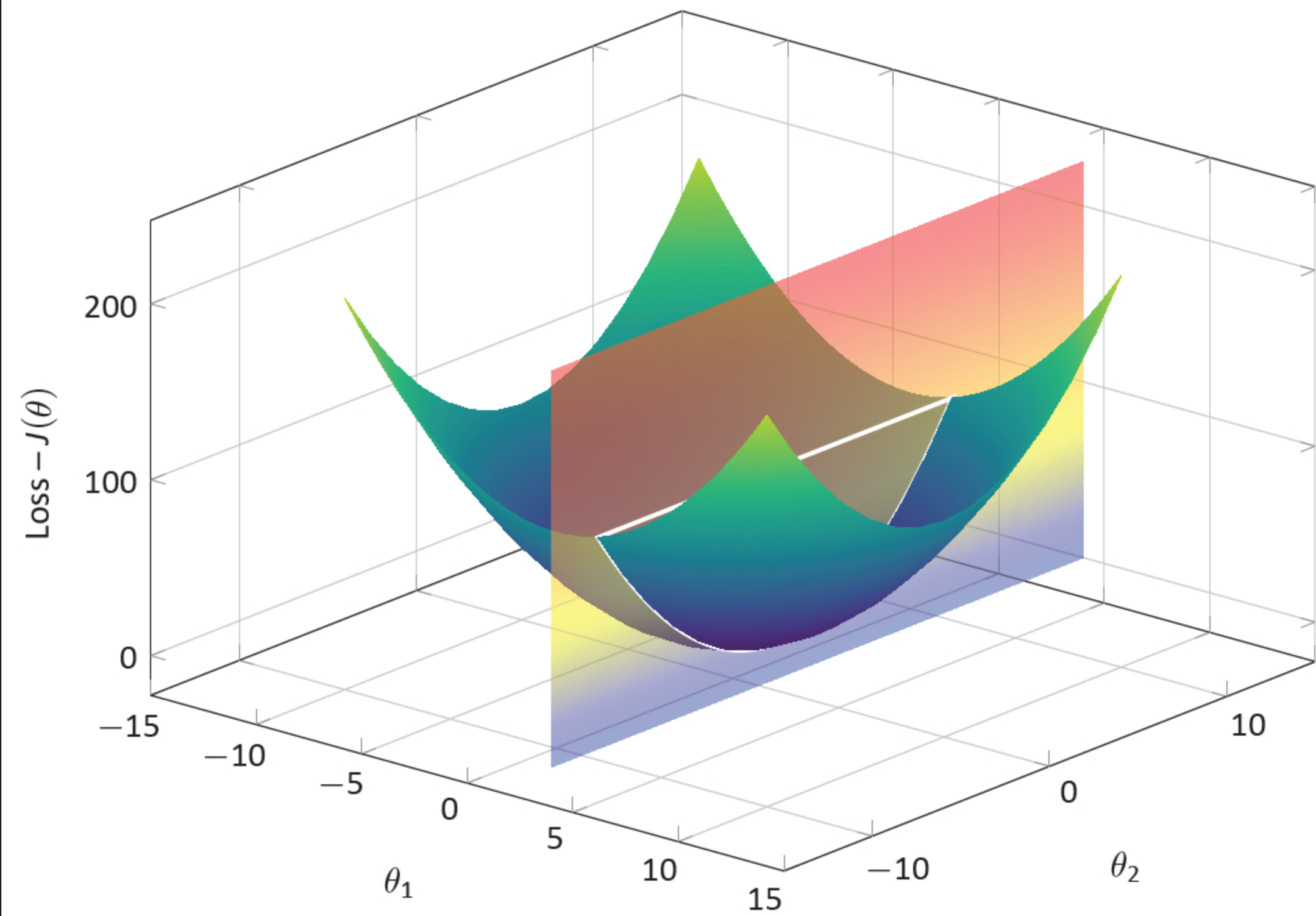


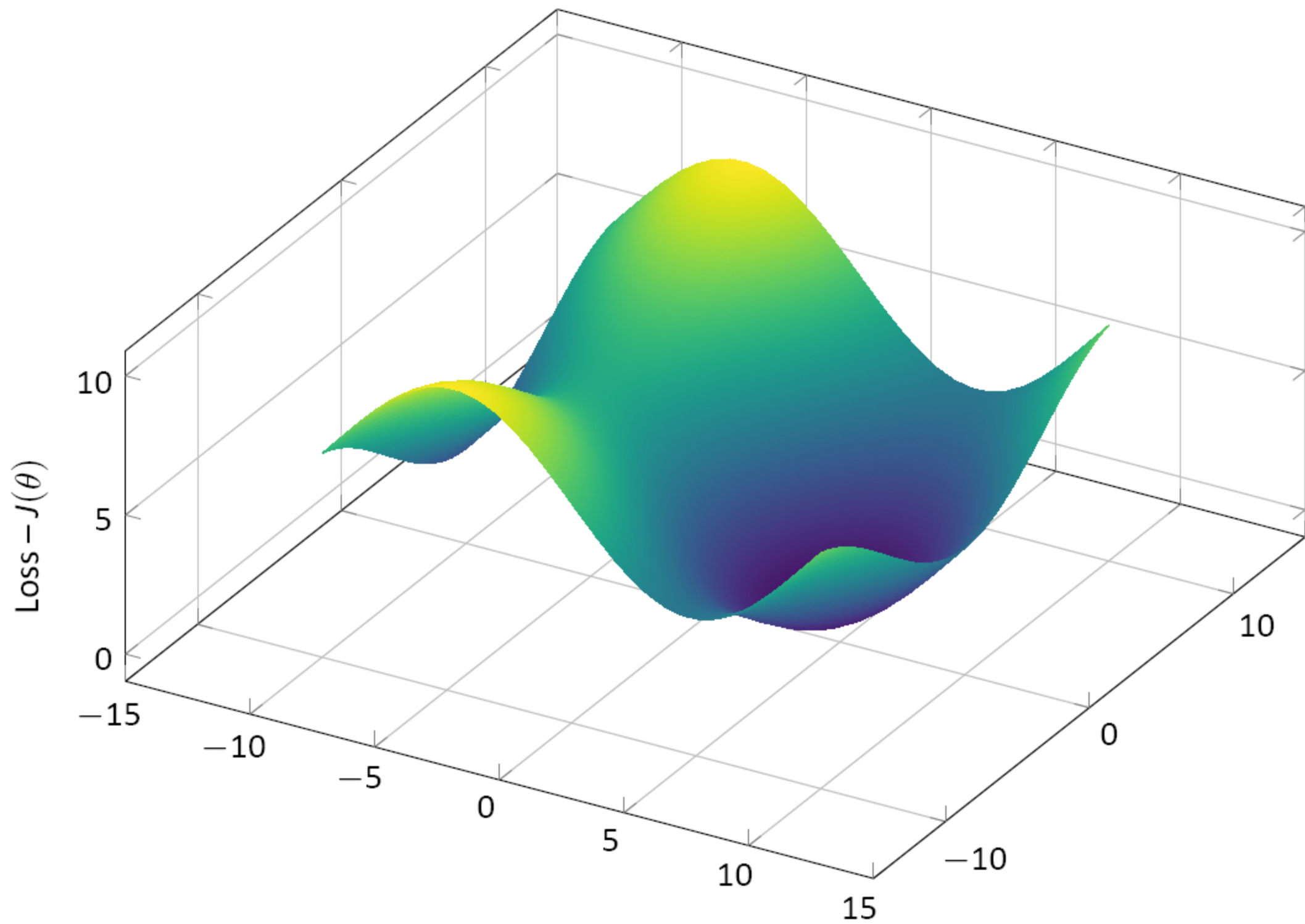


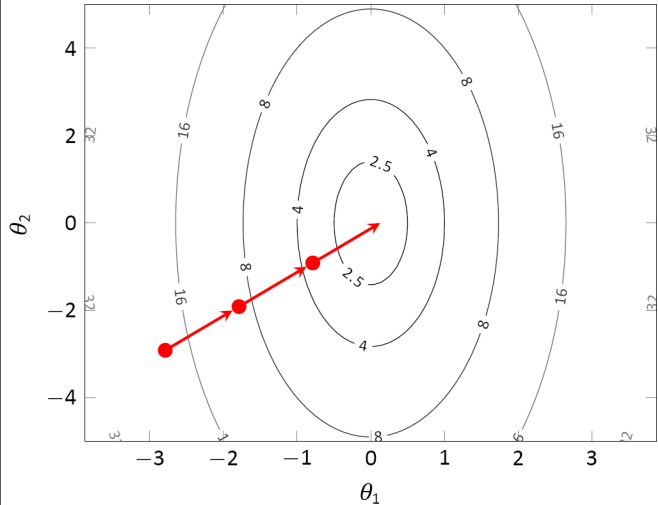


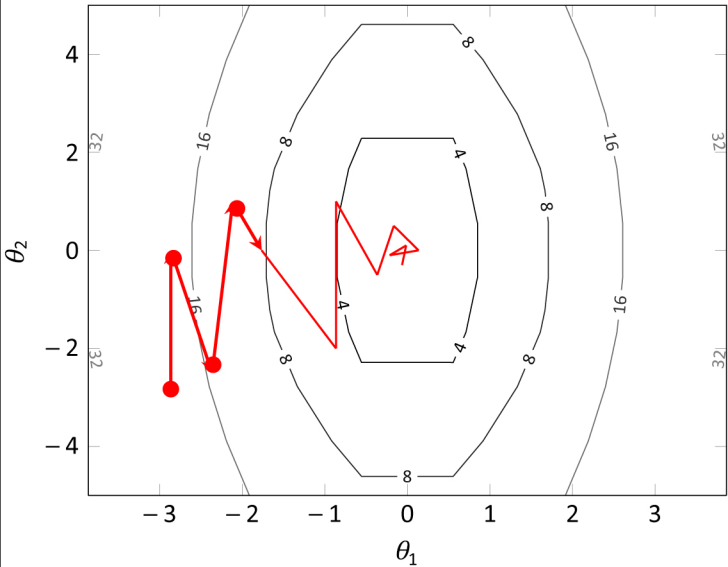


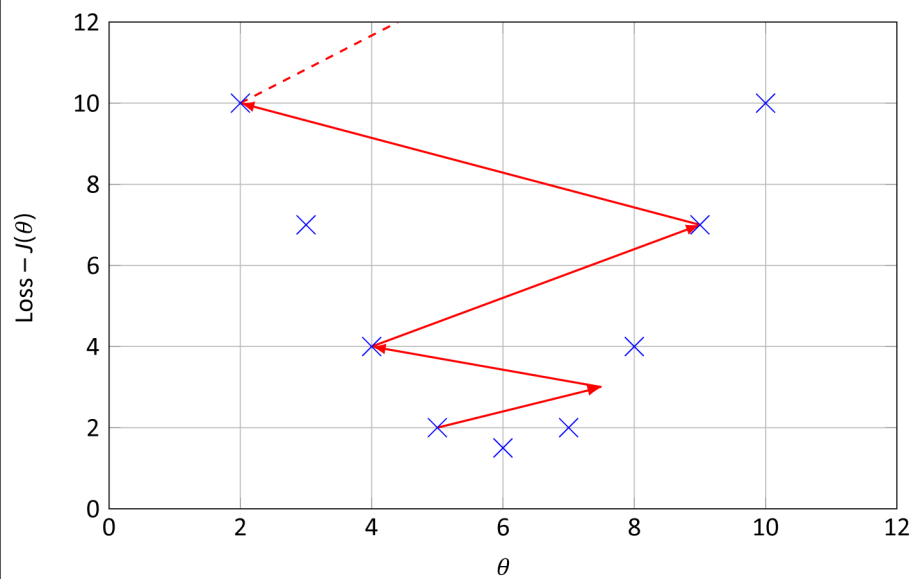


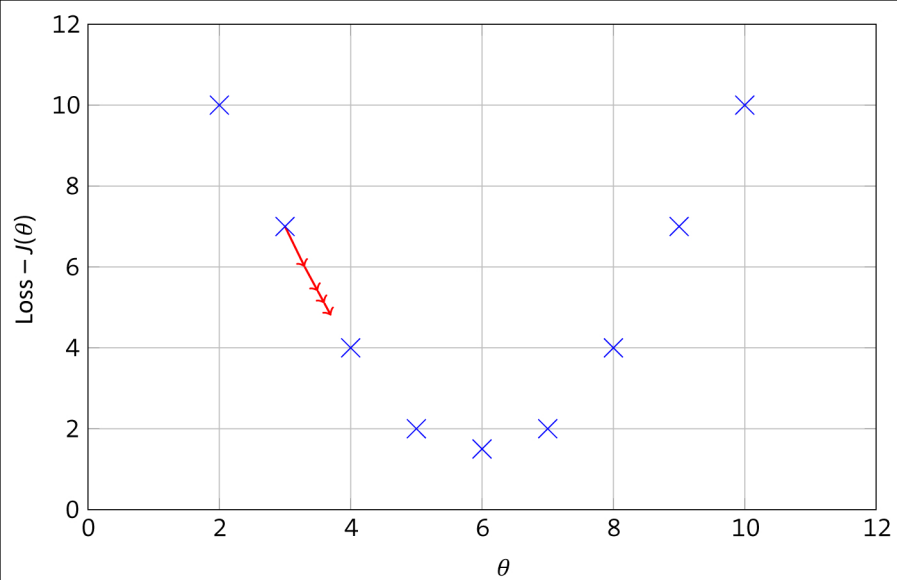












Label

1

0

0

50

100

150

200

250

300

Size

350

400

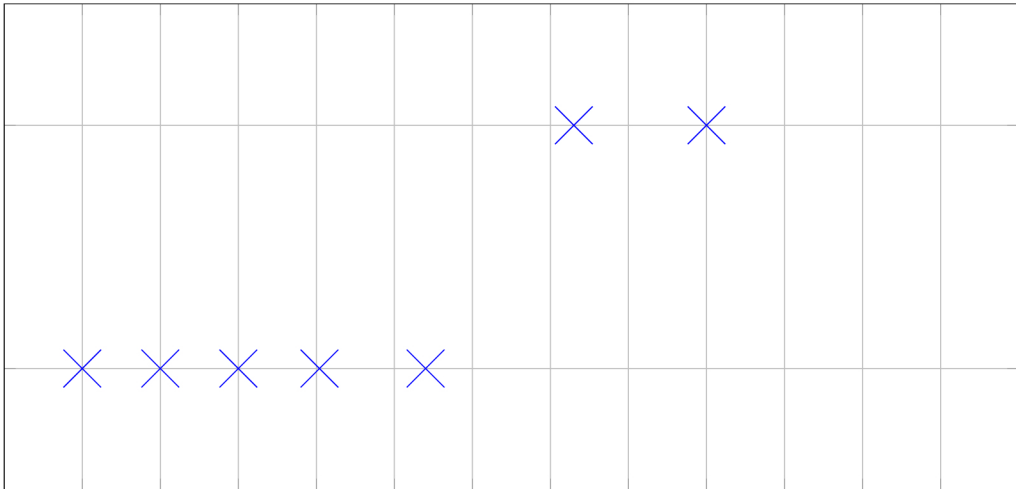
450

500

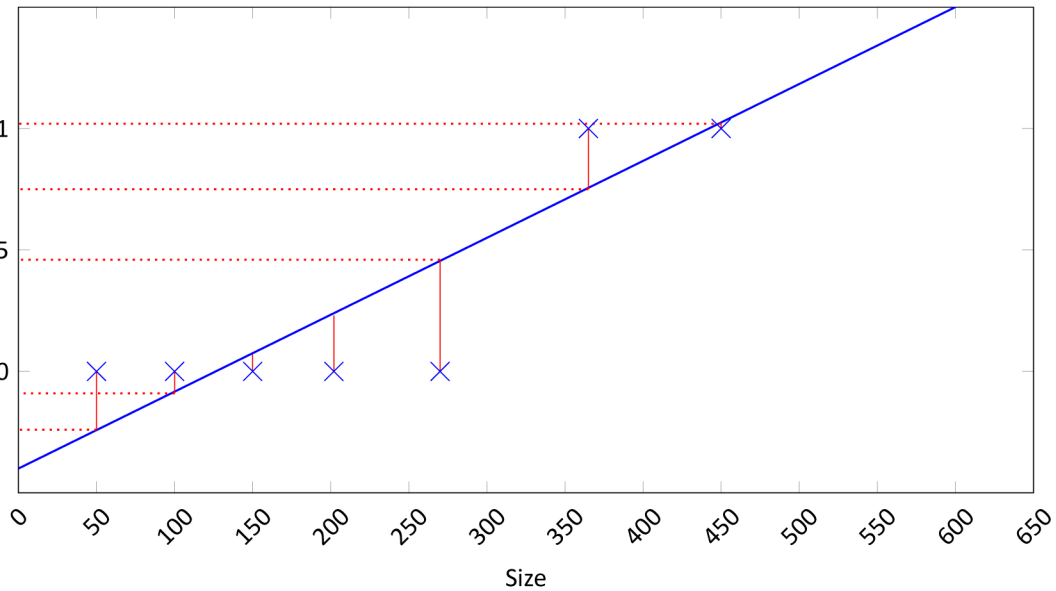
550

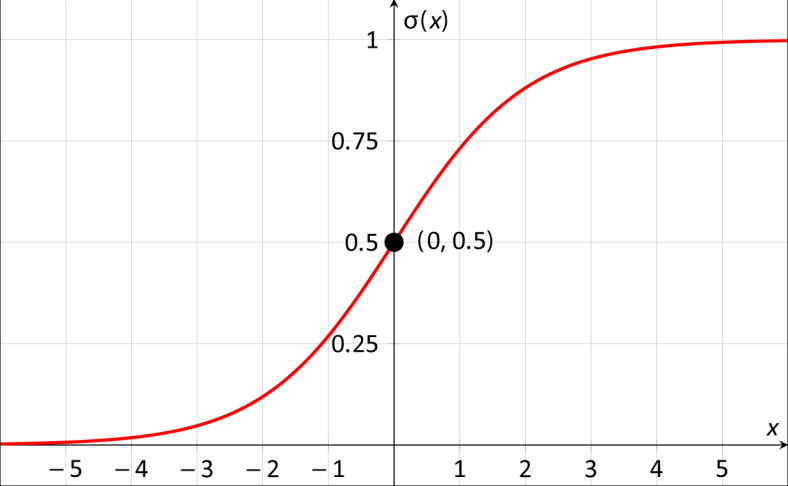
600

650

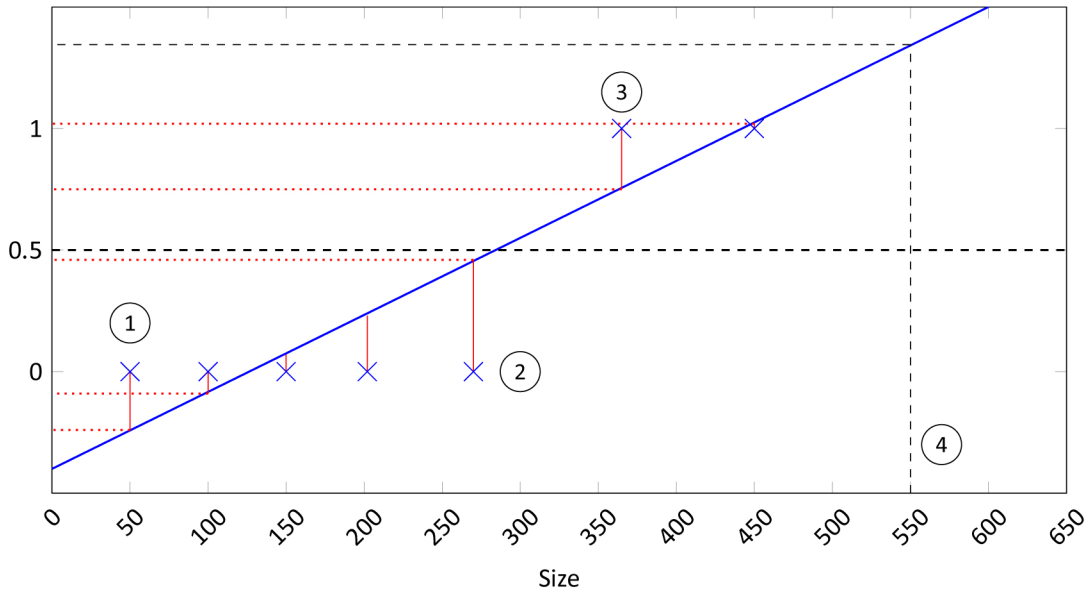


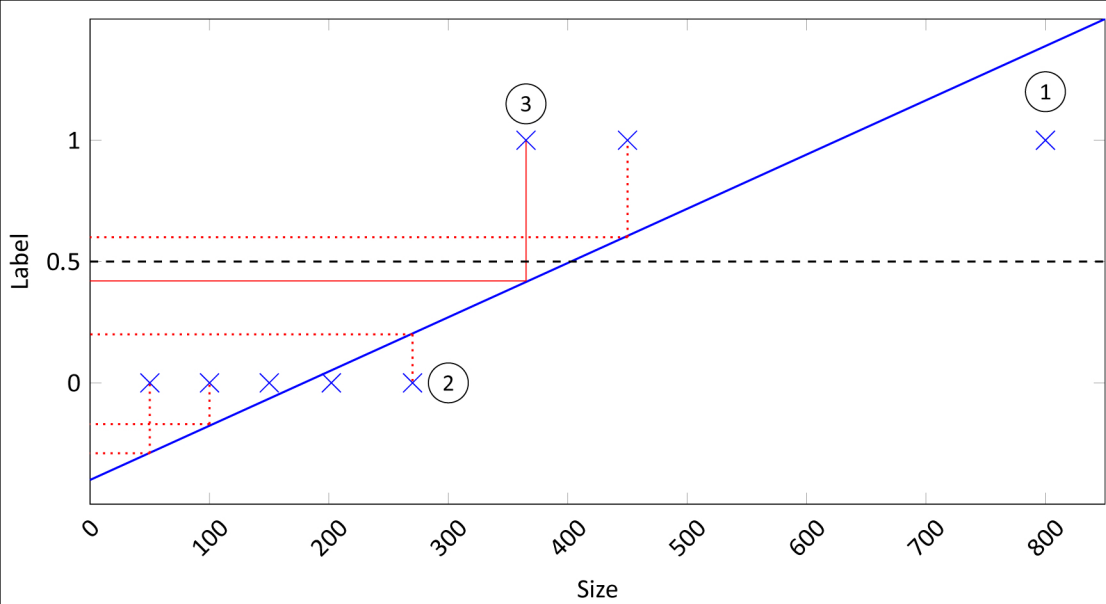
Label

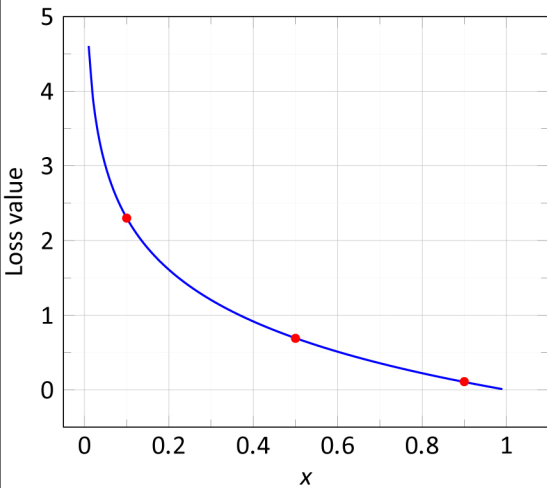
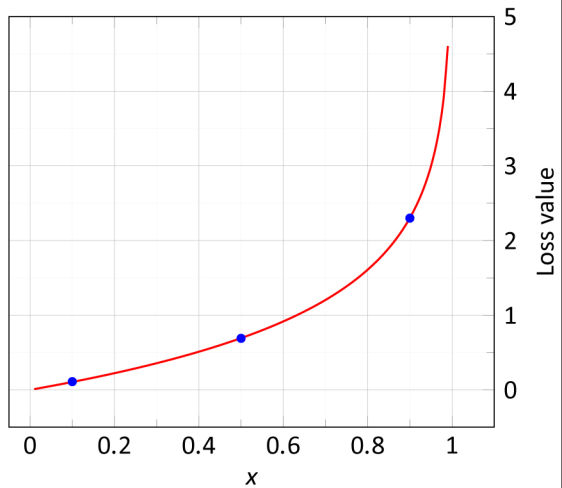


