

# Working with IMAGE in Machine Learning

```
In [1]: import pandas as pd
```

```
import numpy as np
```

```
import matplotlib.pyplot as plt
```

```
from matplotlib import image
```

```
import seaborn as sns
```

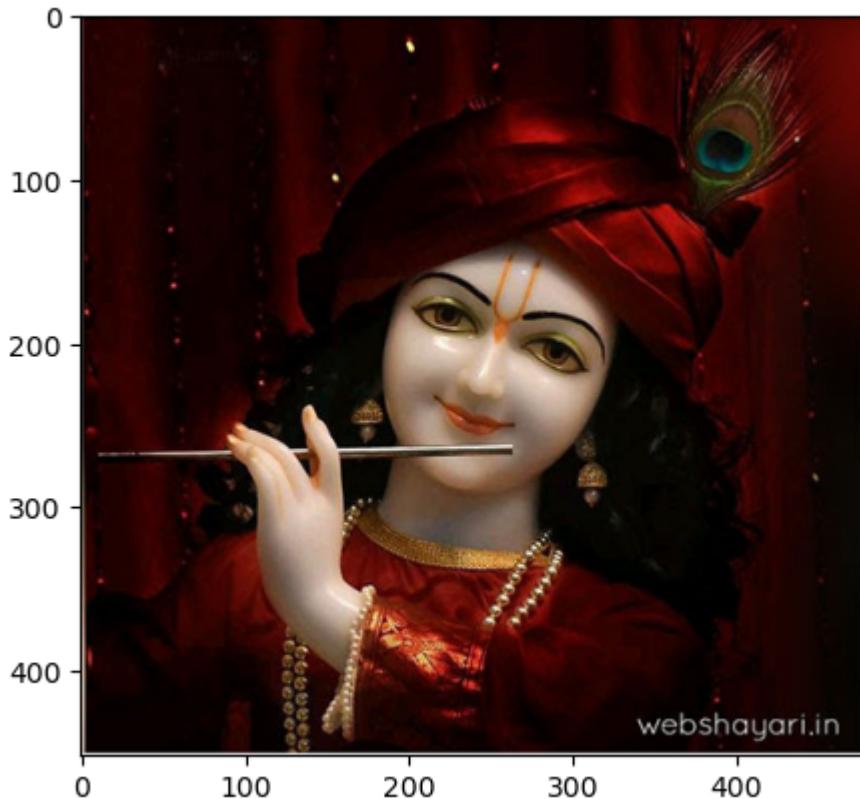
```
In [2]: img = image.imread('C:/Users/priya/Pictures/Saved Pictures/krishna.jpg')
```

```
In [3]: print(type(img),img.shape)#rows=452,columns=480,depth/channels/Layers(RGB)=3  
#pixel=480*452(width*height)
```

```
<class 'numpy.ndarray'> (452, 480, 3)
```

```
In [4]: plt.imshow(img)#image is matrices of numbers
```

```
Out[4]: <matplotlib.image.AxesImage at 0x2595db06ef0>
```



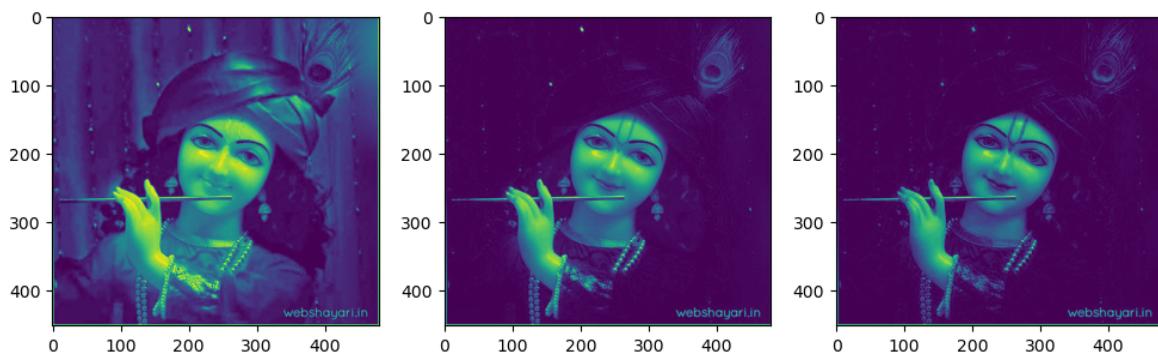
```
In [5]: plt.figure(figsize=(12,12))

plt.subplot(1,3,1)
plt.imshow(img[:, :, 0])

plt.subplot(1,3,2)
plt.imshow(img[:, :, 1])

plt.subplot(1,3,3)
plt.imshow(img[:, :, 2])
```

Out[5]: <matplotlib.image.AxesImage at 0x2595dd36890>



## Loading image using PIL

```
In [6]: pip install PIL
```

Note: you may need to restart the kernel to use updated packages.

