NeuralNet 101

1. Orientation

Welcome to NeuralNet 101

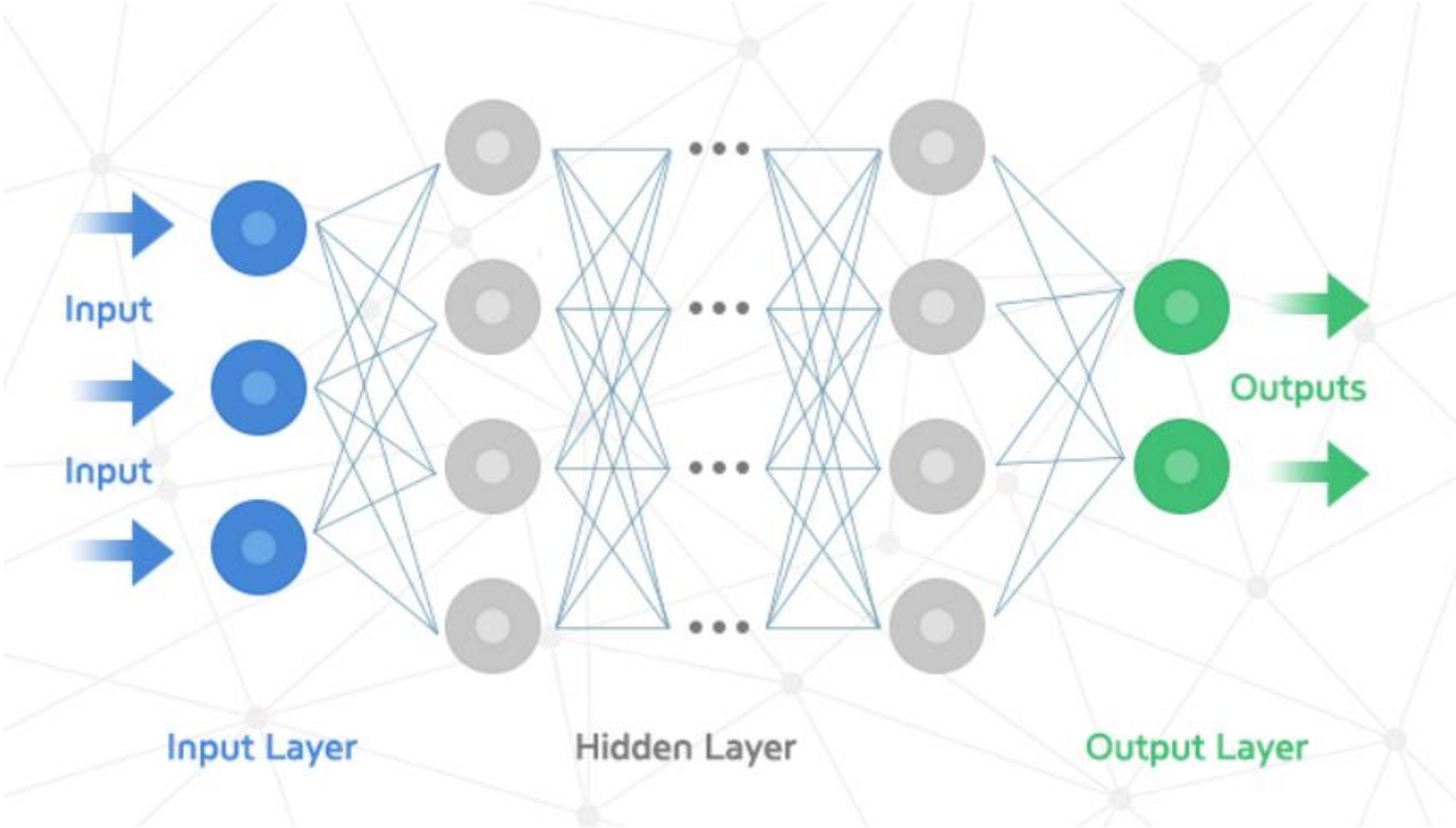
- In this group learning, we will use Korean but with slight English because of the proper nouns in research area(like logistic regression)

- The level of this group learning will be easy, but if you cannot get the point, the instructor will talk it based on mathematical & other intuitions.

