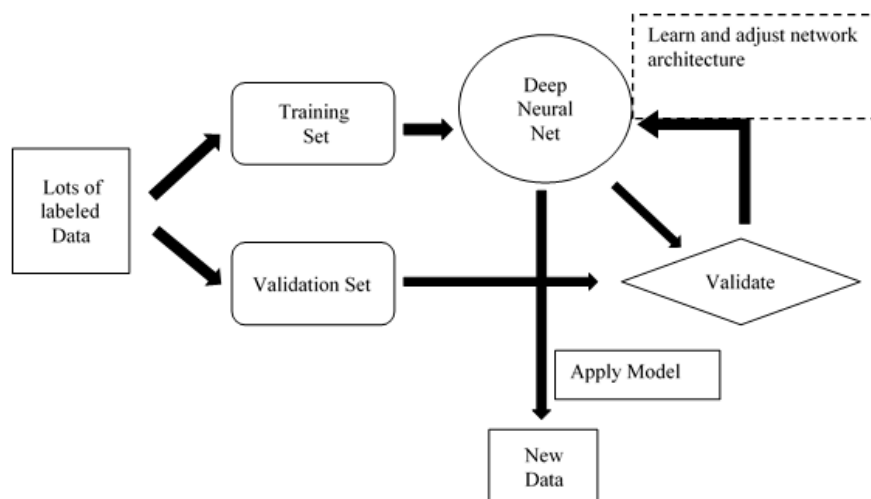
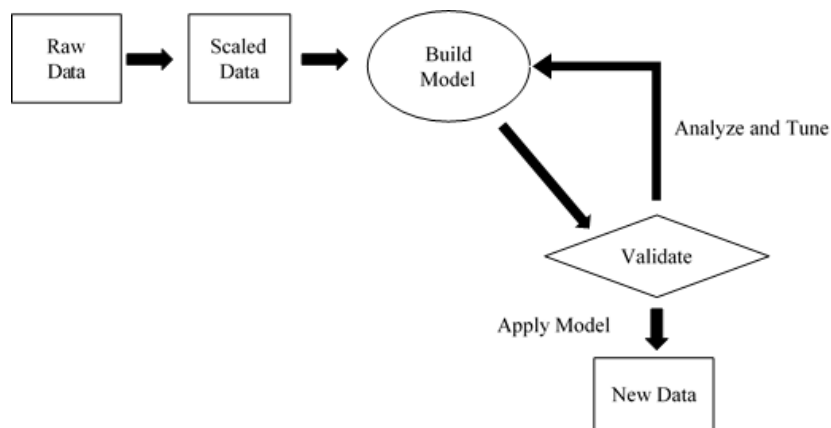
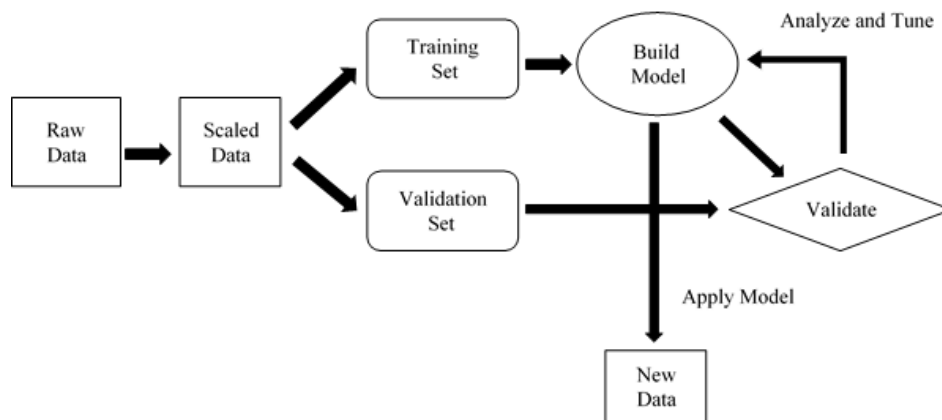


## Chapter 1: TensorFlow: Basic Concepts





### About TensorFlow

TensorFlow™ is an open source software library for numerical computation using data flow graphs. Nodes in the graph represent mathematical operations, while the graph edges represent the multidimensional data arrays (tensors) communicated between them. The flexible architecture allows you to deploy computation to one or more CPUs or GPUs in a desktop, server, or mobile device with a single API. TensorFlow was originally developed by researchers and engineers working on the Google Brain Team within Google's Machine Intelligence research organization for the purposes of conducting machine learning and deep neural networks research, but the system is general enough to be applicable in a wide variety of other domains as well.



The image is a screenshot of a code editor window. The window has a menu bar with "File", "Edit", "Format", "Run", "Options", "Window", and "Help". The code is written in Python and is titled "#first\_session\_only\_tensorflow.py". The code is as follows:

```
#first_session_only_tensorflow.py

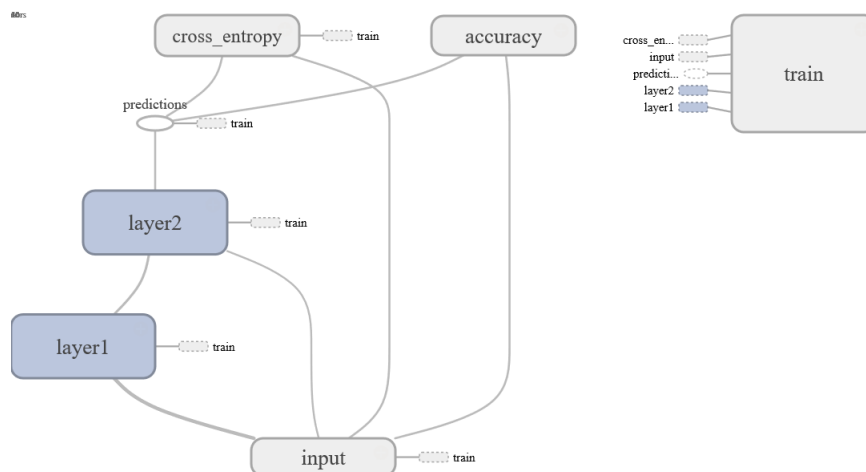
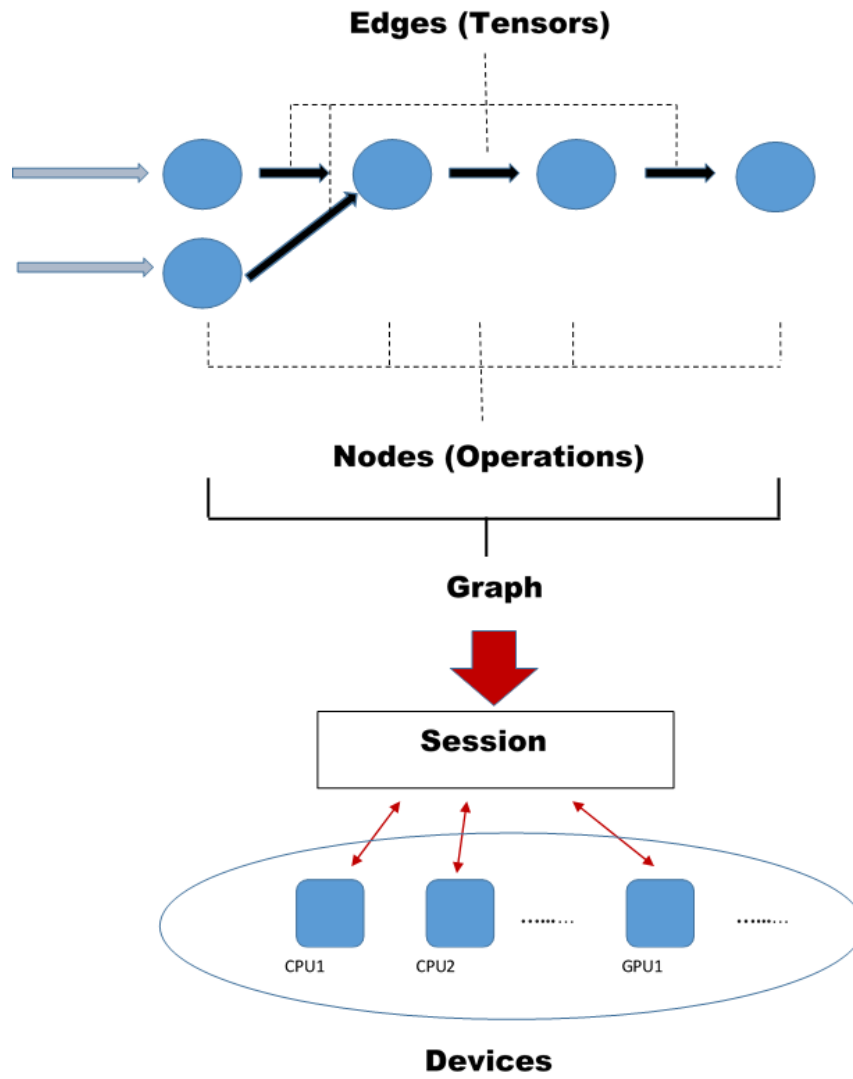
import tensorflow as tf

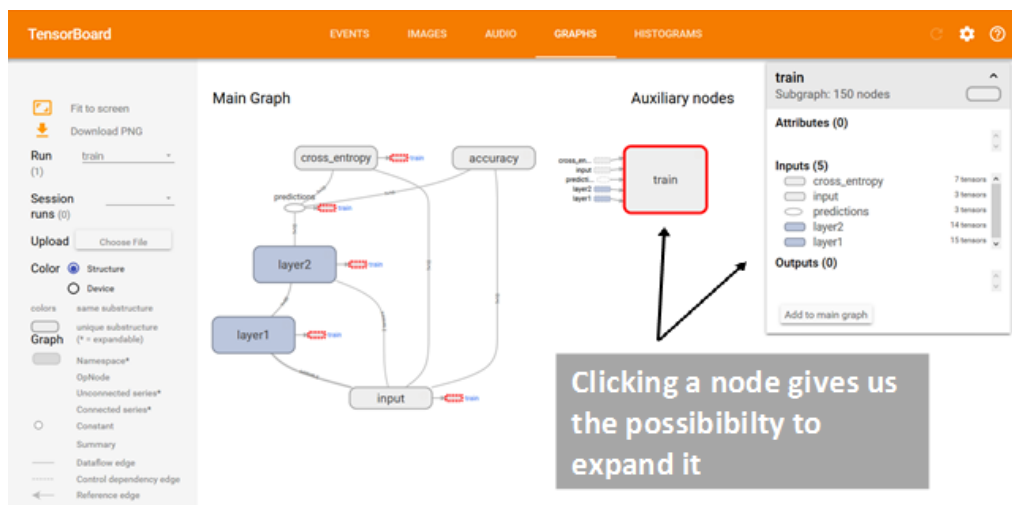
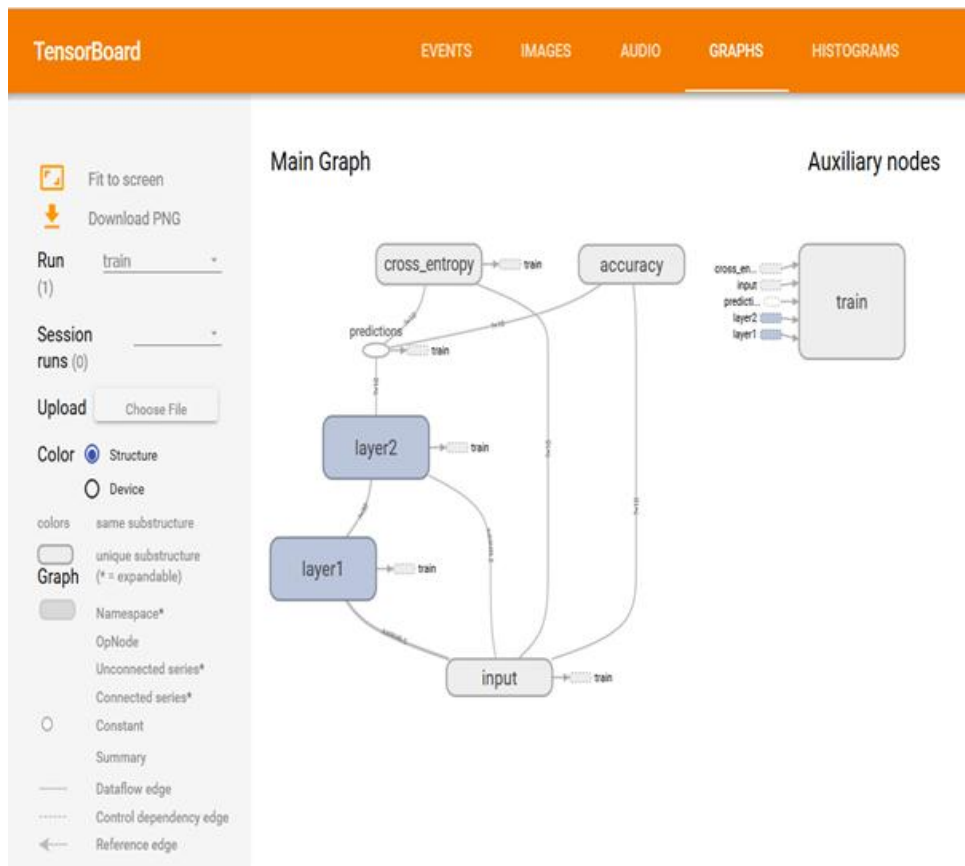
x = tf.constant(1, name='x')
y = tf.Variable(x+9, name='y')










model = tf.initialize_all_variables()

with tf.Session() as session:
    session.run(model)
    print(session.run(y))
```