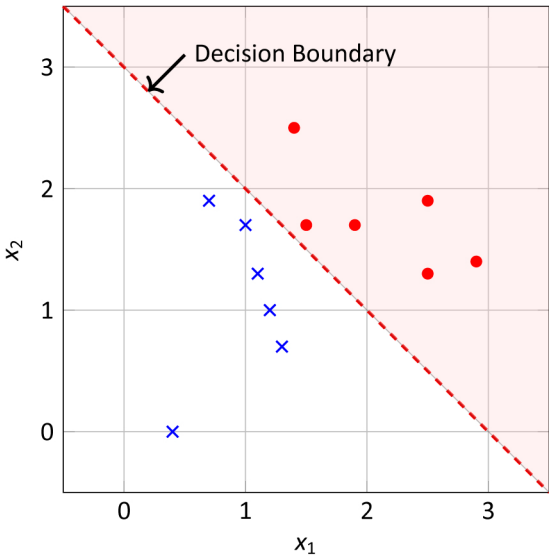


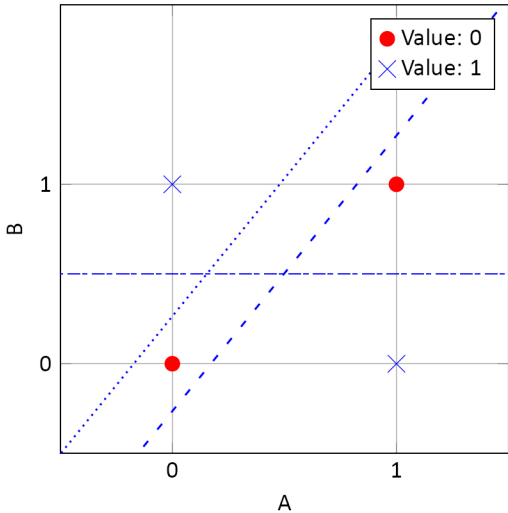
Label

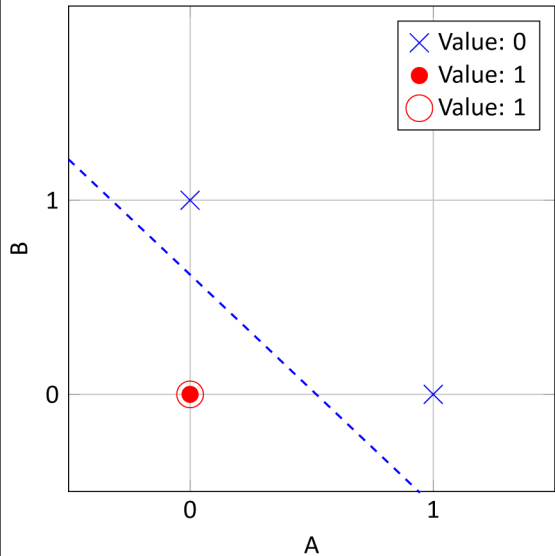


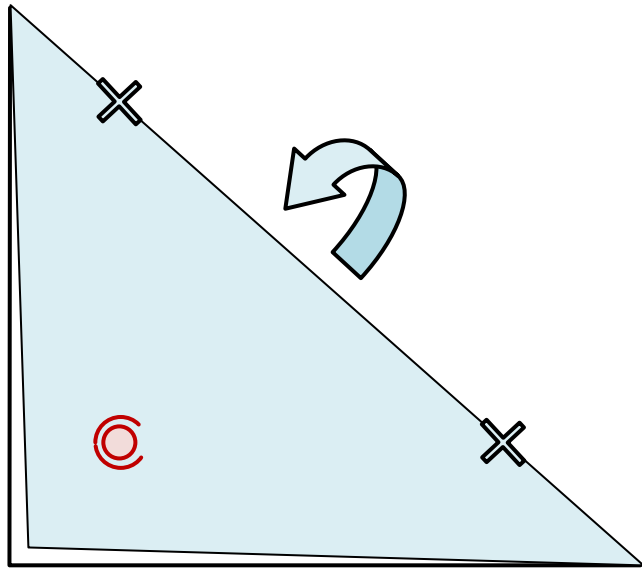
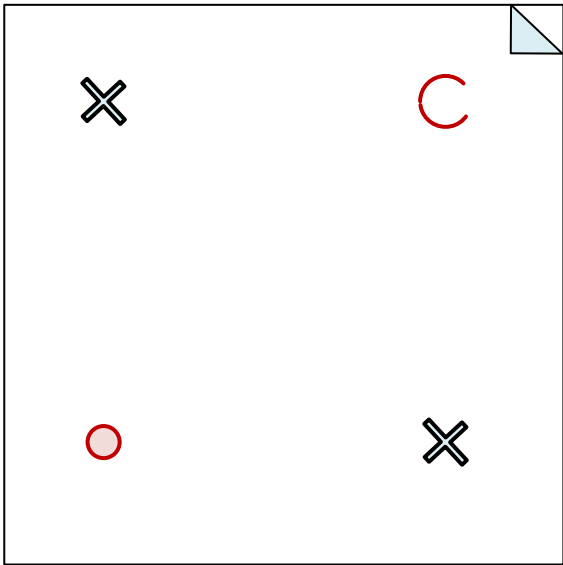


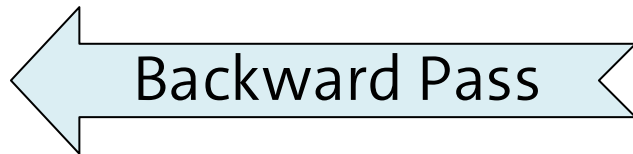
Case 1: $-\log(x)$ Case 2: $-\log(1 - x)$ 



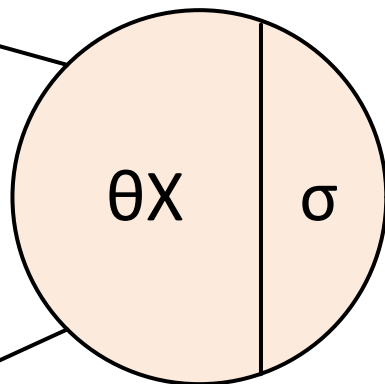






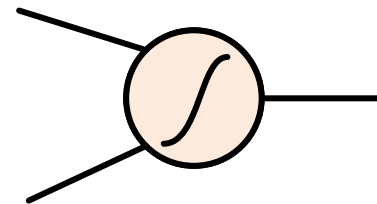
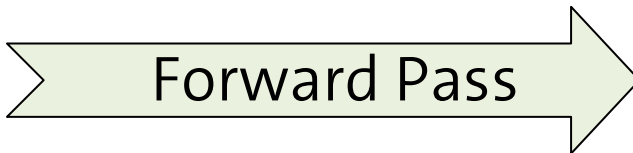


x_1

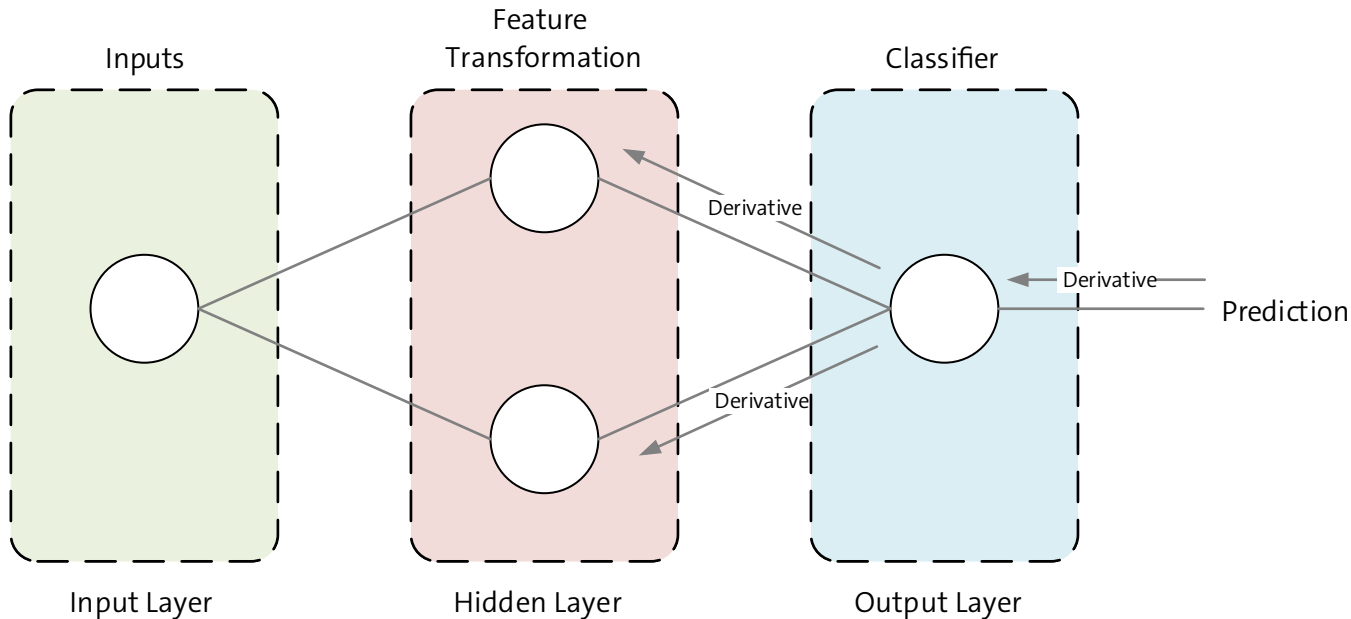


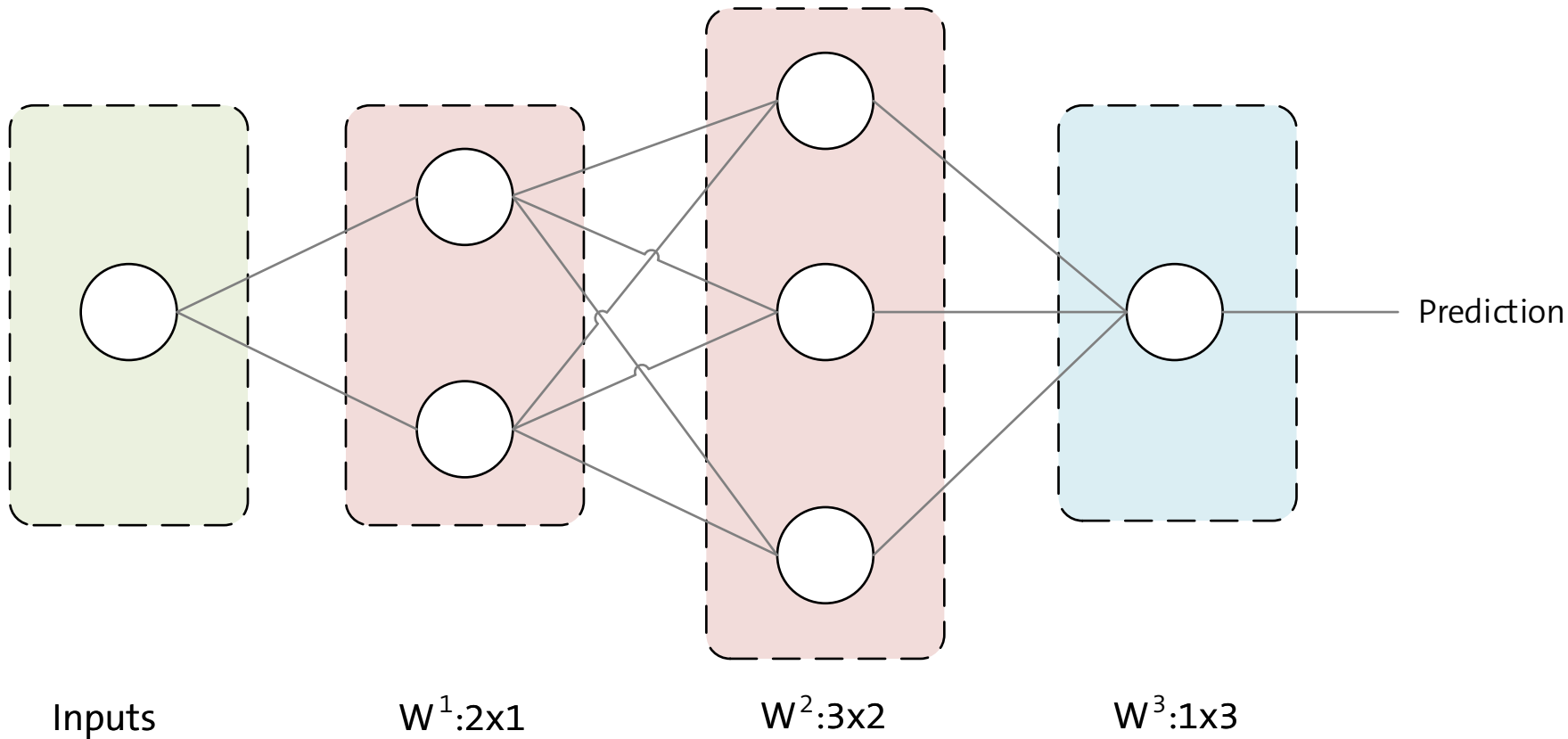
$h(x)$

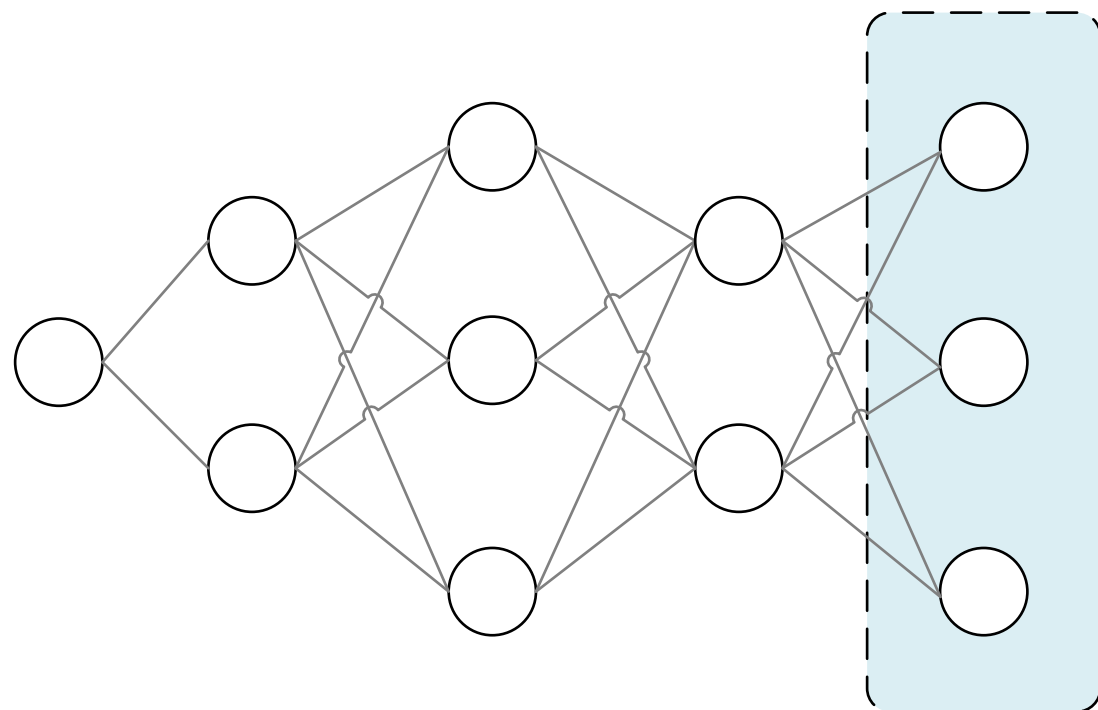
x_2



Concise
Version







Multi-Class

Softmax

$\begin{bmatrix} 0.7 \\ 0.2 \\ 0.1 \end{bmatrix}$

Multi-Label

Sigmoid

$\begin{bmatrix} 0.7 \\ 0.4 \\ 0.9 \end{bmatrix}$

Sparse
Multi-Class

Softmax

1

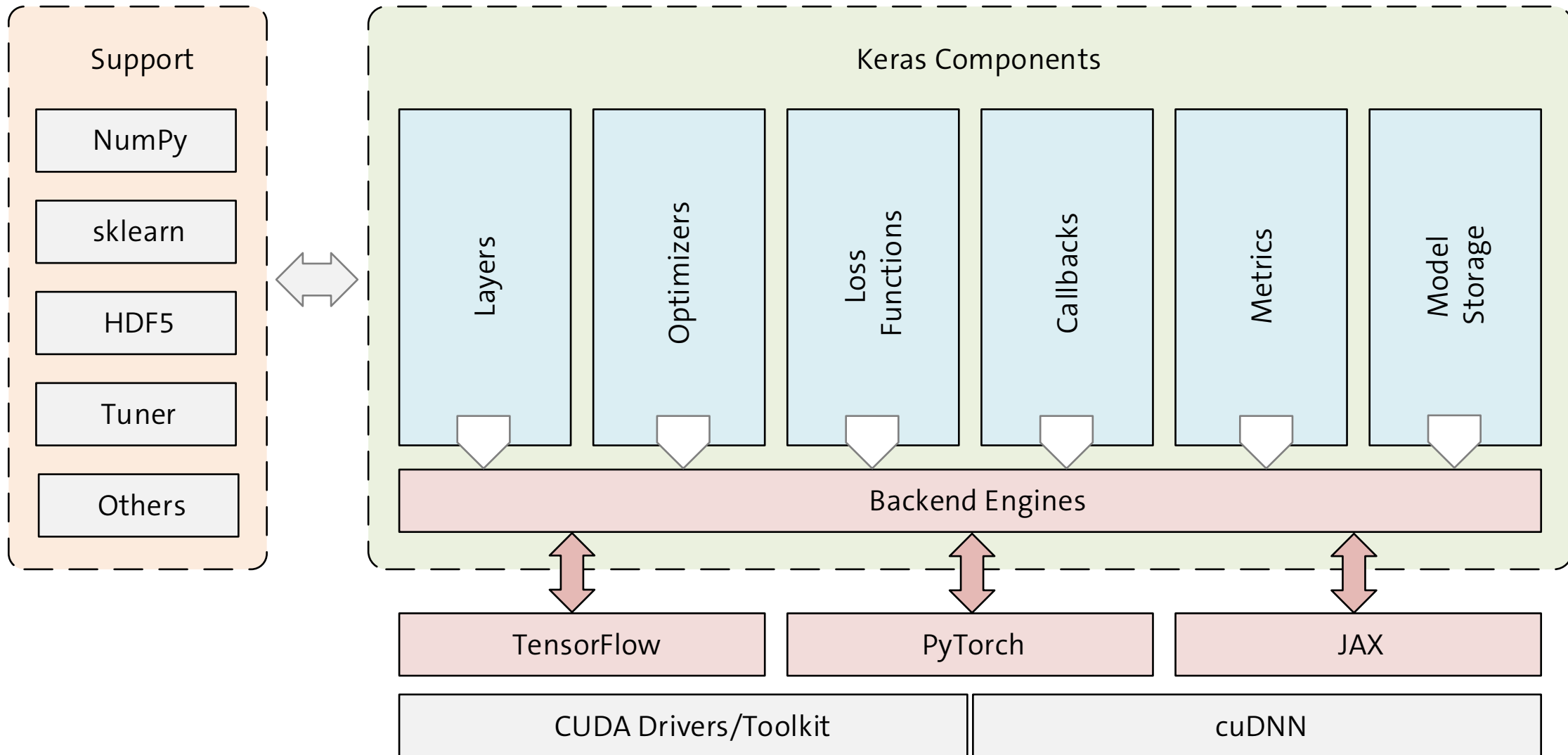
(Scalar Output)

Losses

Categorical
Cross-Entropy
Loss (CCL)

Binary
Cross-entropy
Loss

Sparse CCL





+ Code + Text



Start coding or go to the runtime menu

Run all ⌘/Ctrl+F9

Run before ⌘/Ctrl+F8

Run the focused cell ⌘/Ctrl+Enter

Run selection ⌘/Ctrl+Shift+Enter

Run cell and below ⌘/Ctrl+F10

Interrupt execution ⌘/Ctrl+M I

Restart session ⌘/Ctrl+M .

