Multi Layer Perceptron

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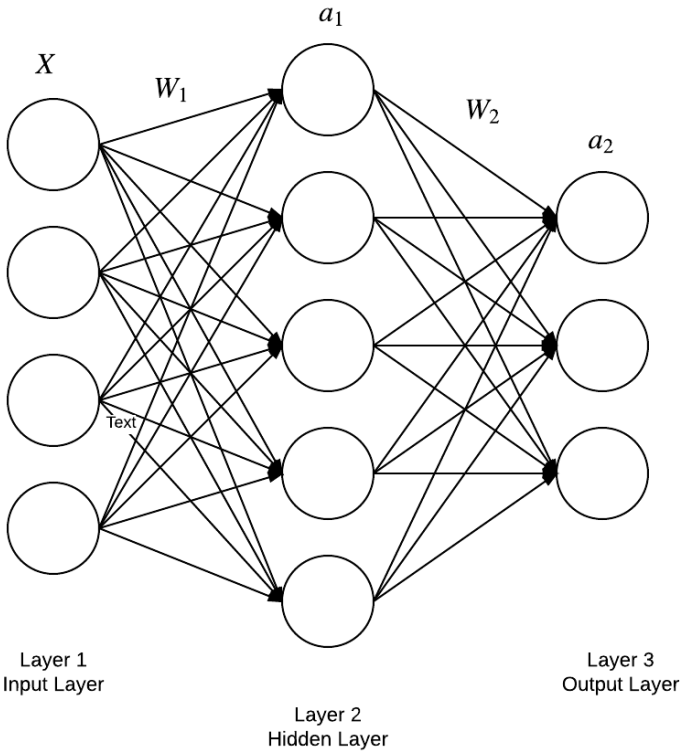
Introduction

Introduction

- The assignment is to implement the ‘Multi Layer Perceptron (MLP)’ model for text classification.
- We will provide main.py, util.py, train.json and test.json. You have to implement the Multi Layer Perceptron in main.py.
- In this PDF, we will briefly explain the ‘Multi Layer Perceptron’

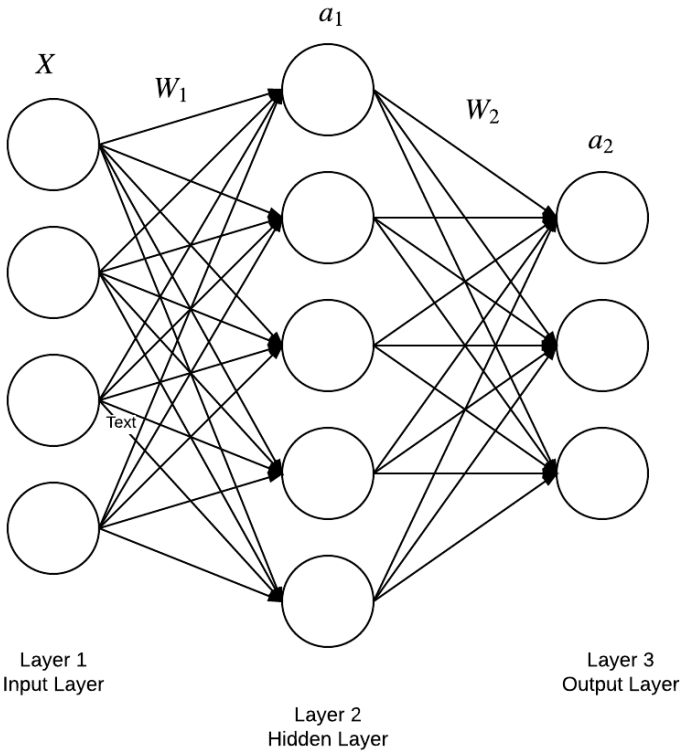
Multi Layer Perceptron

- **Multi Layer Perceptron**
  - The MLP is one of the simplest Neural Network (NN).
  - Goal of the MLP is to get the best performance for given input data.



Multi Layer Perceptron

- **Learning Process of the MLP**
  1) The MLP uses training data and obtains outputs.
  2) The MLP calculates errors between the outputs and labels.
  3) The MLP finds optimal weights by iterating backpropagation in the direction of reducing sum of the errors.



Given Data

- **train.json & test.json**
  - Data Format : a list of dictionaries
  - Data Example :

```
[
    {
        “paragraph” : “Since Game of Throne first aired, …”
        “label”: “tv”,
        “id”: “31”      *this is an article id
    },
    …
]
```

  - The number of Labels : 5 (finance, lifestyle, tv, sports, entertainment)

Assignment

- **Various Possible Inputs**
  - TF
  - Normalized TF-IDF
  - Binary vector
    - 1 if a word in document else 0
    - For example,

      doc_a = I love dog doc_b = I like cat

      Vocab = { cat, dog, I, like, love }

      vec_a = [0, 1, 1, 0, 1] vec_b = [1, 0, 1, 1, 0]

Assignment

- **Assignment**
  - Implement the ‘MLP’ model for text classification in main.py.
    - Use TF, normalized TF-IDF and binary vectors as input for the model respectively.
  - Implementing the MLP model consists of 3 steps
    - Preprocessing Train/Test data and calculating vectors (TF, normalized TF-IDF and binary)
    - Training the model with Train data
    - Evaluating the model with Test data
  - You have to get at least 70% of accuracy in the test dataset for all input vectors (TF, normalized TF-IDF and binary).

Assignment

- **Assignment**
  - In this assignment, you have to calculate precision, recall, and f1-score for each labels by yourself.
  - You also need to calculate micro average precision/recall/f1-score, and model accuracy.
  - Additional libraries not allowed (e.g. Scikit-Learn)
  - See page 10 for specific output format.

Assignment

- **Submission File**
  1) StudentName _StudentID_main.py (python version 3.x)
     - e.g., 홍길동_2020123123_main.py.
       e.g., MichaelJackson_2020123123_main.py

  2) StudentName _StudentID.txt
     - e.g., 홍길동_2020123123.txt
       e.g., MichaelJackson_2020123123.txt

Assignment

- **Outlook of the Text File**

```
Input Type : Binary
              precision    recall  f1-score    # docs

entertainment      73.68     70.00     71.79       20
      finance      75.00     75.00     75.00       20
    lifestyle      71.43     75.00     73.17       20
       sports      85.71     90.00     87.80       20
           tv      89.47     85.00     87.18       20

    micro avg      79.00     79.00     79.00      100
     accuracy                          79.00      100

Input Type : TF
              precision    recall  f1-score    # docs

entertainment      66.67     70.00     68.29       20
      finance      73.68     70.00     71.79       20
    lifestyle      75.00     75.00     75.00       20
       sports      78.26     90.00     83.72       20
           tv      88.24     75.00     81.08       20

    micro avg      76.00     76.00     76.00      100
     accuracy                          76.00      100

Input Type : TF-IDF
              precision    recall  f1-score    # docs

entertainment      55.56     75.00     63.83       20
      finance      94.12     80.00     86.49       20
    lifestyle      94.12     80.00     86.49       20
       sports      90.00     90.00     90.00       20
           tv      84.21     80.00     82.05       20

    micro avg      81.00     81.00     81.00      100
     accuracy                          81.00      100
```

Assignment

- **Cautions**
  - Use ‘Python3’ and ‘Google Colab’.
  - Do not import any library except already imported libraries.
  - Copy will be scored 0.

Thank you for your attention!

고 영 중 (Ko, Youngjoong)

http://nlp.skku.edu/