**Lesson 00**

**CSC357 Machine Learning**

**14 January 2020**

**Numpy Tutorial**

**Instructor:** **Leon Tabak**

**Authors:** **Alex Heisdorffer, Chenxi Liu, Yudong Zhang, Linda Wang**

**Question List:**

1. What is the use of numpy? Why do we need it?Why do programmers use numpy to create arrays instead of using lists?
2. Does shape of array really matter when we doing matrix operations such as: multiplication or addition.
3. What is broadcasting?

 array1 = numpy.array([[1,2,3], [4,5,6]])

 array2 = numpy.array([7,8,9,10])

 array3 = array1 + array2

Did the interpreter identify an error?

1. How to confirm the dimension of an array? How to create a N-dimensions array?

What the value of array1.ndim, array1.shape, array1.size? (array1 is the above example)

1. What is the output you expect to see when running following code?

 array4 = numpy.array([ [1,1,1], [2,2,2] ])

 array5 = numpy.array([ [1,10], [1,10], [1,10] ])

 print( array4.dot(array5) )

**Notes of understanding matrix multiplication:**

**References:**

* [**https://www.mathwarehouse.com/algebra/matrix/multiply-matrix.php**](https://www.mathwarehouse.com/algebra/matrix/multiply-matrix.php)
* [**https://guides.github.com/pdfs/markdown-cheatsheet-online.pdf**](https://guides.github.com/pdfs/markdown-cheatsheet-online.pdf)
* [**http://cs231n.github.io/python-numpy-tutorial/**](http://cs231n.github.io/python-numpy-tutorial/)
* [**https://docs.scipy.org/doc/numpy/reference/**](https://docs.scipy.org/doc/numpy/reference/)
* [**https://docs.scipy.org/doc/numpy/reference/arrays.html**](https://docs.scipy.org/doc/numpy/reference/arrays.html)