Restart session and run all

Disconnect and delete runtime

Change runtime type

Manage sessions

View resources

View runtime logs

Change runtime type

Runtime type

Python 3 ▼

Hardware accelerator



CPU



T4 GPU



A100 GPU



L4 GPU



v2-8 TPU

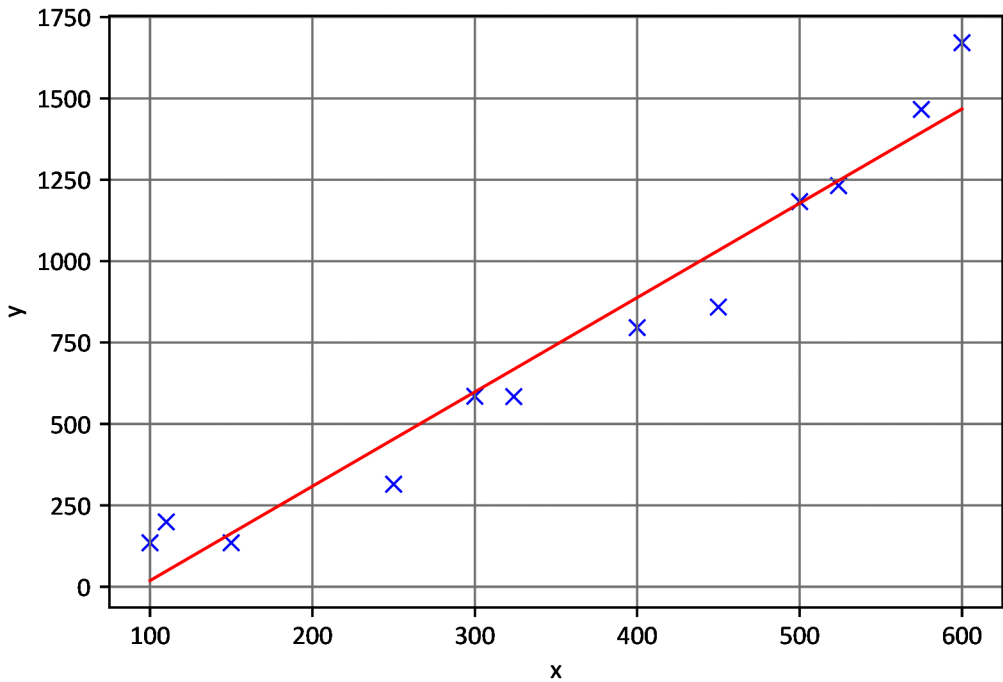


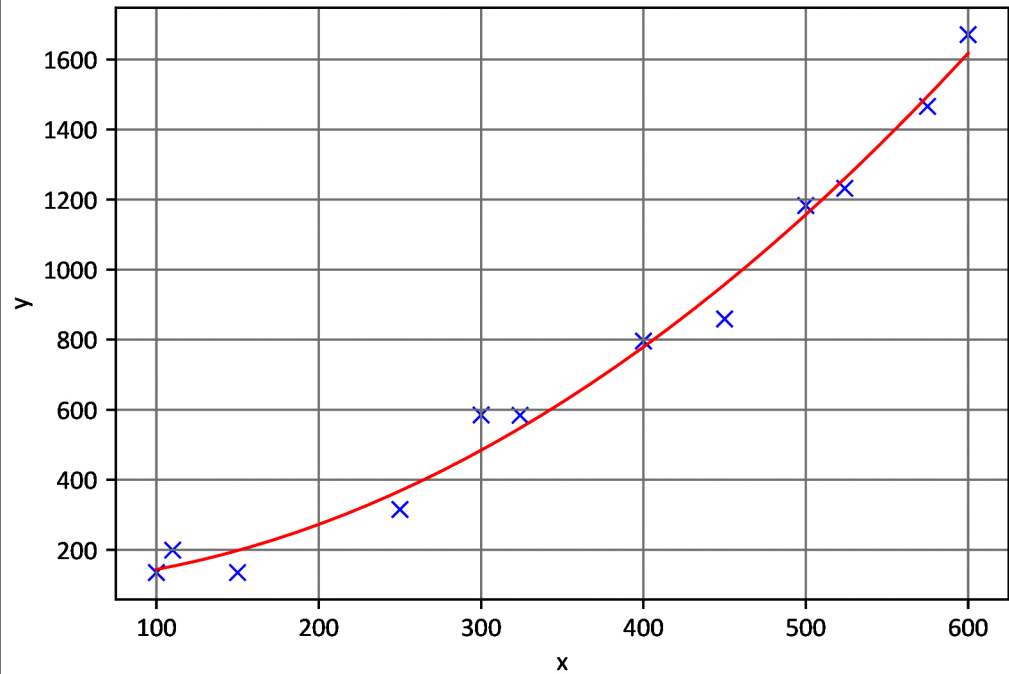
v5e-1 TPU

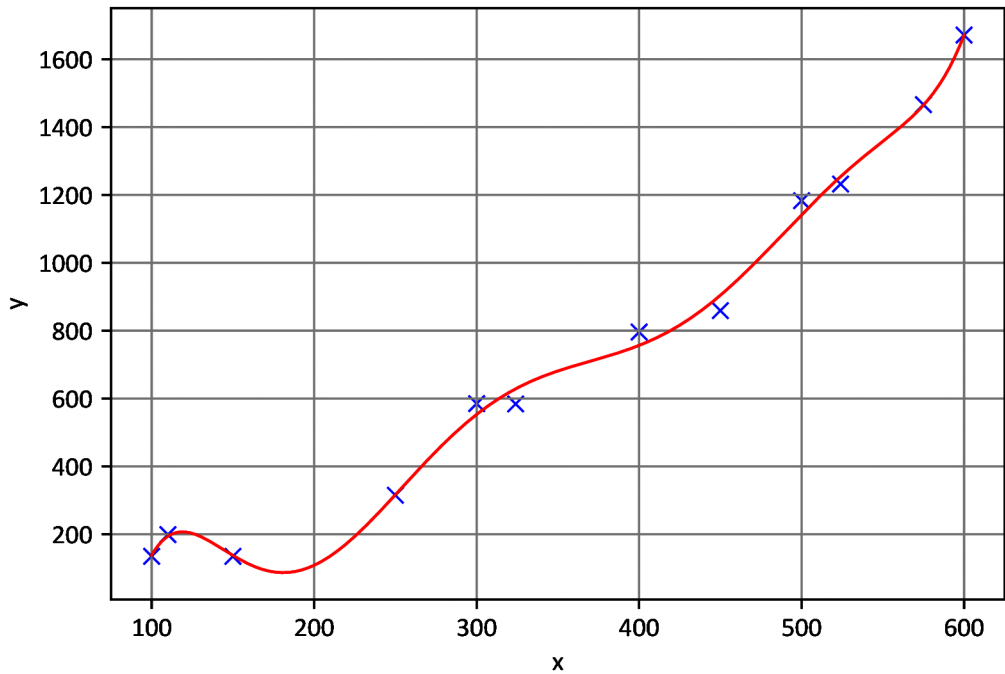
Want access to premium GPUs? [Purchase additional compute units](#)

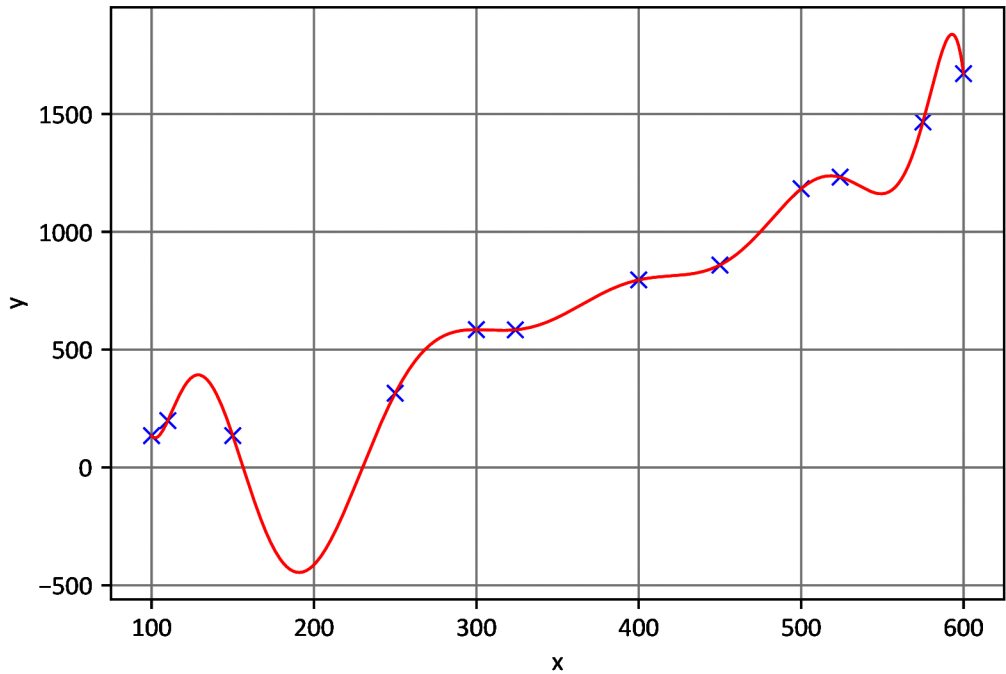
Cancel

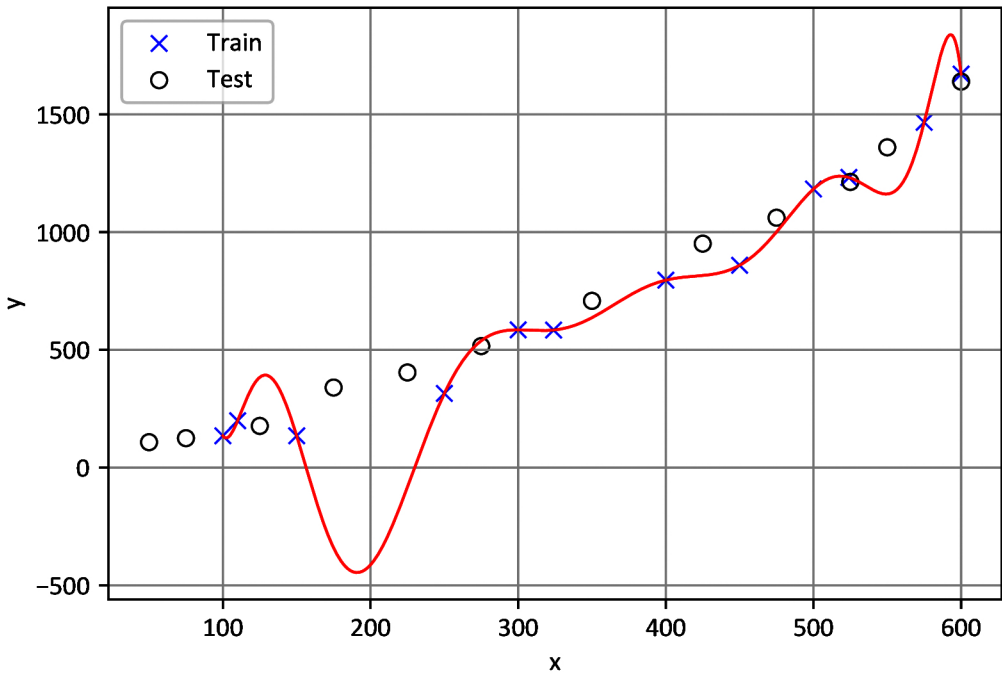
Save

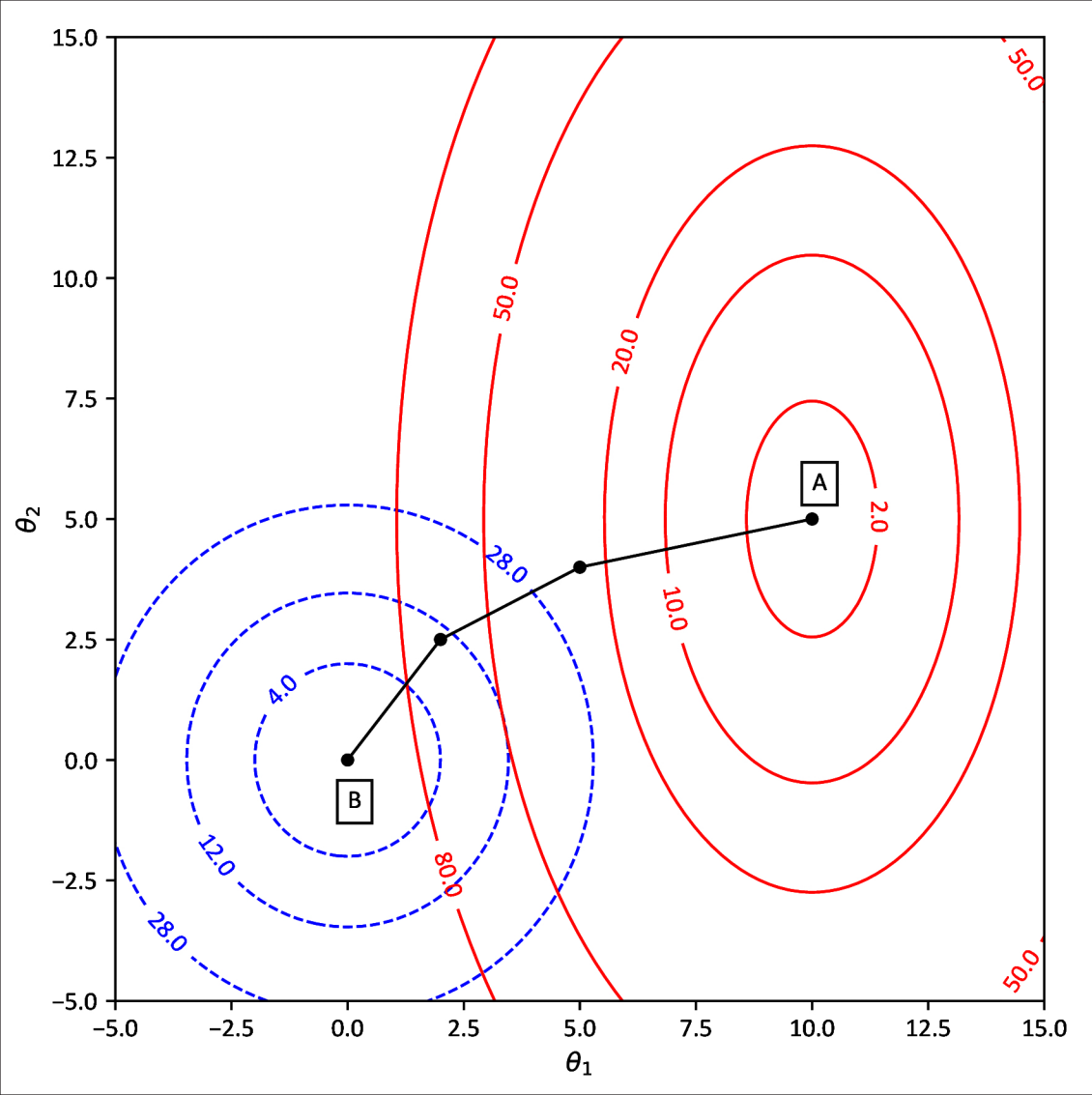


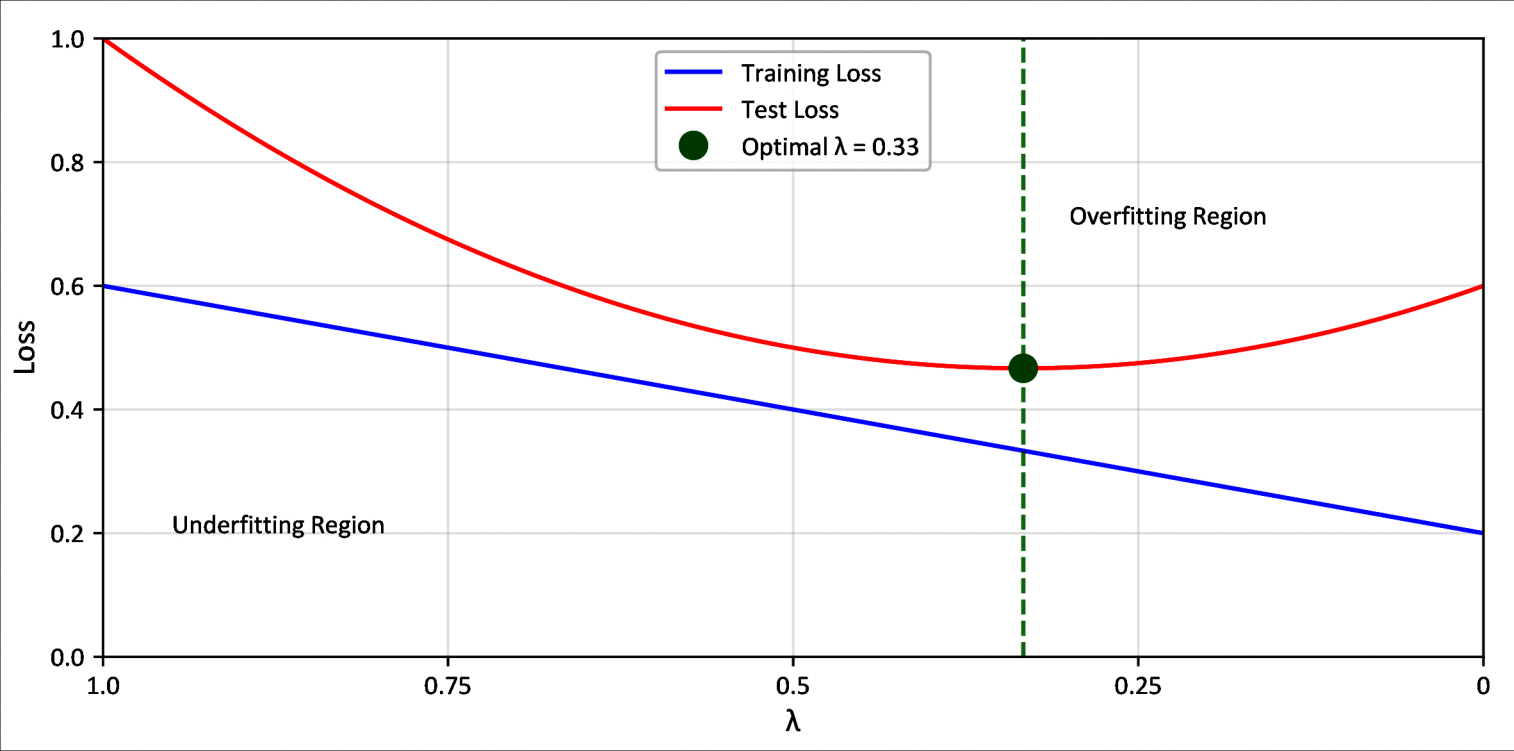


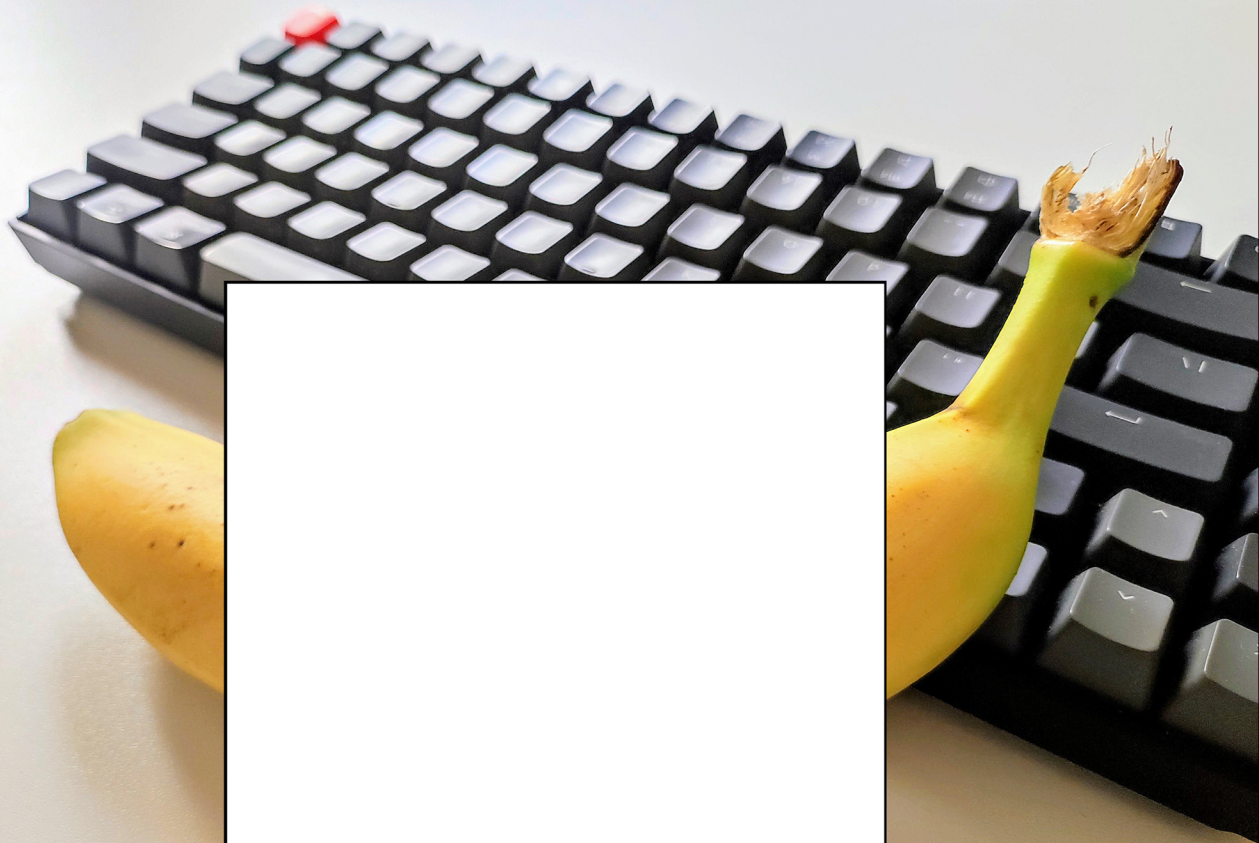


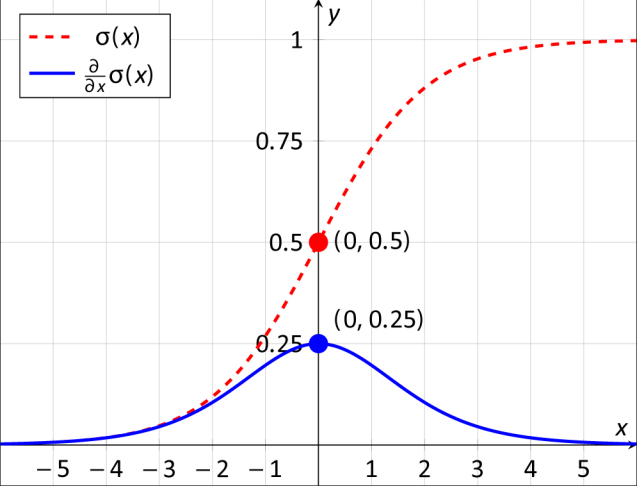


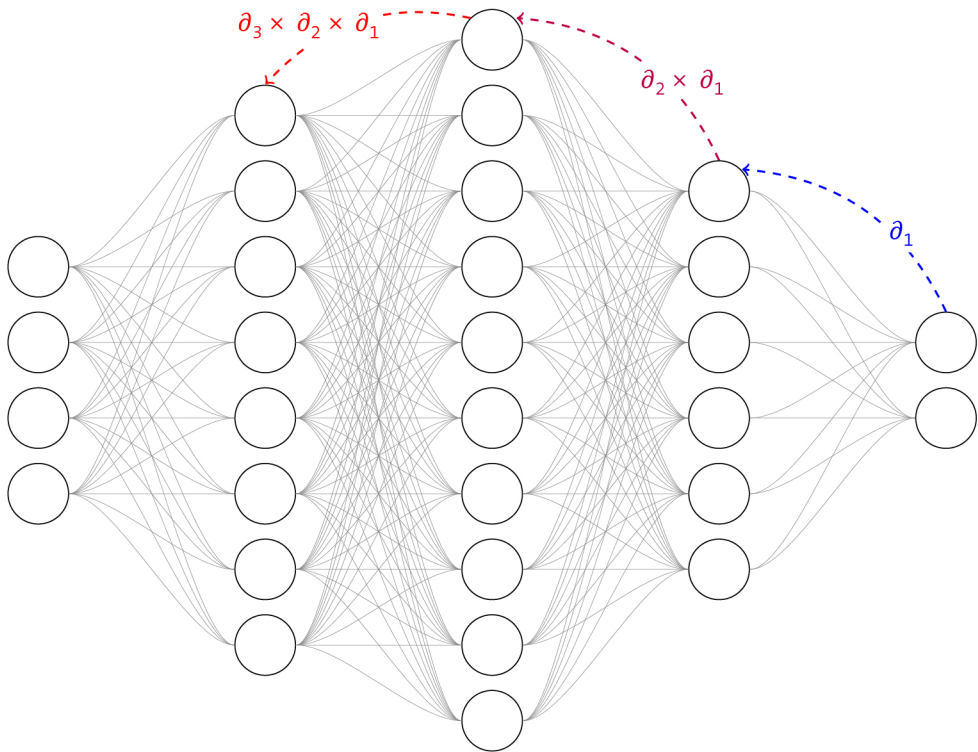




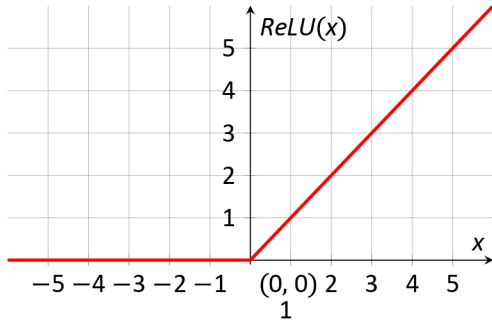




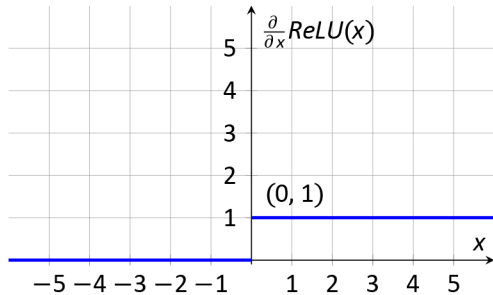


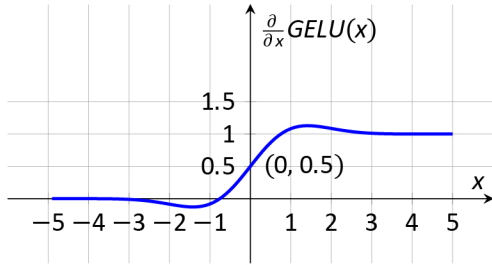
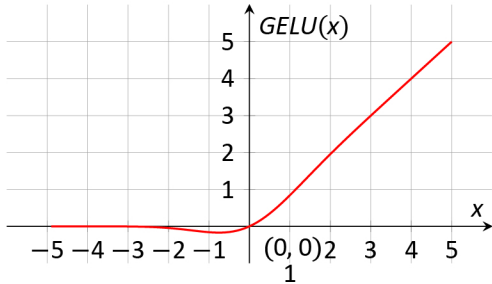


