Assignment TUMKUD - Total Utility Maximization model for Kutting of Under-segmented Data

Deep Learning from (almost) scratch

In this section we will code simple a neural network model from scratch. However, before we go into coding let's start with some loose ends in lecture.

In lecture we went over backpropagation with a simple neural network using squared error loss. However, in this homework, we will work on Cross Entropy loss with a softmax layer.

Recall in class we define the softmax layer as:

$$P(y=j) = \frac{exp(h_j)}{\Sigma_k exp(h_k)} \tag{1}$$

where h_j is the output of the previous layer for class index j

The cross entropy loss is defined as:

$$L = -\Sigma_j y_j log P(y=j) \tag{2}$$

where y_j is 1 if y is class j, and 0 otherwise.

- Prove that the derivative of the loss with respect to h_i is $P(y=i) - y_i$. In other words, find $\frac{\partial L}{\partial h_i}$ for $i \in \{0, ..., N-1\}$ where N is the number of classes. Hint: first find $\frac{\partial P(y=j)}{\partial h_i}$ for the case where $j=i$, and the case where $j \neq i$. Then, use the results with chain rule to find the derivative of the loss.

Download the starter code for Part I at `https://raw.githubusercontent.com/ekapolc/cattern/master/TUMKUD/hw4_prob_part1.zip`

TUDKUM - Thai word segmentation with neural networks

In this section we will work on the task of Thai word segmentation. The database we will use is the BEST corpus provided by NECTEC.

To work on this part, you will need to get a VM with GPU from Google Cloud. To signup with Google Cloud follow the instructions at `https://github.com/ekapolc/cattern/blob/master/TUMKUD/Gcloud_GPU_tutorial_for_assignment.md` (You will need a credit card for this. Contact me if you do not have one.)

After you have finished the setup, in the VM with virtualenv enabled, go to the hw4 directory. We already have setup the data there. You only need to grab the starter code by

```
wget --no-check-certificate https://raw.githubusercontent.com/ekapolc/cattern\
/master/TUMKUD/Word_Tokenizer_Lab.ipynb
```

Happy coding.