ERROR: Could not find a version that satisfies the requirement PIL (from versions: none)  
ERROR: No matching distribution found for PIL

```
In [7]: pip install pillow
```

Requirement already satisfied: pillow in c:\users\priya\anaconda3\lib\site-packages (9.4.0)

Note: you may need to restart the kernel to use updated packages.

```
In [8]: from PIL import Image
```

```
In [9]: img = Image.open('C:/Users/priya/Pictures/Saved Pictures/krishna.jpg')
```

```
In [10]: print(type(img))
img.show()#open in new window
```

```
<class 'PIL.JpegImagePlugin.JpegImageFile'>
```

```
In [11]: plt.imshow(img)
```

```
Out[11]: <matplotlib.image.AxesImage at 0x2595dc7dba0>
```



```
In [12]: print(img.size)#width*height in pixels
print(img.filename)
print(img.format)
print(img.mode)
```

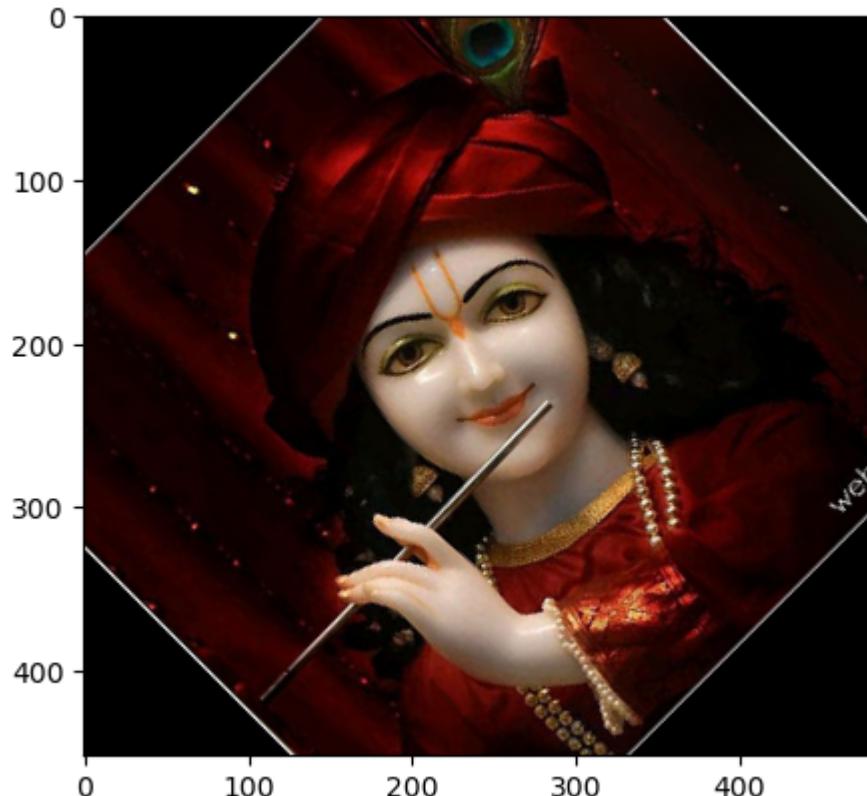
```
(480, 452)
C:/Users/priya/Pictures/Saved Pictures/krishna.jpg
JPEG
RGB
```

