Assignment-Deep Learning

1. Installation
2. Download PyCharm community edition from [www.jetbrains.com](http://www.jetbrains.com/pycharm/download/#section=windows). The process of installation is straightforward. However, you can watch the [youtube videos](https://youtu.be/lM5Y7BnP56k) and [official guides](https://www.jetbrains.com/help/pycharm/installation-guide.html) that show the install PyCharm and start a project.
3. Open Terminal in PyCharm:

Text

Description automatically generated

**Click Terminal**

And install libraries with the following commands:

Tensorflow:

pip install tensorflow

Keras:

pip install keras

Sklearn:

pip install sklearn

Numpy:

pip install numpy

Matplotlib:

pip install matplotlib

Note: you can install most of the python libraries through pip install….

1. Download Data

Download [GTSRB - German Traffic Sign Recognition Benchmark dataset from Kaggle](https://www.kaggle.com/datasets/meowmeowmeowmeowmeow/gtsrb-german-traffic-sign) to your local machine.

1. Read from Local Drive
2. Read the training data from “Train” and testing data from “Test” folder.

Hint: you can refer to the loading data part in the given sample code.

1. Build your own Convolutional Neural Network:
   1. Build the Convolutional Neural Network using Tensorflow and Keras.
   2. Build and train the model. The model should have Convolutional, Dense, DropOut and Pooling layers.
   3. Show few examples of prediction.
   4. Compare the performance with the above model.

Hint: You can refer the given example code and documents from [this link.](https://www.tensorflow.org/tutorials/keras/classification)

What to submit:

1. A word or pdf document contains screenshots of the above steps and explanations. Also, summary the performance and results of the models.
2. Try to change (at least 3 parameters) neural network structure, learning rate, epoch, batch size, and other parameters and see how the performance changes. Try to find reasons for the observations.
3. A python jupyter-notebook or code file (.py) contains all the code for the above steps. Make sure your python code can run without any syntax errors.

Note: You can run a few epochs with small batch size if you do not have a powerful machine.

You can also consider fewer layers and neurons if you do not have a powerful machine.