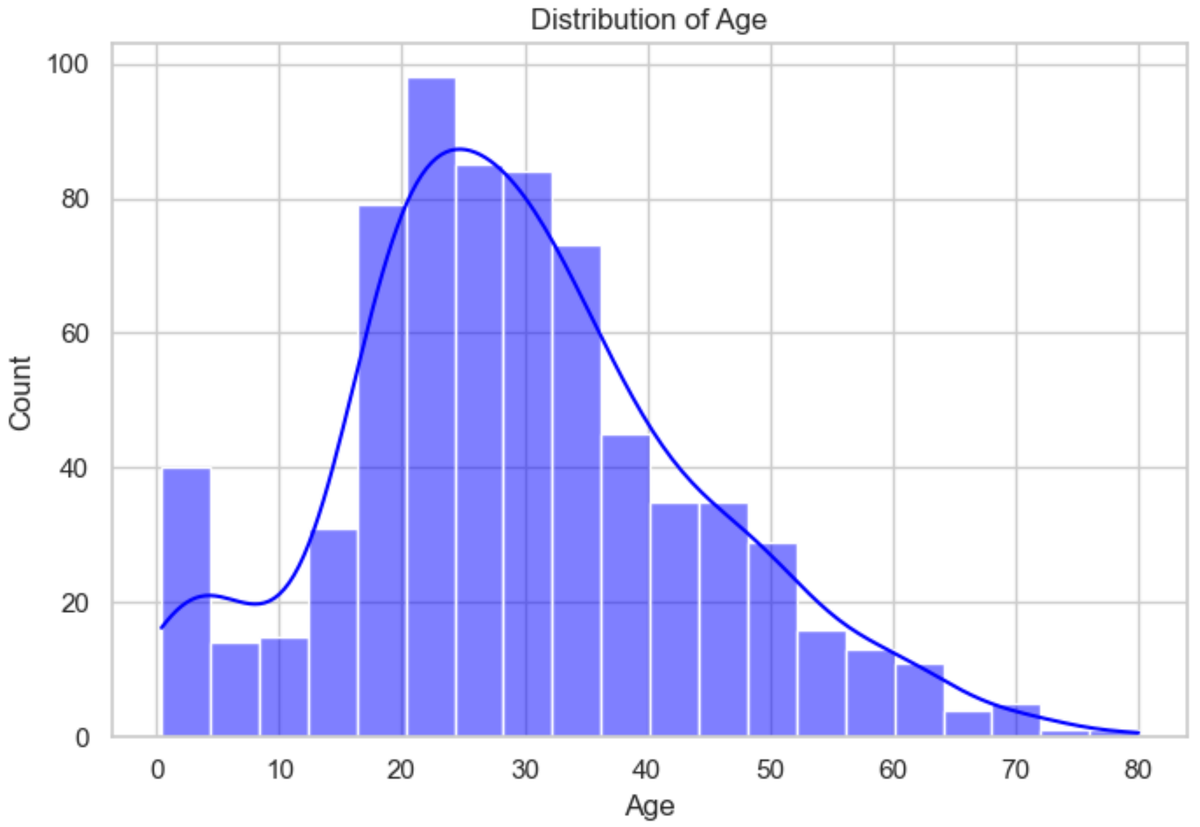
როგორ გადავრჩეთ ტიტანიკზე?

