Module-03, Python for Data Analysis

Data Exploration (NumPy)

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Numpy Arrays

NumPy arrays are the main way we will use NumPy throughout this lecture. NumPy arrays essentially come in two flavors: vectors and matrices. Vectors are strictly 1-d arrays and matrices are 2-d (but you should note a matrix can still have only one row or one column).
Let's begin our introduction by exploring how to create NumPy arrays.

- Creating NumPy Arrays.
  We can create an array by directly converting a list or list of lists:
- Built-in Methods
  There are lots of built-in ways to generate Arrays.
- Random
  Numpy also has lots of ways to create random number arrays:
- Array Attributes and Methods
  Let's discuss some useful attributes and methods or an array:

Built-in Methods

- arange

  Return evenly spaced values within a given interval.
- zeros and ones

  Generate arrays of zeros or ones
- linspace

  Return evenly spaced numbers over a specified interval.
- eye

  Creates an identity matrix

Random Methods

- rand
  Create an array of the given shape and populate it with random samples from a uniform distribution over “[0, 1)“.
- randn
  Return a sample (or samples) from the ”standard normal” distribution. Unlike rand which is uniform:
- randint
  Return random integers from ‘low‘ (inclusive) to ‘high‘ (exclusive).

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Array Attributes and Methods

- max,min,argmax,argmin
  These are useful methods for finding max or min values. Or to find their index locations using argmin or argmax
- Reshape
  Returns an array containing the same data with a new shape.
- Shape
  Shape is an attribute that arrays have (not a method):

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NumPy Indexing and Selection

To select elements or groups of elements from an array.

- Bracket Indexing and Selection
  The simplest way to pick one or some elements of an array looks very similar to python lists:
- Broadcasting
  Numpy arrays differ from a normal Python list because of their ability to broadcast:
- Indexing a 2D array (matrices)
  The general format is **arr-2d[row][col]** or **arr-2d[row,col]**. I recommend usually using the comma notation for clarity.
- Selection
  To use brackets for selection based off of comparison operators.

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NumPy Operations

- Arithmetic

  We can easily perform array with array arithmetic, or scalar with array arithmetic. Let's see some examples:
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Universal Array Functions

Numpy comes with many, which are essentially just mathematical operations you can use to perform the operation across the array. Let's show some common ones:

- Taking Square Roots of array
- Calcualting exponential (e) of array
- log of array
- sin of array

Great Job

Thank yo