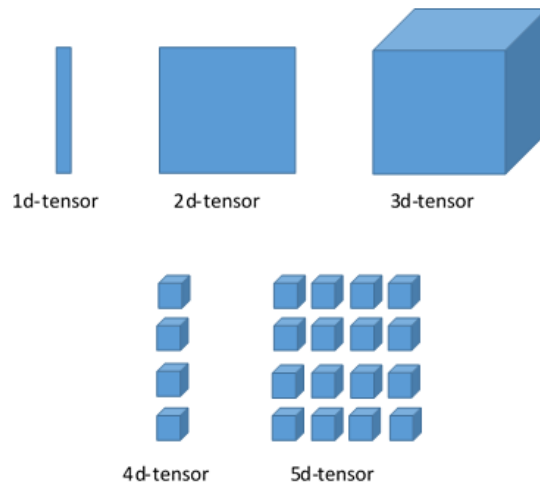
The code editor has a vertical toolbar on the left side with icons for various functions like opening files, saving, and running. The status bar at the bottom right shows "Ln: 1, Col: 0".





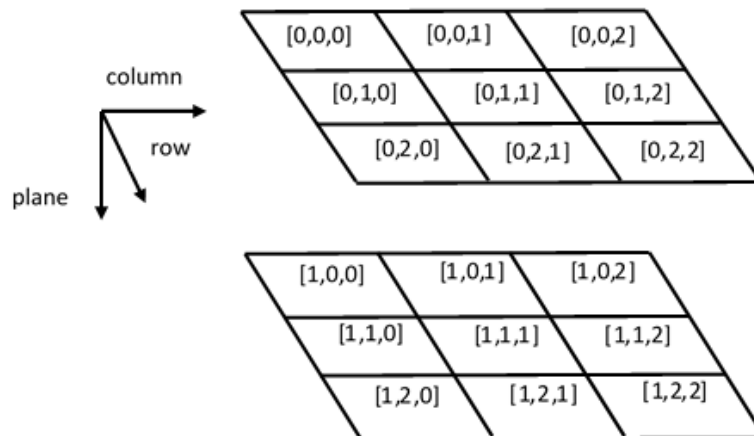
Symbol	Meaning
	High-level node representing a name scope. Double-click to expand a high-level node.
	Sequence of numbered nodes that are not connected to each other.
	Sequence of numbered nodes that are connected to each other.
	An individual operation node.
	A constant.
	A summary node.
	Edge showing the data flow between operations.
	Edge showing the control dependency between operations.
	A reference edge showing that the outgoing operation node can mutate the incoming tensor.

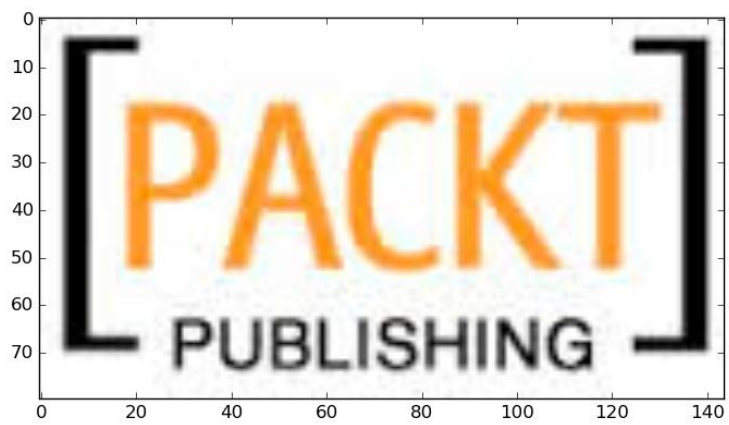
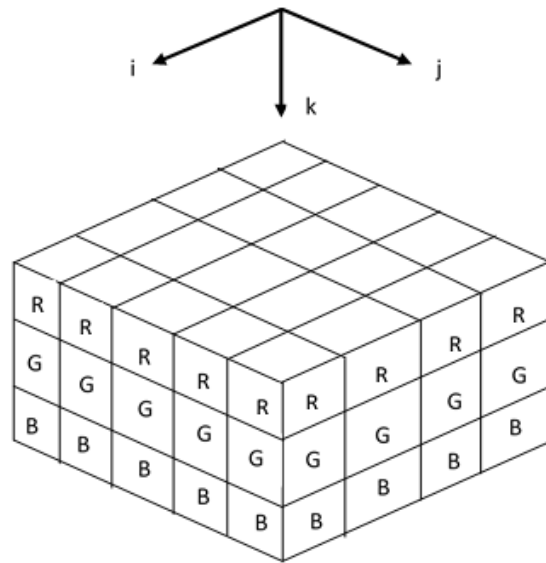
## Chapter 2: Doing Math with TensorFlow

