Deep Learning and Spiking Neural Network Project Report

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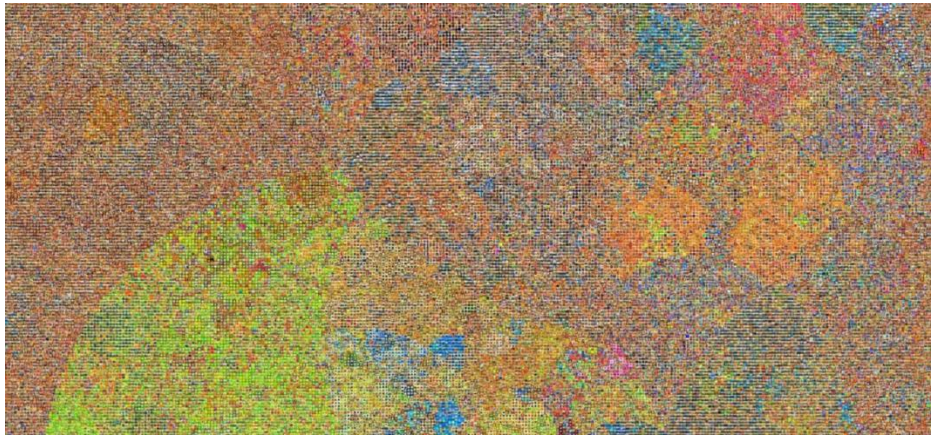
Introduction

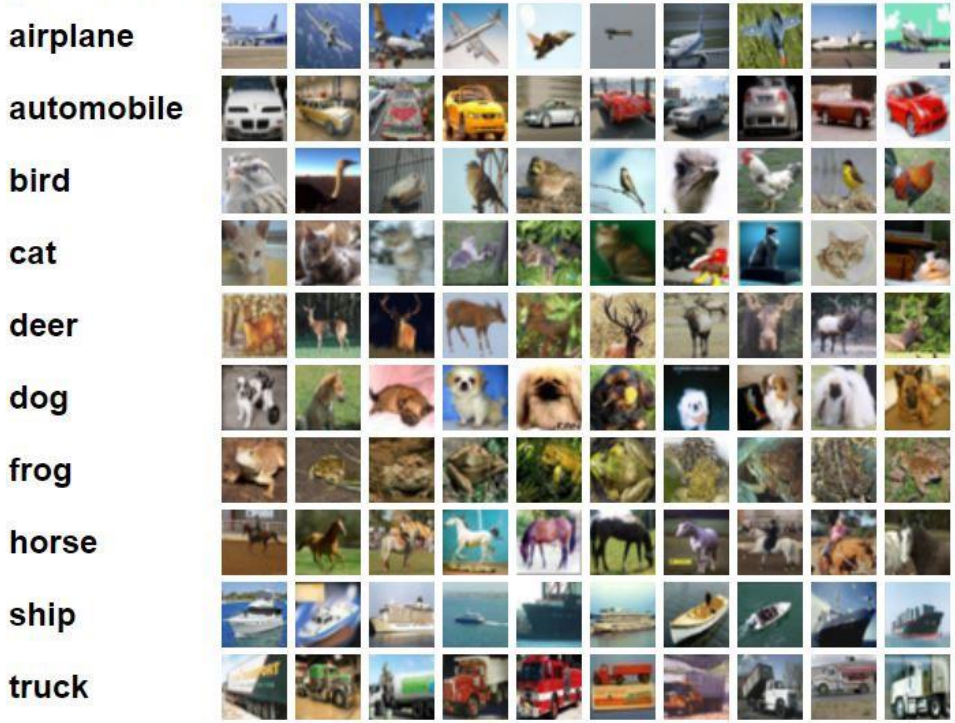
- Deep learning in general terms, implies a learning technique that learns features in layers.
- It is a technique that enables computers/intelligent systems to improve with experience and data.