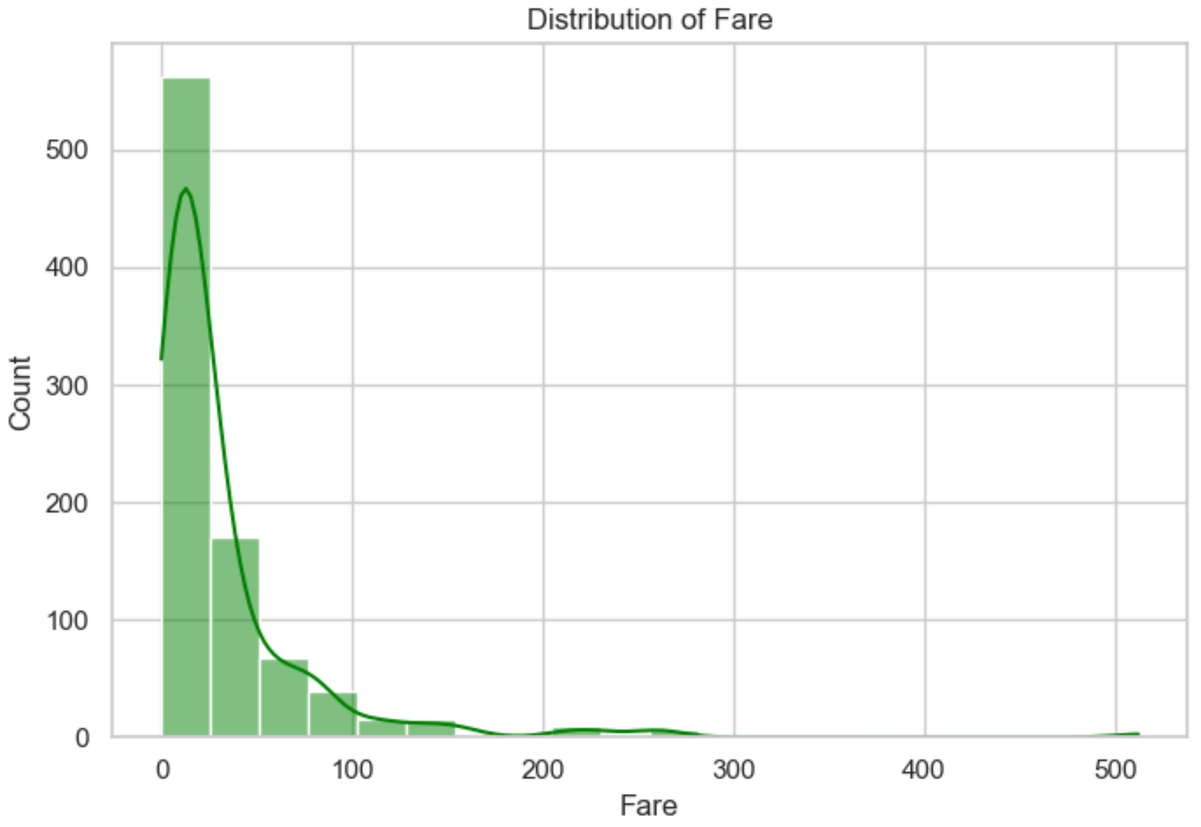
FFNN VS RNN

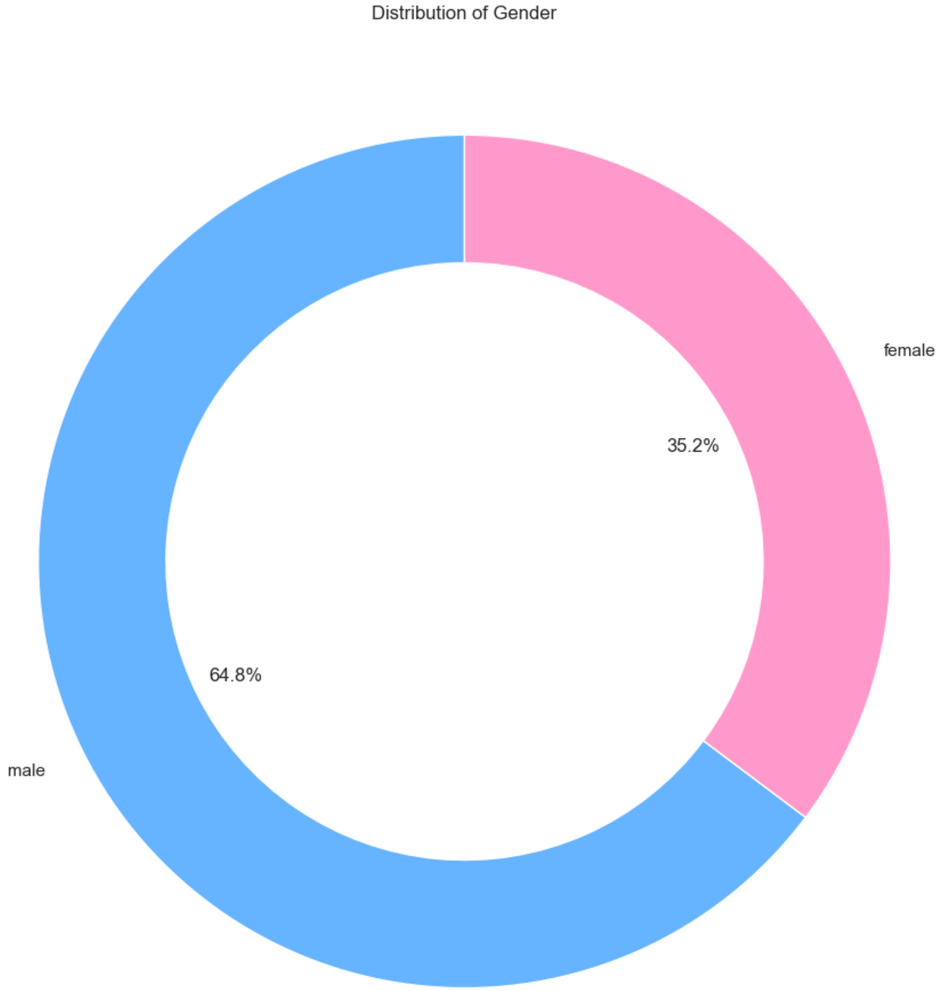
თორნიკე კიკაჩეიშვილი

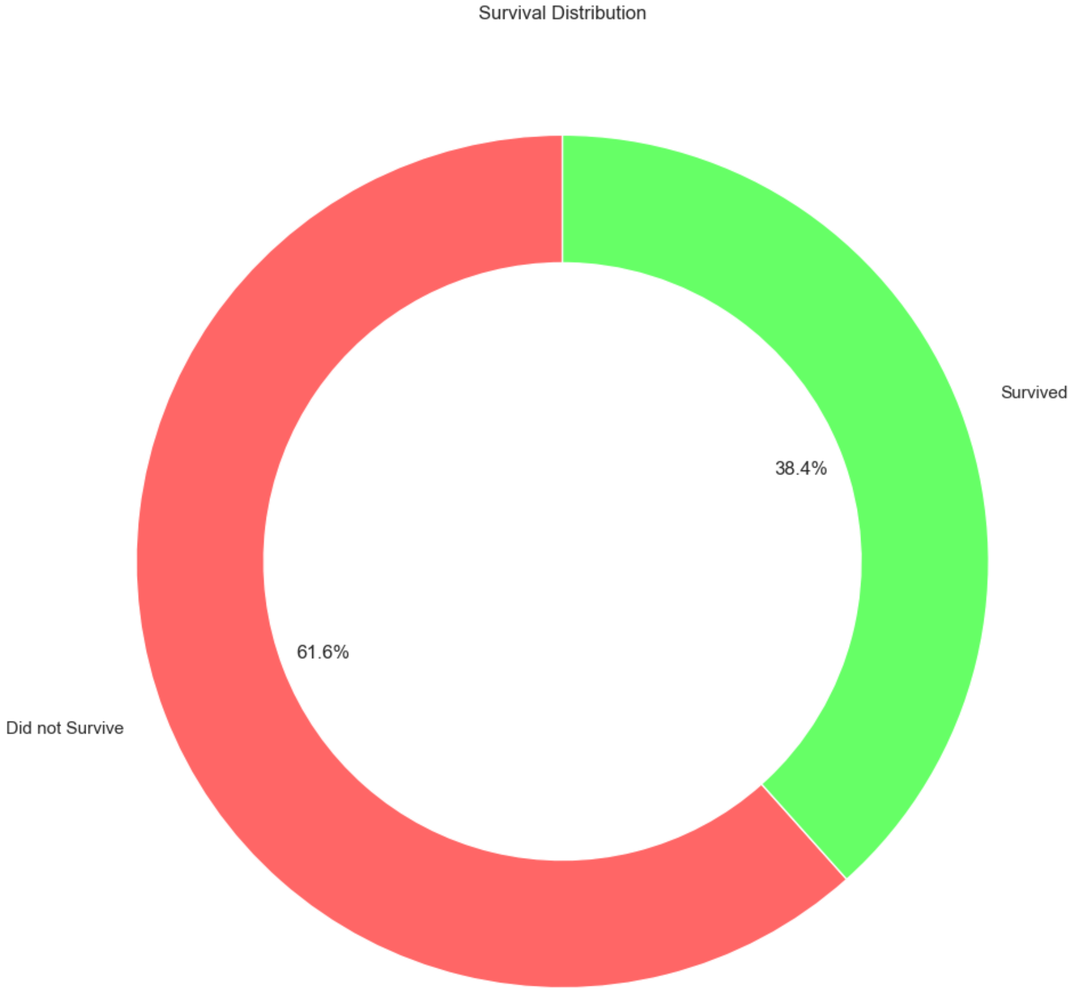
მონაცემები

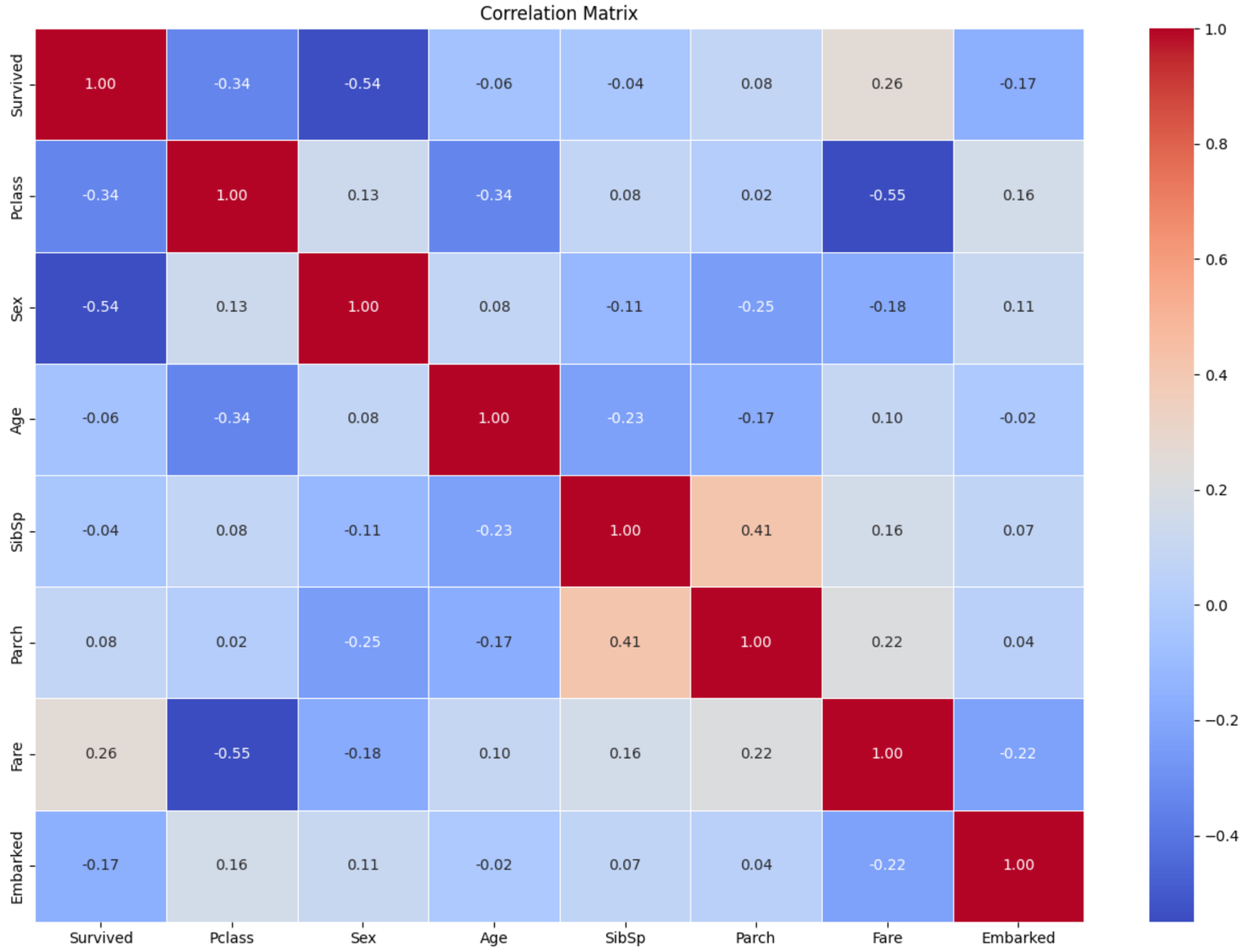
Variable	Definition	Key
survival	Survival	0 = No, 1 = Yes
pclass	Ticket class	1 = 1st, 2 = 2nd, 3 = 3rd
sex	Sex	
Age	Age in years	
sibsp	# of siblings / spouses aboard the Titanic	
parch	# of parents / children aboard the Titanic	
ticket	Ticket number	
fare	Passenger fare	
cabin	Cabin number	
embarked	Port of Embarkation	C = Cherbourg, Q = Queenstown, S = Southampton