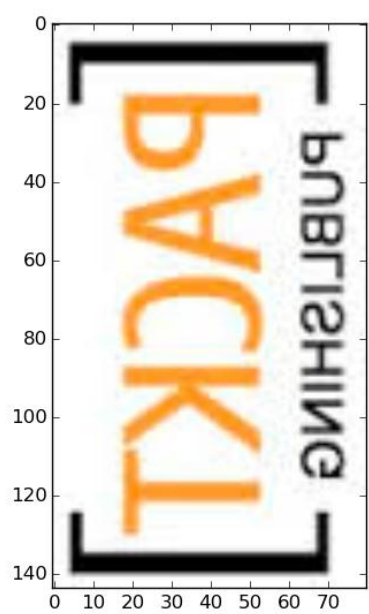
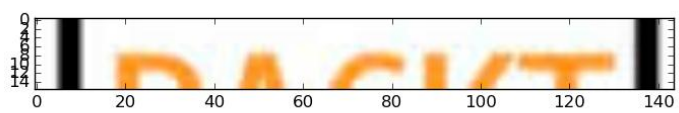


```
File Edit Shell Debug Options Window Help
Python 2.7.10 (default, Oct 14 2015, 16:09:02)
[GCC 5.2.1 20151010] on linux2
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
matrix1 =
[[2 2 2]
 [2 2 2]
 [2 2 2]]
matrix2 =
[[1 1 1]
 [1 1 1]
 [1 1 1]]
matrix3 =
[[ 2.  7.  2.]
 [ 1.  4.  2.]
 [ 9.  0.  2.]]
matrix1*matrix2 =
[[6 6 6]
 [6 6 6]
 [6 6 6]]
matrix1 + matrix2 =
[[3 3 3]
 [3 3 3]
 [3 3 3]]
matrix3 determinant result =
56.0
>>> |
```

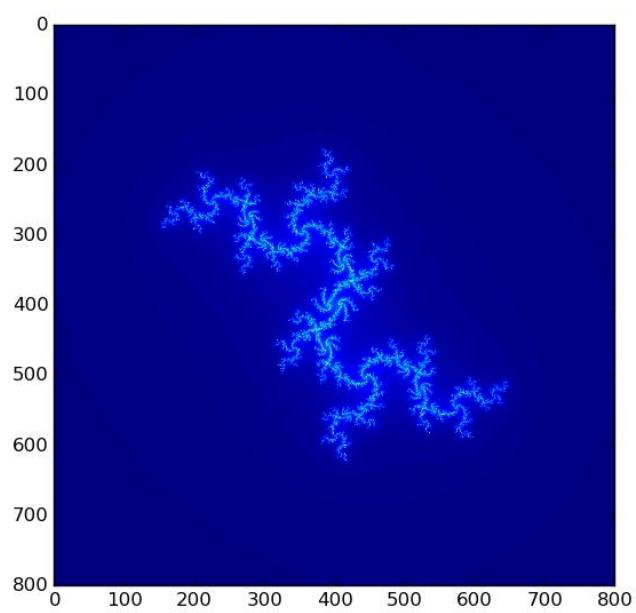
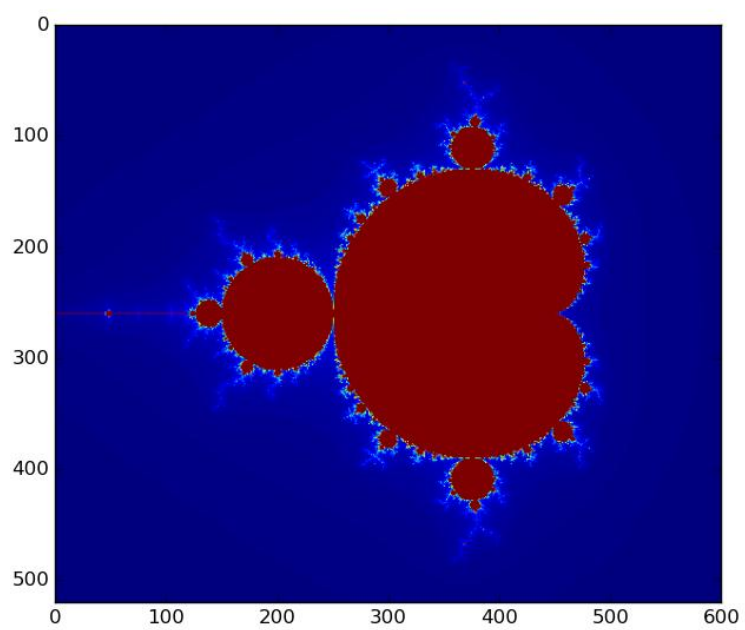
Ln: 28 Col: 4

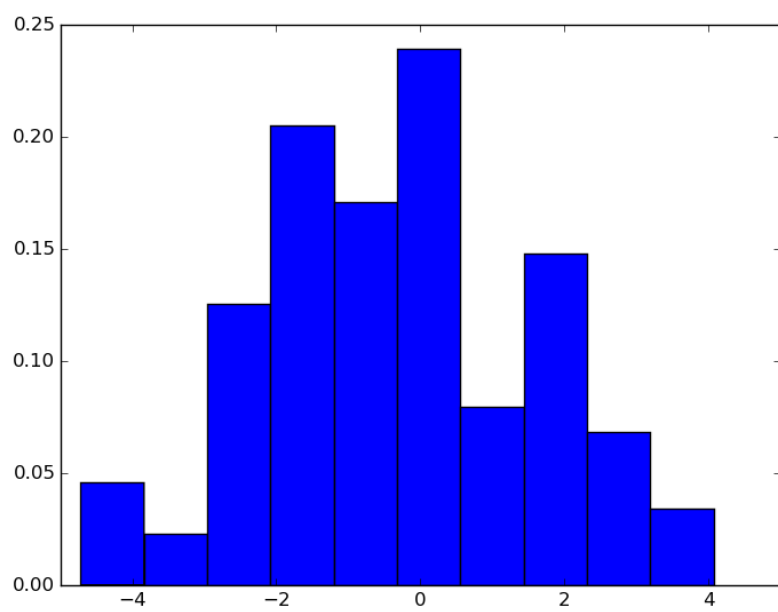
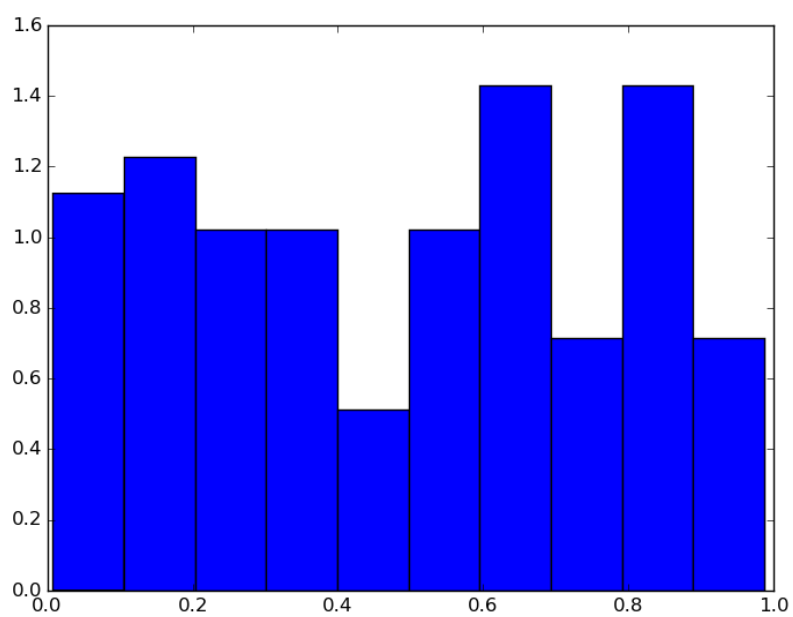