Data Set Structure

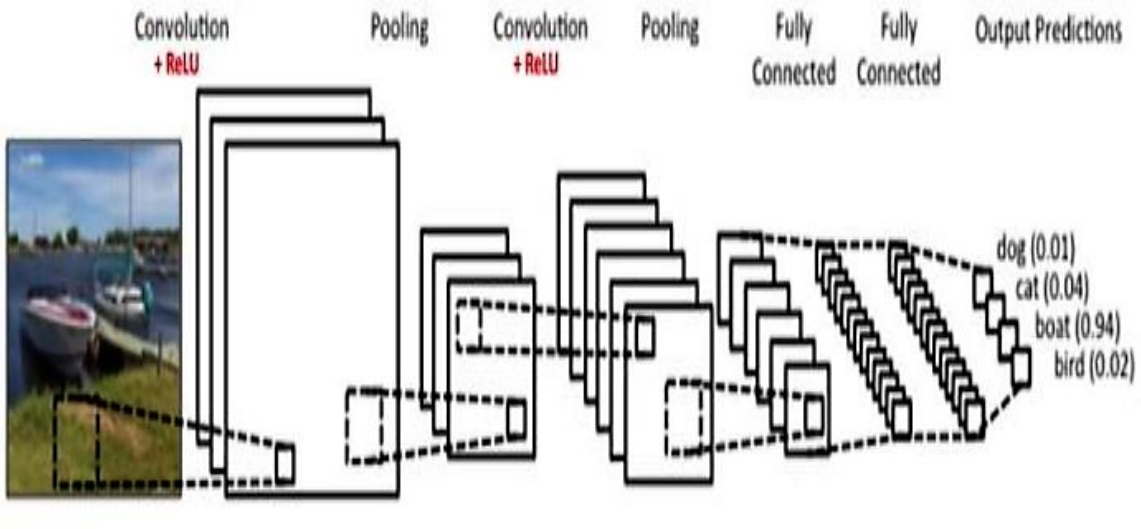


60,000 images

Here are the classes in the dataset, as well as 10 random images from each:



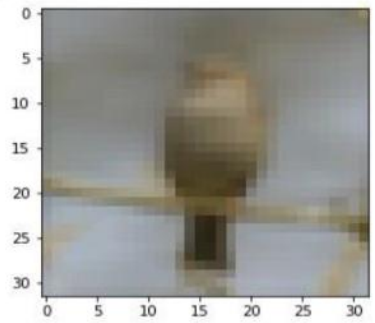
Classification Rule



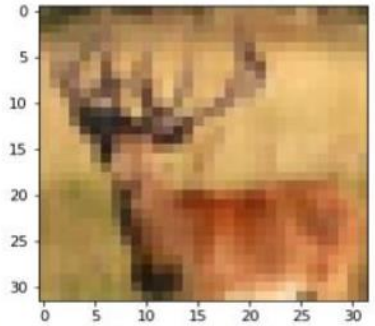
- The input layer accepts the data and passes it on to the network, while the output layer gives the prediction information of the input