ReLU Function



ReLU Derivative

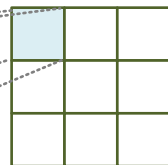
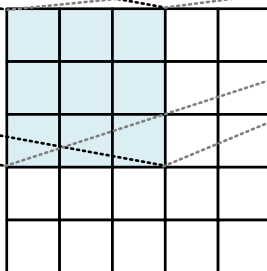
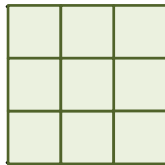




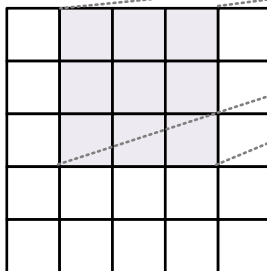
Filter
(3x3)

Input
(5x5)

Output
(3x3)

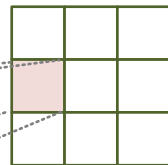
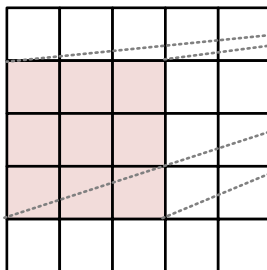


Move Filter Right
(Stride = 1)



⋮

Move Filter to
Next Row
(Stride = 1)



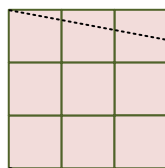
Grayscale Image



After Gaussian Blur Filter

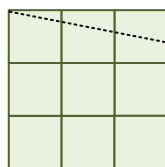
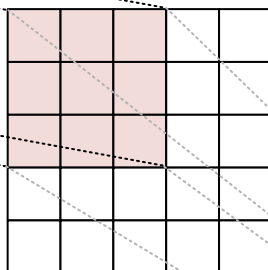


3-Channel Single Filter
(3x3)

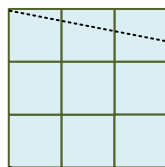
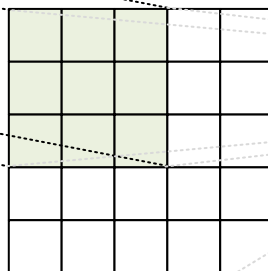


X

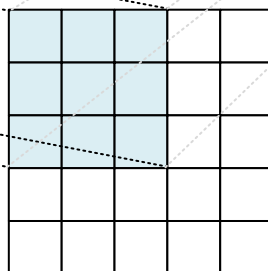
3-Channel Input
(5x5)



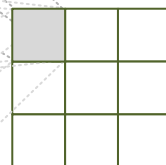
X



X



1-Channel Output
(3x3)



+

+

+

Original Image



After Gaussian Blur Filter



Input Layer
(1000x1000, 3 Channel)

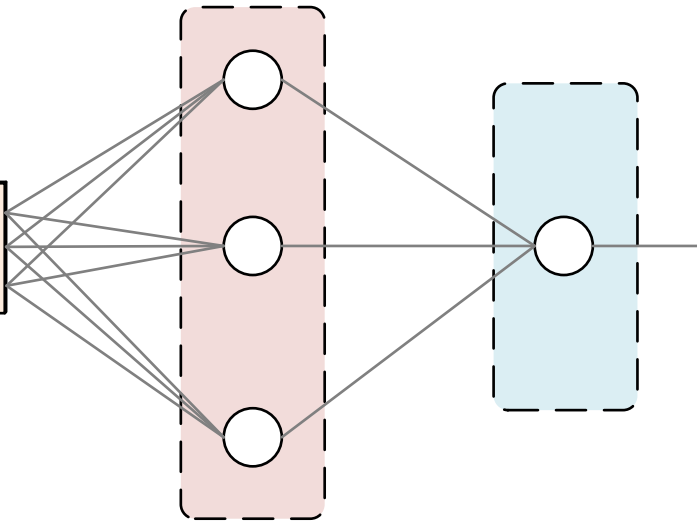
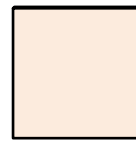
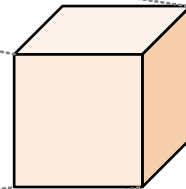
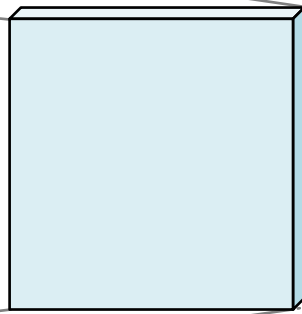
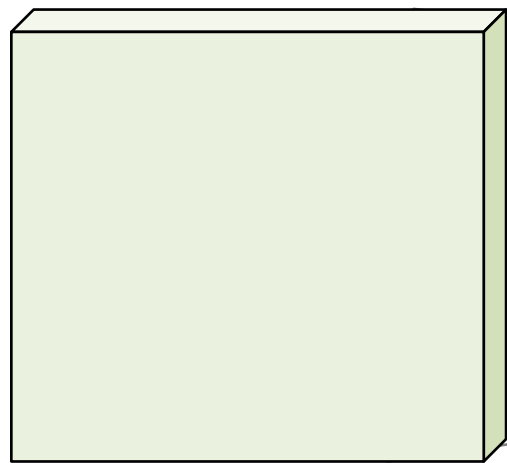
Convolution Layer
(3x3, 2 Filters, Stride=2)

Convolution Layer
(3x3, 10 Filters, Stride=2)

Pooling
Layer

Dense Layer
(100 Units)

Dense Layer
(1 Unit)



1000 x 1000 x 3

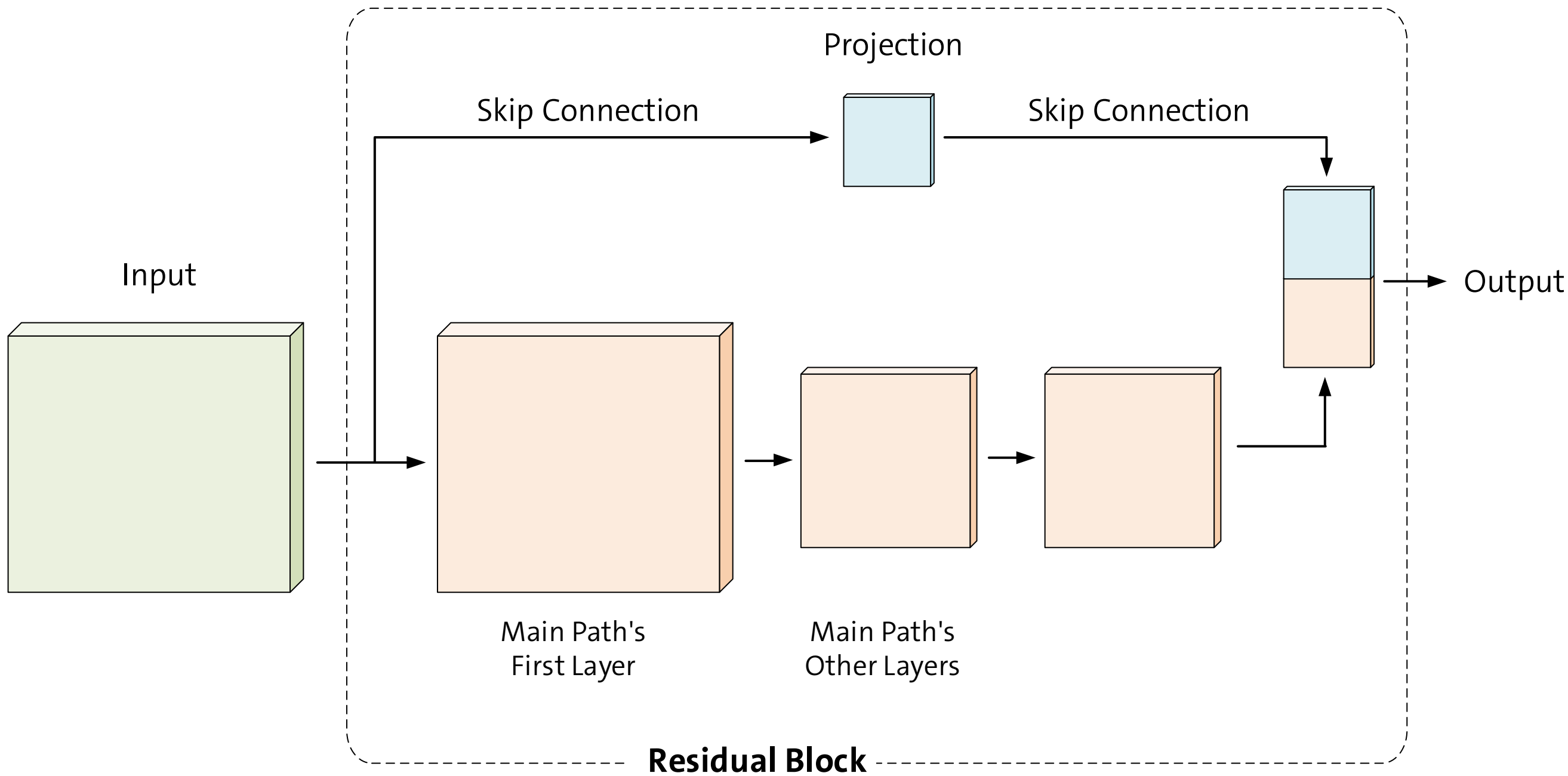
500 x 500 x 2

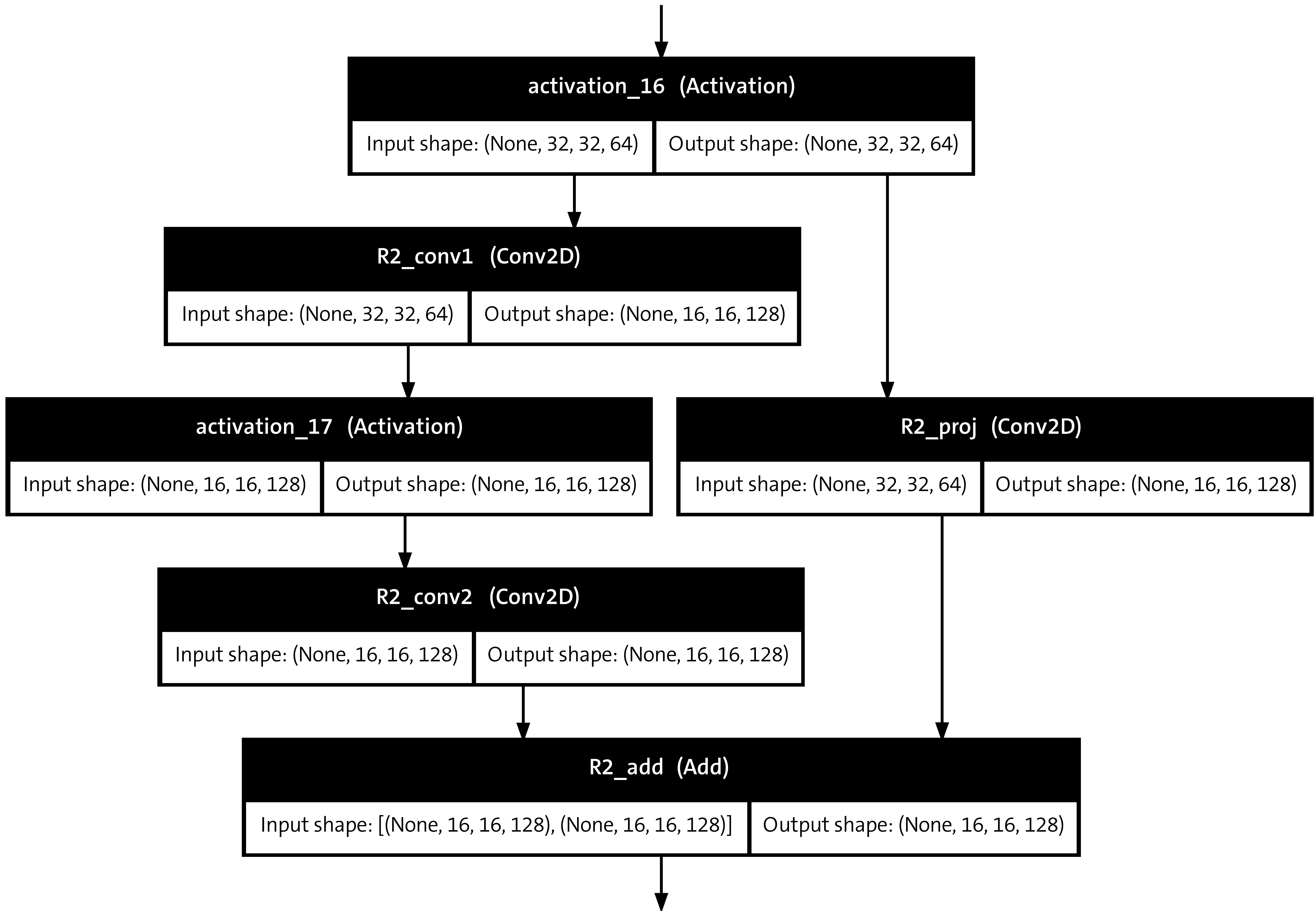
250 x 250 x 10

250 x 250 x 1

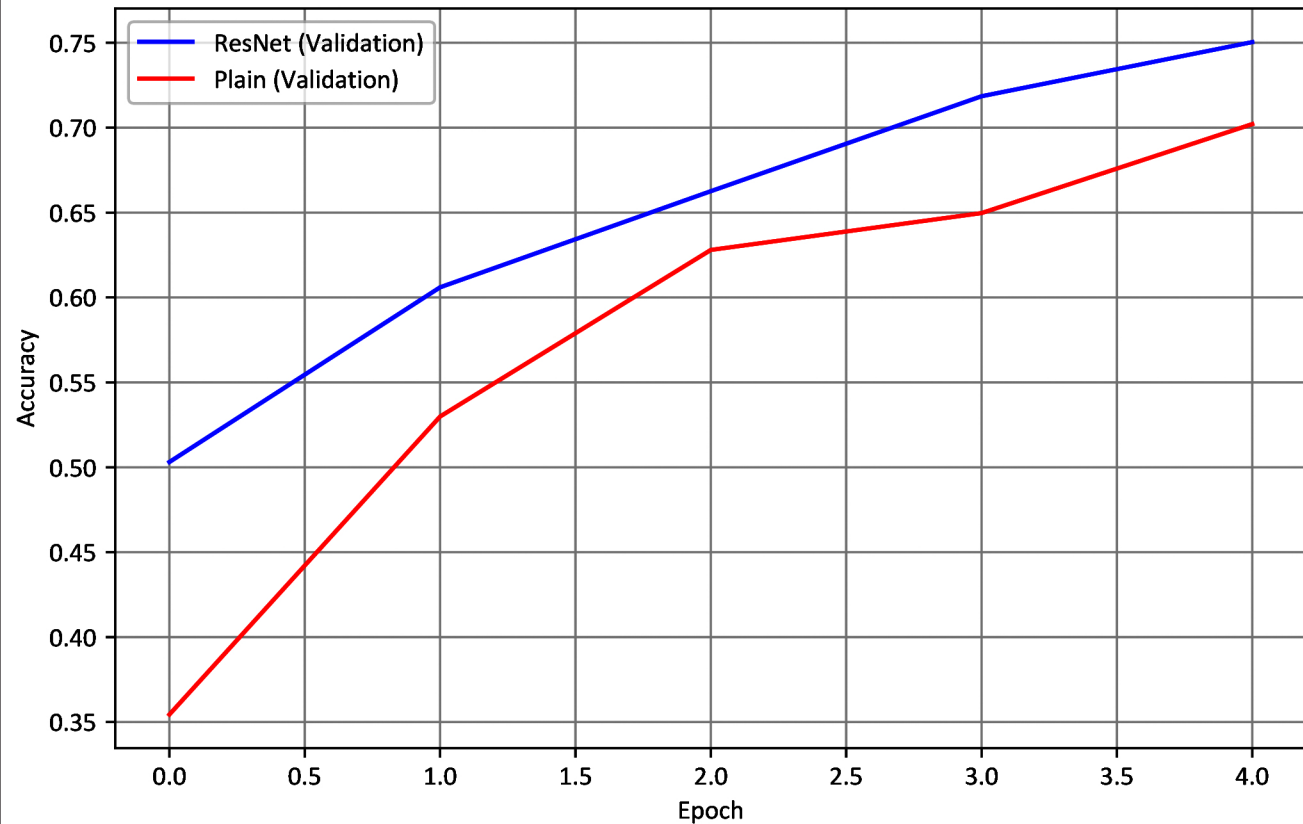
100

1





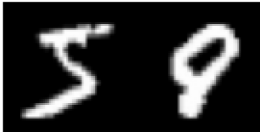
Training Performance Comparison



Label: 0.0



Label: 1.0



Label: 0.0



Label: 1.0



True: 0.0 | Pred: 0.00005



True: 1.0 | Pred: 0.98287



True: 0.0 | Pred: 0.30248



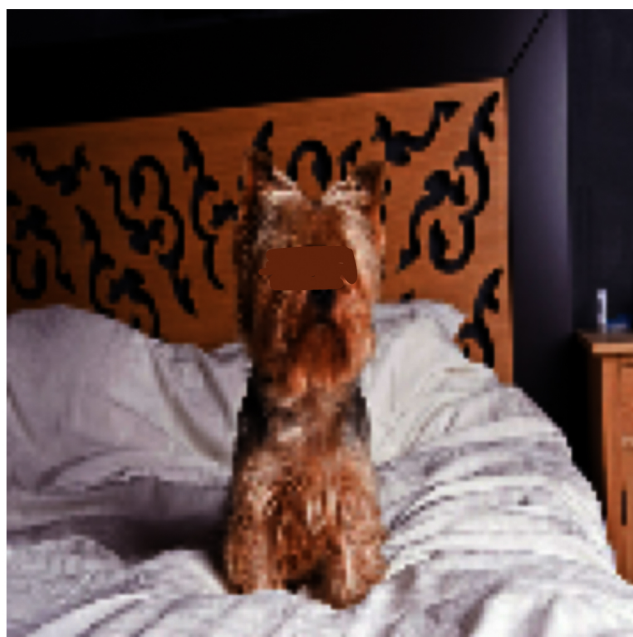
Image



Ground Truth Mask



Image



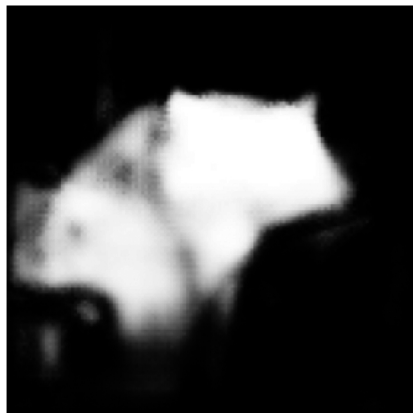
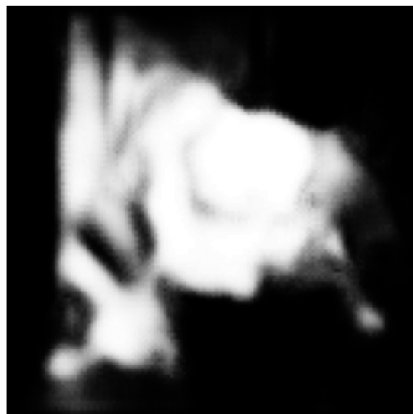
Ground Truth Mask



