Instructions

- Solve the problems on the following page. Where applicable use python.
- Feel free to use an external library of your choice, ***unless otherwise stated.***
- There is no time limit or necessary right answer.
- We are looking at the quality of your solution and the approach used. Make sure you can explain it when asked.
- What we are interested in seeing is the way you think. Send your solution by email to nisarg@vector.ai in files called *single_neuron.py*, *twenty_newsgroups.py* and a *PDF called Answers.pdf* with the subject line “Machine Learning Test”. We will subsequently schedule a 30 minute session to talk through your solution.
- Most importantly, enjoy it!

Problem 1

You have to classify whether a number is higher or lower than 5 with a single neuron. Implement this *without using any library*. Pick an activation function of your choice. What would you do if the problem changed to classify a number as higher or lower than 50? Write your code into a file called *single_neuron.py*.

Problem 2

Scikit-learn has a dataset called 20 newsgroups that has 18000 news articles from 20 topics. Use the training part of this dataset to train a classifier. Accuracy values will be measured on the test set of the same data. Write your code into a file called *twenty_newsgroups.py*

Problem 3

Explain Bayes theorem. Use an example.

Problem 4

What is cross-validation? Why is it important?

Problem 5

Explain exploding and vanishing gradients. How do you tackle this?