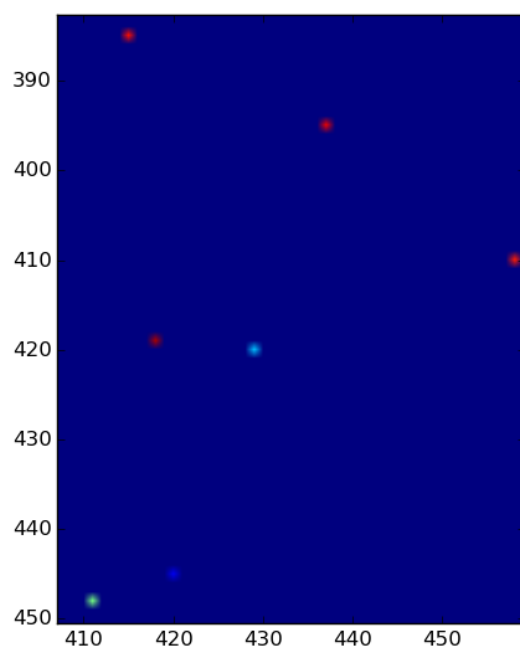
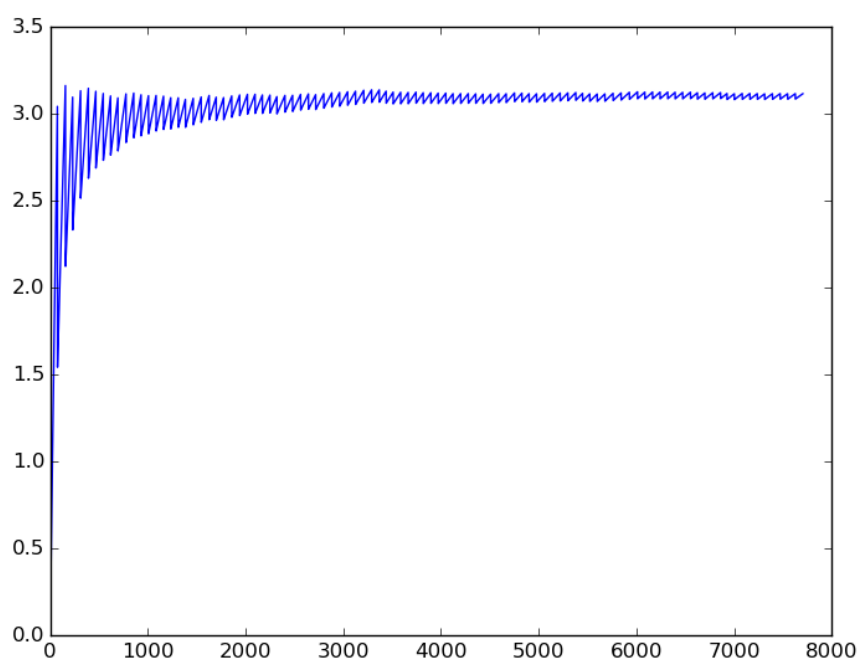


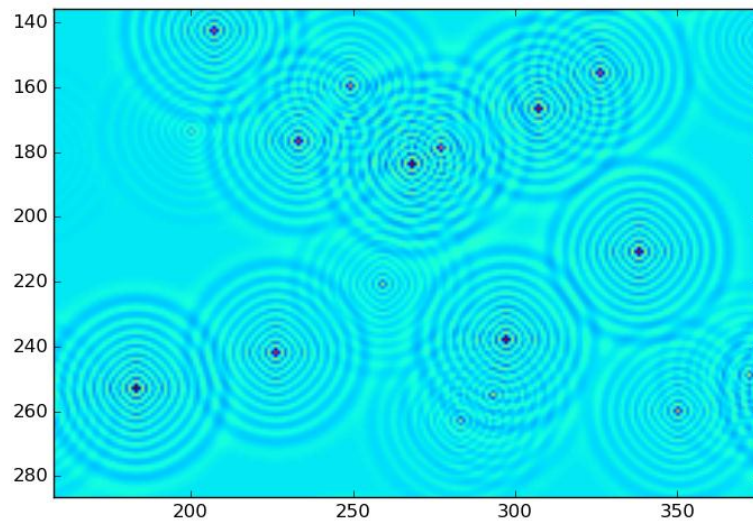
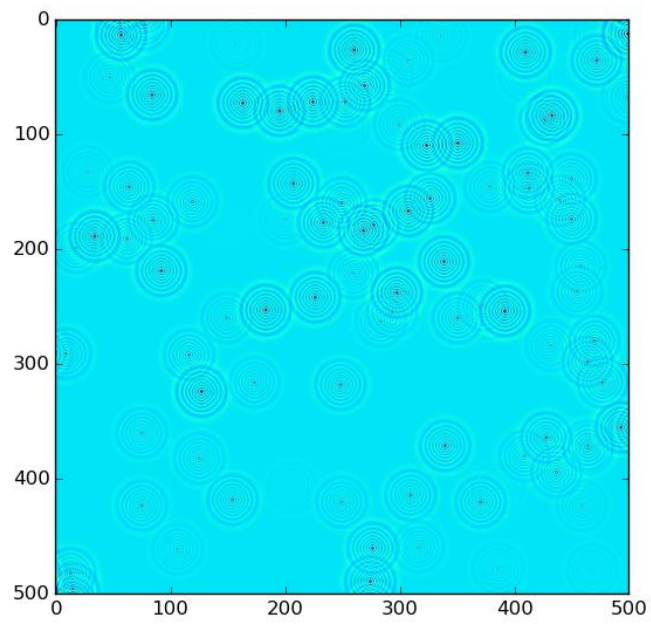




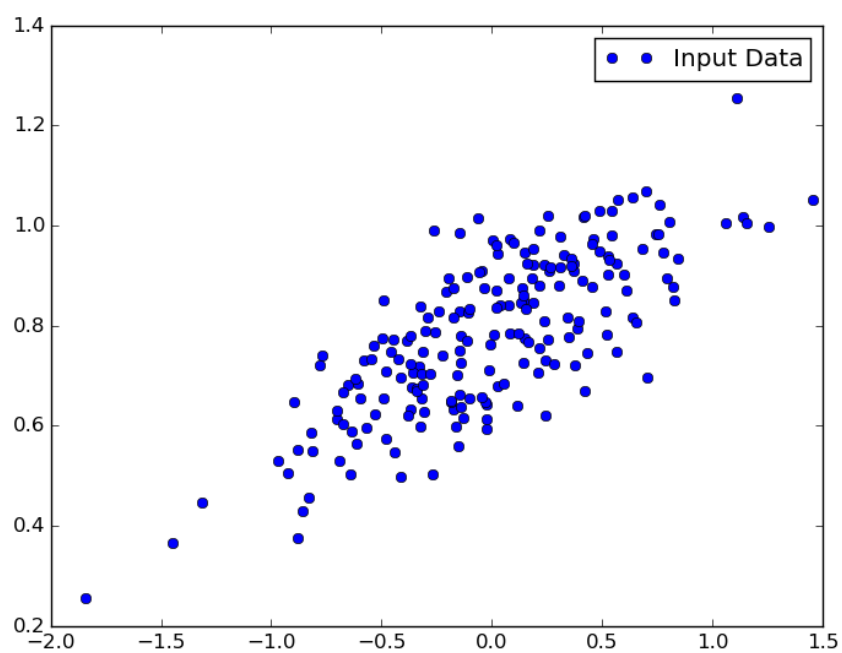






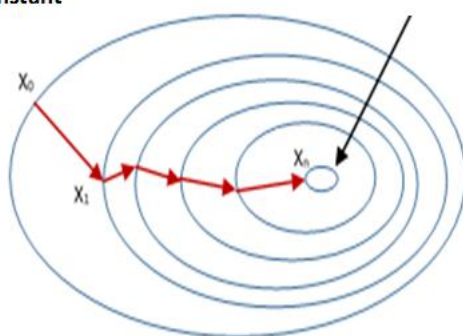


## Chapter 3: Starting with Machine Learning

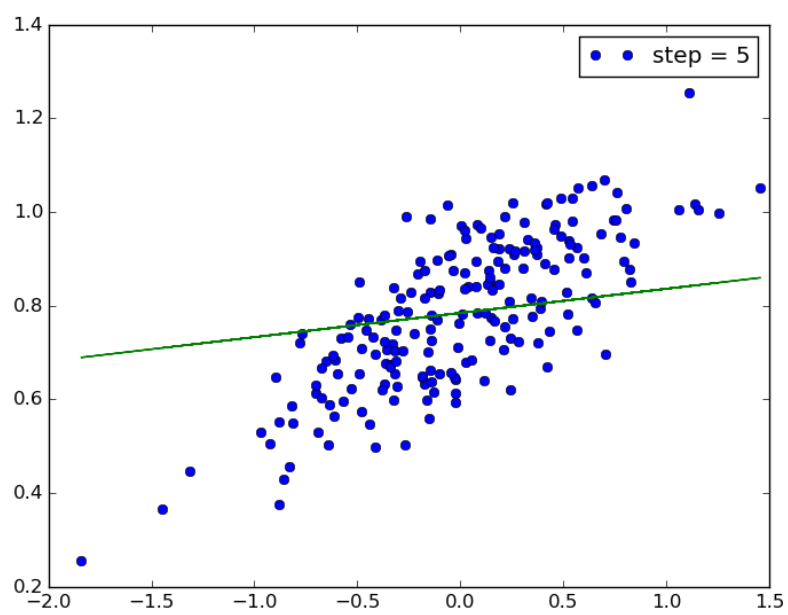
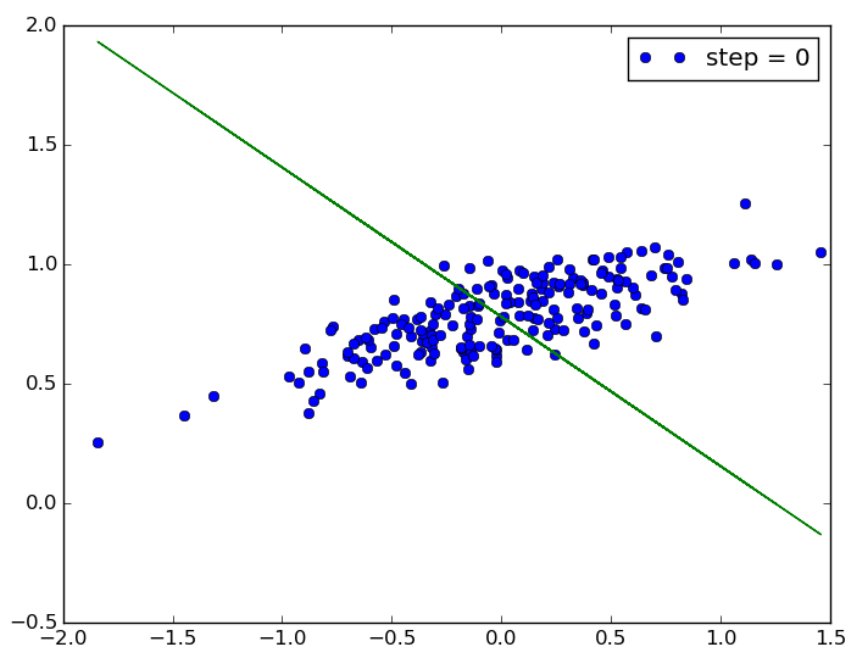


