

# MOOC Self Directed Learning (1)

Major	컴퓨터소프트웨어학부
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Site	Coursera		
Category	Computer Science	Lecturer	Andrew Ng
Title	Neural Networks and Deep Learning	Time	4 weeks / 2hours each week

## Rationale for Choosing a Course [More than 5 lines]

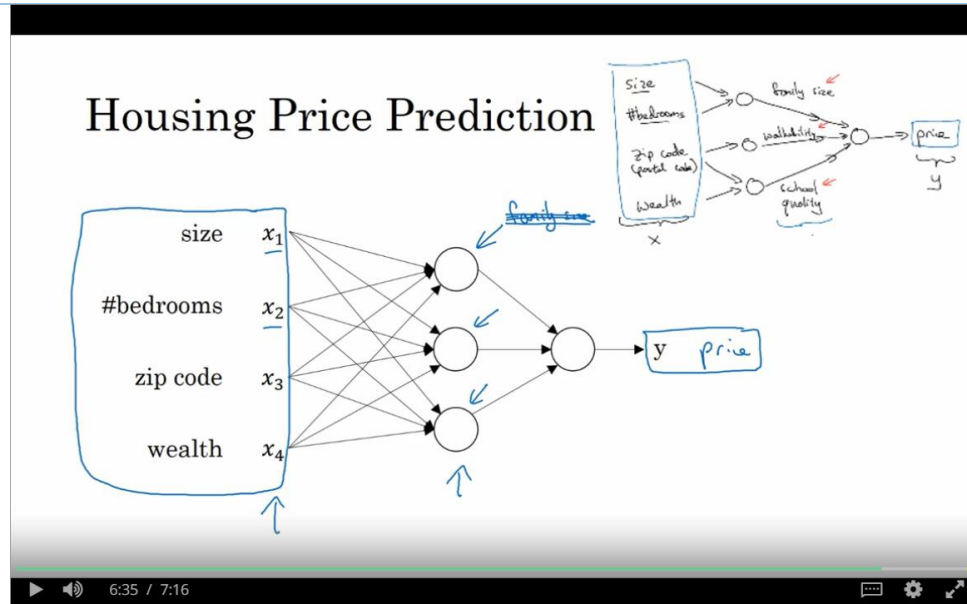
As a student in the department of computer science, the deep learning course is important and meaningful for me to get it. In addition, the lecturer of this course is Andrew Ng that a famous professor focusing on machine learning and artificial intelligence. The neural networks and deep learning course would be not only bringing me tons of knowledge needed for the AI introduction classes in college but also took me into the new area of computer science that I have never been to. Besides, these course with the coding practices that's why I chosen this course on this site.

## Plan for Taking a Course [More than 10 lines]

I am start upping with my friends also professor about the hardware and algorithm for elders, the machine learning and deep learning is very helpful for us to designing and developing the production. As we know, the traditional industry has limited but though adding AI or other new technology on those traditional production, that will create the more value with it. The neural network is the key of the deep learning. Though having this course and more coding practice, I hope that I can build or code the neural networks by myself. To understand the major technology trends driving Deep Learning and be able to build, train and apply fully connected deep neural networks. To know how to implement efficient (vectorized) neural networks and understand the key parameters in a neural network's architecture. This course also teaches me how Deep Learning actually works, rather than presenting only a cursory or surface-level description. So after completing it, I will be able to apply deep learning to a my own applications. It's helpful for me to looking for a job in AI, after this course I will also be able to answer basic interview questions.

# MOOC Self Directed Learning (2)

## Lecture Screenshot



### Summary of Lecture

It's first week, the lecture is introducing to deep learning and explain to the concept of neural networks. It gives me a quick sense of what I'll learn in the next few weeks as well. In the first video, this specialization comprises five courses. And the most important foundations, really the most important building blocks of deep learning. To build and get to work a deep neural network. Having learned the framework for neural network programming, I got to build a deep neural network and neural network with many layers and see it worked for myself. Understand the major trends driving the rise of deep learning. Be able to explain how deep learning is applied to supervised learning. To understand what the major categories of models are (such as CNNs and RNNs), and when they should be applied. Be able to recognize the basics of when deep learning will (or will not) work well. Be able to explain the major trends driving the rise of deep learning, and understand where and how it is applied today.