Assignments

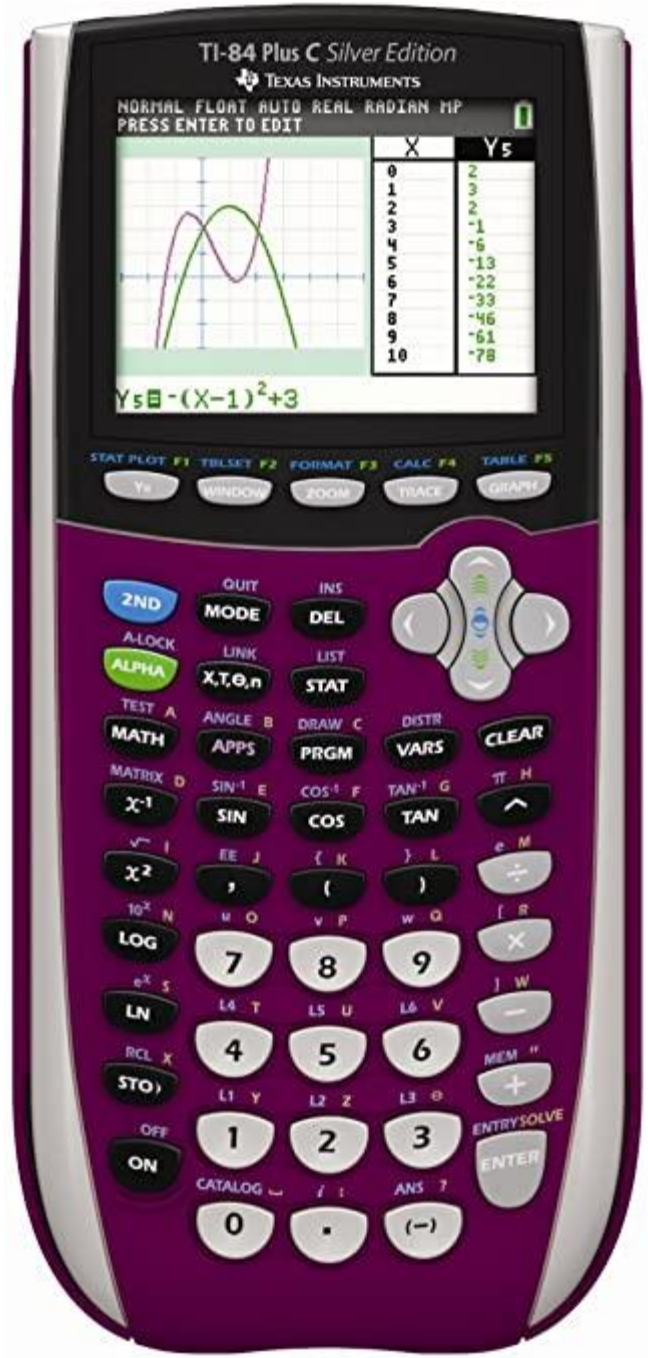
- 1st week: Learn some functions of NumPy & PyTorch and find optimal points of even polynomial functions
- 2nd week: Analyze the delivery data and predict estimated delivery time with Linear Regression
- 3rd week: Estimating the possibility of elected based on Logistic Regression
- 4th week: Classify MNIST digits with Softmax
- 5th week: Make own neural nets based on Numpy and train & evaluate it

So, what is the NeuralNet?



Referenced from: Hyundai Motors group

My definition of neural network: just gigantic matrix calculator


TI-84 Plus C Silver Edition
Texas Instruments
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS ENTER TO EDIT
X Y5
0 2
1 3
2 2
3 -1
4 -6
5 -13
6 -22
7 -33
8 -46
9 -61
10 -78
Y5=-(X-1)^2+3
STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y= WINDOW ZOOM TRACE GRAPH
2ND QUIT INS
MODE DEL
A-LOCK LINK LIST
ALPHA X,T,Θ,n STAT
TEST A ANGLE B DRAW C DISTR
MATH APPS PRGM VARS CLEAR
MATRIX D SIN-1 E COS-1 F TAN-1 G π H
x-1 SIN COS TAN ^
√ I EE J { K } L e M
x2 , ( ) ÷
10x N u O v P w Q [R
LOG 7 8 9 ×
ex S L4 T L5 U L6 V
LN 4 5 6 −
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OFF ENTRY SOLVE
ON 1 2 3 ENTER
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0 . (−)

What can we do with gigantic matrix calculator?