Supervised learning

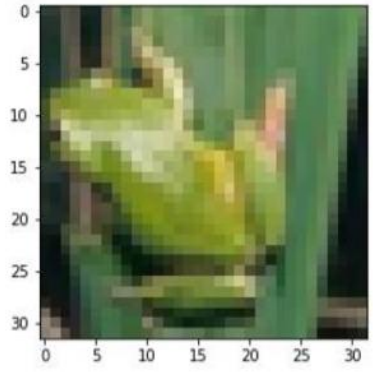
The image belongs to the Class:
2



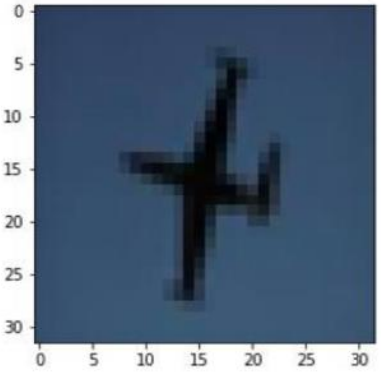
The image belongs to the Class:
4

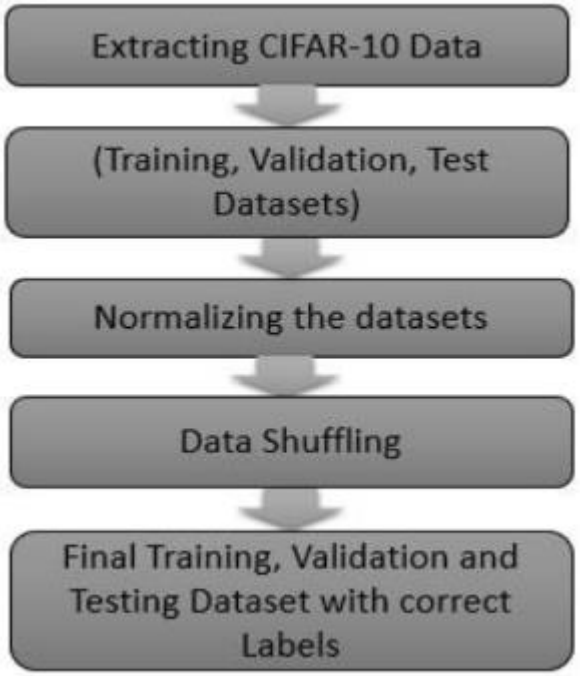


The image belongs to the Class:
6