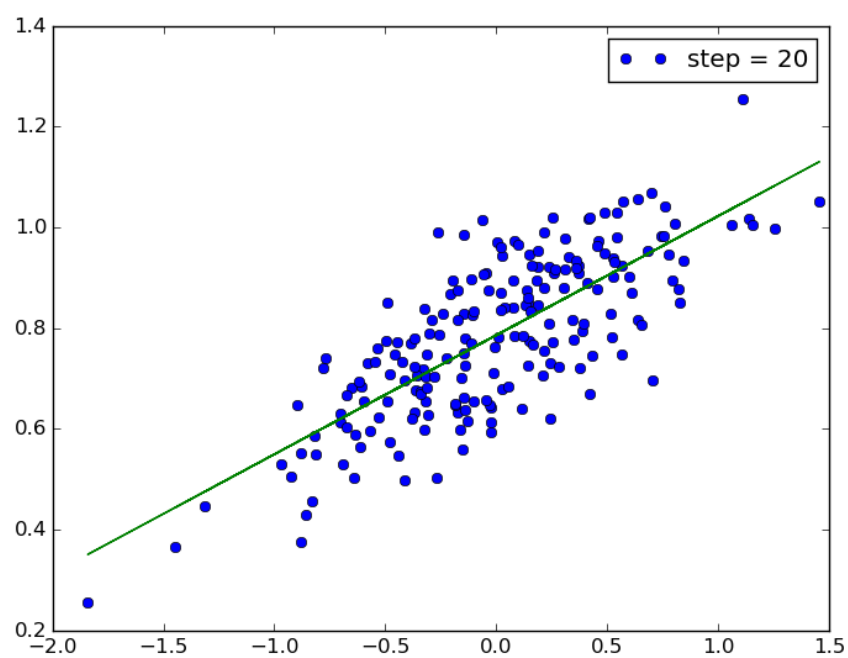
The borders are regions in which  $F(x)$  is constant

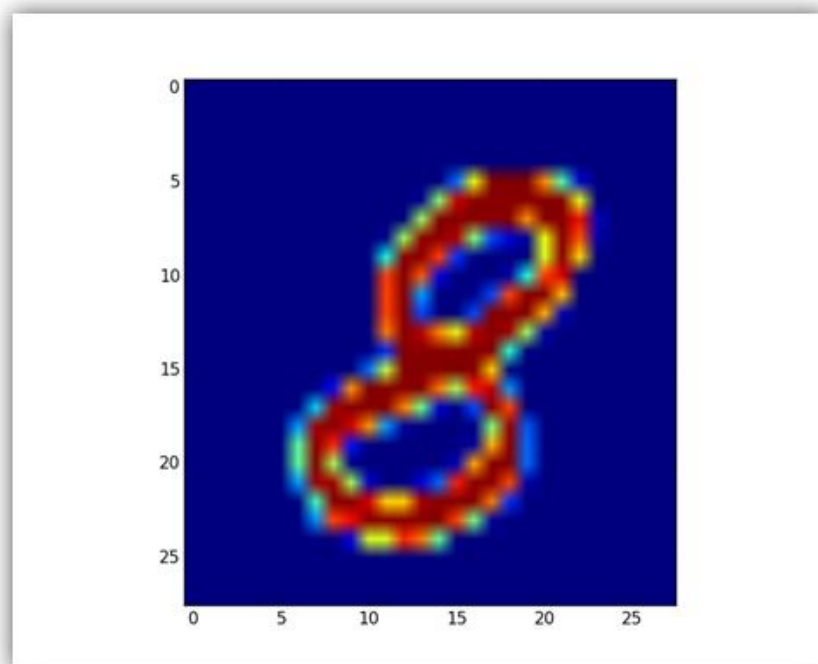
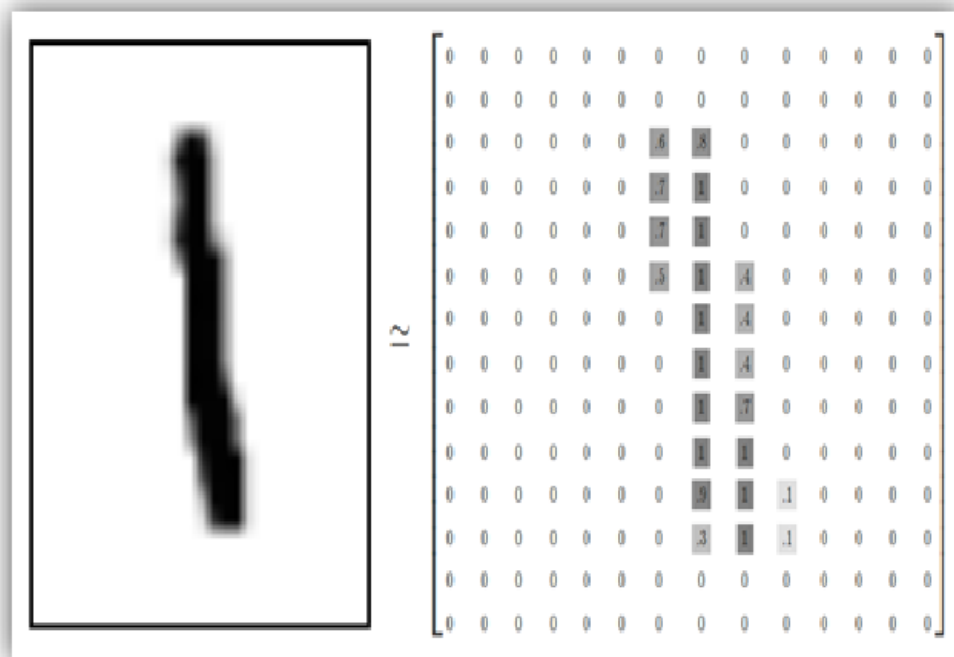
We want to converge towards the minimum, the center of the figure



$F(x)$  decreases faster if it moves in the direction of maximum slope (the derivative of  $F(x)$ )

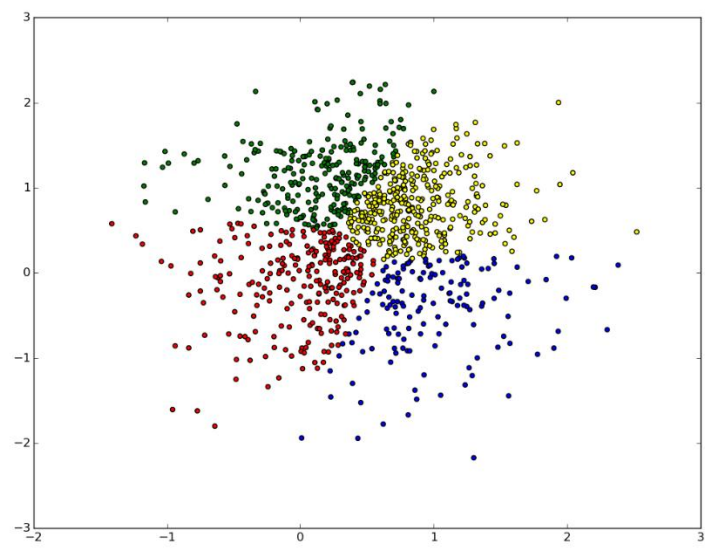
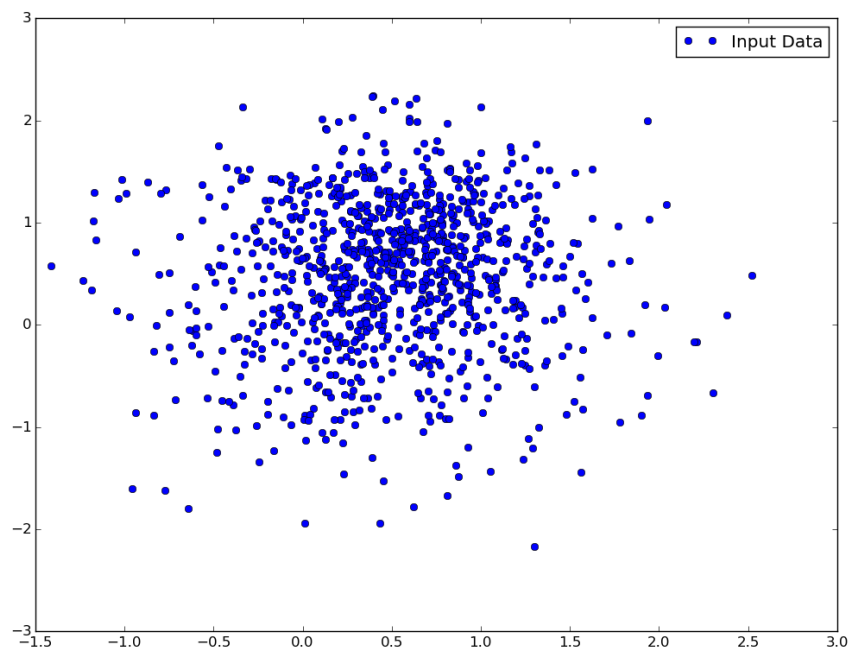




