Folder structure

In the folder, there are
three jupyter notebooks(.ipynb),
three folders
a readme,
a csv table,
a report.

Three jupyter notebooks(.ipynb):
Model.ipynb: This is the main code of the model
Proving that the cross entropy is ok.ipynb: This is the code to prove that
using y_hat-y in cross-entropy function as the output delta and then skip the backward of softmax,
using -y/y_hat(the derivative of cross-entropy function) and then via the backward of softmax, have same result.
dataset prepare.ipynb: This is to transform labels to one-hot encode and separate test dataset to test and validation.

Three folders:
Pic: The folder to save the output pictures (loss and accuracy). The index of picture is related to the csv table.
Assignment1-Dataset: The raw dataset from this assignment
Train-Test-Val: The dataset from dataset prepare.ipynb, including train, test and validation datasets

A readme:
This file. README.pdf

A csv table:
analyse.csv includes the index of analyse, the description of change and the output results. The index in the table maybe different to the report because we change it in report to make sure it is more readable.

A report:
The final report to show our work.

IMPORTANT:

1. Version: Python 3.9.16/ numpy 1.23.5/ pandas 1.5.3/ matplotlib 3.7.0/
2. Before all, running dataset prepare.ipynb first.
3. Before running the Model.ipynb, please check the dataset load part first.
   If you want to run with train, test and validation. You do not need to change anything.

If you just want to run the raw dataset(Train, Test), using the second cell.

```
# # load raw dataset
# train_data=np.load('Assignment1-Dataset\\train_data.npy')
# train_label=np.load('Assignment1-Dataset\\train_label.npy')
# valid_data=np.load('Assignment1-Dataset\\test_data.npy')
# valid_label=np.load('Assignment1-Dataset\\test_label.npy')
```

Annotating the third cell

```
# load dataset
test_data=np.load('Train-Test-Val\\test_data.npy')
test_label=np.load('Train-Test-Val\\test_label.npy')
train_data=np.load('Train-Test-Val\\train_data.npy')
train_label=np.load('Train-Test-Val\\train_label.npy')
valid_data=np.load('Train-Test-Val\\valid_data.npy')
valid_label=np.load('Train-Test-Val\\valid_label.npy')
```

Annotating the first line in forth cell

```
test_data = (test_data - np.min(test_data)+1e-4) / \
    (0.1*(np.max(test_data)-np.min(test_data)))
```

Annotating the first line in last but one cell

```
added_list.append(cross_entropy(test_label,y_hat))
```

using the third line in last but one cell

```
# added_list.append(None)
```