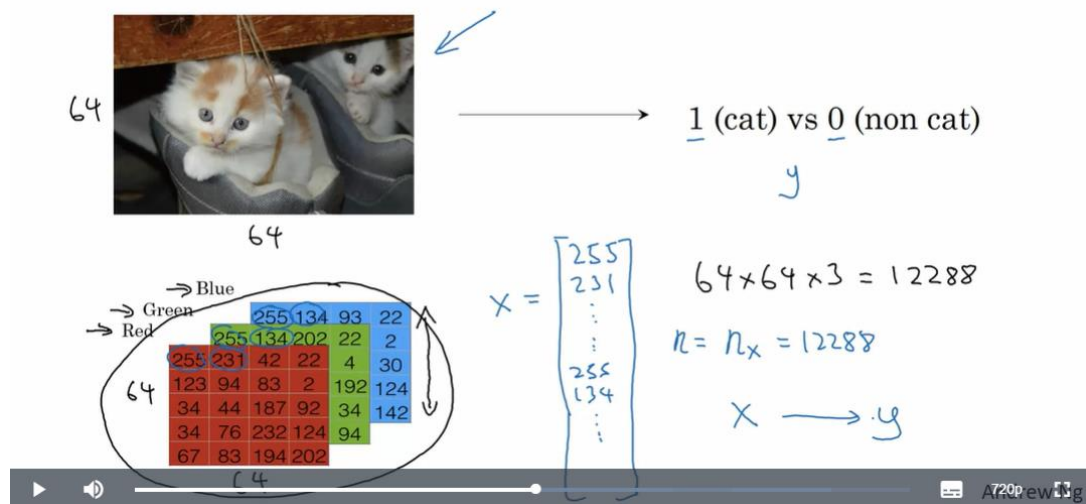
### Critical Point

The digital data or take computation with the rise of specialized hardware like GPUs and faster networking many types of hardware. Do a very large neural networks or should a computation point of view will keep on getting better and take algorithms relative learning research communities though continuously phenomenal at innovating on the algorithms front so because of this I think that we can be optimistic answer the optimistic the deep learning will keep on getting better for many years to come.

# MOOC Self Directed Learning (3)

## Lecture Screenshot

### Binary Classification



#### Summary of Lecture

Building a logistic regression model, structured as a shallow neural network and implementing the main steps of an ML algorithm, including making predictions, derivative computation, and gradient descent. To implement computationally efficient, highly vectorized, versions of models. Understand how to compute derivatives for logistic regression, using a backpropagation mindset. In addition, become familiar with Python and Numpy and work with iPython Notebooks. And also be able to implement vectorization across multiple training examples. The loss function that measures how well doing on the single training example The cost function that measures how well parameters  $w$  and  $b$  are doing on the entire training set. Learn about how can use the gradient descent algorithm to train, or to learn, the parameters  $w$  and  $b$  on my own training set. And it is the familiar logistic regression algorithm.

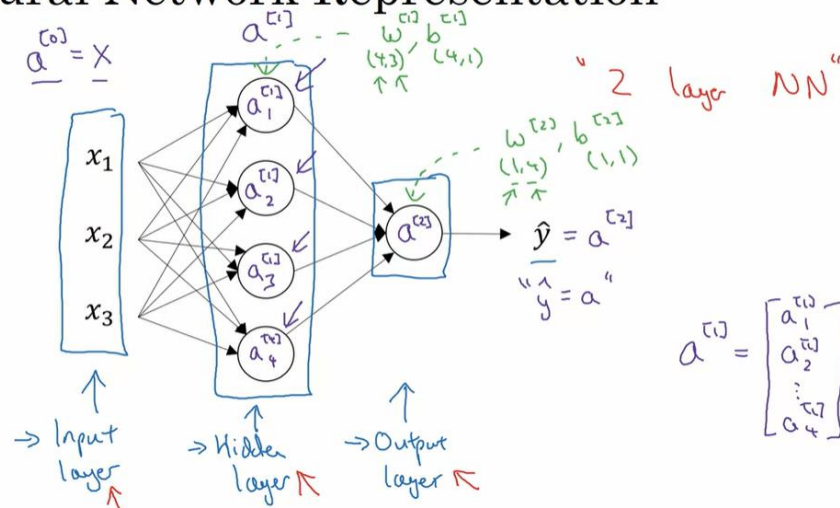
#### Critical Point

The loss function is applied to just a single training example like so. And the cost function is the cost of the parameters. In training the logistic regression model, we're going to try to find parameters  $W$  and  $B$  that minimize the overall costs function  $J$  written at the bottom. So, just seen the set up for the logistic regression algorithm, the loss function for training example and the overall cost function for the parameters of your algorithm. It turns out that logistic regression can be viewed as a very small neural network.