## Rotation of Image

```
In [13]: img_rotated=img.rotate(45)
```

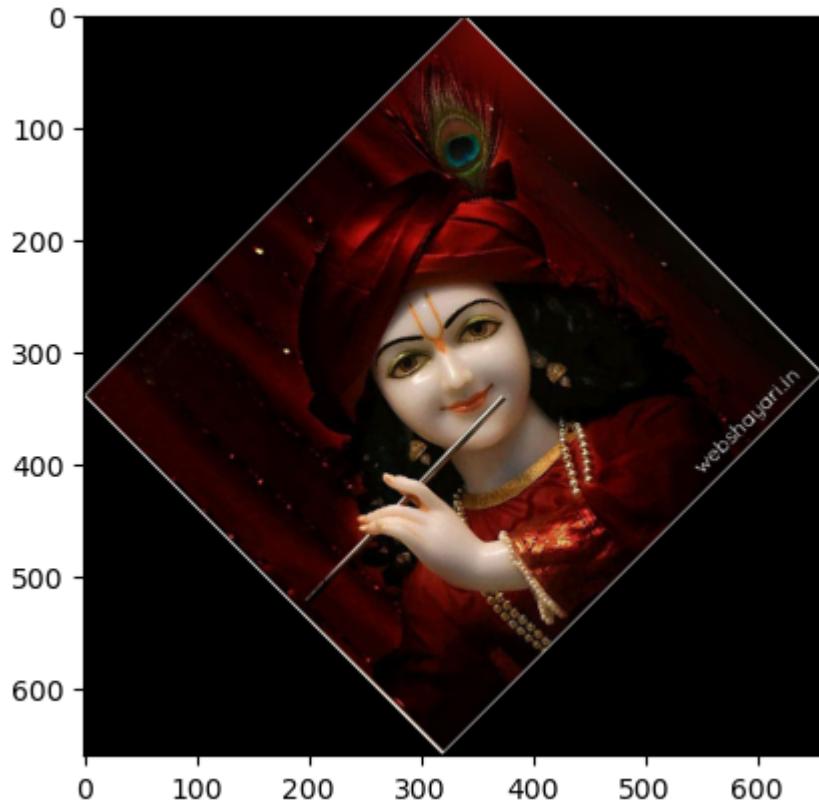
```
In [14]: plt.imshow(img_rotated)
```

```
Out[14]: <matplotlib.image.AxesImage at 0x2595df55270>
```



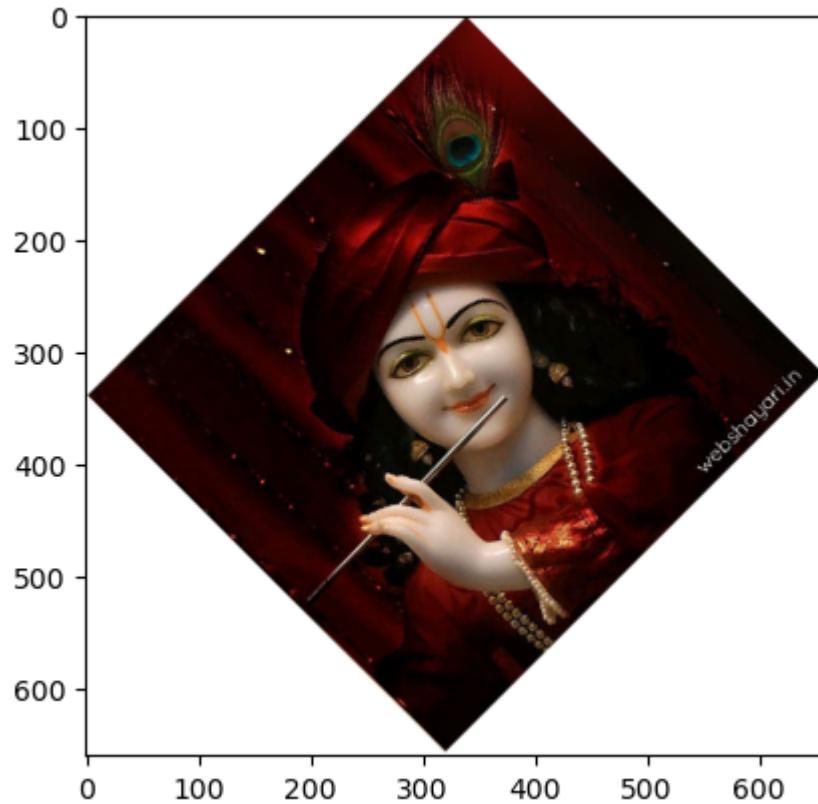
```
In [15]: img_rotated=img.rotate(45,expand=True)
plt.imshow(img_rotated)
```

```
Out[15]: <matplotlib.image.AxesImage at 0x2595dfe9390>
```



```
In [16]: img_rotated=img.rotate(45,expand=True,fillcolor=(255,255,255))
plt.imshow(img_rotated)
```

```
Out[16]: <matplotlib.image.AxesImage at 0x2595e2073d0>
```