Distribution of Age
Count
Age
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80

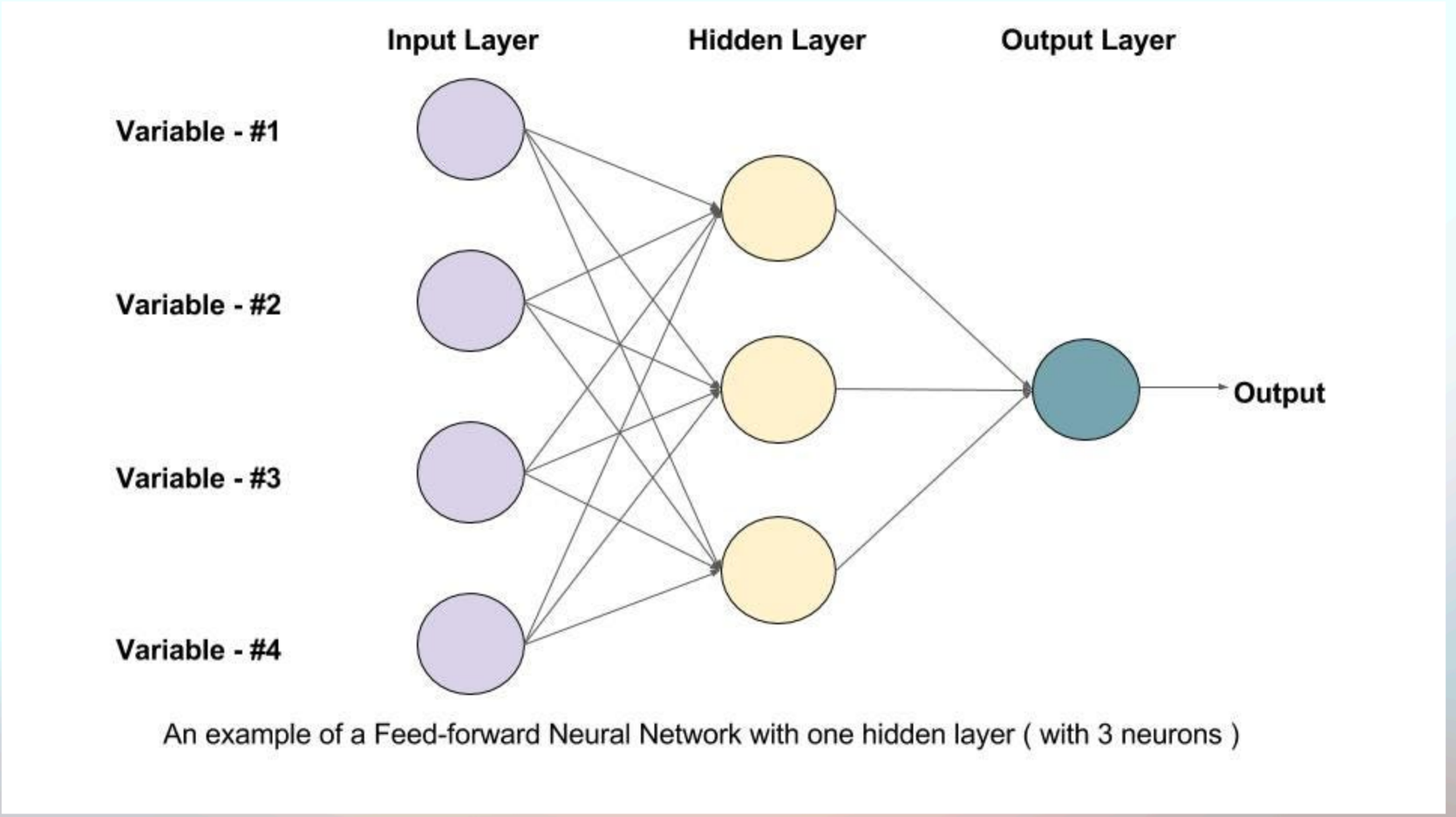

Distribution of Fare
Count
Fare
0
100
200
300
400
500
0
100
200
300
400
500


Distribution of Gender
female
35.2%
64.8%
male


Survival Distribution
Survived
38.4%
61.6%
Did not Survive


Correlation Matrix
Survived
Pclass
Sex
Age
SibSp
Parch
Fare
Embarked
1.00 -0.34 -0.54 -0.06 -0.04 0.08 0.26 -0.17
-0.34 1.00 0.13 -0.34 0.08 0.02 -0.55 0.16
-0.54 0.13 1.00 0.08 -0.11 -0.25 -0.18 0.11
