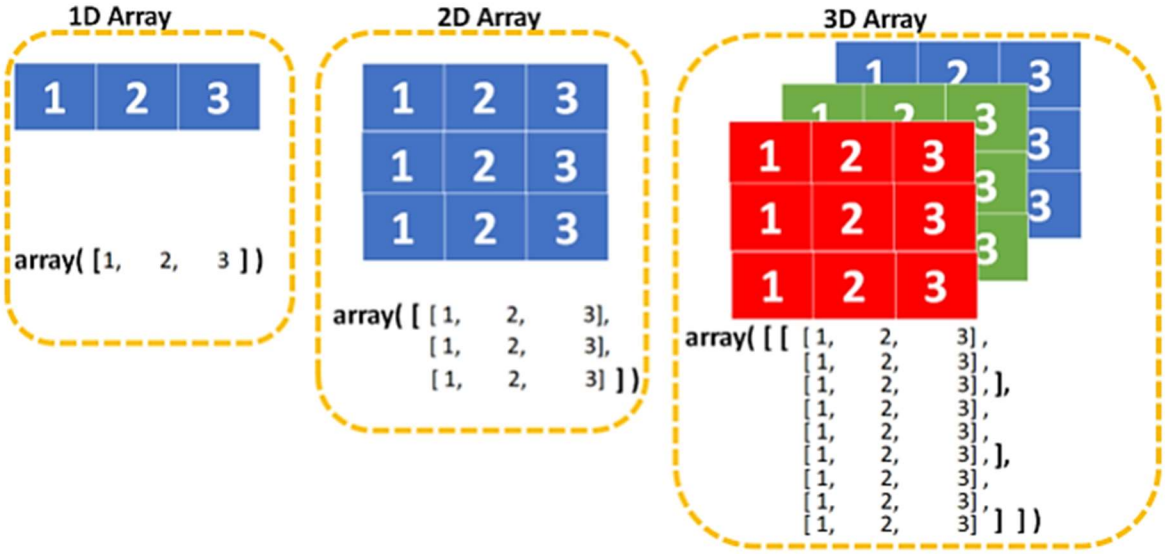
LEC # 03

Vectorization

Conversion to an Raw Data into an array of numbers is called vectorization

An image is converted into 03 dimensions.

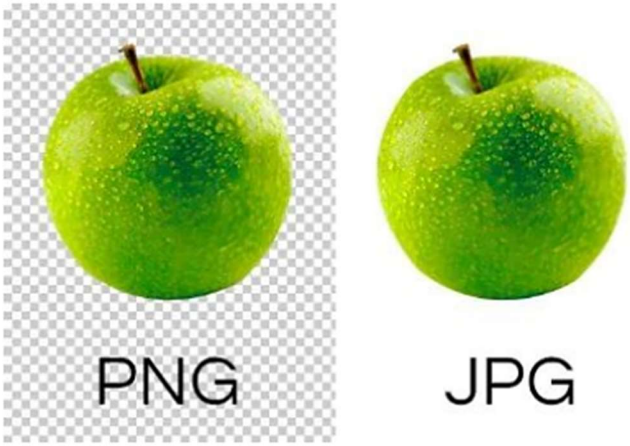
- X-Axis
- Y-Axis
- RGB Values



JPEG VS PNG

Because of their different compression processes, JPEGs contain less data than PNGs — and therefore, are usually smaller in size. Unlike JPEGs, PNGs support transparent backgrounds, making them preferred for graphic design.

- For JPEG image there are three channels. Red, Green and Blue.
- For PNG images, there is an additional channel i.e. Alpha. This indicates the transparency.



Gray Scale image:

Grayscale images, a kind of black-and-white or gray monochrome, are composed exclusively of shades of gray. The contrast ranges from black at the weakest intensity to white at the strongest.

- To identify an image, the colors may or may not be required (like person image) – use gray scale image
- To identify image, where color is important (like cancer cells) – use rgb or png format.
- We can use Grayscale images as it will reduce Computation Power requirements

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Packages

- ***To read png image - Pillow package***

The Pillow library contains all the basic image processing functionality. You can do image resizing, rotation and transformation. Pillow module allows you to pull some statistics data out of image using histogram method, which later can be used for statistical analysis and automatic contrast enhancement.

- ***Open Cv package***

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products.

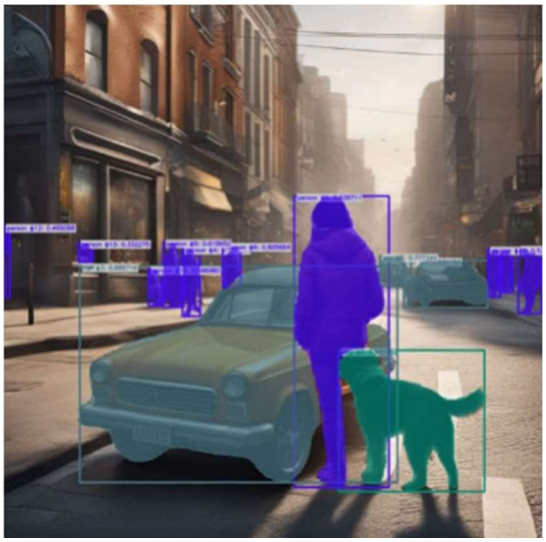
- OpenCV is a library of programming functions mainly for real-time computer vision.
- Used for Pre-Processing of Image Data

- ***Matplotlib Package***

Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. Matplotlib makes easy things easy and hard things possible. Create publication quality plots.

Image Segmenetation

Image segmentation is a computer vision technique that partitions a digital image into discrete groups of pixels—image segments—to inform object detection and related tasks. By parsing an image's complex visual data into specifically shaped segments, image segmentation enables faster, more advanced image processing.



In digital image processing and computer vision, image segmentation is the process of partitioning a digital image into multiple image segments, also known as image regions or image objects.

Tensor Flow

TensorFlow is a free and open-source software library for machine learning and artificial intelligence. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks.

Class of tensorflow – image data generator class

RGB range

RGB range – 0 to 255 (R,G,B = 256 colors) -> Normalize – convert range from 0 to 1.

Normalize:

Number: int = 256

Print(number/255) – answer came between 0 to 255

Target size – best size of image:

Size of image – 150 x 150

Numpy

NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

Class mode – binary – because it has 2 class

Sciencepy.ioread audio file – convert audio file into numpy array

Training Data Ratios

- 70% for training 30% for testing
- 80% for training 20% for testing
- 60% for training 40% for testing
- 60% for training, 20% validation, 20% for testing