In [17]: `plt.imshow(img)`

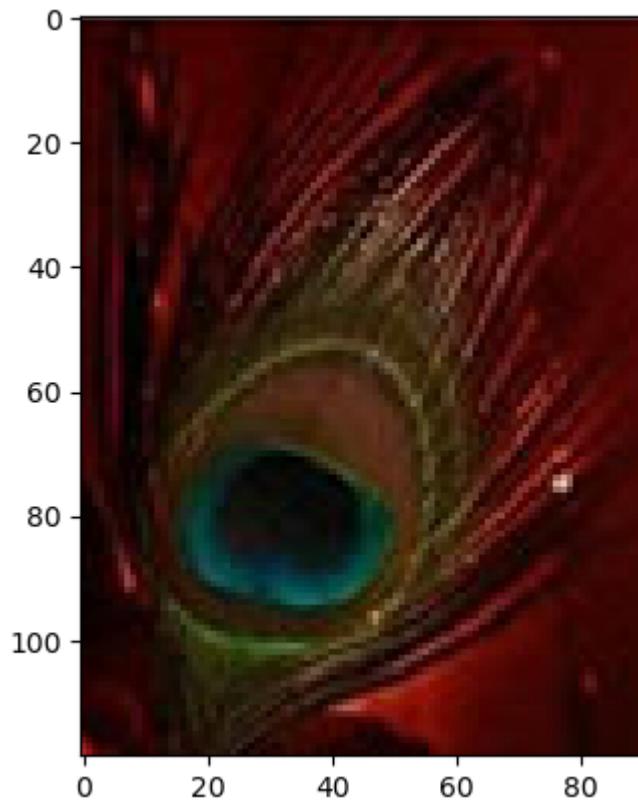
Out[17]: <matplotlib.image.AxesImage at 0x2595e291a20>



## Crop the Image

```
In [18]: img_cropped = img.crop((360,1,450,120))  
plt.imshow(img_cropped)
```

```
Out[18]: <matplotlib.image.AxesImage at 0x2595e050eb0>
```



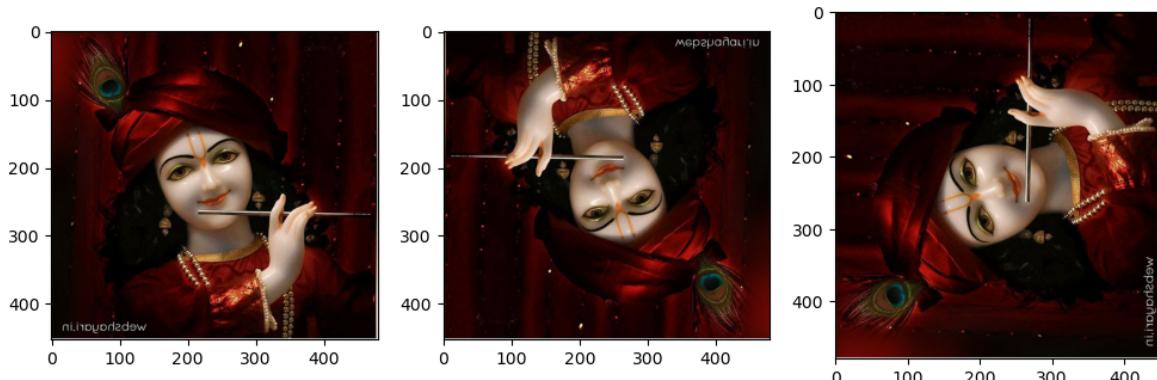
## Flipping

```
In [19]: plt.figure(figsize=(12,12))
plt.subplot(1,3,1)
img_flipped_horizontal = img.transpose(Image.FLIP_LEFT_RIGHT)
plt.imshow(img_flipped_horizontal)

plt.subplot(1,3,2)
img_flipped_vertical = img.transpose(Image.FLIP_TOP_BOTTOM)
plt.imshow(img_flipped_vertical)

plt.subplot(1,3,3)
img_flipped = img.transpose(Image.TRANSPOSE)
plt.imshow(img_flipped)
```

Out[19]: <matplotlib.image.AxesImage at 0x2595e10fa90>



## Resizing

```
In [20]: new_img = img.resize((200,200))
new_img.save('C:/Users/priya/Pictures/Saved Pictures/krishr.jpg')

print(img.size)
print(new_img.size)
```

