NEURAL NETWORK

An Industrial Internship Day to Day Activity Report

submitted by

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DATE	ACTIVITY DESCRIPTION
22 March 2021	*I Enrolled in the course and researched about the outcomes and skills that will be obtained from this course.*
23 March 2021	*I understood various concepts that were new to me like Deep learning specialization. It taught me that Deep learning has already transformed traditional internet businesses like web search and advertising. But deep learning is also enabling brand new products and businesses and ways of helping people to be created. Everything ranging from better healthcare, where deep learning is getting really good at reading X-ray images to delivering personalized education, to precision agriculture, to even self driving cars and many others.*
24 March 2021	*I studied about the term Neural Network today. Neural Network: The term, Deep Learning, refers to training Neural Networks, sometimes very large Neural Networks. Housing price prediction example: If we have a data sets with six houses, we know the size of the houses in square feet or square meters and know the price of the house and want to fit a function to predict the price of the houses, the function of the size. So if we are familiar with linear regression you might say, well let's put a straight line to these data so and we get a straight line like that. But prices can never be negative, right. So instead of the straight line fit which eventually will become negative, let's bend the curve here. So it just ends up zero here. So this thick blue line ends up being your function for predicting the price of the house as a function of this size. Whereas zero here and then there's a straight line fit to the right.*
25 March 2021	*I learnt about Supervised learning and its combination with neural networks. Supervised learning with neural networks. In supervised learning, you have some input x, and you want to learn a function mapping to some output y. So for example, just now we saw the housing price prediction application where you input some features of a home and try to output or estimate the price y. Here are some other examples that neural networks have been applied to very effectively.*

26 March 2021	*Today I learnt about Scale drives deep learning progress.*
27 March 2021	*I revised and understood all the topics learnt in previous lectures and attempted WEEK 1 QUIZ. This marks the end of week 1.*
28 March 2021	*Today I learnt about Binary classification and logistic regression. Binary classification: Logistic regression is an algorithm for binary classification. So let's start by setting up the problem. Here's an example of a binary classification problem. You might have an input of an image, like that, and want to output a label to recognize this image as either being a cat, in which case you output 1, or not-cat in which case you output 0, and we're going to use y to denote the output label. Let's look at how an image is represented in a computer. To store an image your computer stores three separate matrices corresponding to the red, green, and blue color channels of this image.*
29 March 2021	*I studied Logistic regression in depth today. Logistic regression: This is a learning algorithm that you use when the output labels Y in a supervised learning problem are all either zero or one, so for binary classification problems. Given an input feature vector X maybe corresponding to an image that you want to recognize as either a cat picture or not a cat picture, you want an algorithm that can output a prediction, which we'll call Y hat, which is your estimate of Y. More formally, you want Y hat to be the probability of the chance that, Y is equal to one given the input features X.*
30 March 2021	*Today I was taught about cost function and its relation with logistic regression. Logistic regression cost function: To train the parameters W and B of the logistic regression model, you need to define a cost function.*
31 March 2021	*Gradient Descent: I learnt about how we can use the gradient descent algorithm to train, or to learn, the parameters w and b on our training set. we have on the second line the cost function, J, which is a function of your parameters w and b. And that's defined as the average. So it's 1 over m times the sum of this loss function. And so the loss function measures how well your algorithms outputs y-hat(i) on each of the training examples stacks up or compares to the ground true*