# MOOC Self Directed Learning (4)

## Lecture Screenshot

### Neural Network Representation



Andrew Ng

### Summary of Lecture

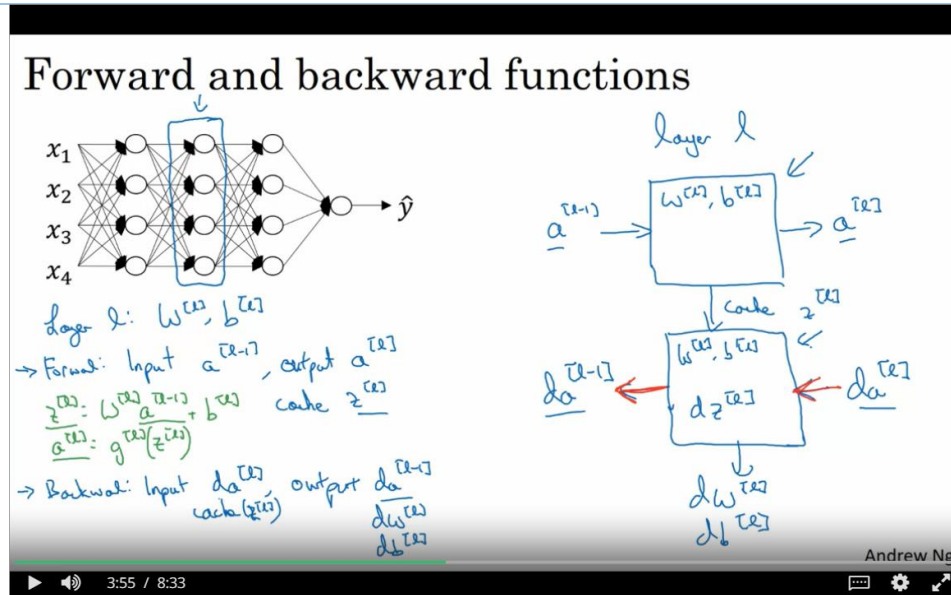
Understand hidden units and hidden layers. Be able to apply a variety of activation functions in a neural network. Build your first forward and backward propagation with a hidden layer. Apply random initialization to your neural network and Become fluent with Deep Learning notations and Neural Network Representations. The most importance is to build and train a neural network with one hidden layer. Learn to build a neural network with one hidden layer, using forward propagation and backpropagation. Develop an intuition of back-propagation and see it work on data. Recognize that the more hidden layers you have the more complex structure you could capture. Build all the helper functions to implement a full model with one hidden layer. There will be a visual comparison of four activation functions. All four should have "z" as the horizontal axis. The top right chart in the slide shows "x", which should be "z".

### Critical Point

Training examples stacked up horizontally in the matrix  $x$ , it can derive a vectorized implementation for propagation through your neural network. To give a bit more justification for why the equations we wrote down is a correct implementation of vectorizing across multiple examples. Go through part of the propagation calculation for the few examples. And also it can vectorize your neural network across multiple training examples.

# MOOC Self Directed Learning (5)

## Lecture Screenshot



### Summary of Lecture

Understand the key computations underlying deep learning, use them to build and train deep neural networks, and apply it to computer vision. See deep neural networks as successive blocks put one after each other. Build and train a deep L-layer Neural Network. Analyzing matrix and vector dimensions to check neural network implementations. Understand how to use a cache to pass information from forward propagation to back propagation. Understand the role of hyperparameters in deep learning. Learned to build a deep neural network that classifies. Learn how to use all the helper functions built in the previous assignment to build a model of any structure you want. Experiment with different model architectures and see how each one behaves. Recognize that it is always easier to build helper functions before attempting to build a neural network from scratch.

### Critical Point

To implement all the building blocks of a neural network and use these building blocks in the next assignment to build a neural network of any architecture you want. Develop an intuition of the over all structure of a neural network. Write functions (e.g. forward propagation, backward propagation, logistic loss, etc...) that would help you decompose your code and ease the process of building a neural network. Initialize/update parameters according to your desired structure.

# MOOC Self Directed Learning (6)

## Reflection

After taking Andrew Ng's ML course before starting this course. In that, lecture notes for the videos were provided as a pdf file. That was very helpful. I did not see any lecture note pdf files in this course. It is very useful to have those. Plus in the ML course, the programming exercise came with very detailed notes in a pdf file as well. That too helped. I find this course to be much more cryptic without any lecture notes or detailed programming exercise notes. But I would like to see Professor Ng's "scribbles" transcribed into more readable text. There are two aspects to the desire for transcribed text. One case is that the handwriting sometimes gets a little sloppy and the fine detail of a word or sub or superscript is muddled. Secondly, the "logical flow" of the thought process sometimes wanders over the page (e.g., doesn't always flow left-to-right, top-to-bottom) so it's hard to reconstruct the flow looking at the final, static page. As cited, the original Machine Learning course did a better job of providing not only transcribed lecture notes, but additional background information that was either "hand waved" in the video or additional details that help with derivations details.

### Implication for study or career

#### [4<sup>th</sup> Industrial Revolution]

Artificial intelligence (AI) promises to deliver some of the most significant and disruptive innovations of this century. Self-driving cars, robotic assistants, and automated disease diagnosis are all products of an emerging AI revolution that will reshape how we live and work. And with demand for talented engineers more than doubling in the last few years, there are limitless opportunities for professionals who want to work on the cutting edge of AI research and development. AI will be a great transformer, improving the efficiency of many sectors — including education — and enabling the creation of higher-value services that can lead to overall economic growth.

### Future Plan

With the opening of huge software and IT companies in India, the job opportunities for trained professionals have increased considerably. India is known to be a leader in software and IT sector. Computer science graduates find job opportunities in a variety of environments in academia, research, industry, government, private, business organizations and so on. They are involved in analyzing problems for solutions, formulating and testing, using advanced communications or multi-media equipment, or working in teams for product development. The software and IT companies are the major employers of computer science graduates.