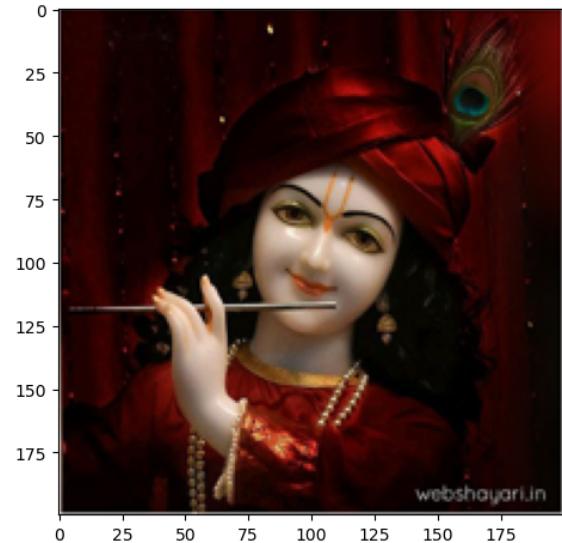
(480, 452)  
(200, 200)

```
In [21]: plt.figure(figsize=(12,12))

plt.subplot(1,2,1)
plt.imshow(img)

plt.subplot(1,2,2)
plt.imshow(new_img) #aspect ratio=width/height=7/4
```

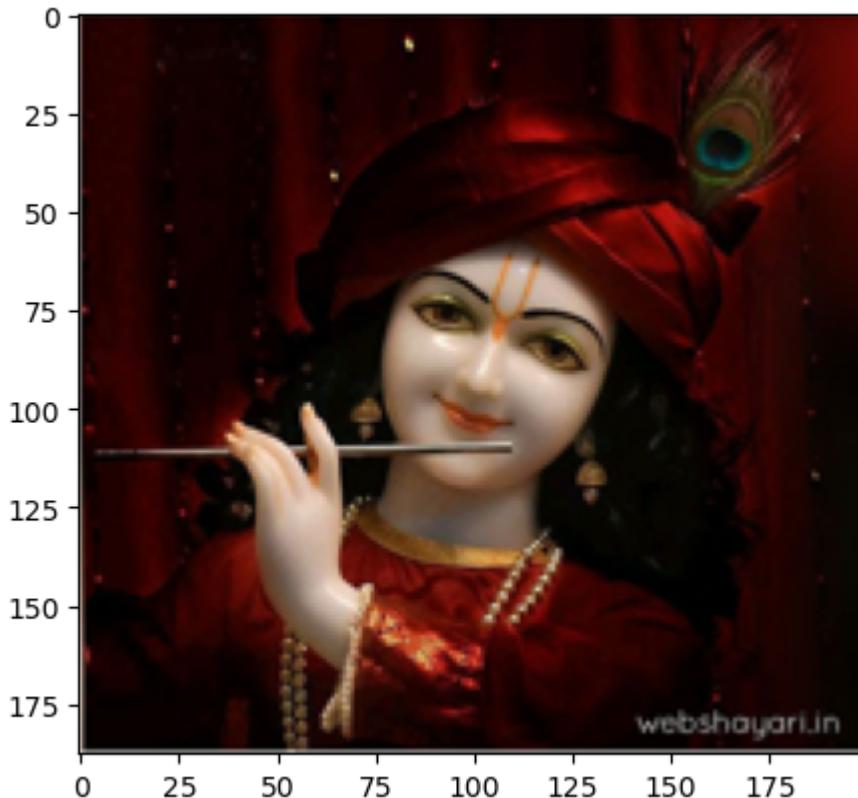
Out[21]: <matplotlib.image.AxesImage at 0x2595f905e40>



```
In [22]: #thumbnail take care of the aspect ratio
img.thumbnail((200,200))
img.save('C:/Users/priya/Pictures/Saved Pictures/krishr.jpg')
print(img.size)
plt.imshow(img)#aspect ratio=200/188
```

(200, 188)