	label y(i) on each of the training examples. And the full formula is expanded out on the right. So the cost function measures how well your parameters w and b are doing on the training set. So in order to learn the set of parameters w and b it seems natural that we want to find w and b that make the cost function J(w, b) as small as possible.
1 April 2021	*Today I came across the topic Mathematical derivatives and solved few of its examples.*
2 April 2021	*Today I understood the term Computation Graph: The computations of a neural network are organized in terms of a forward pass or a forward propagation step, in which we compute the output of the neural network, followed by a backward pass or back propagation step, which we use to compute gradients or compute derivatives. The computation graph explains why it is organized this way.*
3 April 2021	*Today I was taught Derivatives with a computation graph, Logistic regression gradient Descent: I learnt about the the key equations I need in order to implement gradient descent for logistic regression.*
4 April 2021	*I exercised Gradient Descent on m Examples today , and studied Derivation of DL/dz.*
5 April 2021	*Today I studied Python and Vectorization: In logistic regression if we need to compute Z equals W transpose X plus B, where W was this column vector and X is also this vector. Maybe there are very large vectors if we have a lot of features. So, W and X were both these R and no R, NX dimensional vectors. So, to compute W transpose X, if we had a non-vectorized implementation, we would do something like Z equals zero. And then for I in range of X. So, for I equals 1, 2 NX, Z plus equals W I times XI. And then maybe you do Z plus equal B at the end. So, that's a non-vectorized implementation. Then we find that that's going to be really slow. In contrast, a vectorized implementation would just compute W transpose X directly. In Python or a numpy, the command you use for that is Z equals np.W, X, so this computes W transpose X. And you can also just add B to that directly. And we find that this is much faster.*

6 April 2021	*Today I summarised Vectorization Examples, Clarification of dz.*
7 April 2021	*Today I was taught Vectorizing Logistic Regression: After vectorizing, they can process an entire training set, that is implement a single elevation of grading descent with respect to an entire training set without using even a single explicit for loop.*
8 April 2021	*After the previous lecture today I learnt about Vectorizing Logistic Regression's Gradient output: using vectorization to perform the gradient computations for all M training samples. Again, all sort of at the same time.*
9 April 2021	*Today I came across a totally foreign topic Broadcasting in Python, Python/ Numpy vectors, Logistic regression cost functions and understood it with the help of the video.*
10 April 2021	*I revised and understood all the topics learnt in previous lectures and attempted WEEK 2 QUIZ today.*
11 April 2021	*I ended my day today by attempting to solve the Deep learning honor code assignment. With this assignment I completed Week 2 of this course.*
12 April 2021	*I started my 3rd week by learning Neural Networks: A neural network is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates. In this sense, neural networks refer to systems of neurons, either organic or artificial in nature.*
13 April 2021	*Today I learnt about Neural network representation, Computing neural networks output which were already familiar to me.*
14 April 2021	*I understood and learnt Vectorizing across multiple examples and Vectorized Implementation.*
15 April 2021	*Today I learnt the importance and usage of Activation Function: When you build your neural network, one of the choices you get to make is what activation function to use in*

	the hidden layers, as well as what is the output units of your neural network. sigmoid is called an activation function.
16 April 2021	*Today I was taught Need for non-linear Activation functions, Derivatives of Activation Function.*
17 April 2021	*I revised and understood all the topics learnt in previous lectures and attempted QUIZ FOR WEEK 3.* *I also attempted Planar data classification with one hidden layer assignment today. With this assignment I approached the end of Week 3.*
18 April 2021	*I started the 4th and final week of this course with Deep L-layer neural network topic which taught me by taking example of a neural network with two hidden layers and a neural network with 5 hidden layers. We say that logistic regression is a very "shallow" model, whereas this model here is a much deeper model, and shallow versus depth is a matter of degree. So neural network of a single hidden layer, this would be a 2 layer neural network. Remember when we count layers in a neural network, we don't count the input layer, we just count the hidden layers as was the output layer. So, this would be a 2 layer neural network is still quite shallow, but not as shallow as logistic regression. Technically logistic regression is a one layer neural network.*
19 April 2021	*Today I learnt about Forward propagation in a Deep network, its usage, functions and code in python.*
20 April 2021	*Today I concentrated on topics Getting matrix dimension right, Need for deep representations, Building blocks of deep neural networks which are very crucial in this course.*
21 April 2021	*Today I learnt about Forward and backward propagation, Hyperparameters vs Parameters.*
22 April 2021	*I revised and understood all the topics learnt in previous lectures and attempted QUIZ ON WEEK 4 today.*
23 April 2021	*Today I attempted the last and final assignments of this course.* *The first assignment was Building deep neural network step by step assignment.* *The second assignment was Deep neural network application assignment.*

	With the completion of both assignments I completed this course. *After this I reviewed few assignments uploaded by other students who took up this course. This step is mandatory for completion of this course and is known as Peer graded assignment. In return other students will review my assignment and I will be graded on that basis. This step marked the end of my journey in this course. Finally I received the course completion certificate today.*