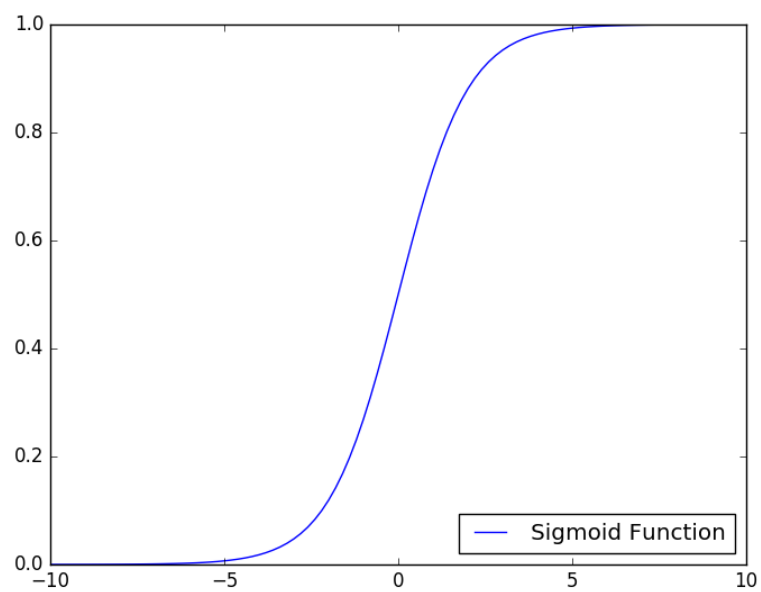
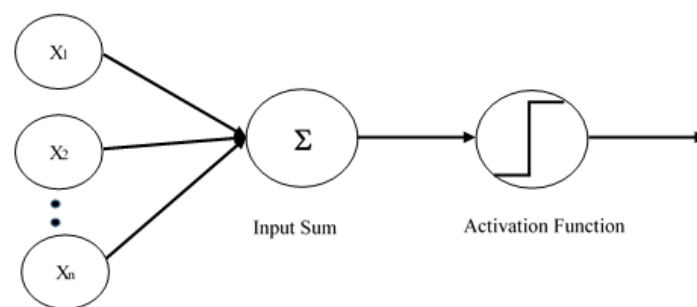
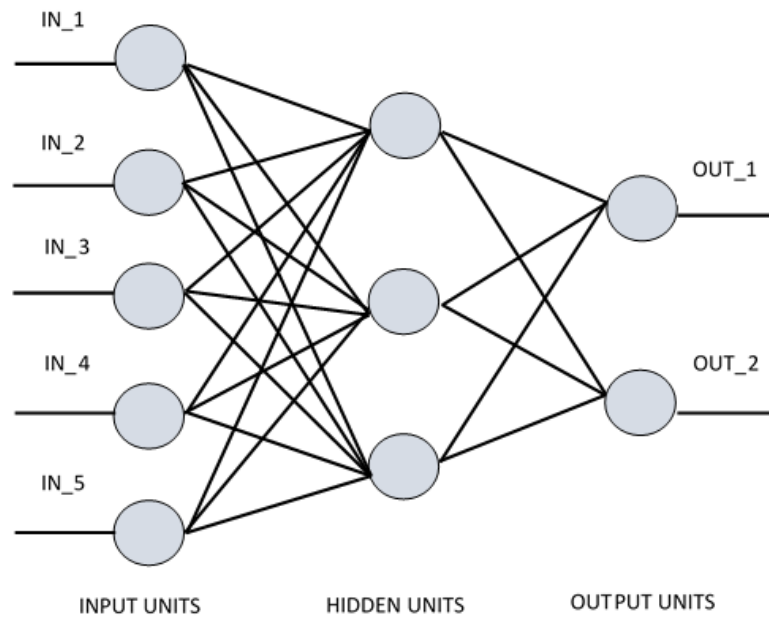


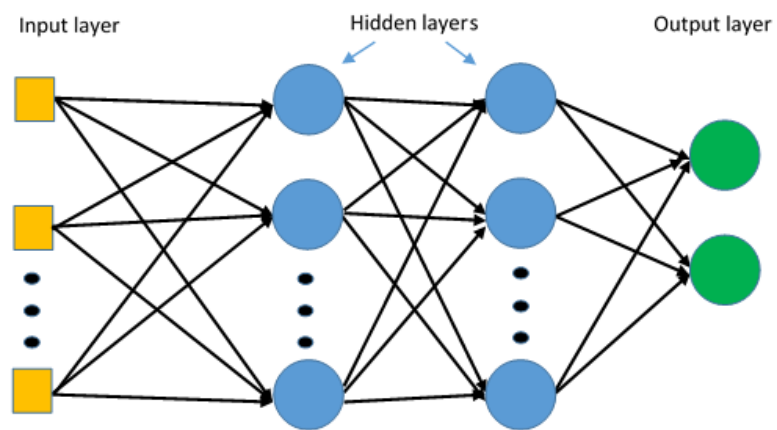
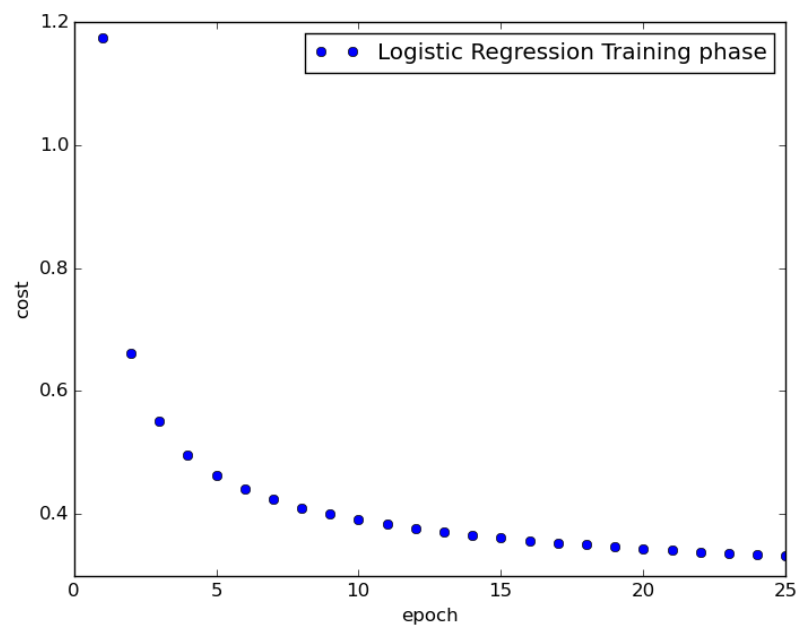
$$d = \sqrt{\sum_{i=1}^n (x_i - y_i)^2}$$

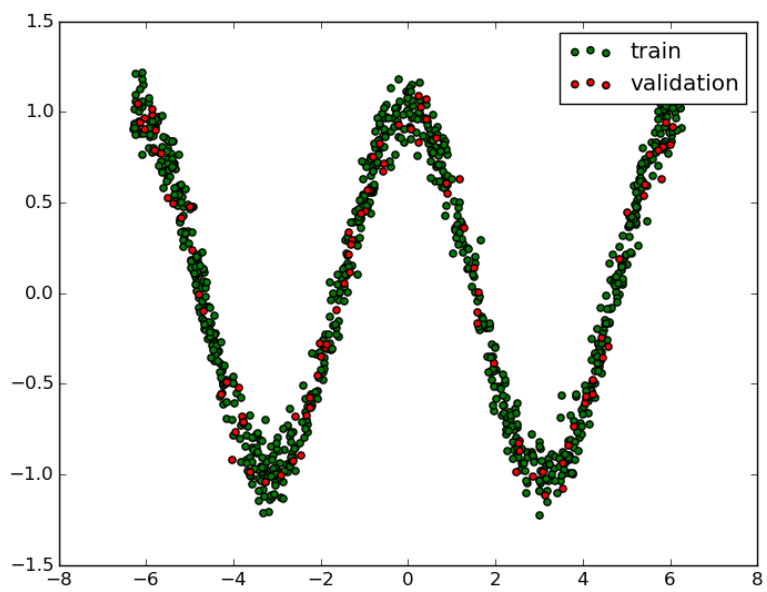
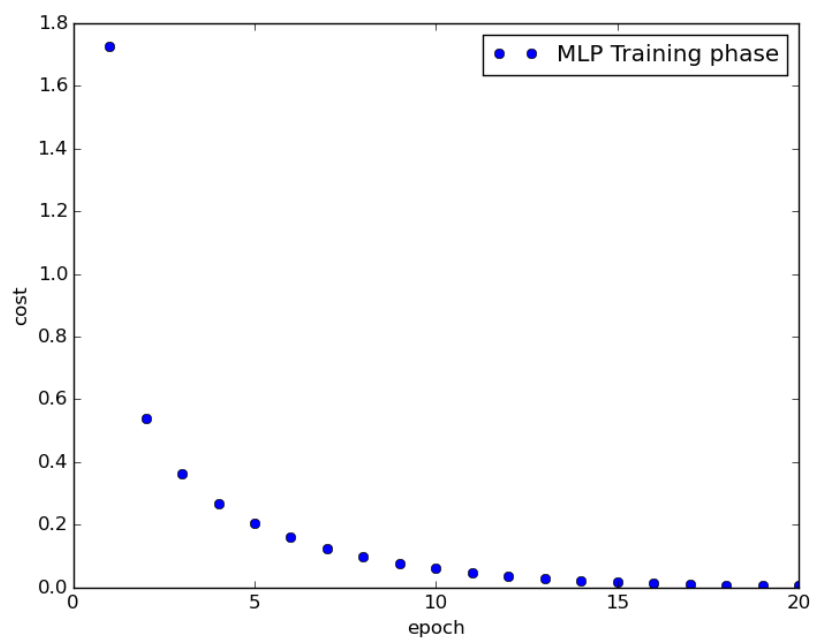


