DATA SCIENCE & MACHINE LEARNING
#2 Introduction to NumPy
(25 JAN 2019)

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#2 Introduction to NumPy

Contents (25 JAN 2019)

- Python Data Types
- The Basics of NumPy Arrays
- Computation on NumPy Arrays: Universal Functions
- Aggregations: Min, Max, and Everything in Between
- Computation on Arrays: Broadcasting
- Comparisons, Masks, and Boolean Logic
- Fancy Indexing
- Sorting Arrays
- Structured Data: NumPy's Structured Arrays

Python Data Types

- While a statically-typed language like C or Java requires each variable to be explicitly declared, a dynamically-typed language like Python skips this specification

```
/* C code */
int result = 0;
for(int i=0; i<100; i++){
    result += i;
}
```

```
# Python code
result = 0
for i in range(100):
    result += i
```

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Python Data Types - Immutable Objects

- Immutable Objects can't be altered after they are created
- Integers
- Floating point numbers
- Complex numbers
- Booleans
- Strings
- Tuples

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Python Data Types - Mutable Objects

- Mutable Objects can be altered after they are created
- Lists
- Dictionaries (Map)
- Sets

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NumPy

- Fundamental package for scientific computing with python
- Other libraries in the scientific toolkit use it's data structures
- Provides a powerful N-dimensional Array Object called ndarray and routines to manipulate it
- Very efficient operations and storage as datasets grows larger in size