Images

True Masks

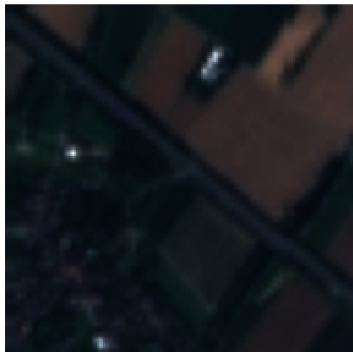
Predicted Masks



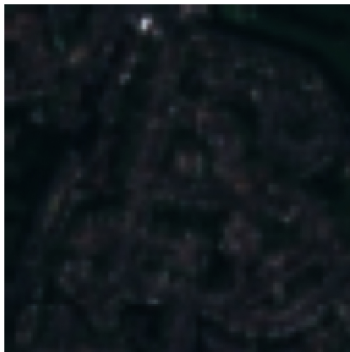
AnnualCrop



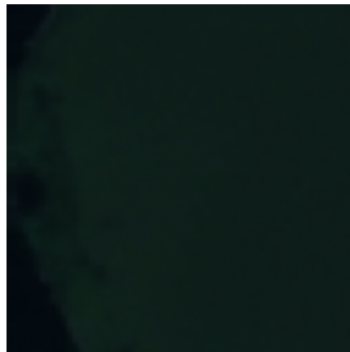
Highway



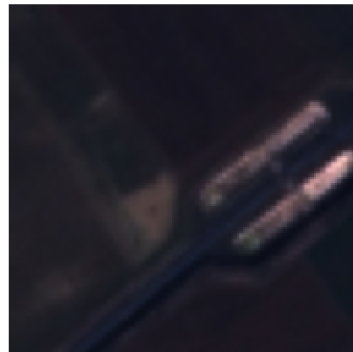
Residential



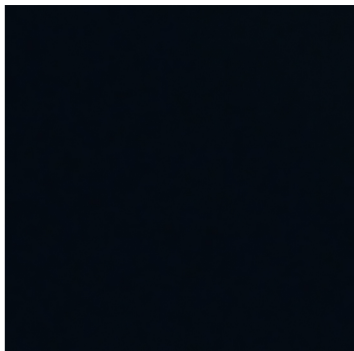
SeaLake



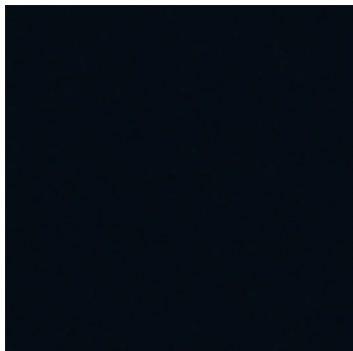
Highway



SeaLake



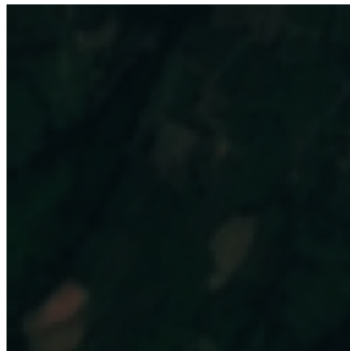
SeaLake



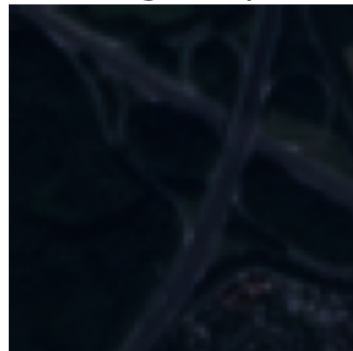
PermanentCrop



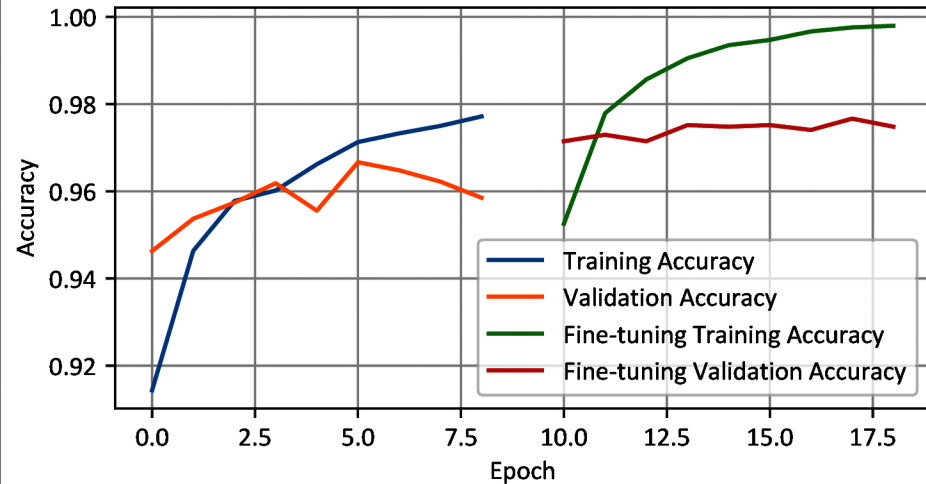
Pasture



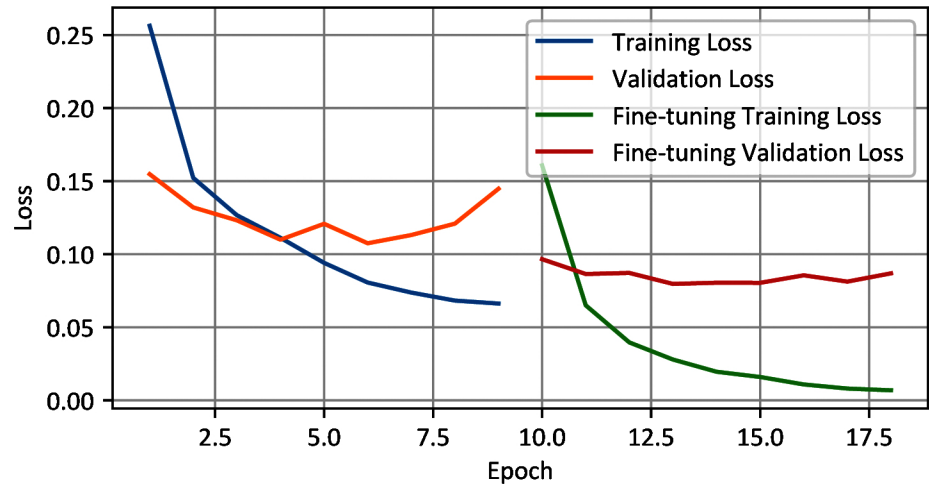
Highway



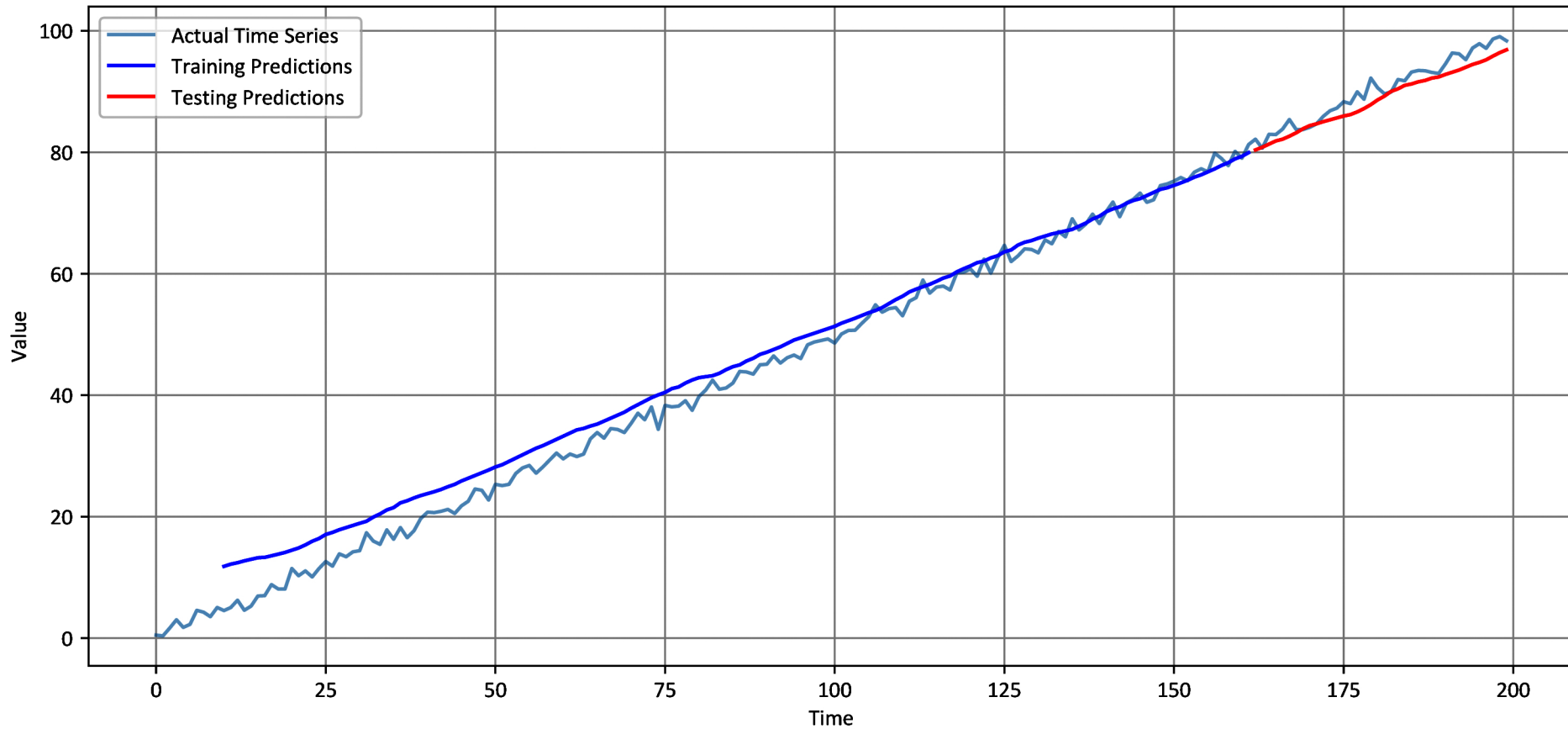
Model Accuracy



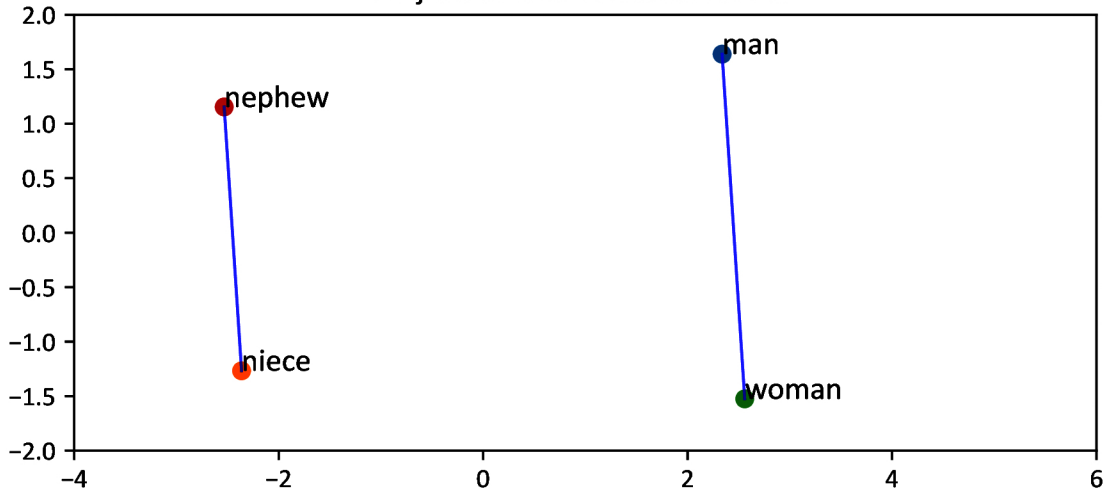
Model Loss



Time Series Prediction



Projection with Semantic Arrows

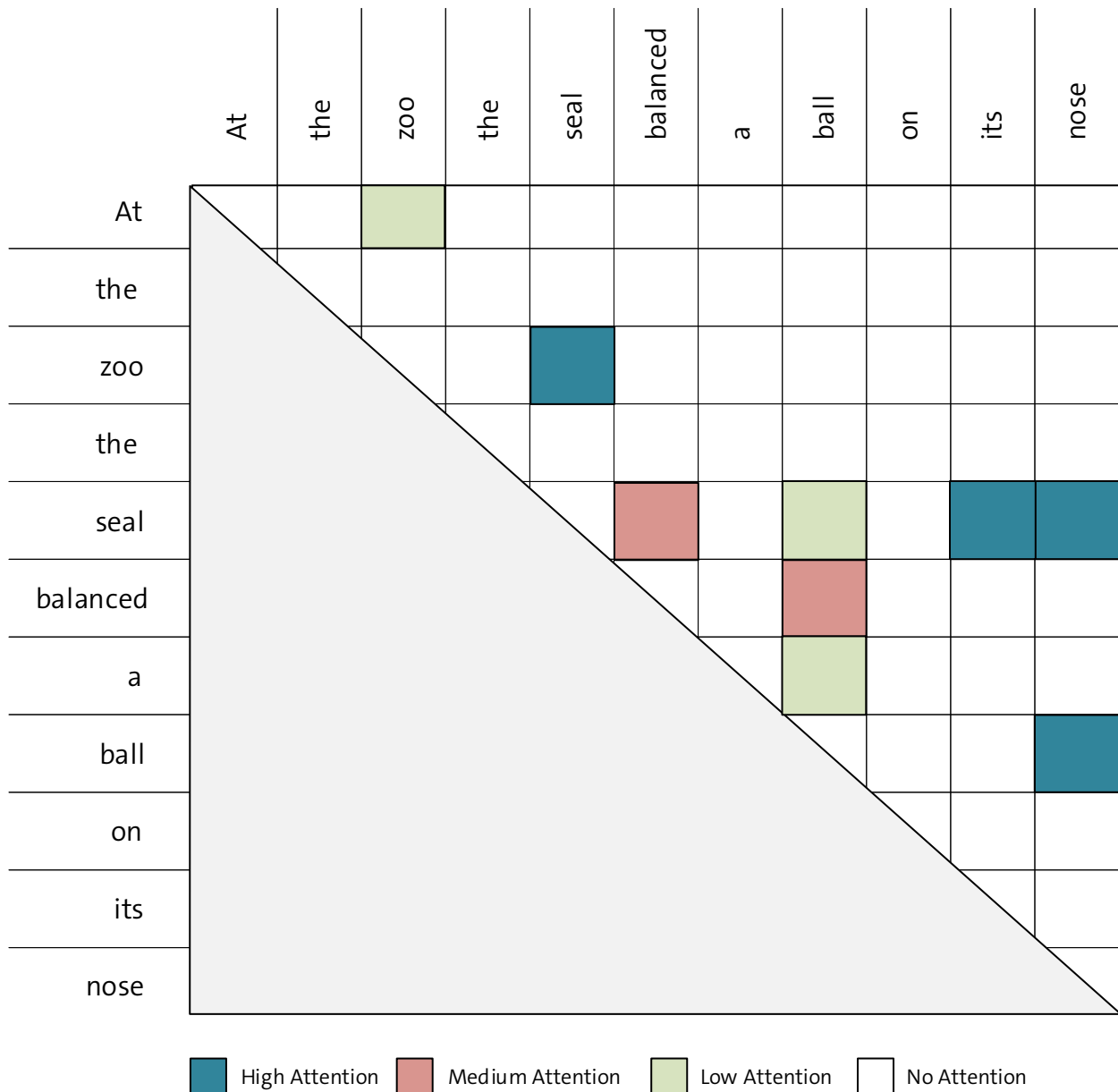


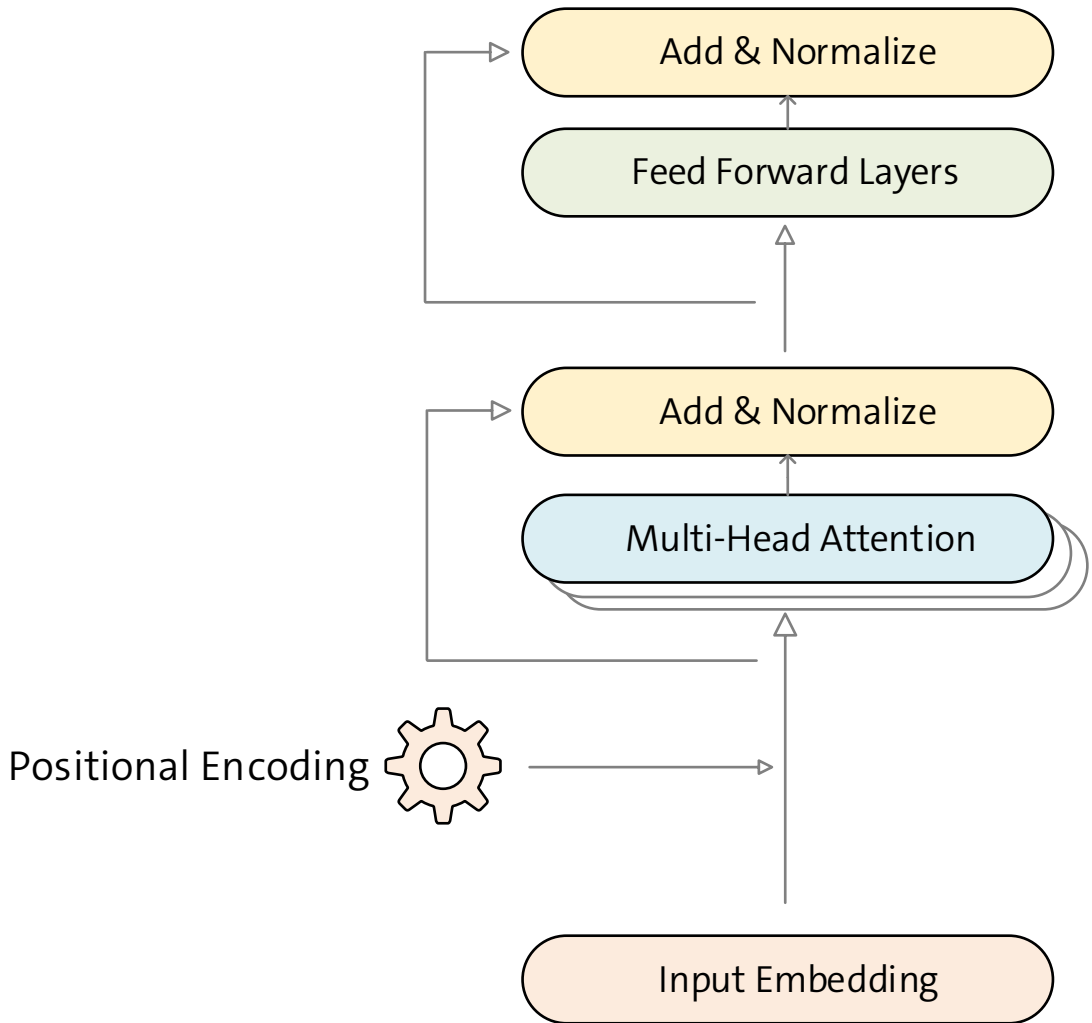
At the zoo , the seal balanced a ball on its nose.

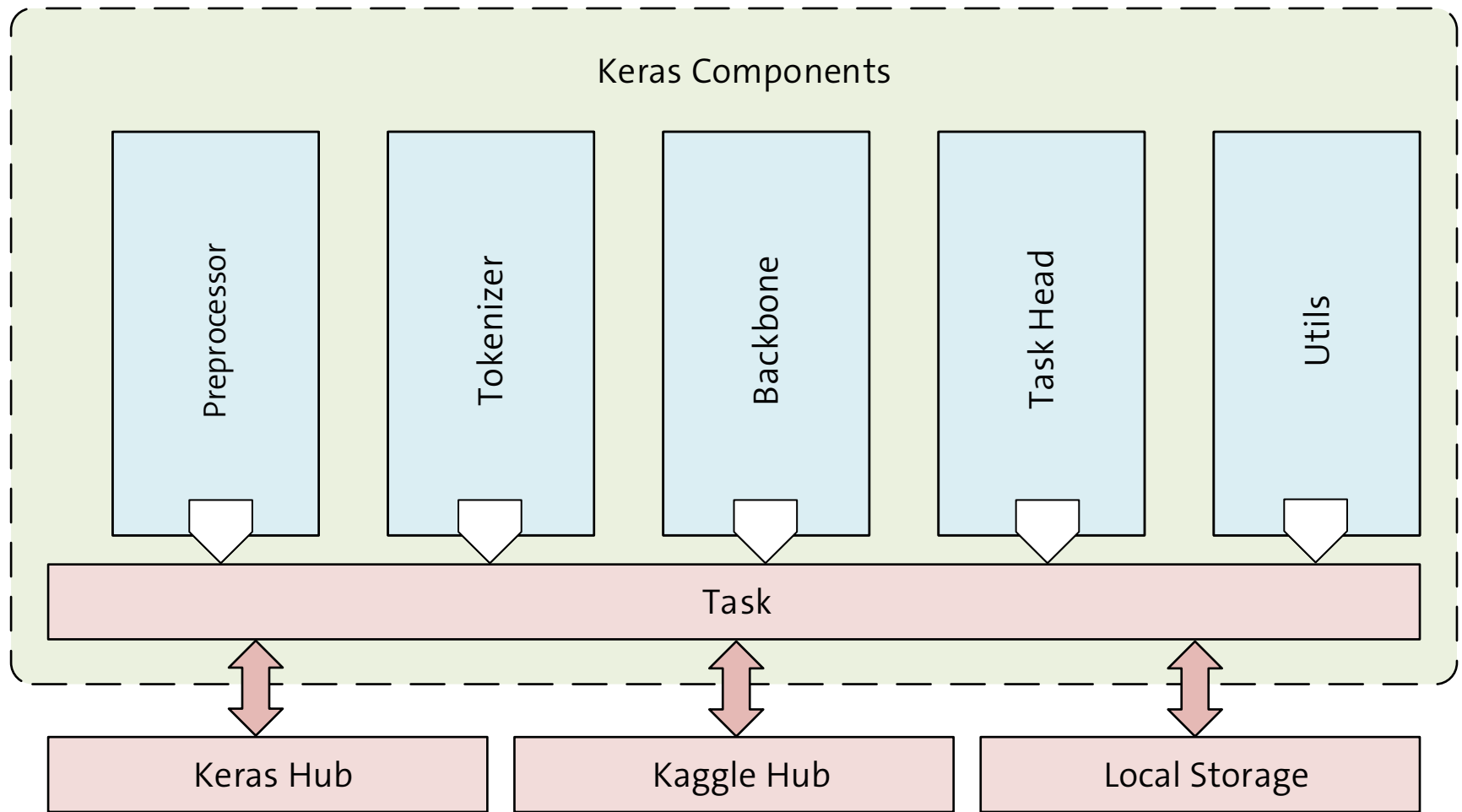
Three green curved arrows originate from the words in the sentence above. One arrow points from 'zoo' to 'seal'. Another points from 'seal' to 'ball'. A third points from 'nose' to 'seal'.

seal seal at a zoo seal at a zoo with a ball seal at a zoo with a ball on its nose

Four right-pointing arrows connect the phrases in the sequence.
$$\begin{bmatrix} 10.0 \\ 12.4 \\ \dots \end{bmatrix}$$
$$\begin{bmatrix} 25.2 \\ 92.7 \\ \dots \end{bmatrix}$$
$$\begin{bmatrix} 15.1 \\ 8.29 \\ \dots \end{bmatrix}$$
$$\begin{bmatrix} 84.3 \\ 65.4 \\ \dots \end{bmatrix}$$









```
import kagglehub  
kagglehub.login()
```



kaggle

Create an API token from [your Kaggle settings page](#) and paste it below along with your

Kaggle username.

Username:

Token:

Login

Thank You



Settings



Your Work



Your profile

Account

Notifications

API

Using Kaggle's beta API, you can interact with Competitions and Datasets to download data, make submissions, and more via the command line. [Read the docs](#)

Create New Token

Expire Token

Your username

Your account number



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1186



Open in Vertex AI



Download



Code



Gemma

keras/gemma



Keras implementation of the Gemma model. This Keras 3 implementation will run on JAX, TensorFlow and PyTorch.

Model Card

Code (418)

Discussion (5)

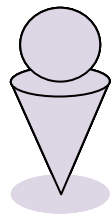
Competitions (20)



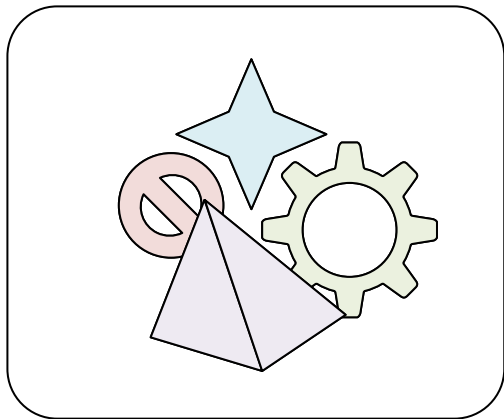
Access Gemma on Kaggle

To access Gemma on Kaggle, you need to first request access.