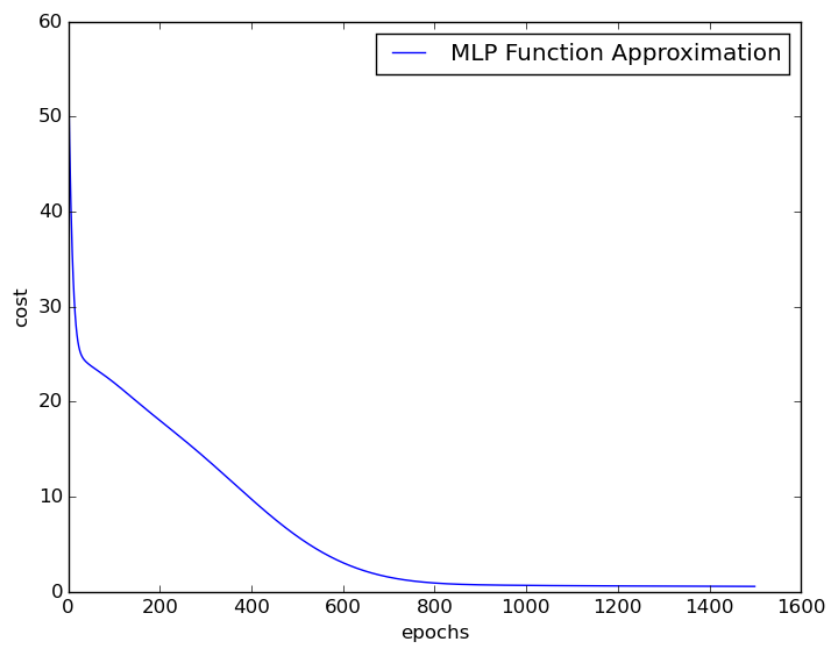


## Chapter 4: Introducing Neural Networks

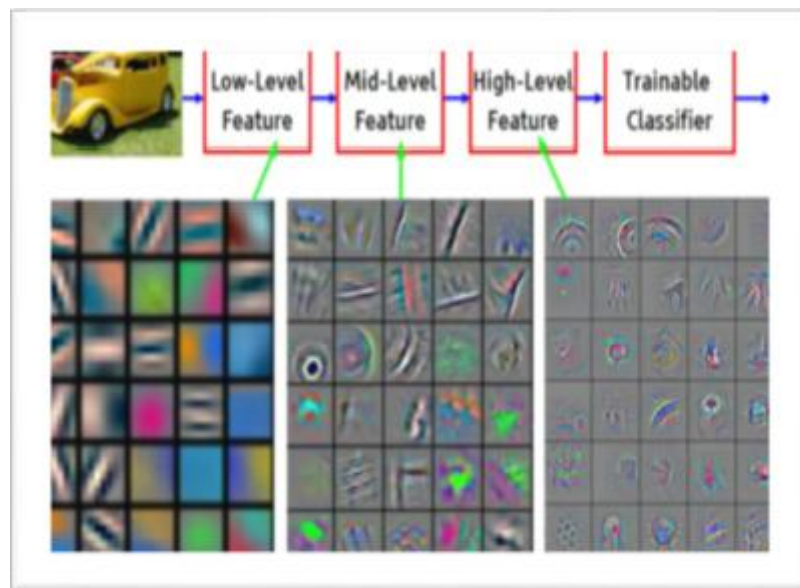


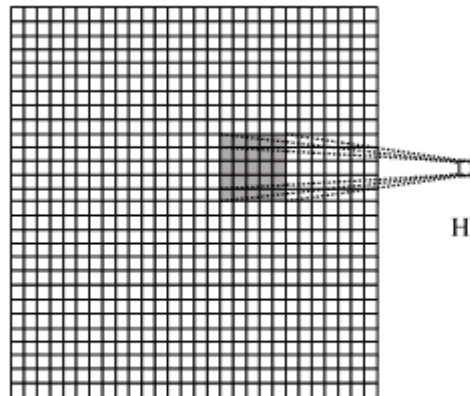
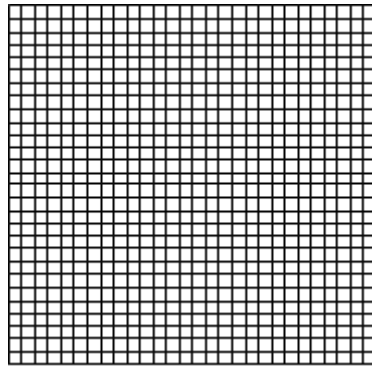






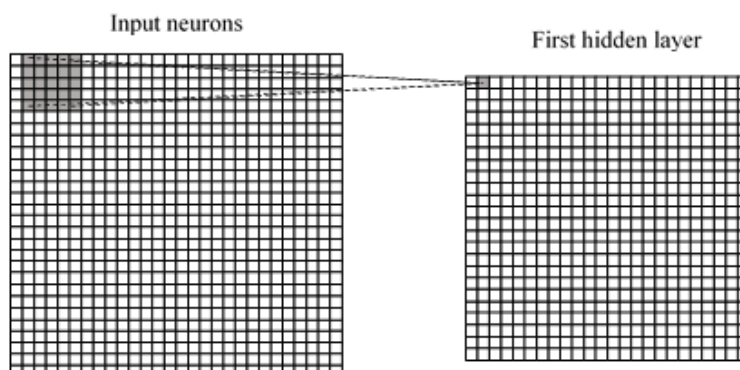
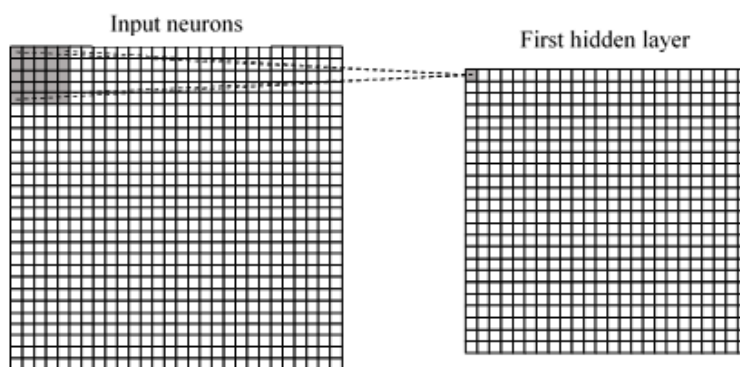
## Chapter 5: Deep Learning