Out[22]: <matplotlib.image.AxesImage at 0x2595f989840>



## Image Enhancement

```
In [23]: from PIL import ImageEnhance
```

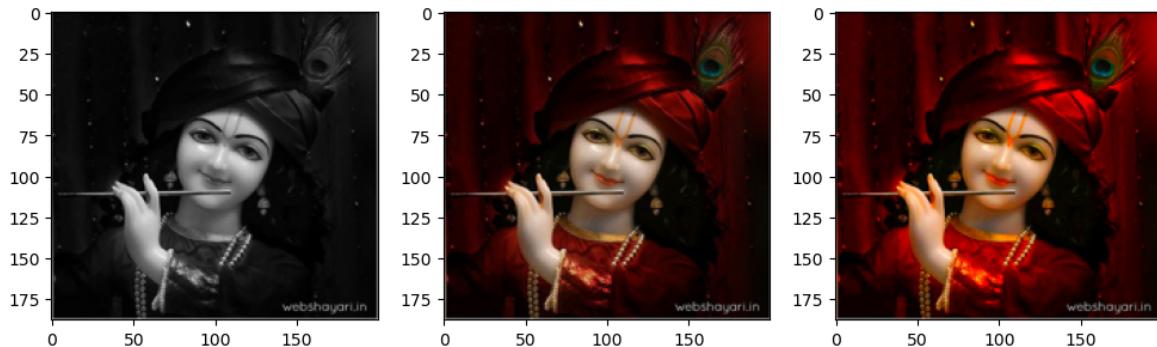
```
In [24]: plt.figure(figsize=(12,8))
color_enhancer = ImageEnhance.Color(img)

plt.subplot(1,3,1)
plt.imshow(color_enhancer.enhance(0))

plt.subplot(1,3,2)
plt.imshow(color_enhancer.enhance(1))

plt.subplot(1,3,3)
plt.imshow(color_enhancer.enhance(2))
```

Out[24]: <matplotlib.image.AxesImage at 0x2595fd9b100>



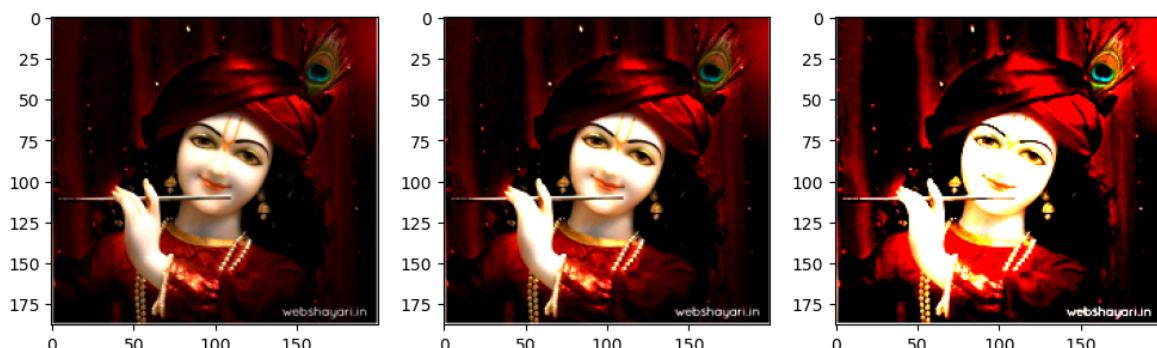
```
In [25]: plt.figure(figsize=(12,8))
contrast_enhancer = ImageEnhance.Contrast(img)

plt.subplot(1,3,1)
plt.imshow(contrast_enhancer.enhance(1.5))

plt.subplot(1,3,2)
plt.imshow(contrast_enhancer.enhance(2))

plt.subplot(1,3,3)
plt.imshow(contrast_enhancer.enhance(5))
```

Out[25]: <matplotlib.image.AxesImage at 0x2595dc1fd00>



```
In [26]: #can use
#Brightness_enhancer = ImageEnhance.Brightness(img)
#Sharpness_enhancer = ImageEnhance.Sharpness(img)
```

