Round 1 - Assignment for Data Scientist - Intern requirement at Pivotchain Solutions || Pune Location

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Date 2022-10-19 13:17

Hello Pranjali,

Warm Greetings!

Further to our conversation, please share the assignment to the candidates who are available to complete the same within 7days and share the completed assignment folder.

Here is a quick summary of our company:

Pivotchain is an advanced video analytics company catering to a wide range of global customers. Our AI products & solutions span across major verticals which include Banking, Airport, Homeland Security & Logistics.

Ever since our inception, we have grown in size and capability and currently have a presence in India & the Middle east. You can see our products on our website (www.pivotchain.com)

Please follow this mail for assignment.

Important Note:
1.There are 2 sections and you need to **solve any one section** completely . Section A belongs to Machine learning and Section B belongs to Artificial neural networks.
2.You should only use NumPy for the following questions(No Scikit learn, Keras, TensorFlow, or any other machine/deep learning framework) for any of the sections
3.Solutions which are directly copy and pasted from the internet or copied from your batchmates/competitors will be rejected. So please write the code by yourself in a jupyter notebook.

Section A - ML
Implement a Linear Support Vector Machine (SVM) using Stochastic Gradient descent (SGD) with L2 regularization(alpha value=0.001) from scratch by using only numpy on the https://scikit-learn.org/stable/modules/generated/sklearn.datasets.load_breast_cancer.html dataset.

You need to calculate Confusion Matrix , Precision,Recall,F1-score,ROC, AUC graph....for the metric parts alone you can use sklearn.metrics or any library.

Note:
1.The complete code should be well commented as .ipynb format.
2.Exploratory data analysis is optional for the given data
3. Any extra findings/contributions from your side on the coding part will be appreciated.

Section B - ANN

1) Implement the forward and backpropagation in batch form.

```
for mini_batch in mini_batches:
    Db, Dw = backprop(mini_batch)
    b = b - eta*Db
    w = w - eta*Dw
```

2) Write neural network class as per given code skeleton

```
class network(object):

    def __init__(self, lst=[]):
        pass

    def feed_forward(self,example):
        "forward propagation "

        return feed_forward_op


    def batch_sgd_backprop(self,X,Y):
        "X-input array"
        "Y-output array"
        "Update weights"

        pass

    def single_example_backprop(self,x,y):
        pass
```

- Create a simple class to build the multi-layer perceptron network for the function **y = x*x**.
The constructor will have one list as an input example(arr=[100,500,600,7])
arr[0] is the input size of the neural network.
arr[1:-1] number of neurons in each hidden layer
a[-1] number of neurons of the output layer

- You can create as many training examples as possible using the function: **y = x*x**

Also, share the code and output(confusion matrix, accuracy, Loss graph) of the above assignment.

The assignment can be sent directly as a **reply to this email** or you can create a github repository and share the link to us.
The Deadline for submission of the assignment is **26th October 2022**.

Feel free to contact me in case of any queries.