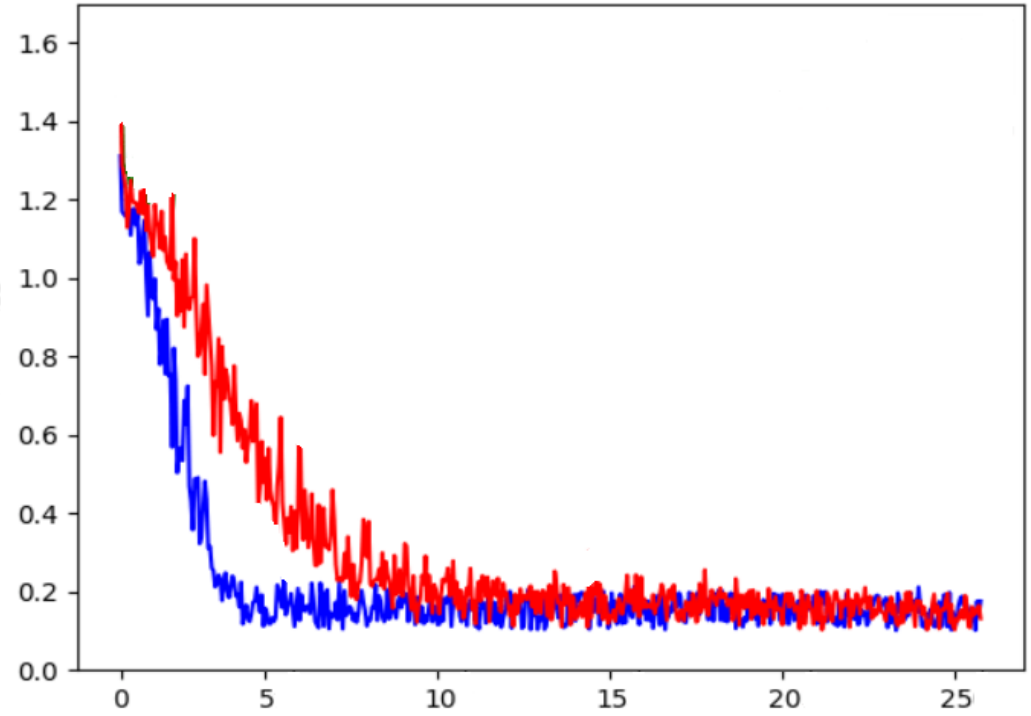
The image belongs to the Class:
0



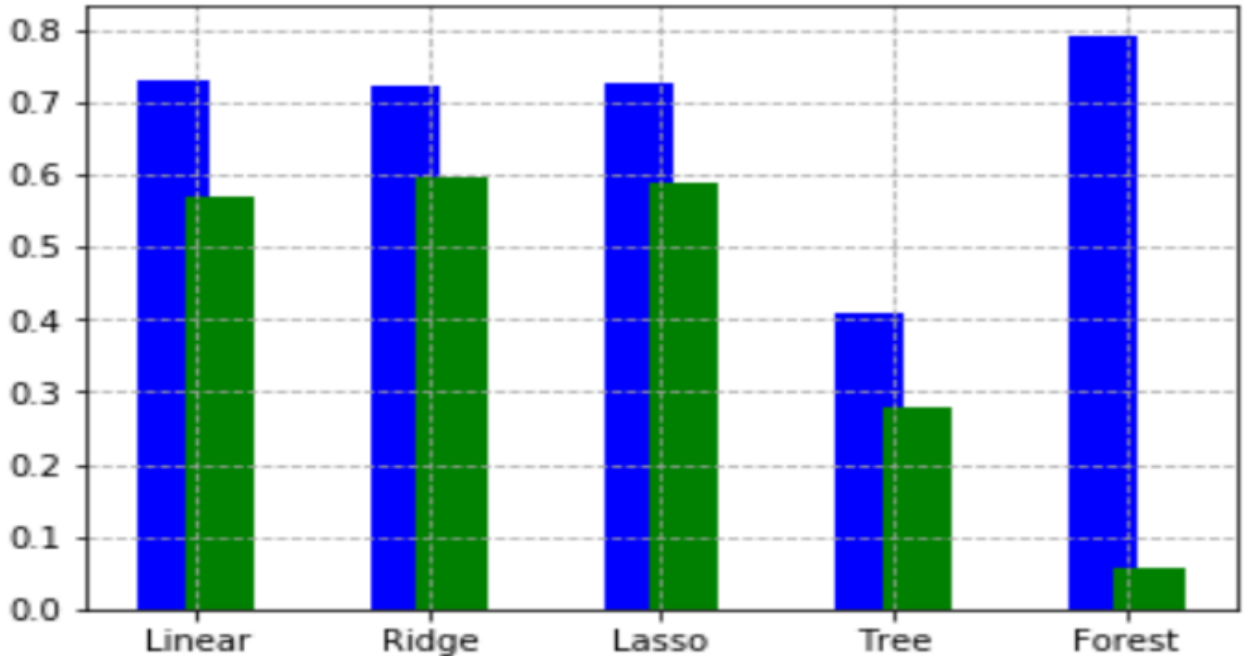


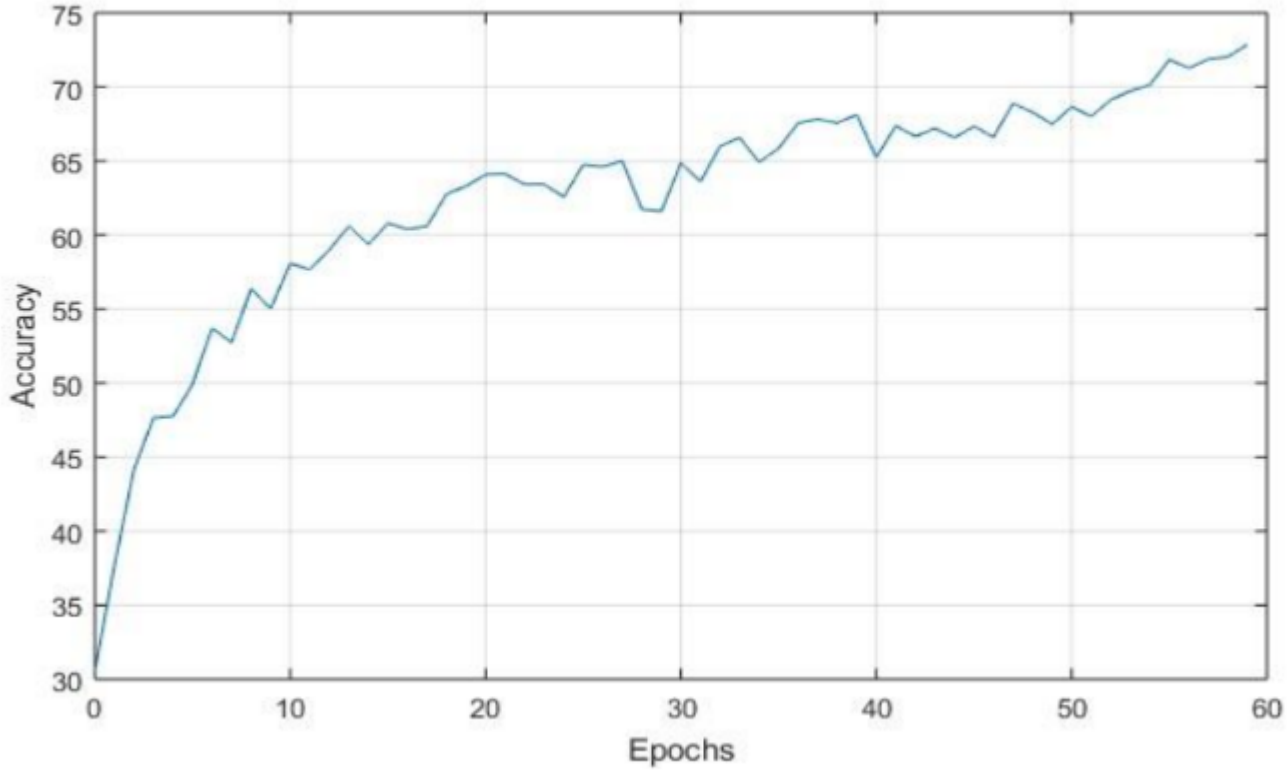
Supervised learning

Number of images used for training = 40K (red)
Number of images used for testing = 10K (blue)