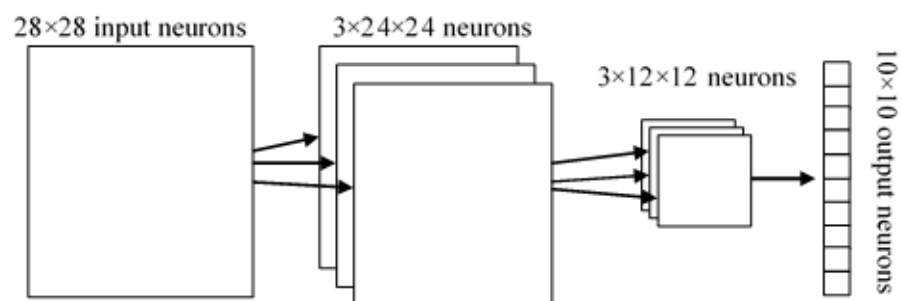
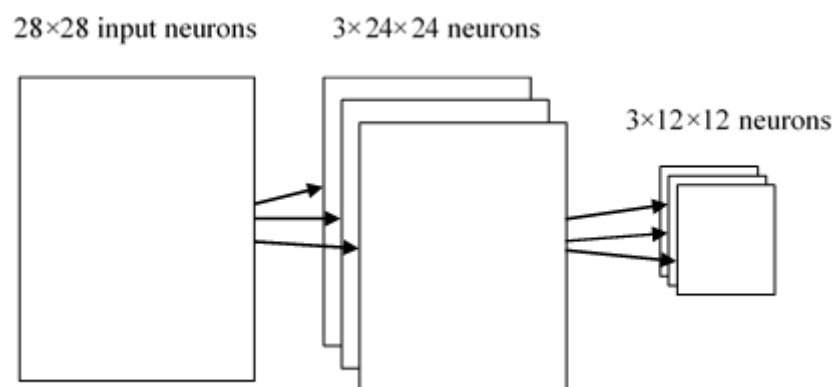
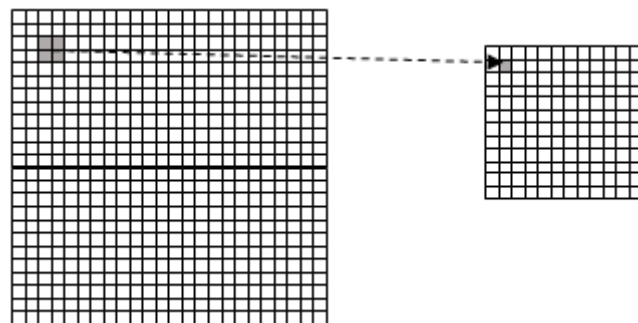
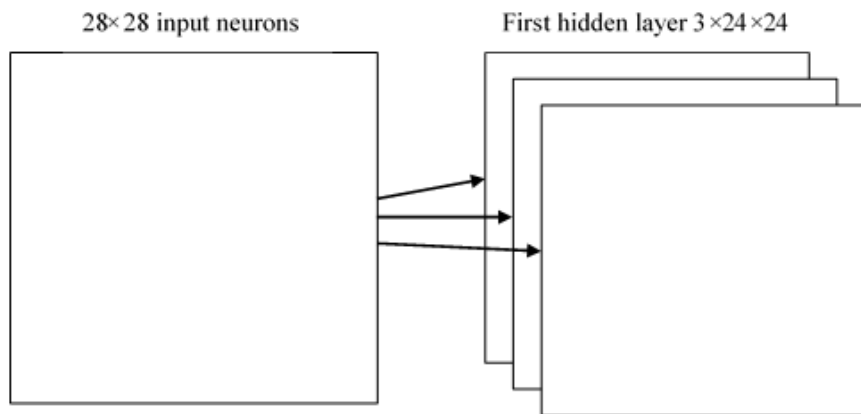


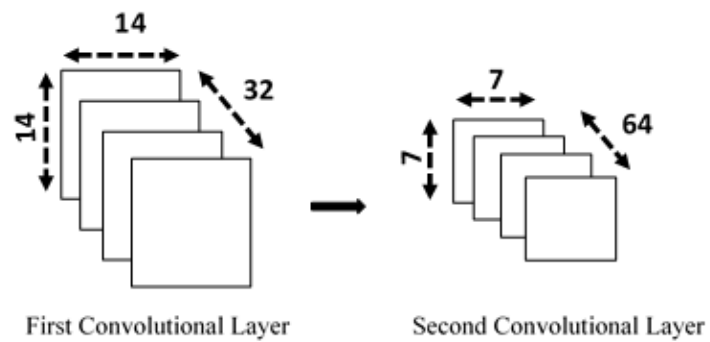
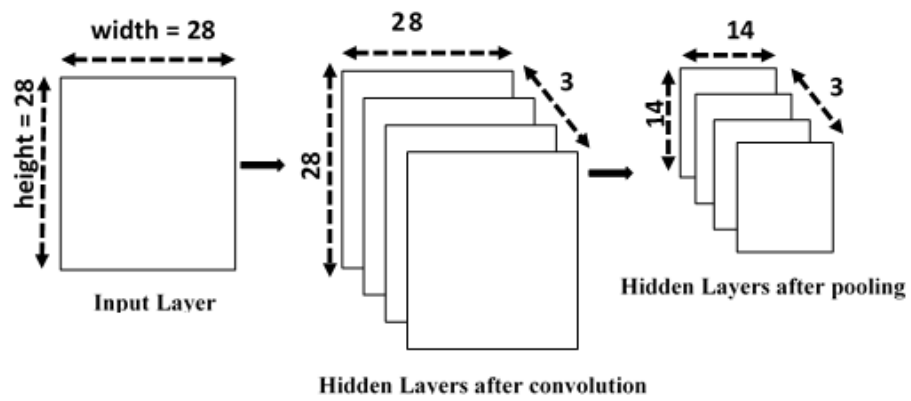
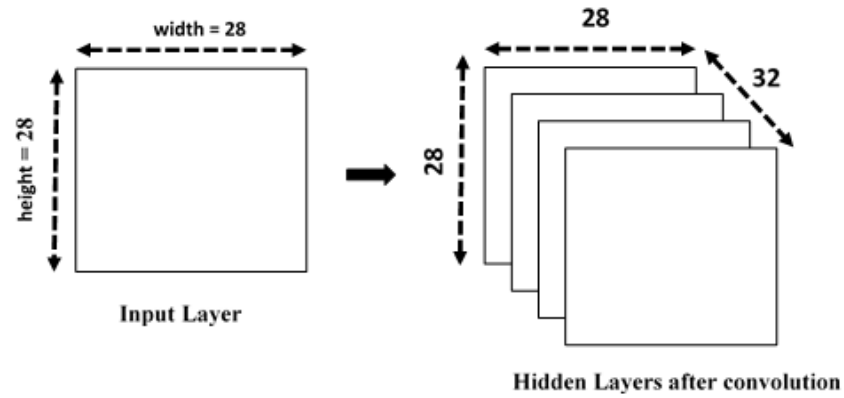
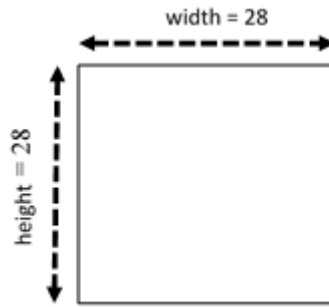


Hidden neurons

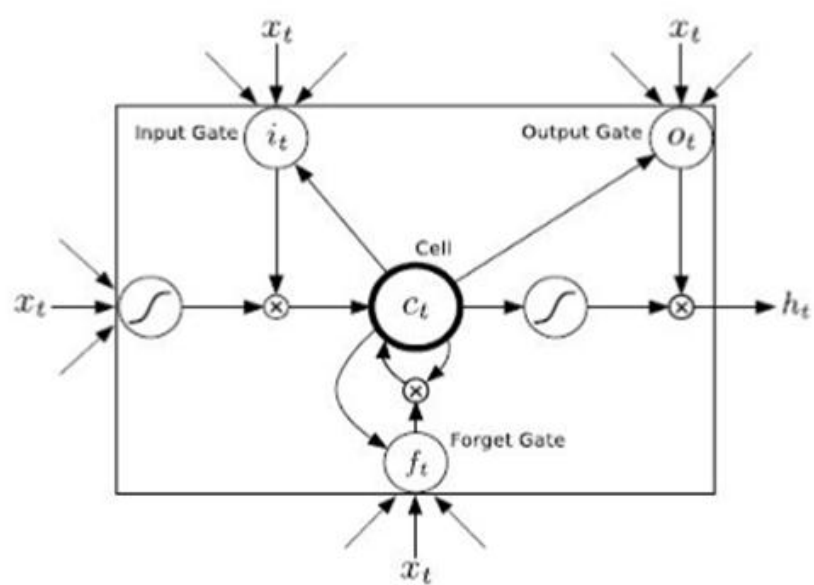
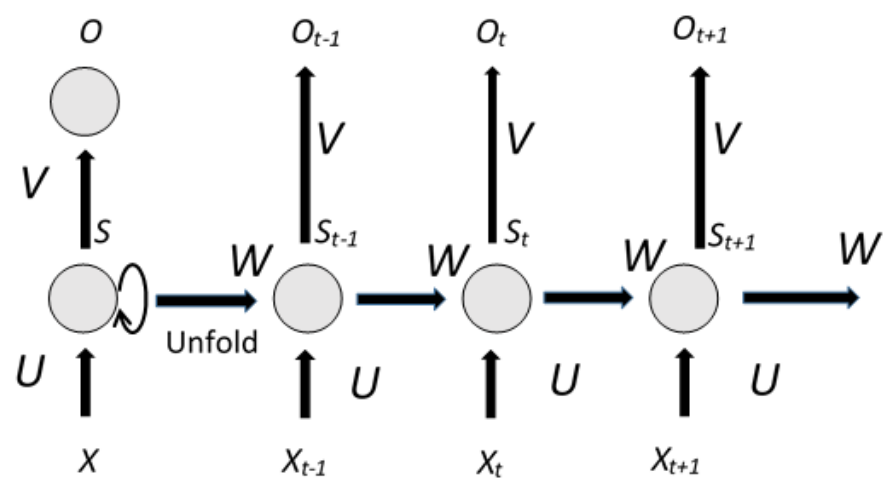
Input neurons











## Chapter 6: GPU Programming and Serving with TensorFlow

