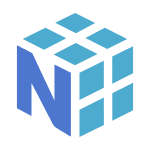
**NumPy **

* NumPy, which stands for Numerical Python, is a powerful library in Python used for numerical and mathematical operations. It provides support for large, multi-dimensional arrays and matrices, along with a collection of high-level mathematical functions to operate on these arrays.
* NumPy is extensively used for implementing machine learning and deep learning algorithms as NumPy supports broadcasting, which allows for efficient operations between arrays of different shapes and sizes without the need for explicit loops. This feature simplifies code and improves performance.
* Also NumPy operations are implemented in highly optimized C and Fortran code, which makes them much faster than equivalent operations using pure Python and for loops. This is particularly crucial for numerical and scientific computing tasks involving large datasets.
* NumPy would be useful to you throughout the project and especially when you will implement the theoretical algorithms from scratch. Hence we highly recommend you to get yourself familiar with NumPy before moving forward.
* Refer to the NumPy’s official documentation : <https://numpy.org/doc/stable/user/absolute_beginners.html>
* Tasks for this checkpoint is as follows:

1. Get familiar with NumPy.
2. Understand the difference between python list and numpy array.
3. Understand *broadcasting* in detail. You can refer to this [link](https://numpy.org/doc/stable/user/basics.broadcasting.html#broadcasting) for the same.
4. Understand why vectorization is important in ML/DL and how NumPy helps with it. Refer to [link](https://medium.com/@jwbtmf/vectorization-in-deep-learning-c47f0d171d0a) this for the same.(Don’t worry if you can’t understand it completely right now. You will geta clear idea once we use it further in the project)
5. Refer to important NumPy functions. Some are listed below

* np.array()
* np.zeros()
* np.ones()
* np.reshape()
* np.concatenate()
* np.mean()
* np.sum()
* np.min()
* np.max()
* np.argmax()
* np.argmin()
* np.random.rand()
* np.random.randn()
* np.random.randint()
* np.dot

You will have to implement the functions listed above with one example and upload the notebook on your github repository. Naming convention must be WoC\_6.0\_Checkpoint\_1.

The deadline for the above task will be **11th January, 2024 11:59 PM.**