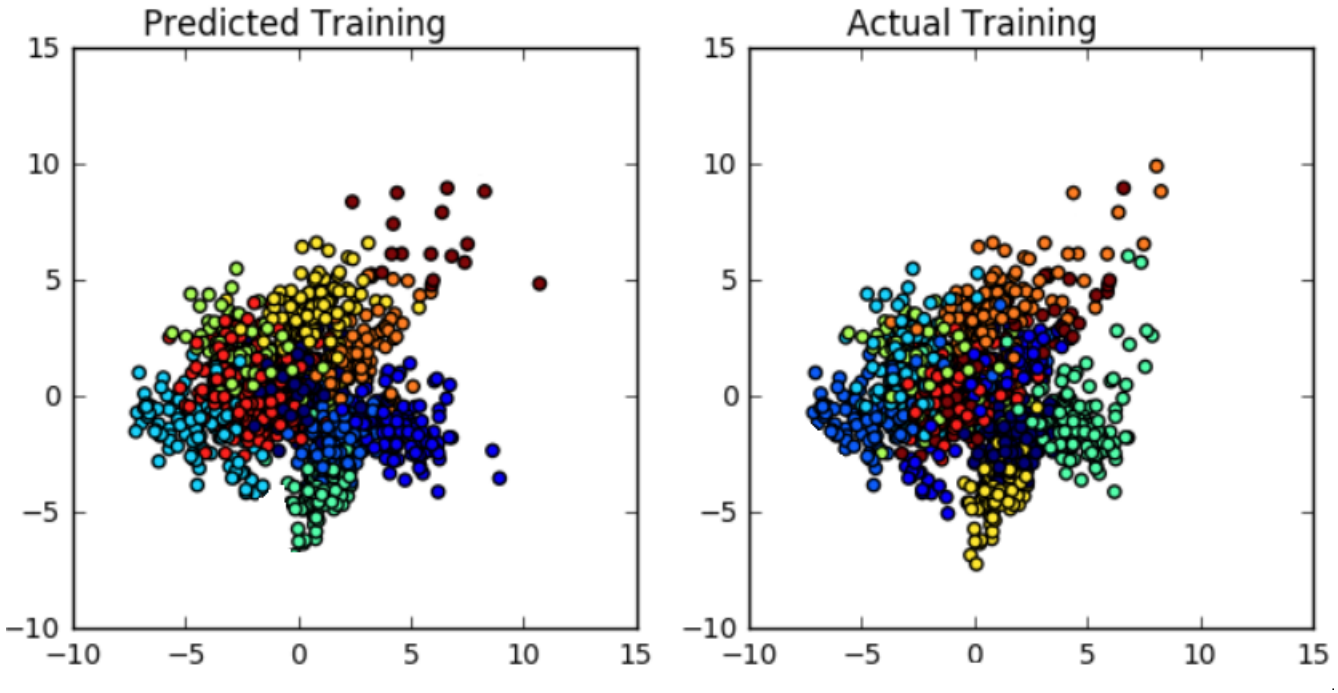


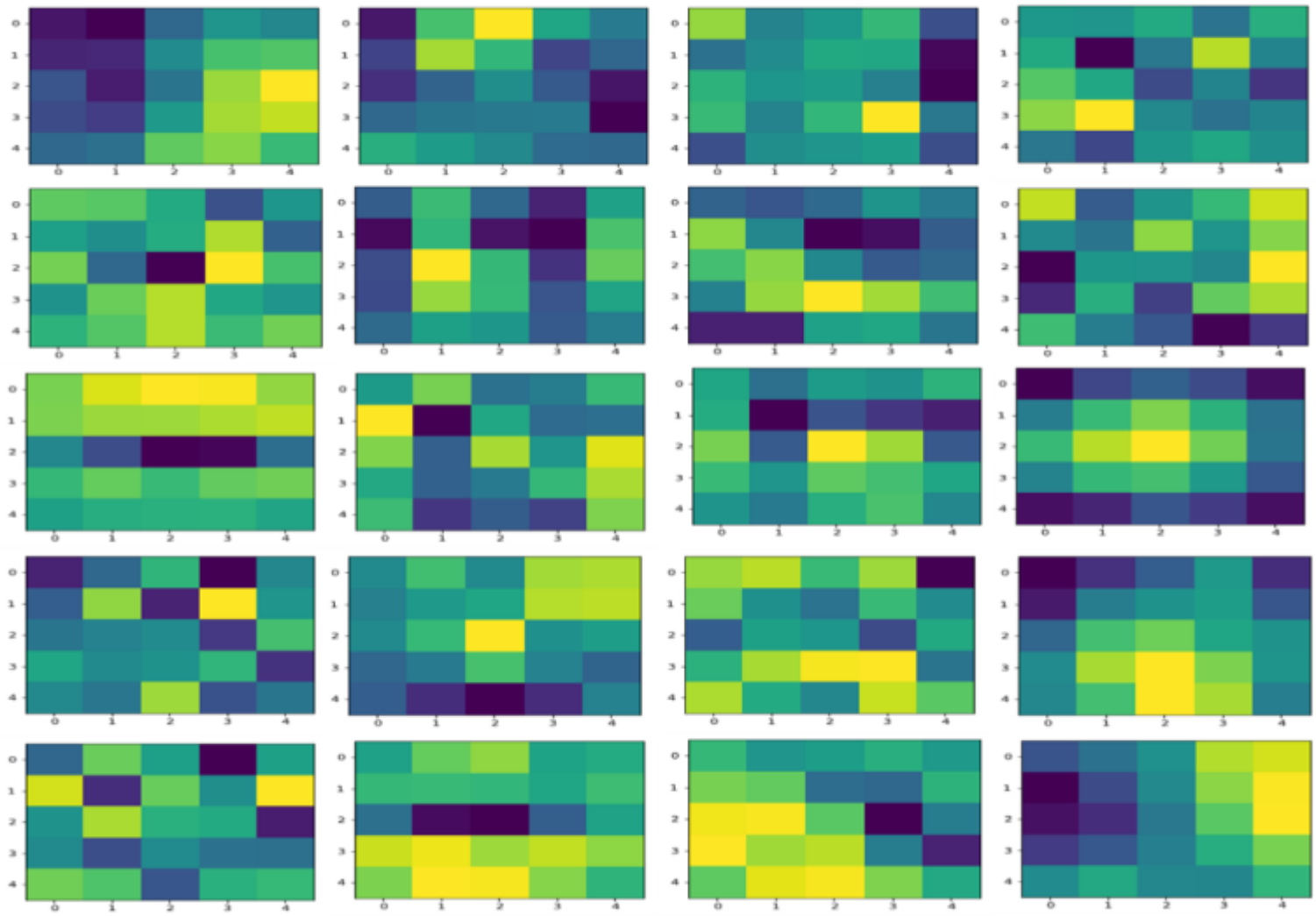
Supervised learning



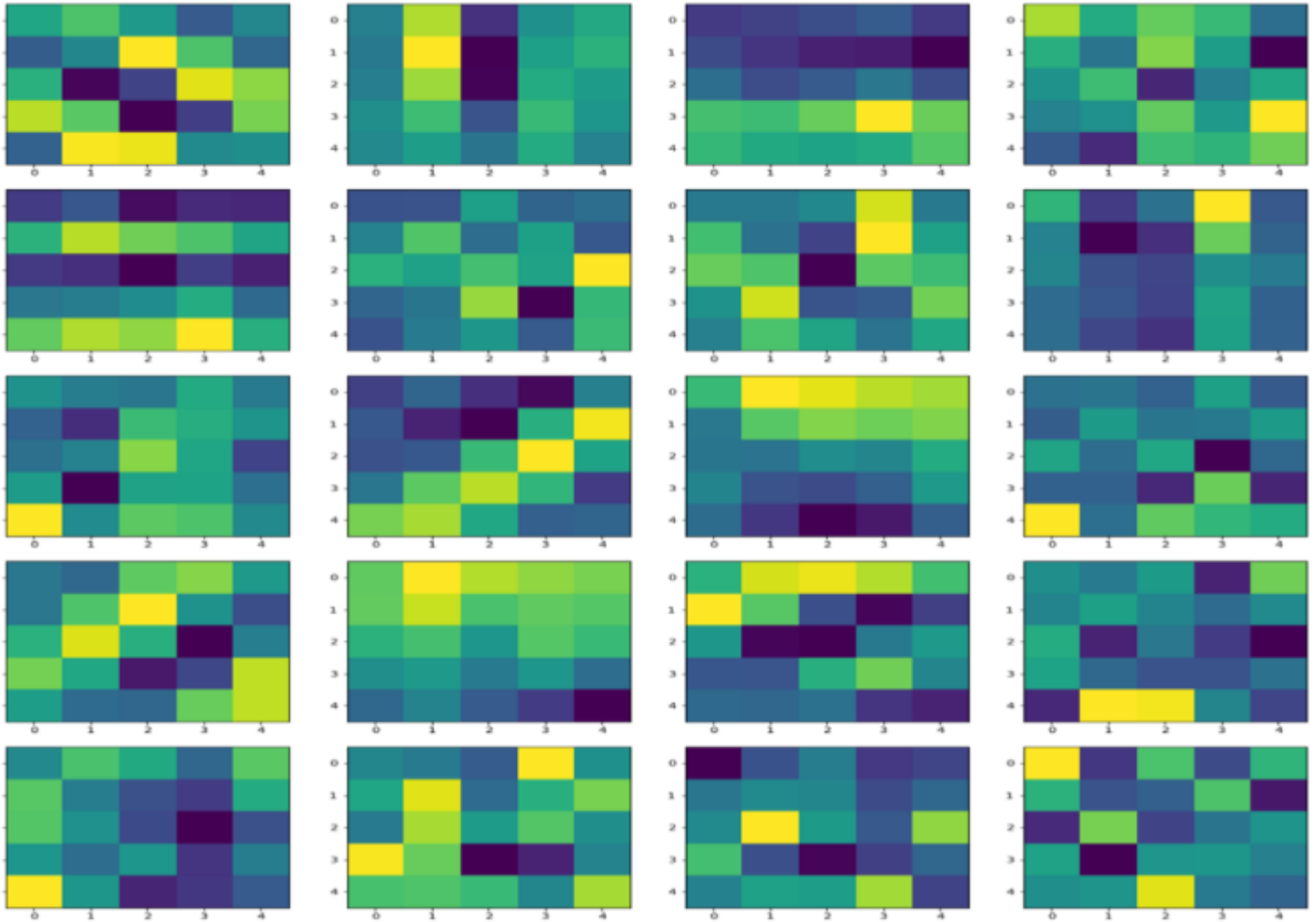

75
70
65
60
55
50
45
40
35
30
Accuracy
0
10
20
30
40
50
60
Epochs

Unsupervised learning





Feed forward network is not recommended for this dataset as it achieves



References

[1] https://www.cs.toronto.edu/ kriz/cifar.html

[2] “Fractional Max-Pooling”, Graham, Benjamin, arXiv:1412.6071

[3] ”UNDERSTANDING DEEP LEARNING REQUIRES RETHINKING GENERALIZATION”, Chiyuan Zhang, Samy Bengio, Moritz Hardt, arXiv:1611.03530v2

[4] http://deeplearning.net/software/theano/

[5] ”Signal Processing and Networking for Big Data Applications”, Zhu Han, Mingyi Hong, Dan Wang

[6] ”michaelnielsen.org ”

[7] ”http://www.wildml.com/2015/11/understanding-convolutional-neural- networks-for-nlp/”

[8] ”https://www.safaribooksonline.com/library/view/deep- learning/9781491924570/ch04.html”

THANK YOU