## Image Filter

```
In [27]: from PIL import ImageFilter
```

```
In [28]: plt.figure(figsize=(12,8))
#contrast_enhancer = ImageEnhance.Contrast(img)

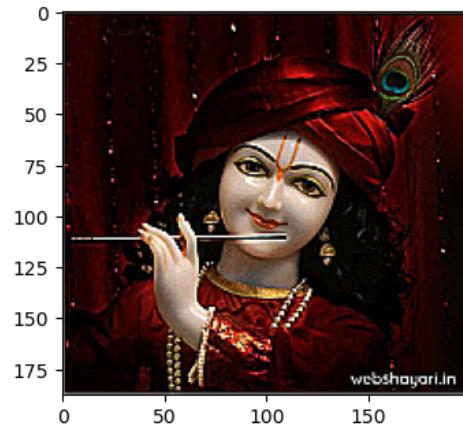
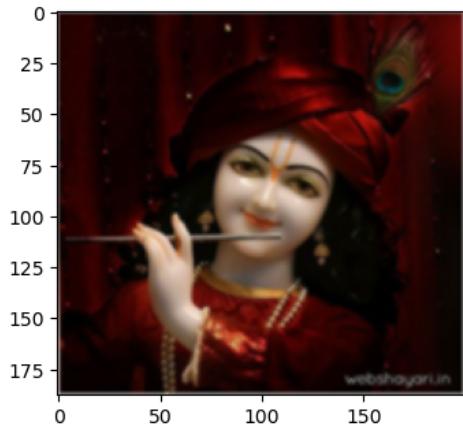
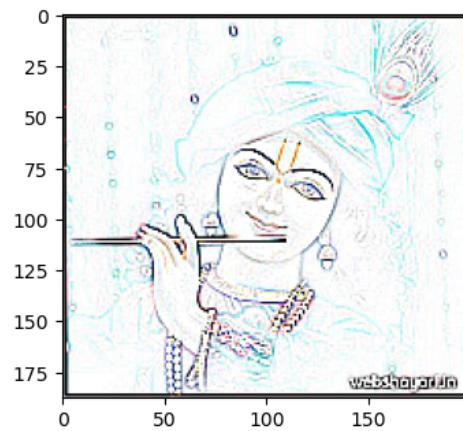
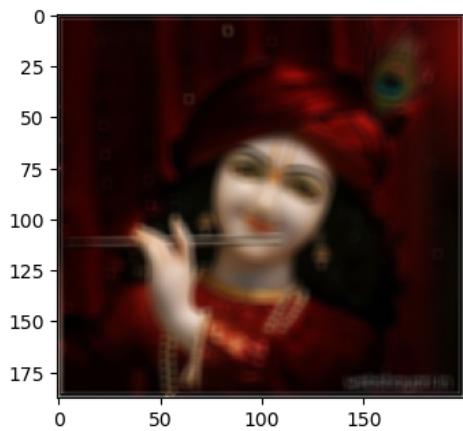
plt.subplot(2,2,1)
plt.imshow(img.filter(ImageFilter.BLUR))

plt.subplot(2,2,2)
plt.imshow(img.filter(ImageFilter.CONTOUR))

plt.subplot(2,2,3)
plt.imshow(img.filter(ImageFilter.SMOOTH))

plt.subplot(2,2,4)
plt.imshow(img.filter(ImageFilter.EDGE_ENHANCE))
```

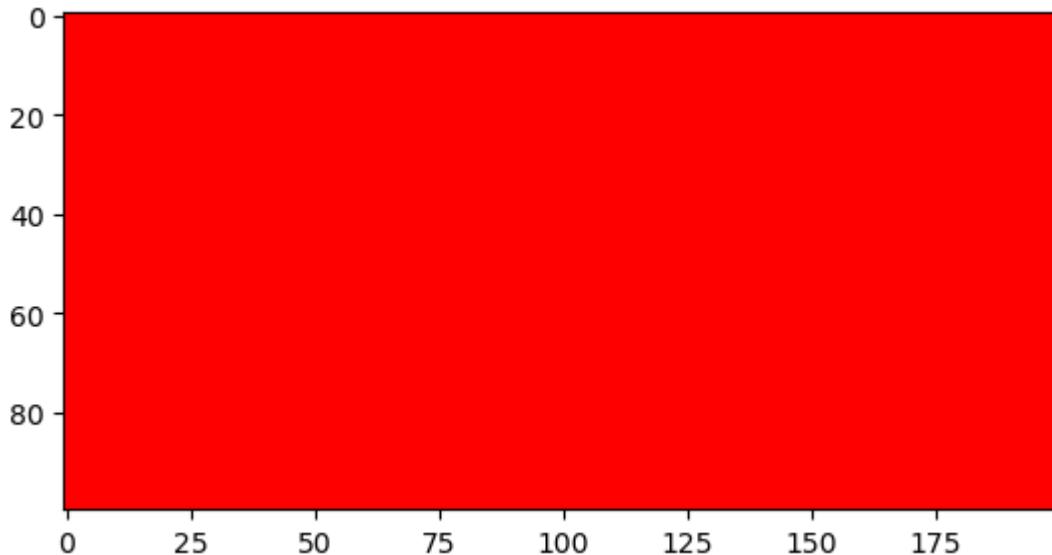
```
Out[28]: <matplotlib.image.AxesImage at 0x2596026dfc0>
```



## Creating PIL image object

```
In [29]: from PIL import Image
img = Image.new(mode="RGB", size=(200,100), color=(255,0,0))#create image
plt.imshow(img)#display image
```

```
Out[29]: <matplotlib.image.AxesImage at 0x259618b5c90>
```