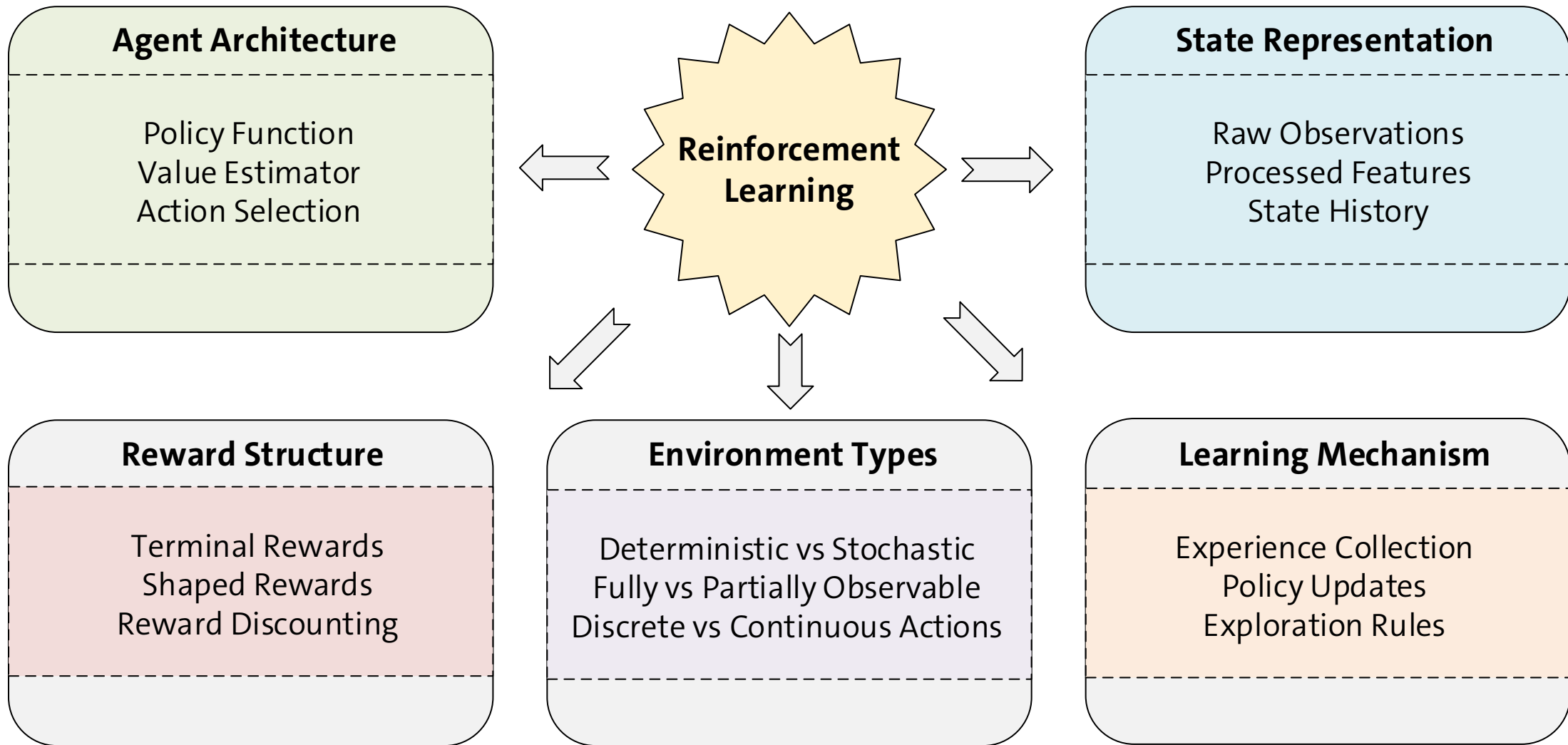
Request Access



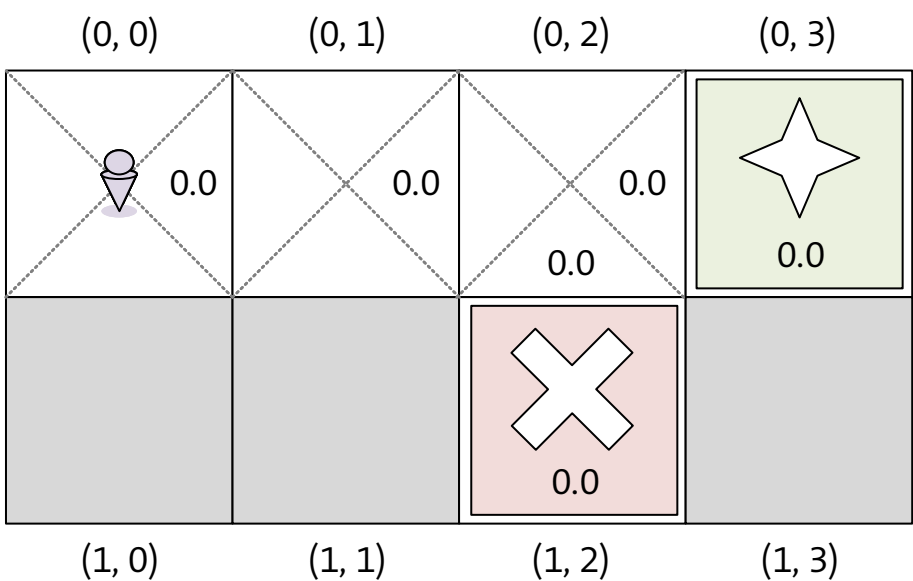
Agent



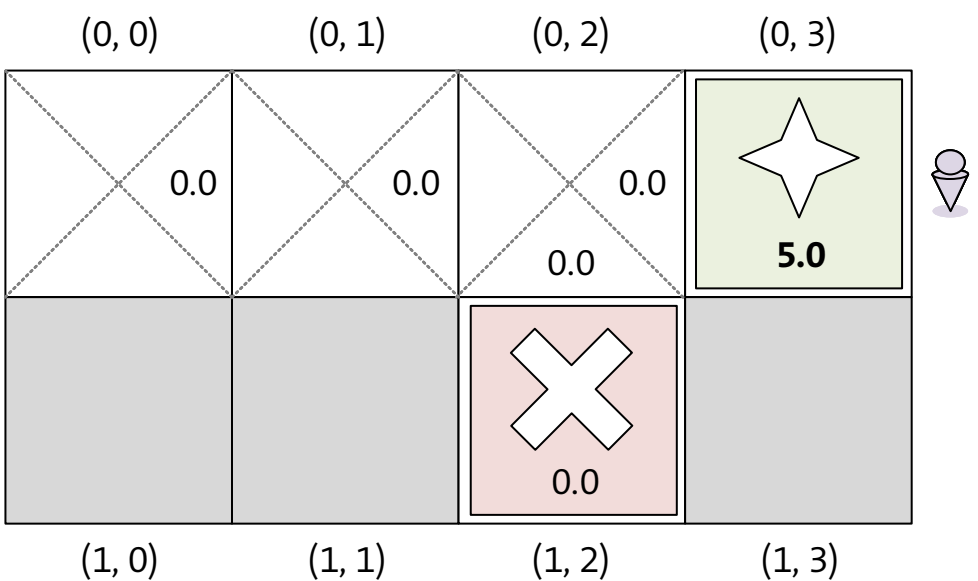
Environment



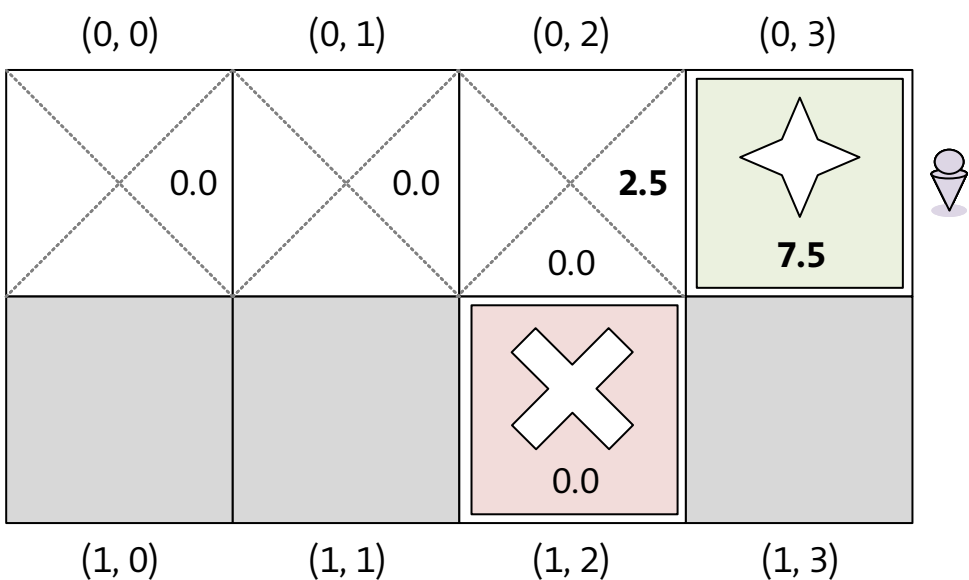
Start



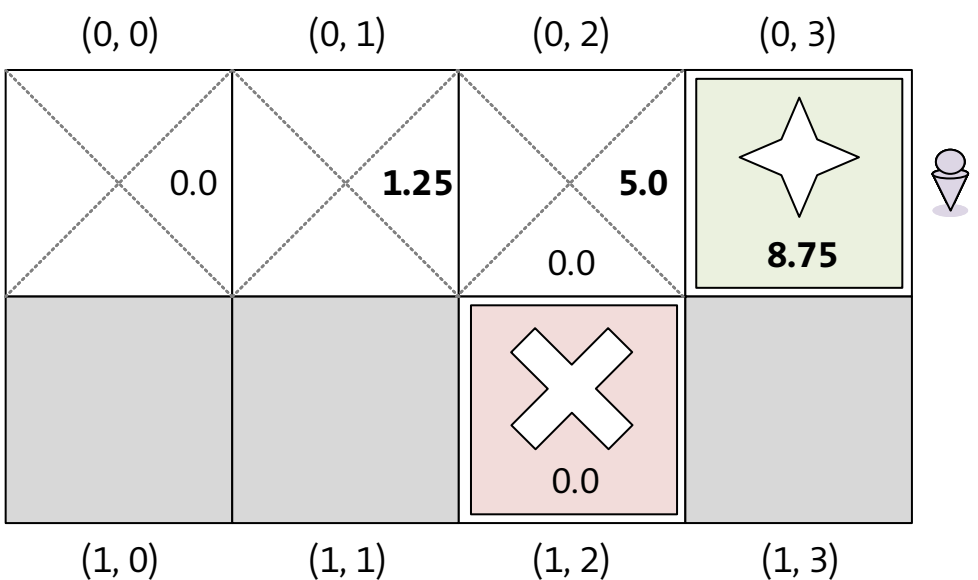
After Episode 1 (R, R, R, X)



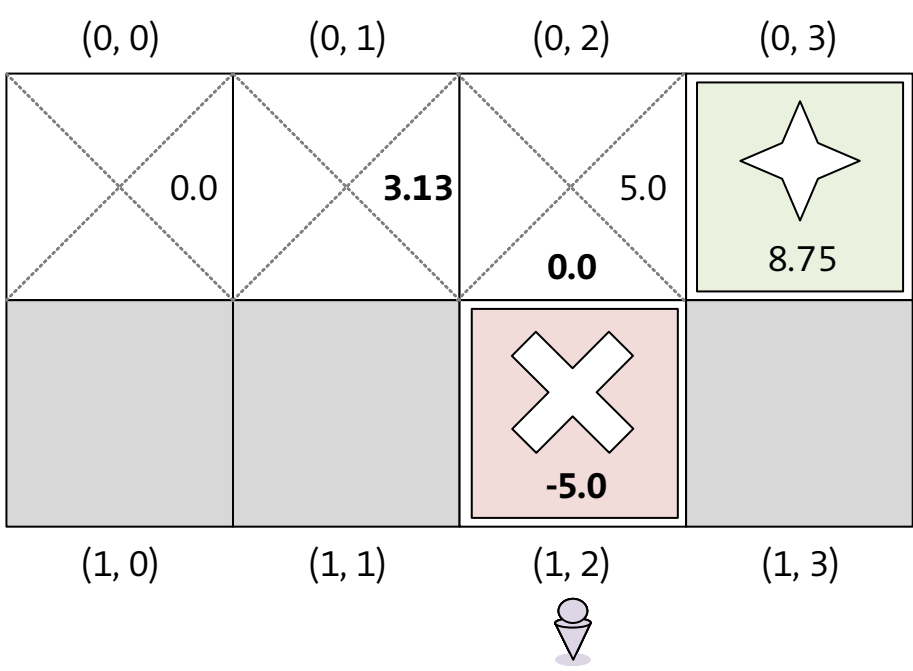
After Episode 2 (R, R, R, X)



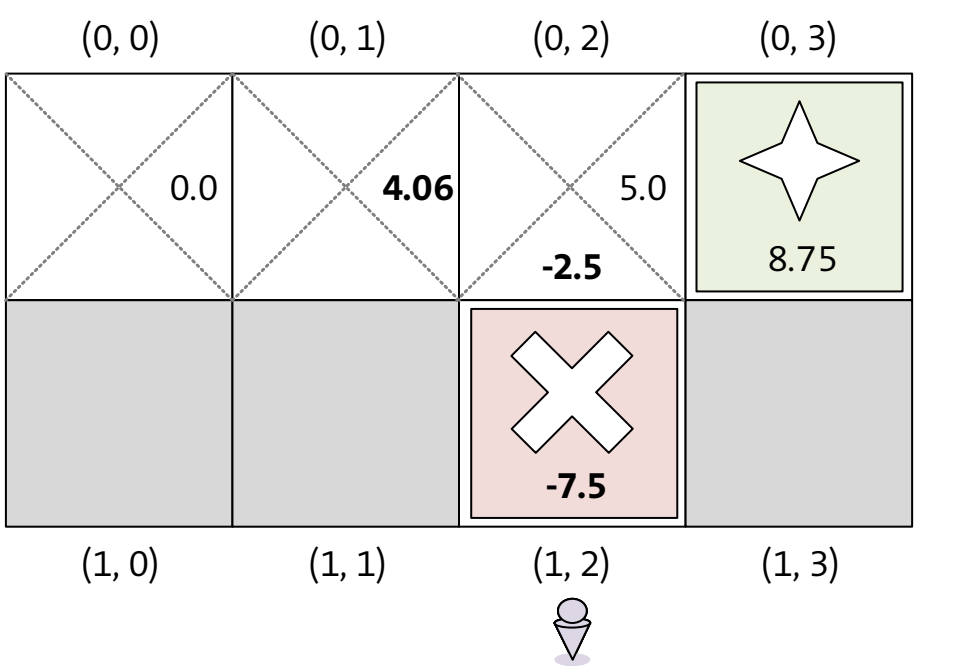
After Episode 3 (R, R, R, X)



After Episode 4 (R, R, D, X)

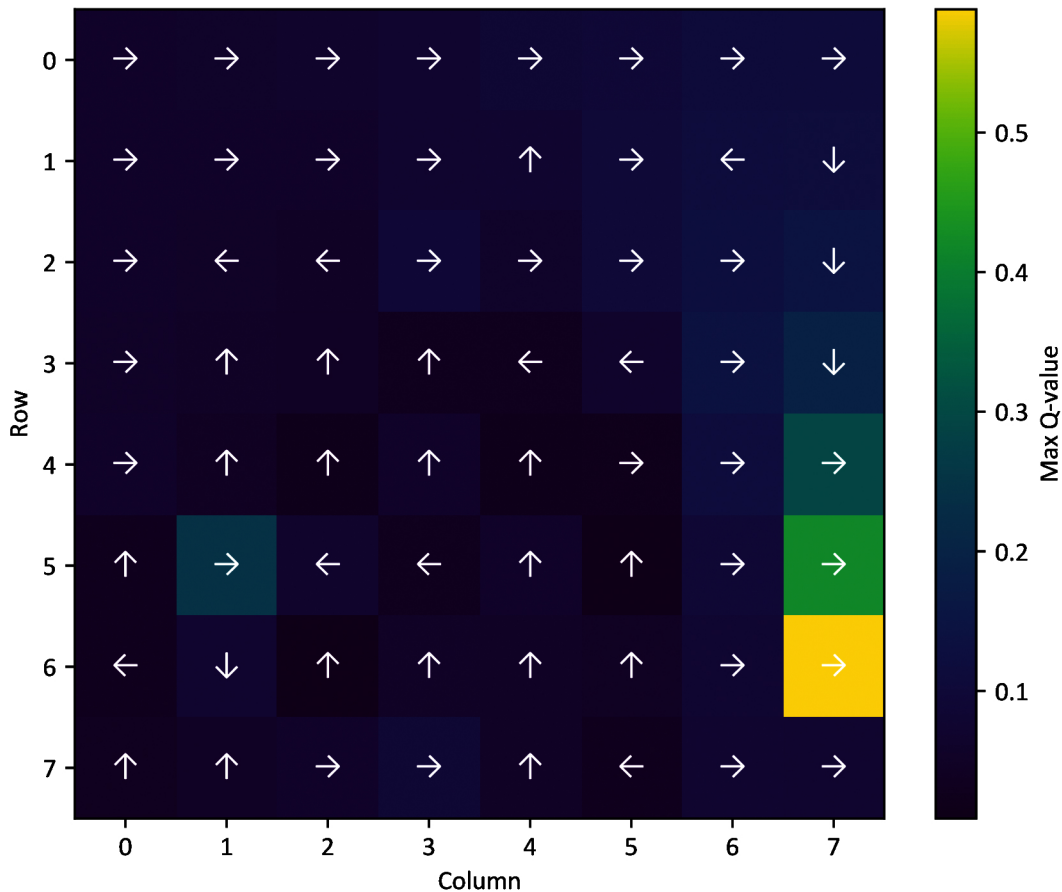


After Episode 5 (R, R, D, X)





Best Action per State (FrozenLake Q-values)



Encoder

Original

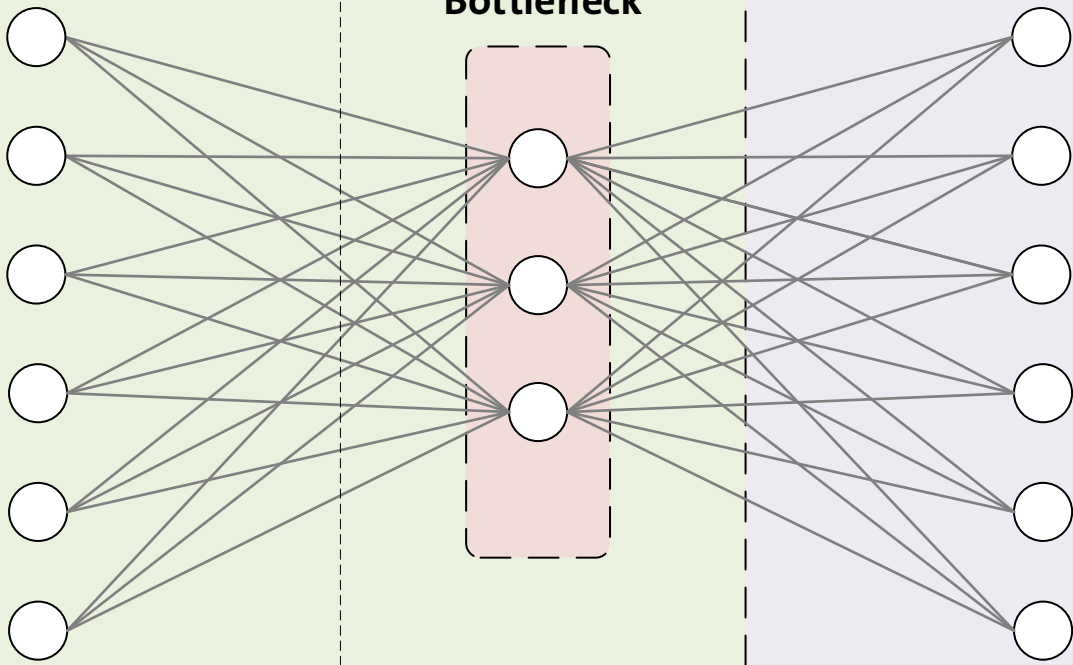


Bottleneck

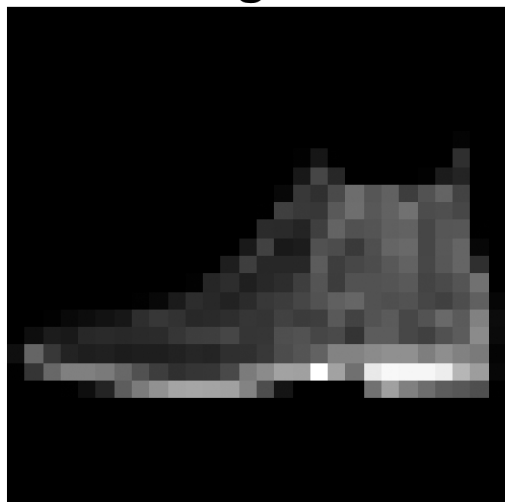


Decoder

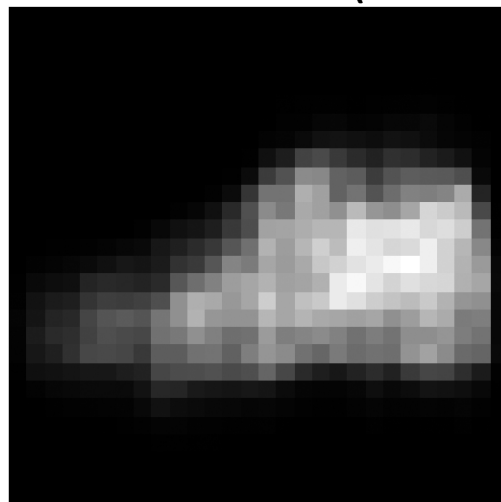
Reconstructed



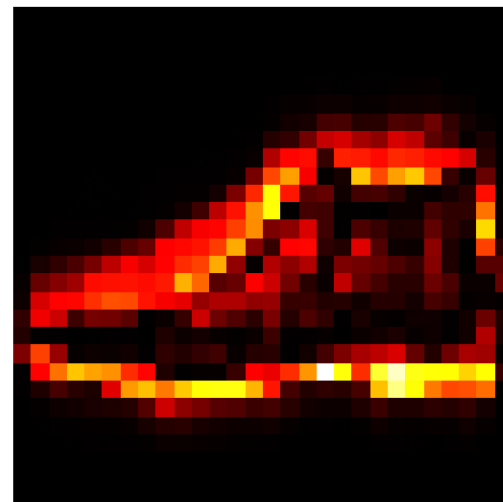
Original



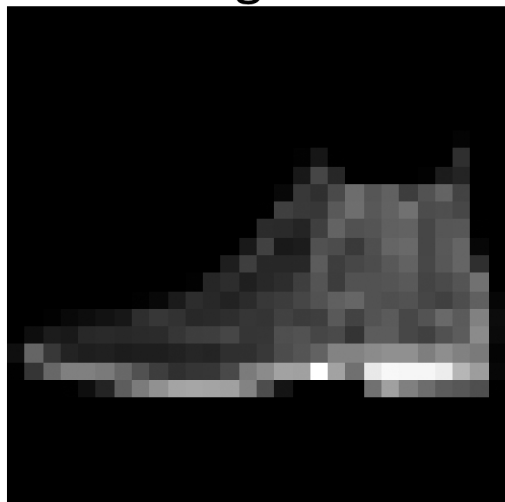
Reconstructed (dim=2)



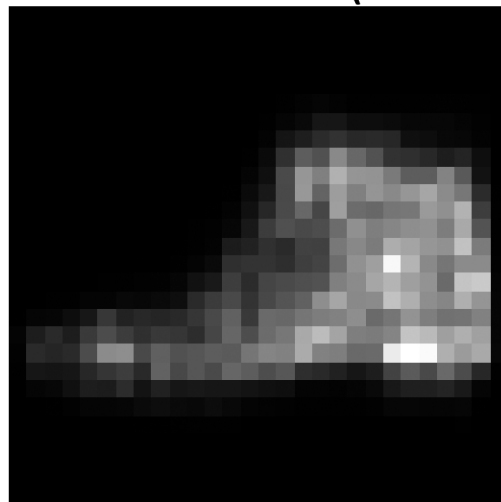
Difference



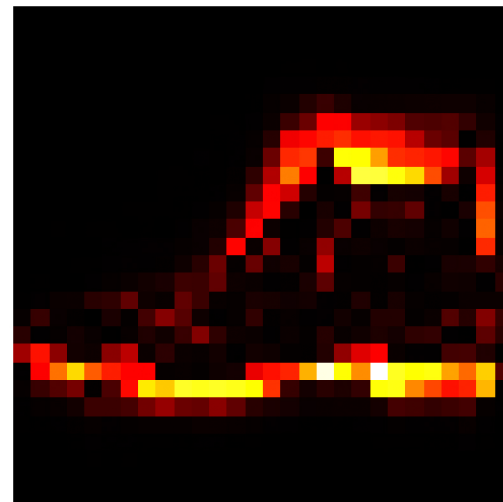
Original



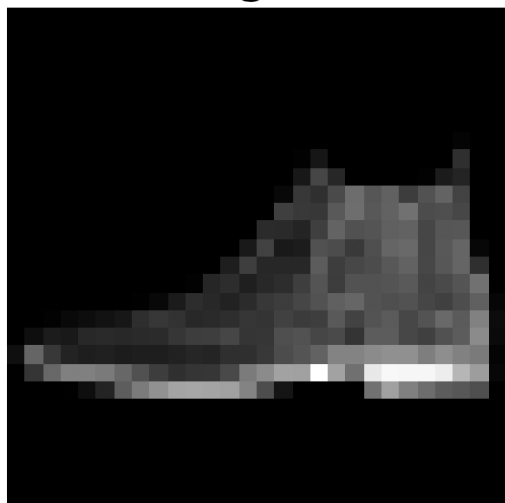
Reconstructed (dim=2)