-0.06 -0.34 0.08 1.00 -0.23 -0.17 0.10 -0.02
-0.04 0.08 -0.11 -0.23 1.00 0.41 0.16 0.07
0.08 0.02 -0.25 -0.17 0.41 1.00 0.22 0.04
0.26 -0.55 -0.18 0.10 0.16 0.22 1.00 -0.22
-0.17 0.16 0.11 -0.02 0.07 0.04 -0.22 1.00
Survived
Pclass
Sex
Age
SibSp
Parch
Fare
Embarked
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4

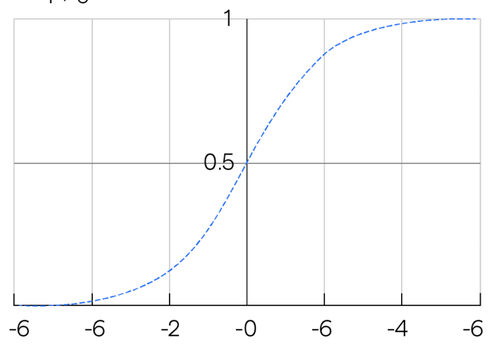
FFNN



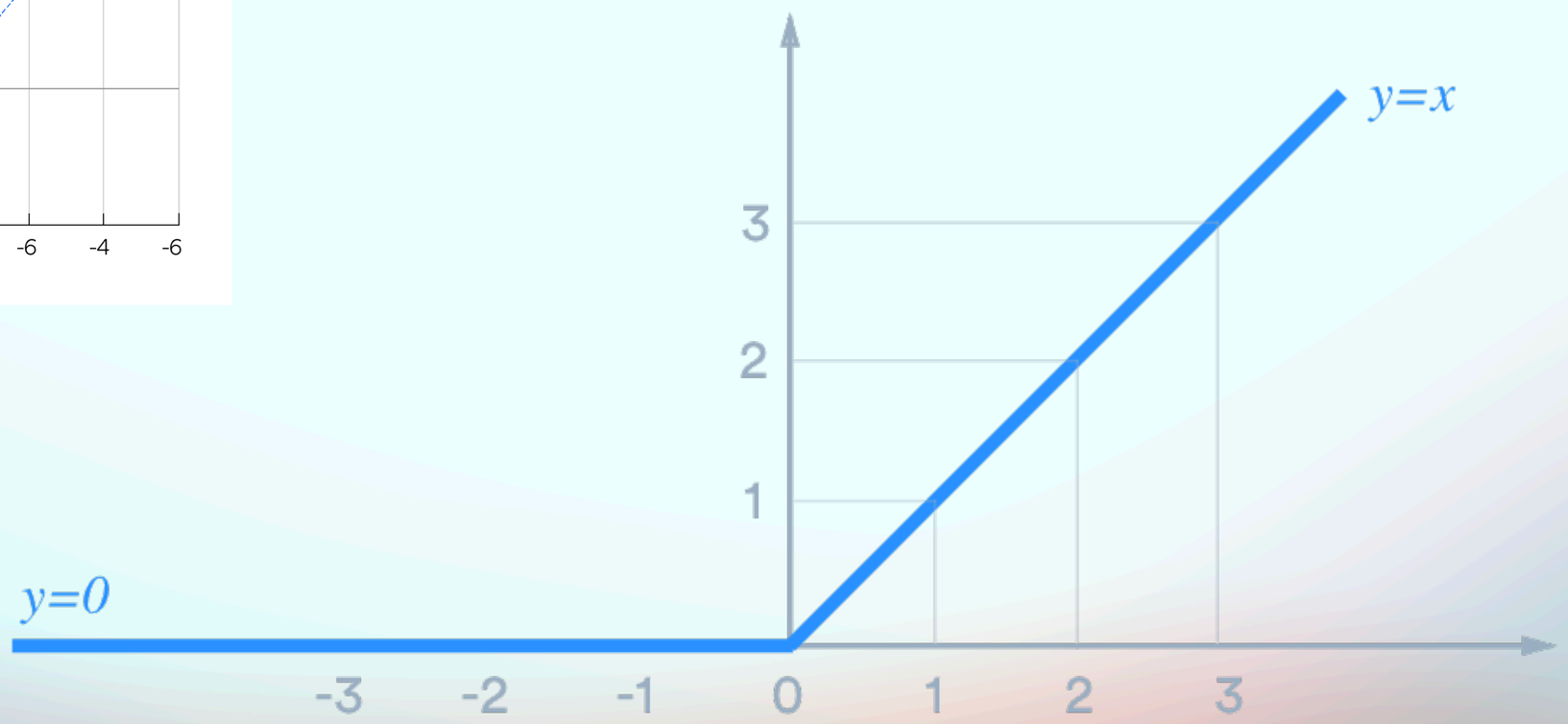
An example of a Feed-forward Neural Network with one hidden layer (with 3 neurons)

