ML HW4

by 108062138 Po-Yu,Wu
hackmd: https://hackmd.io/@sBeNJ4fqRNqa67PhyWWV4A/rysNCMJiF (https://hackmd.io/@sBeNJ4fqRNqa67PhyWWV4A/rysNCMJiF)
source code: https://github.com/108062138/MLlab4.git (https://github.com/108062138/MLlab4.git)

BASIC PART

Describe how you design your own model architecture.

- data download and preprocess
  - data download: I use google colab with google drive. Mount on the drive and unzip the data.
  - data preprocess: I just utilize TA's resource to read in the data and reshape it into size (128,128,1) per image s.t. it can fullfill the requirement to put into the model.
- model architecture
  - I construct the model with three layers of convolution. Between each layer, there is one pooling layer. Consider that the last layer of convolution has 64 kernels. This convolution has way too much parameters. Hence, one flatten layer is added. Follow by the flatten layer is one fullly connected layer. Since it is a binary classification problem, the last layer is also fully connected layer, with one node.
  - The model takes optimizer with `Adam`.

Describe how you choose hyperparameters (eg. optimizer, learning rate).

- Under fit case
  - Add extra layer and add extra epochs
- Over fit case
  - Change batch size
  - Add extra dropout layer to extend the probability to figure out a new path.

ADVANCE PART

- Describe how you design or choose your own model architecture.
  - There are two conditions: sparse data and noraml data(if #1 in such column is less than 1500, then I classify it as sparse data).

        - For normal data:I just utilize the model in the basic part if the data is normal data.
        - For sparse data:I reconstruct the model with the model based on the basic part. The difference is that more convolution layers are added. Apart from the model, I change the sparsity of the dataset by removing lots of 0's data. This way, the model is more likely to recognize about the target.
    - No matter how sparse the dataset is, I will convert it into a single csv s.t. if I train a better model for the specific dataset and I am possible to substitute that prediction without repeating the whole training process again.
- Describe how you choose loss function and optimizer.
    - same as the basic part.

RESULT

```
[22]  1 for ele in f1s:
      2   print(ele, f1s[ele])
0s
```

```
Atelectasis 0.2626865671641791
Cardiomegaly 0.3929471032745592 3
Edema 0.717687074829932
Lung Opacity 0.2138728323699422 6
No Finding 0.8854532677442024
Pleural Effusion 0.4236111111111111
Support Devices 0.4604316546762589 6
```

CREDIT

- 李昕威/張博志跟我討論數值處理