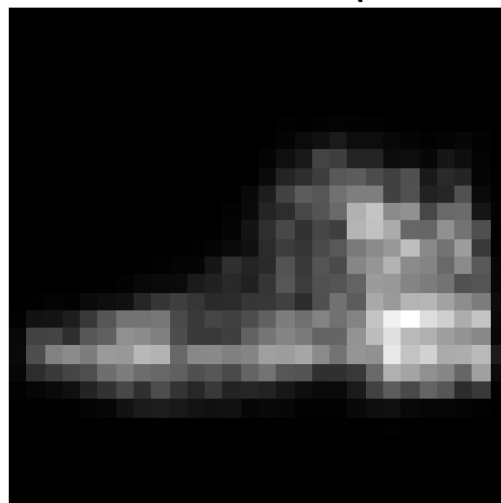
Difference



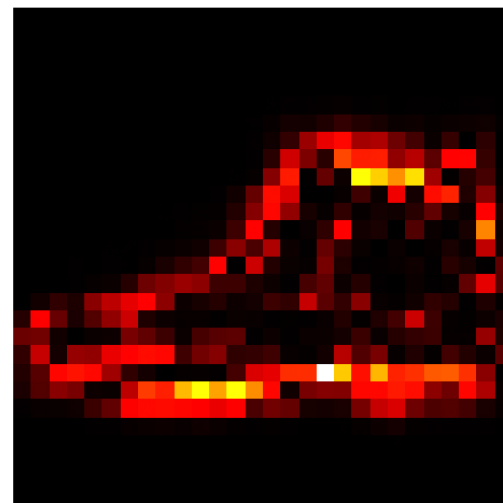
Original



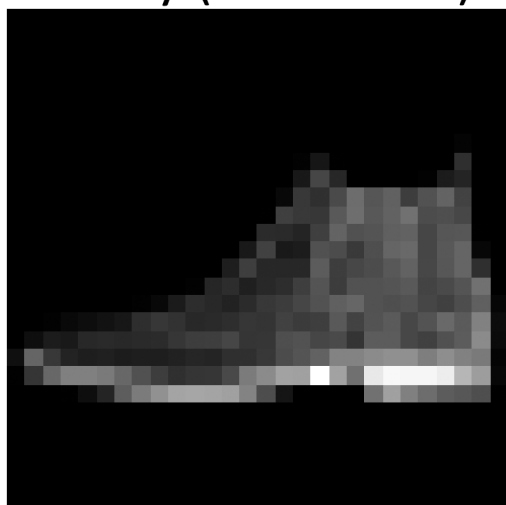
Reconstructed (dim=2)



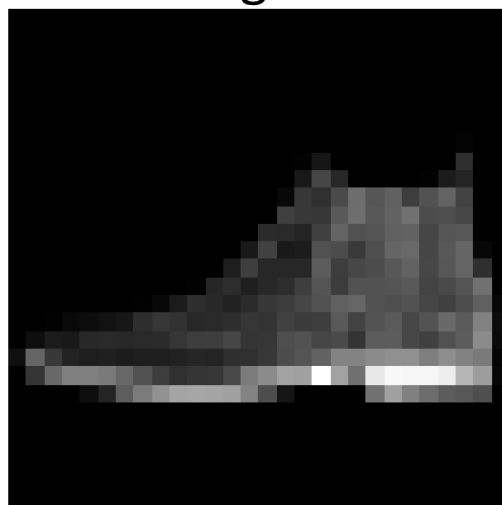
Difference



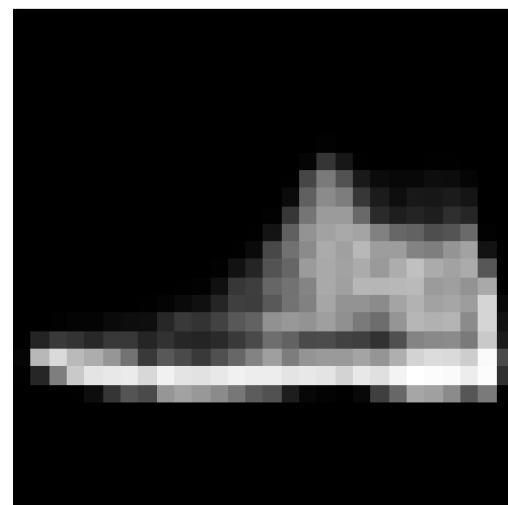
Noisy (factor=0.0)



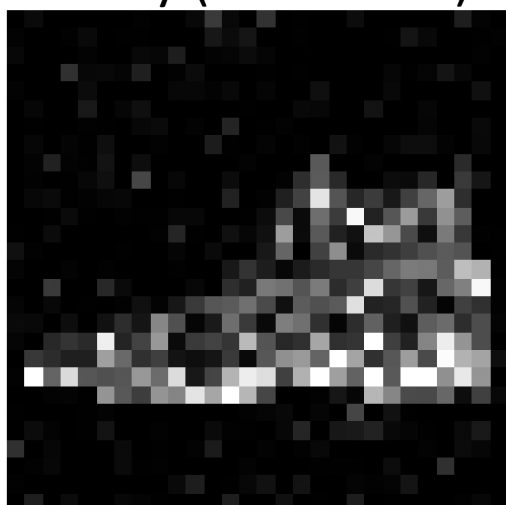
Original



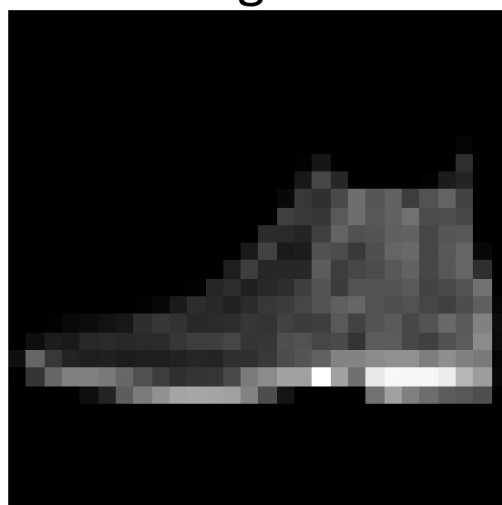
Denoised



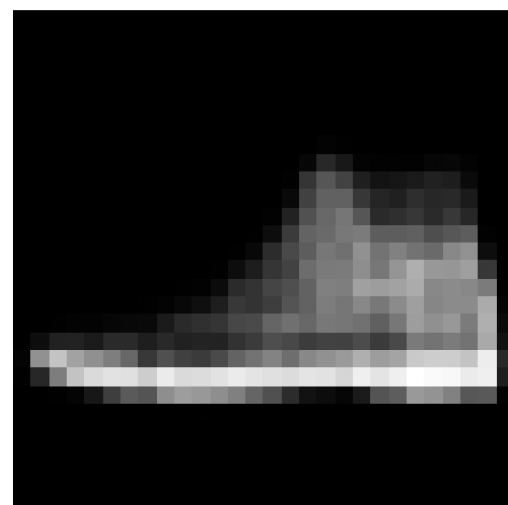
Noisy (factor=0.2)



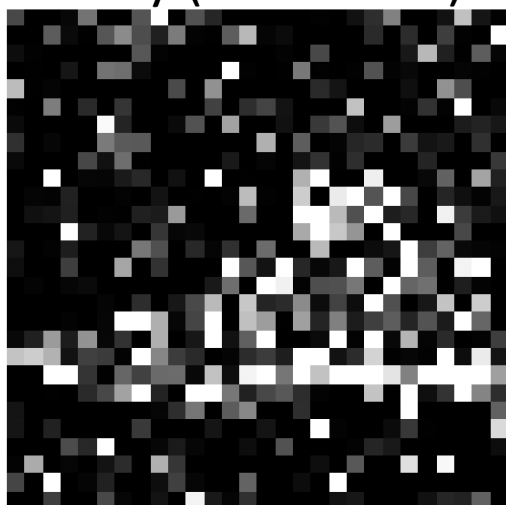
Original



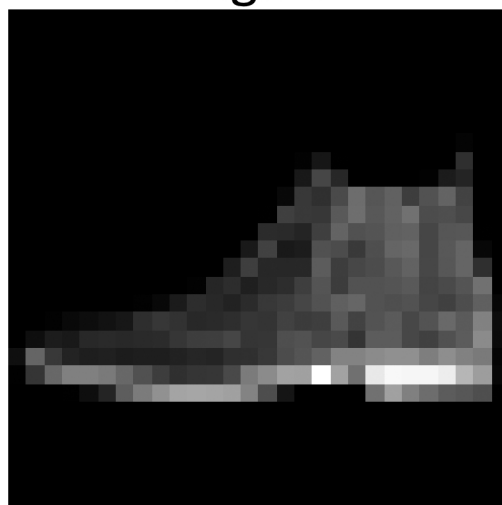
Denoised



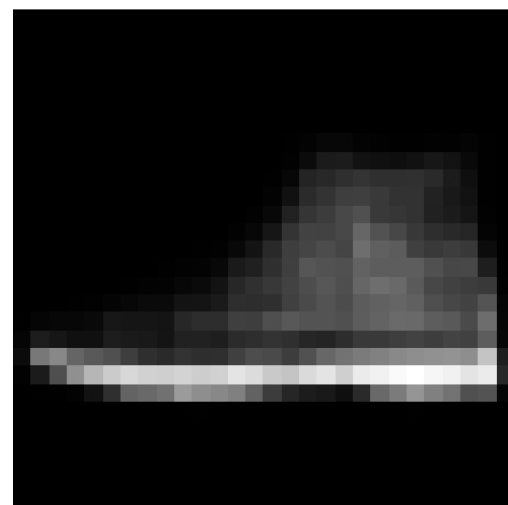
Noisy (factor=0.5)



Original



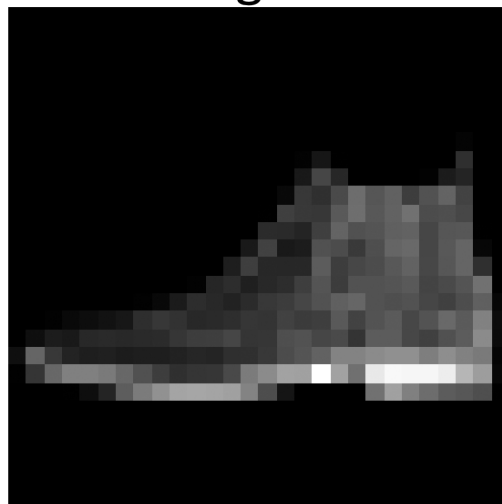
Denoised



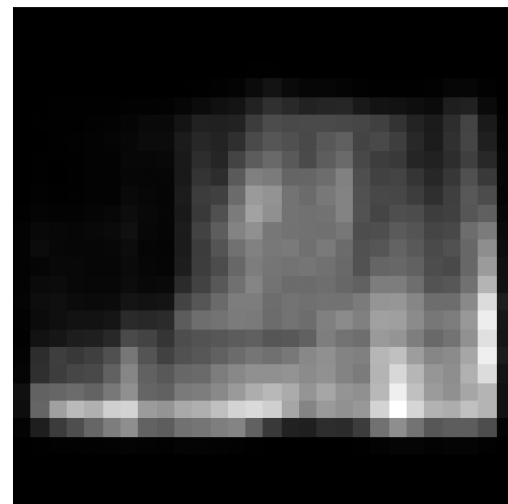
Noisy (factor=1.0)