- AlphaGo
- GPT, BERT - Language Model
- AlphaFold – Protein folding structure prediction

- We can do various useful things based on this gigantic TI-84(just joke)

Alphafold: Leading the significant finding of science

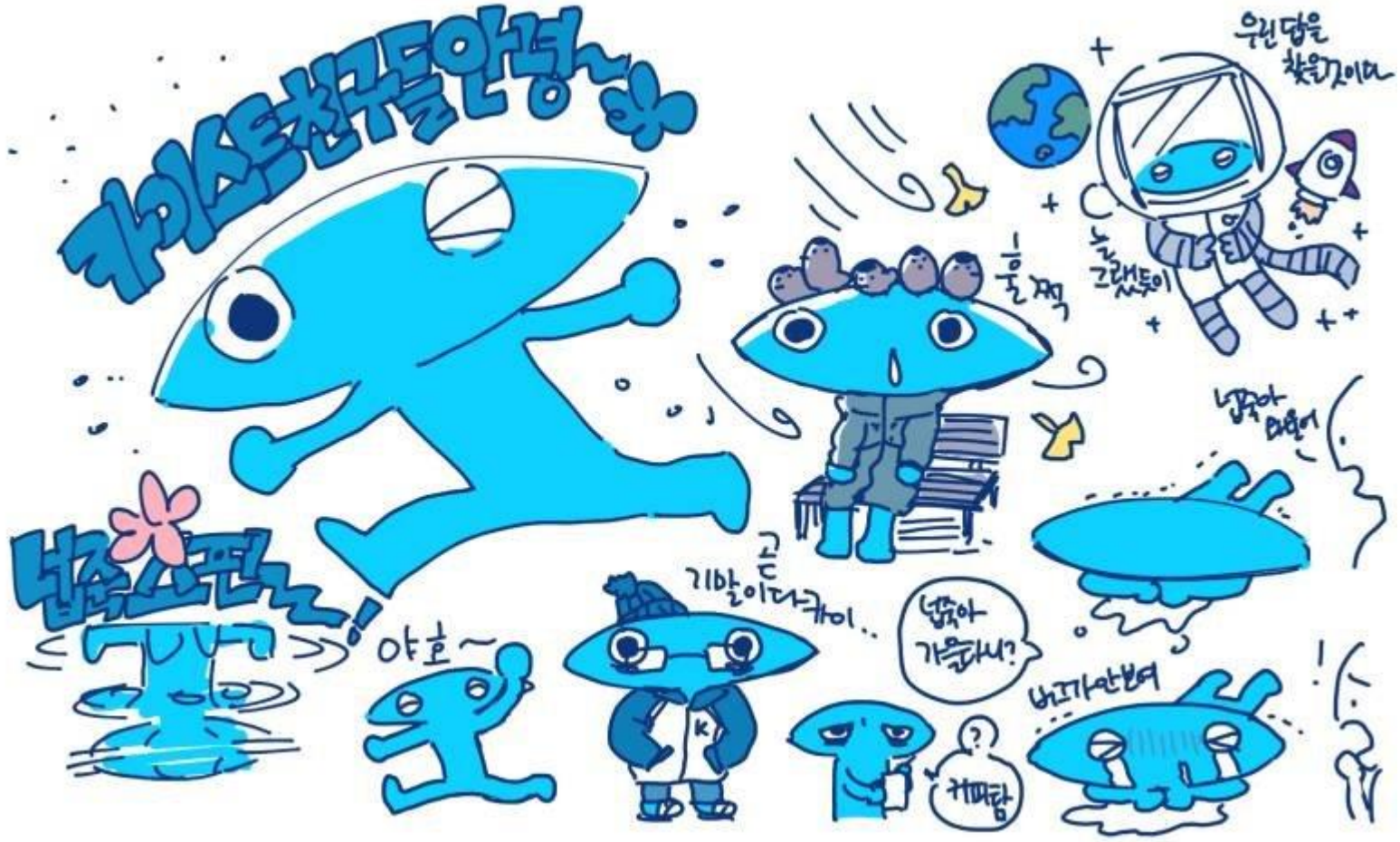
Referenced from: AlphaFold: The making of a scientific breakthrough - YouTube

We will learn these things in this learning

- Optimization based on gradients
- Linear Regression
- Logistic Regression
- Softmax
- Error Backpropagation
- Convolution & Pooling – No Assignment

References

- I use these materials as references for making the learning slides
- 모두를 위한 딥러닝, Sung Kim, 모두를 위한 머신러닝/딥러닝 강의 (hunkim.github.io)
- CS231N, Stanford, CS231n Convolutional Neural Networks for Visual Recognition
- Some of my intuitions based on experiences
- If I use different materials as reference for making learning slides, then I will tag it on the last slide of the learning slides.



Let’s start to learn NeuralNets to win POSTECH :)