COSE474 Deep Learning

Project #1: MLP Implementation

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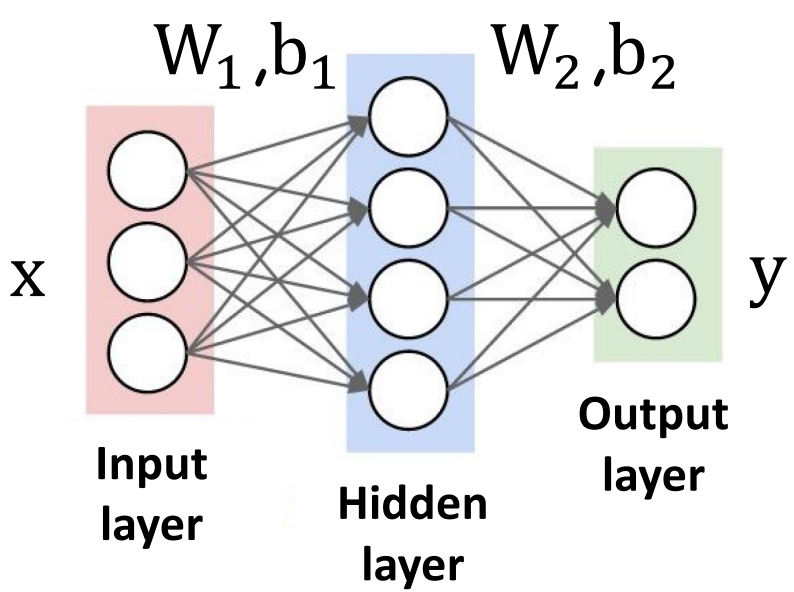
MLP Implementation

Implement 2-Layer Neural Net with Sofmax Classifier



- Perform the image classification using “CIFAR-10” dataset.
- Two weights W_1, W_2 with biased b_1, b_2.
- Predicted output $y' = W_2\big(\mathrm{relu}(W_2 x + b_1)\big) + b_2$.
- Total loss = data loss (softmax+log likelihood loss) + L-2 regularization loss (to W_1, W_2, not b_1, b_2).
- The Ipython Notebook “two_layer_net.ipynb” will walk you through the implementation of a two-layer neural network classifier.

Anaconda Virtual Environments

We strongly recommend using the free Anaconda Python distribution (https://www.anaconda.com/products/individual), which provides an easy way for you to handle package dependencies.

Once you have Anaconda installed, it makes sense to create a ***virtual environment*** for the course.

If you choose not to use a virtual environment (strongly not recommende d!), it is up to you to make sure that all dependencies for the code are inst alled globally on your machine.

Anaconda Virtual Environments

To set up a virtual environment called **COSE474**, run the following in your terminal or cmd.

conda create -n COSE474 python=3.7

To activate and enter the environment, run **conda activate COSE474**.

To deactivate the environment, either run **conda deactivate COSE474** or exit the terminal.

More: https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html

Installing packages: Once your've setup and activate your virtual environment (via conda), you should install the libraries needed to run the assignments using **pip**.

pip install -r requirements.txt

MLP Implementation

Requirements

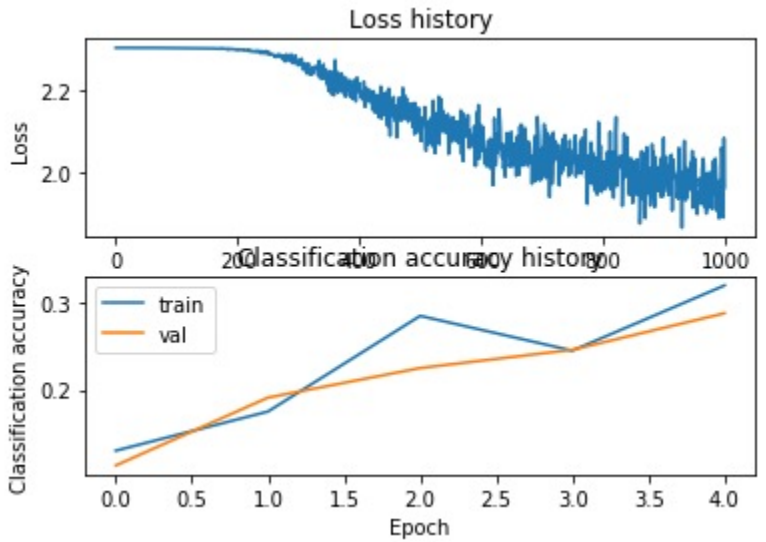
- Need to install some python libraries to run two_layer_net.ipynb
- Run the following command on prompt (cmd)
  - cd (path of assignment folder)
  - **pip install –r requirements.txt**
- CIFAR-10 Dataset
  - http://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz
  - Unzip above file to (Assignment folder)/datasets

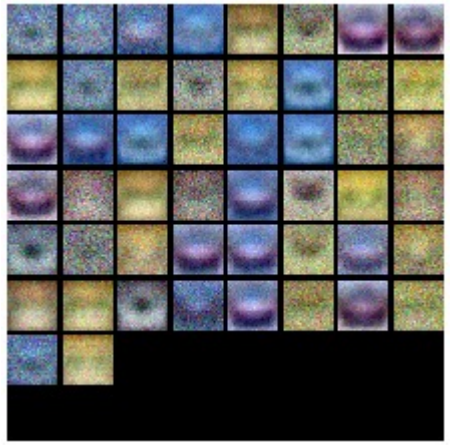
MLP Implementation

Do the following!

- Fill the codes following the instruction in markdown cells
  - **two_layer_net.ipynb, classifier/neural_net.py**
- There are "***#START OF YOUR CODE***" / "***#END OF YOUR CODE***" tags denoting the start and end of code sections you should fill out.

```
iteration 0 / 1000: loss 2.302954
iteration 100 / 1000: loss 2.302551
iteration 200 / 1000: loss 2.297649
iteration 300 / 1000: loss 2.259604
iteration 400 / 1000: loss 2.204187
iteration 500 / 1000: loss 2.118602
iteration 600 / 1000: loss 2.051566
iteration 700 / 1000: loss 1.988489
iteration 800 / 1000: loss 2.006616
iteration 900 / 1000: loss 1.951511
Validation accuracy:  0.287
```





MLP Implementation

Due on Oct. 20 (Wed.), 01:59 pm (in Blackboard)

(late policy: 25% off per a day late)

You must submit the **code** with the **report**.
(**1 page** with free format, including the description of your code, results, and discussions)

The report should be written in **English**.

Please do NOT copy your friends' and internet sources.

Please start your project EARLY.

Thank you!
Q & A