Sigmoid Function

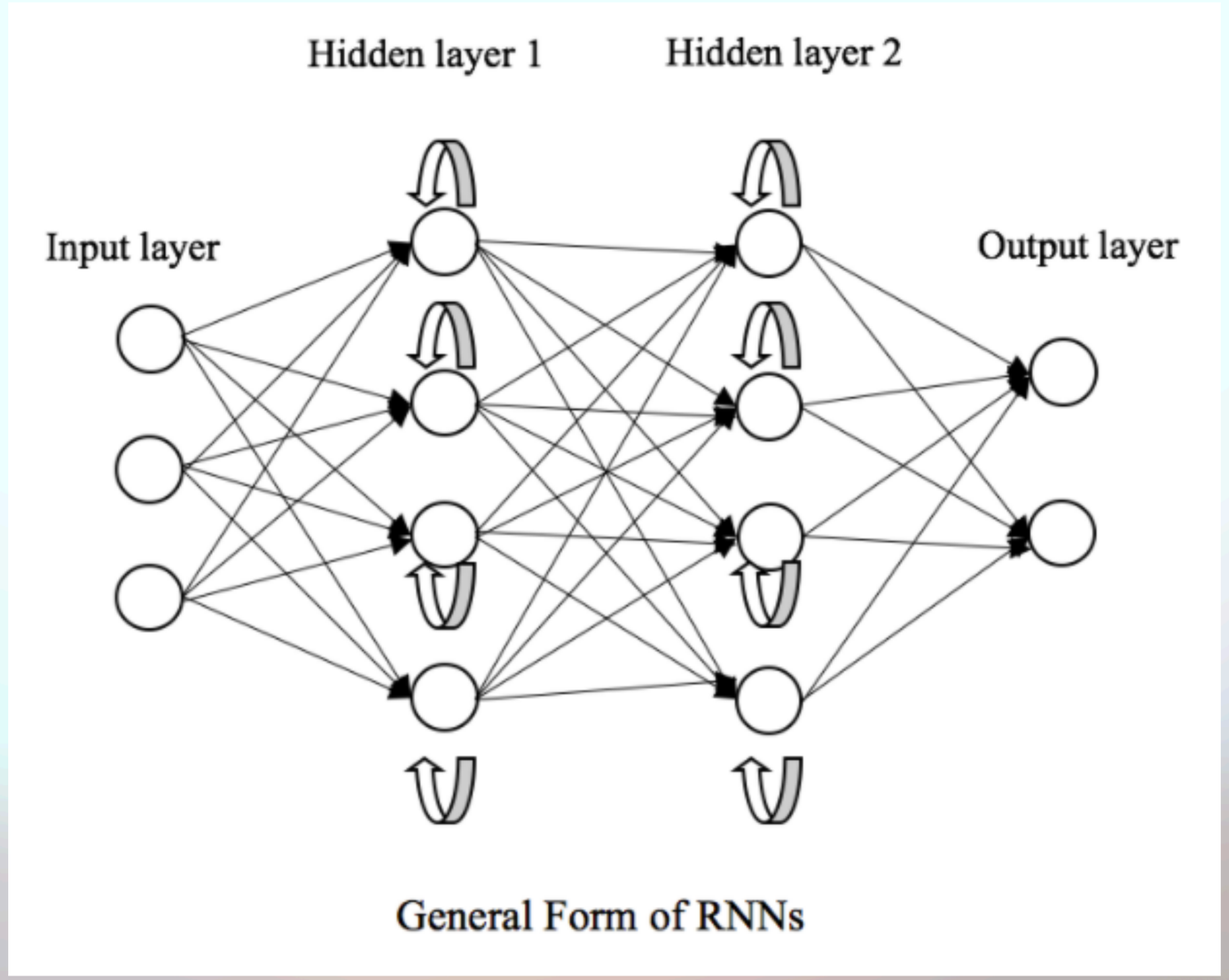
$$f(x) = \frac{1}{1 + e^{-fx}}$$



ReLu



RNN



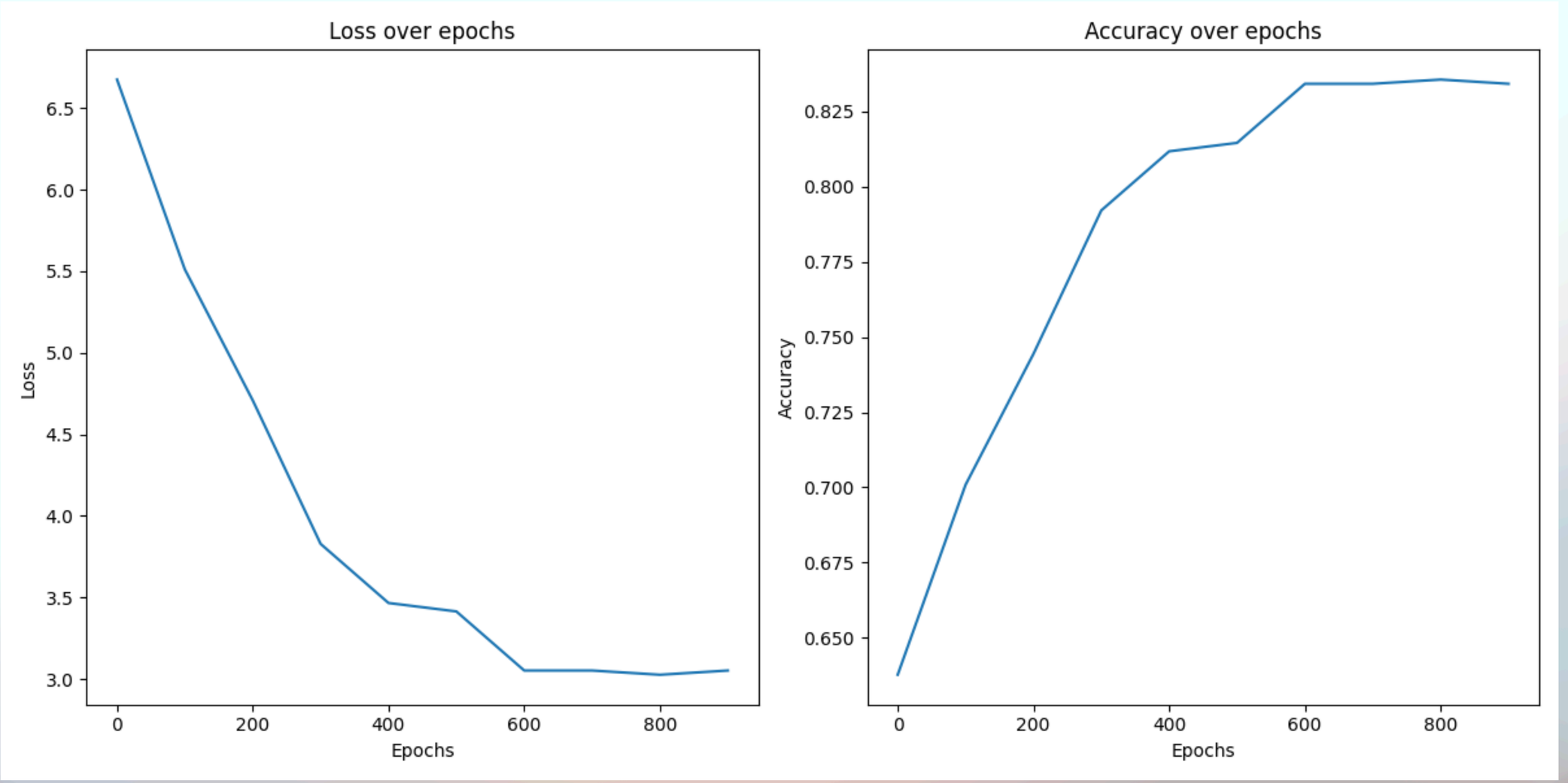
General Form of RNNs

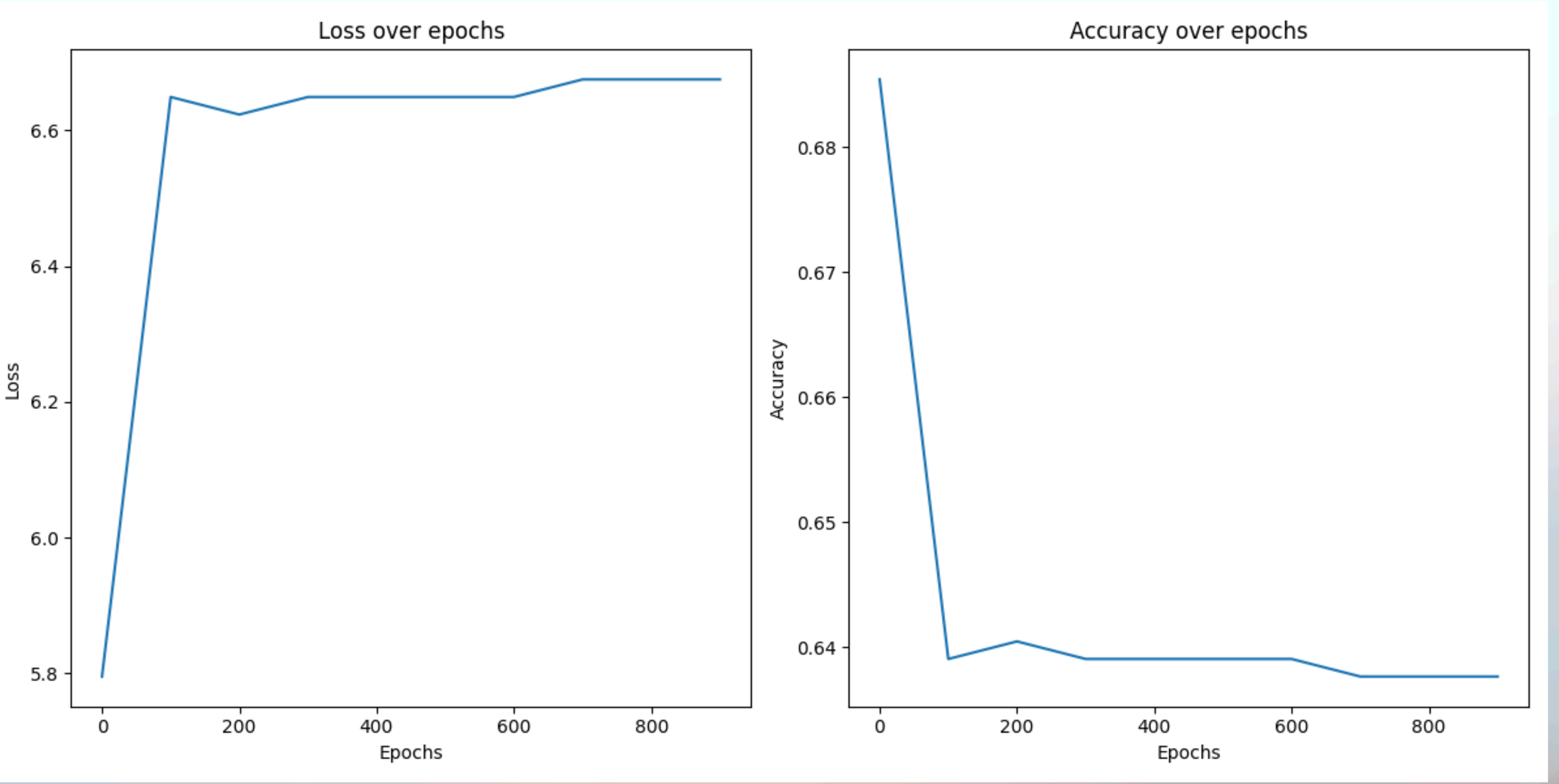
- Training the FFNN model...
- Epoch 0, Loss: 7.0371, Accuracy: 0.6180
- Epoch 100, Loss: 3.8549, Accuracy: 0.7907
- Epoch 200, Loss: 3.4151, Accuracy: 0.8146
- Epoch 300, Loss: 3.2340, Accuracy: 0.8244
- Epoch 400, Loss: 3.1822, Accuracy: 0.8272
- Epoch 500, Loss: 3.0529, Accuracy: 0.8343
- Epoch 600, Loss: 3.1305, Accuracy: 0.8301
- Epoch 700, Loss: 3.1305, Accuracy: 0.8301
- Epoch 800, Loss: 3.0270, Accuracy: 0.8357
- Epoch 900, Loss: 3.0270, Accuracy: 0.8357

- Evaluating on the validation set...
- Validation Loss: 3.9105, Validation Accuracy: 0.7877

- Training the RNN model...
- Epoch 0, Loss: 6.0022, Accuracy: 0.6742
- Epoch 100, Loss: 6.6749, Accuracy: 0.6376
- Epoch 200, Loss: 6.6490, Accuracy: 0.6390
- Epoch 300, Loss: 6.6490, Accuracy: 0.6390
- Epoch 400, Loss: 6.6490, Accuracy: 0.6390
- Epoch 500, Loss: 6.6490, Accuracy: 0.6390
- Epoch 600, Loss: 6.6490, Accuracy: 0.6390
- Epoch 700, Loss: 6.6490, Accuracy: 0.6390
- Epoch 800, Loss: 6.6749, Accuracy: 0.6376
- Epoch 900, Loss: 6.6749, Accuracy: 0.6376

- Evaluating the model on the validation set...
- Validation Loss: 7.1007, Validation Accuracy: 0.6145


Loss over epochs
Loss
Epochs
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
200
400
600
800
Accuracy over epochs
Accuracy
Epochs
0.825
0.800
0.775
0.750
0.725
0.700
0.675
0.650
0
200
400
600
800


Loss over epochs
Loss
6.6
6.4
6.2
6.0
5.8
0
200
400
600
800
Epochs
Accuracy over epochs
Accuracy
0.68
0.67
0.66
0.65
0.64
0
200
400
600
800
Epochs