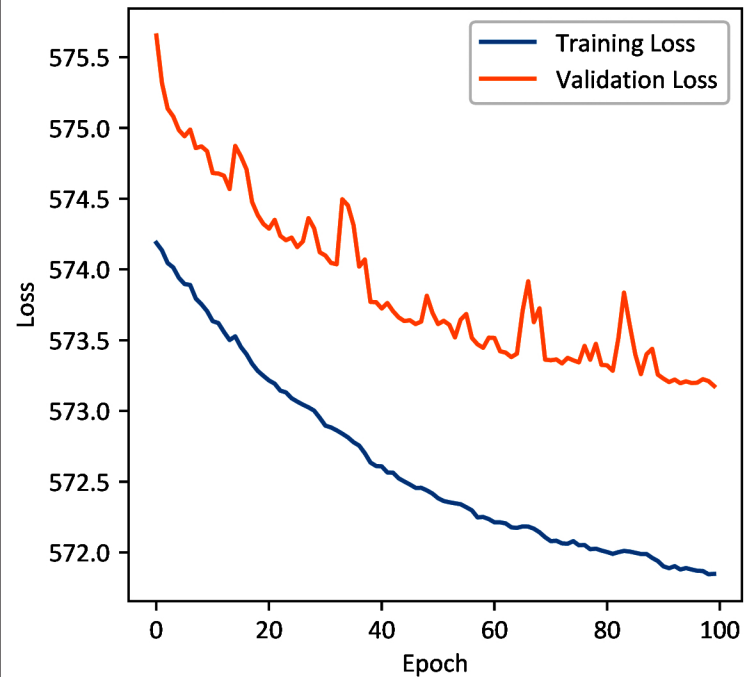
Original



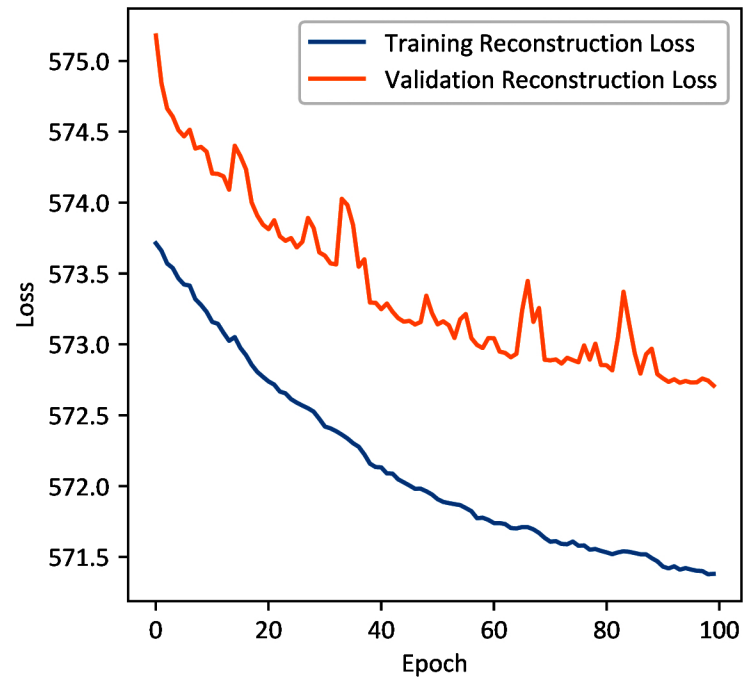
Denoised



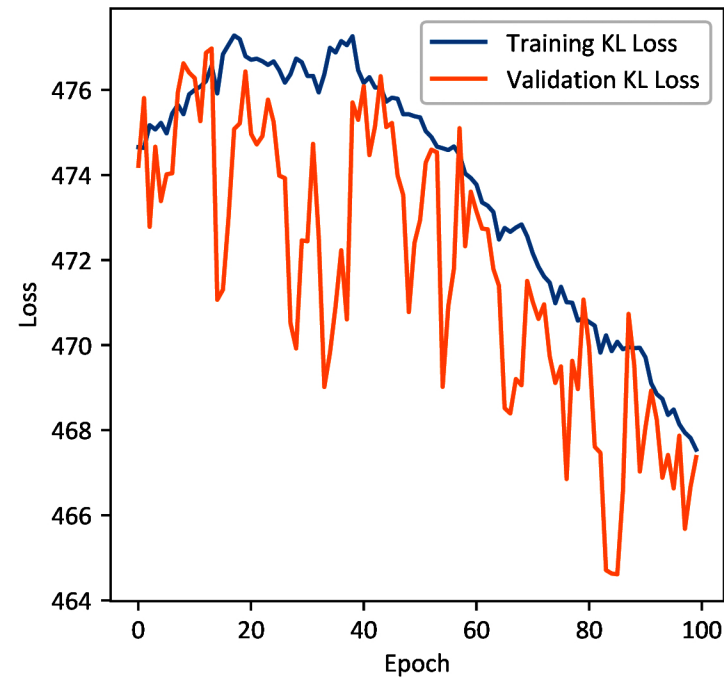
Total Loss



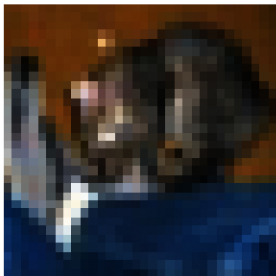
Reconstruction Loss



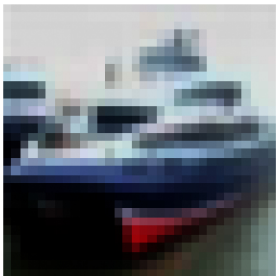
KL Divergence Loss



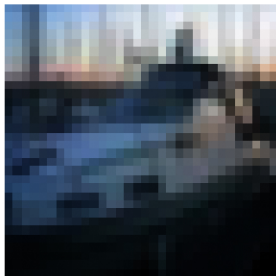
Original cat



Original ship



Original ship



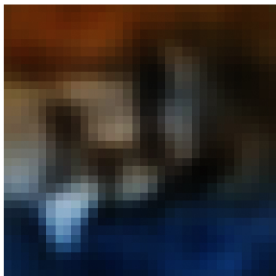
Original airplane



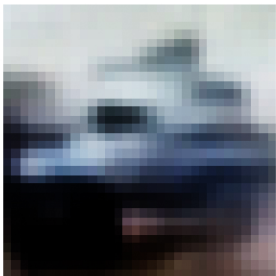
Original frog



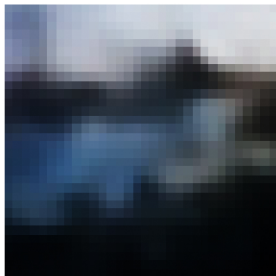
Reconstructed



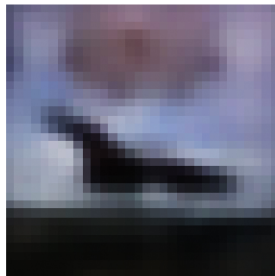
Reconstructed



Reconstructed



Reconstructed



Reconstructed



Start
Image

Step 1

Step 2

Step 3

Step 4

Step 5

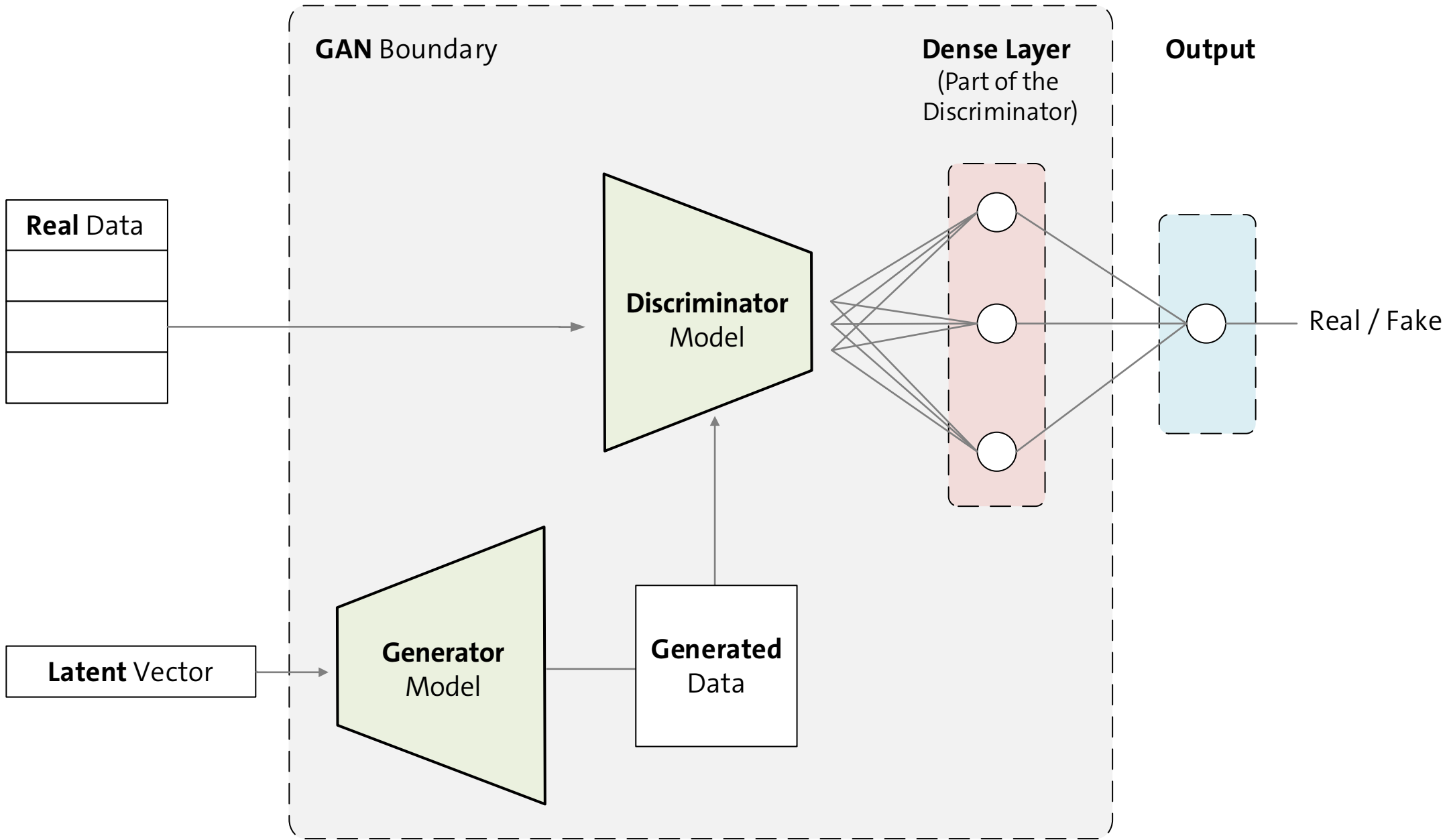
Step 6

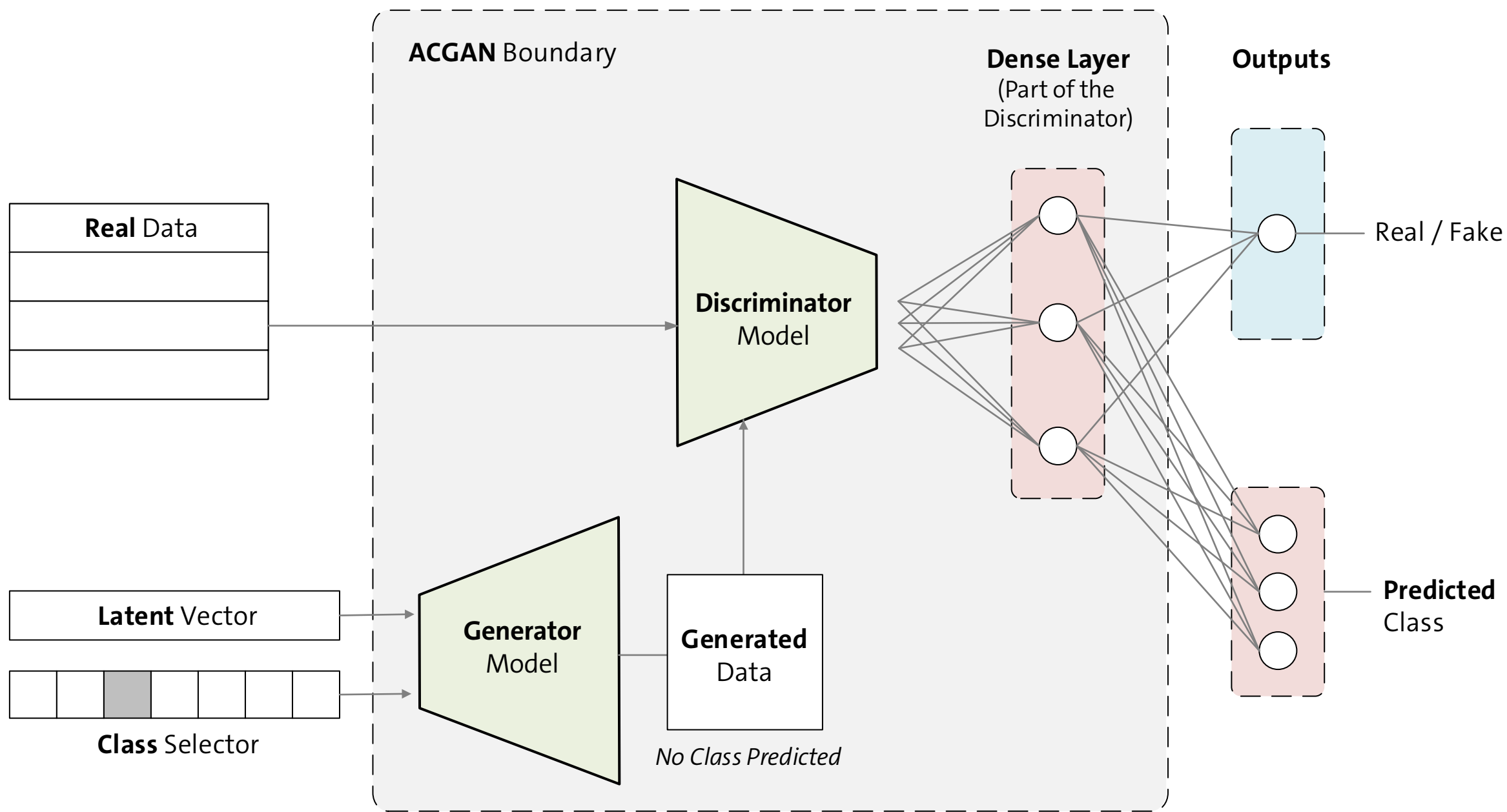
Step 7

Step 8

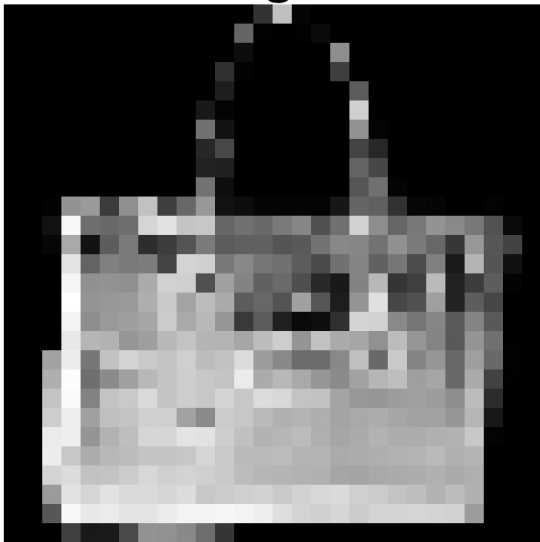
End
Image



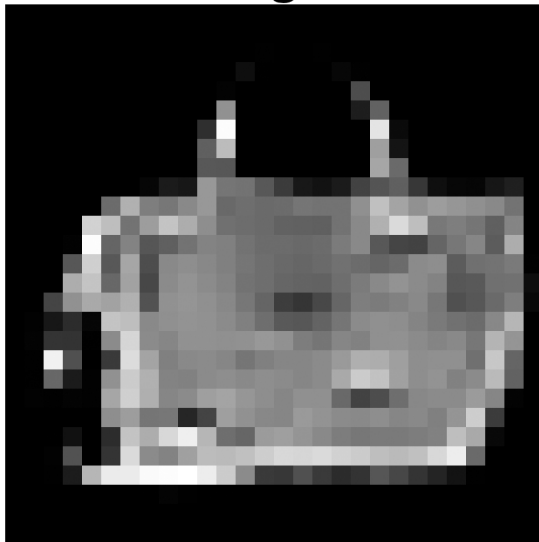




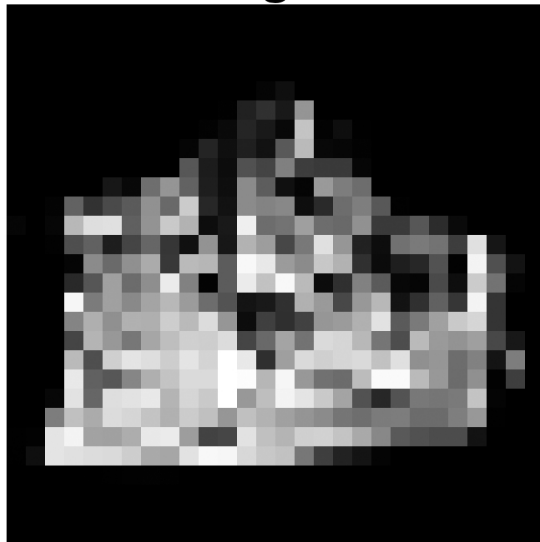
Bag 1

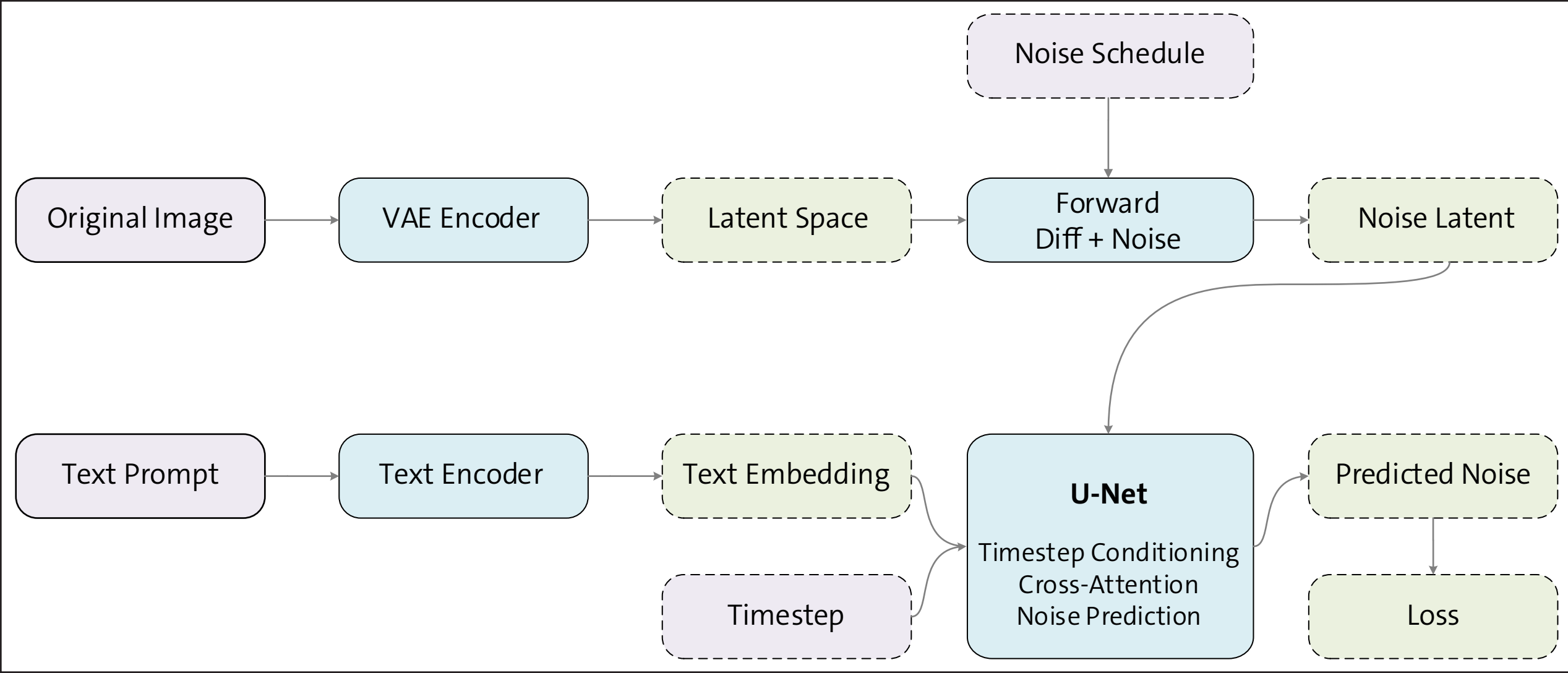


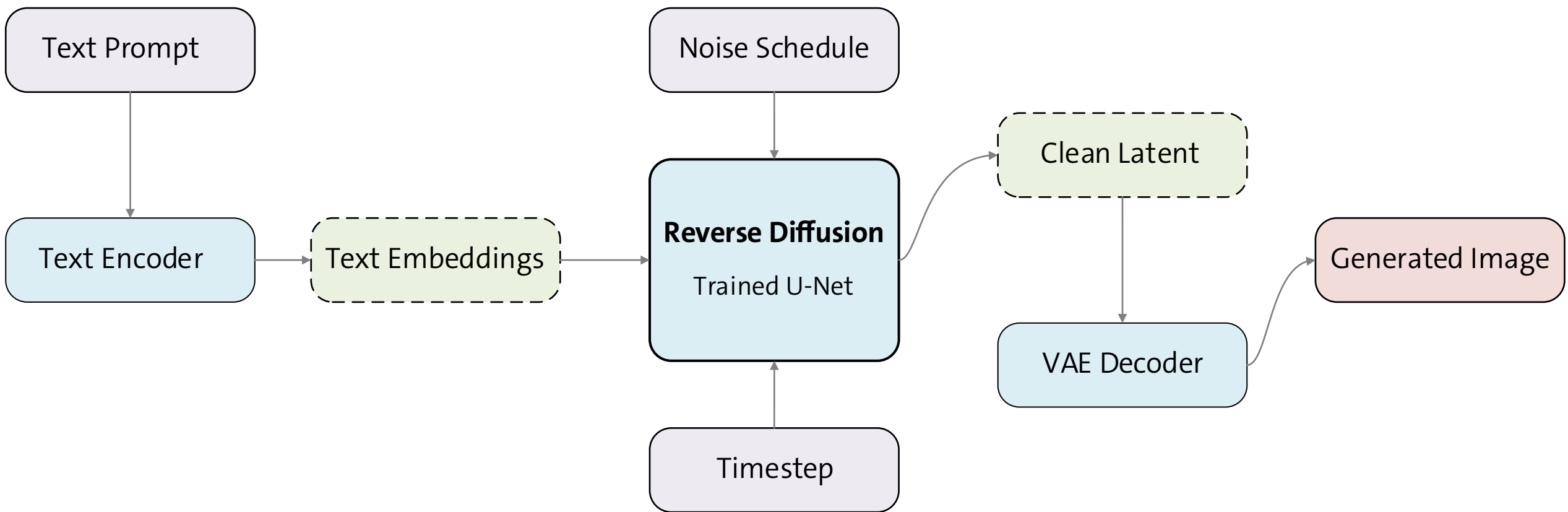
Bag 2

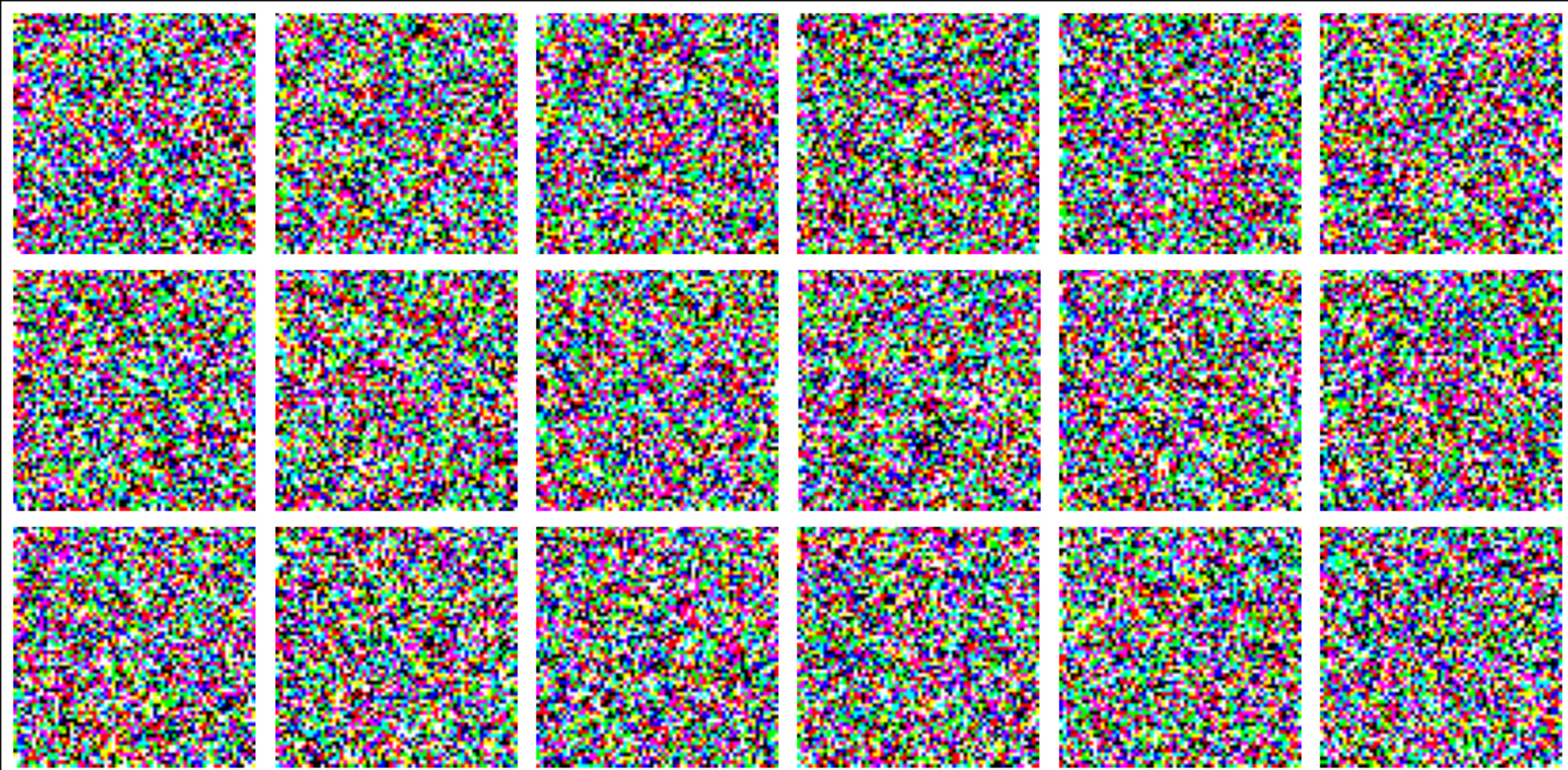


Bag 3

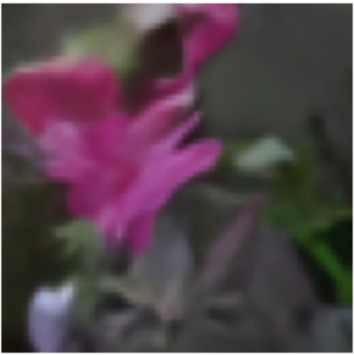
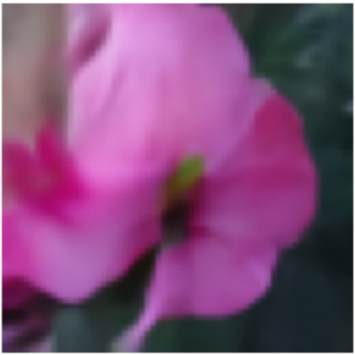
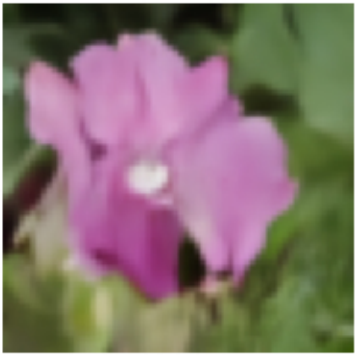
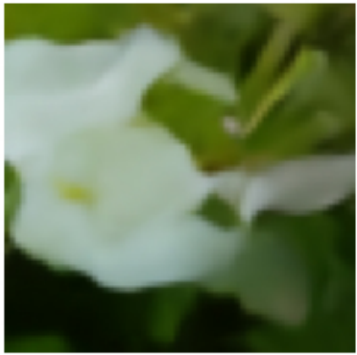
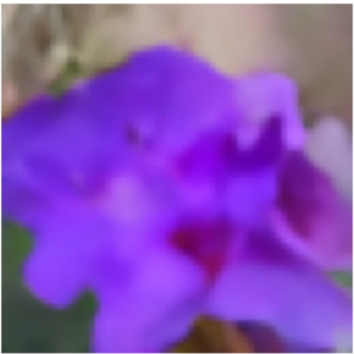
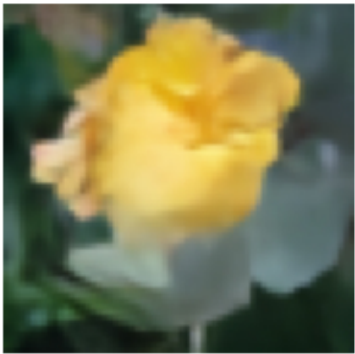
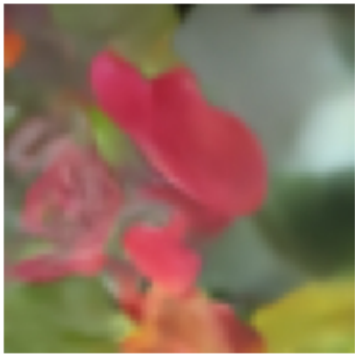
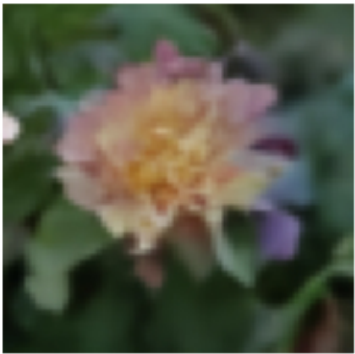
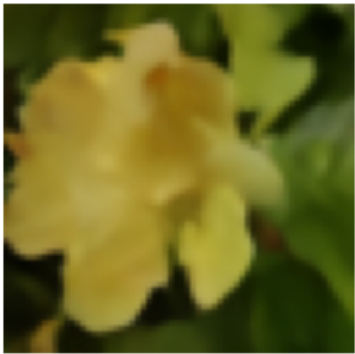
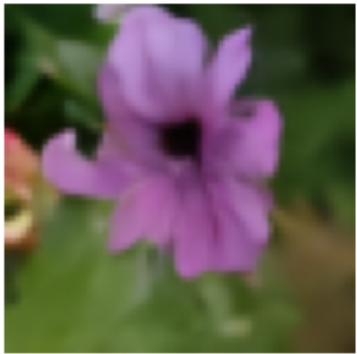
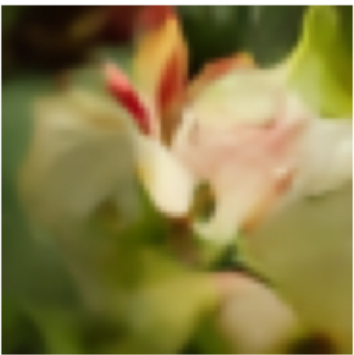
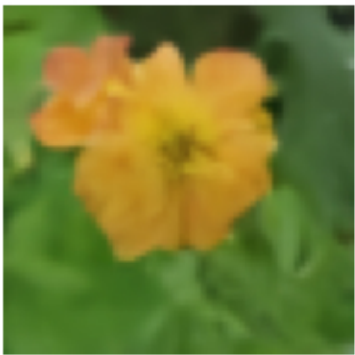
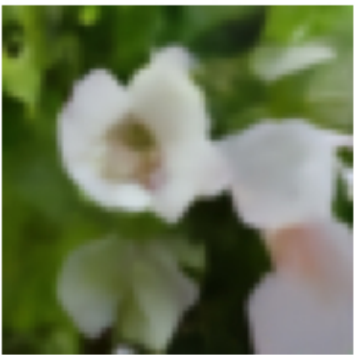
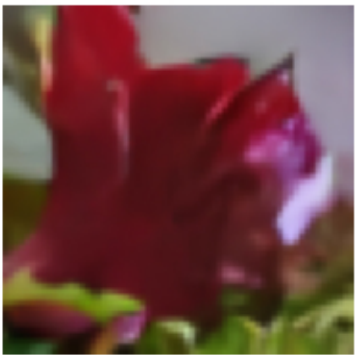
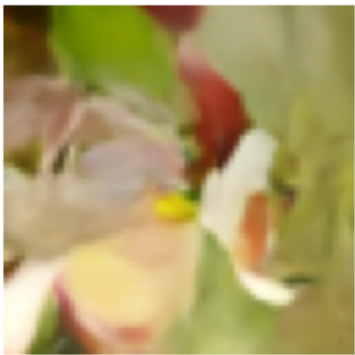
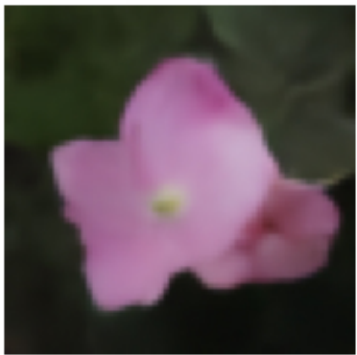




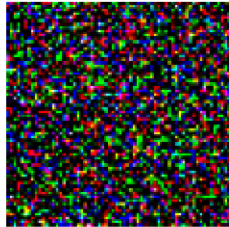




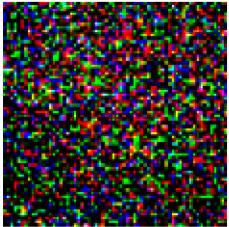




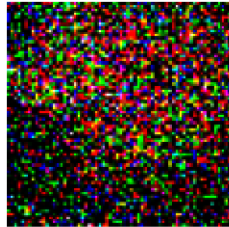
Random
Noise



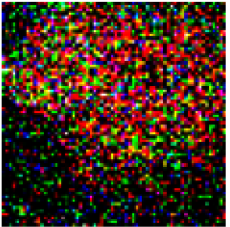
Step 1



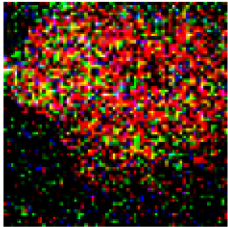
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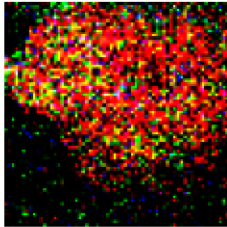
Step 3



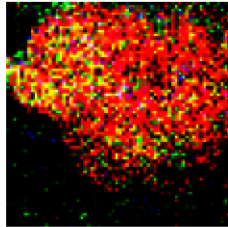
Step 4



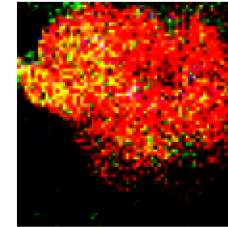
Step 5



Step 6



Step 7



Final
Image