2. Create a draw object

```
In [30]: from PIL import ImageDraw
```

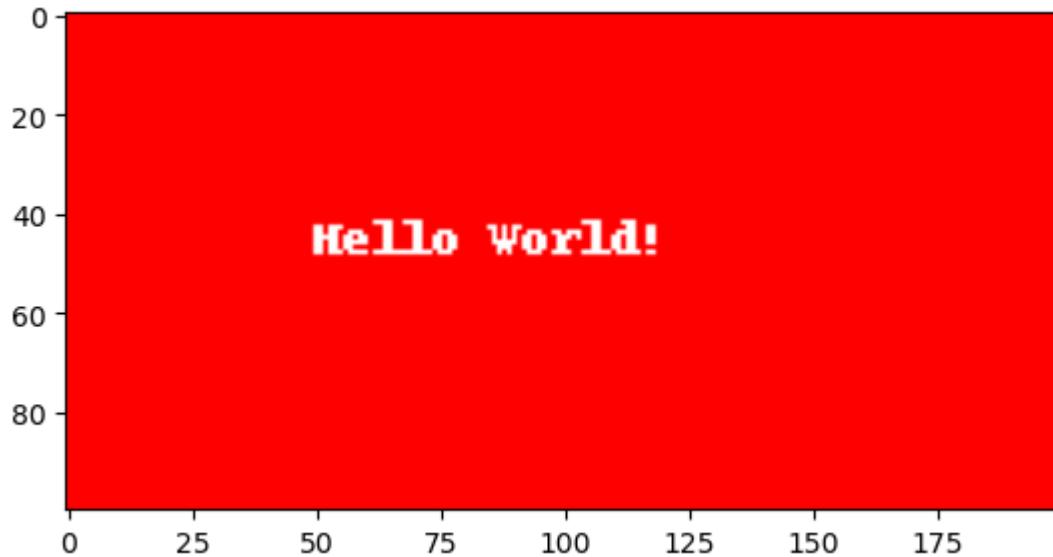
```
In [31]: draw = ImageDraw.Draw(img)
```

3. Preparing the text element and adding text to the image

```
In [32]: text = 'Hello World!'
```

```
In [33]: draw.text((50,40),text)#x=50.y=30  
plt.imshow(img)
```

```
Out[33]: <matplotlib.image.AxesImage at 0x25961948a90>
```



## Text color

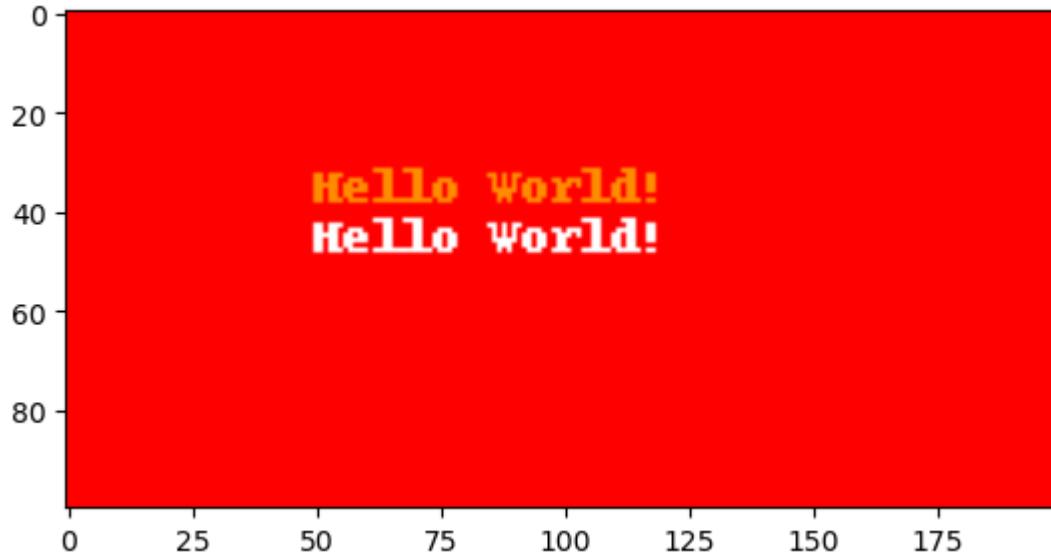
```
In [34]: from PIL import ImageColor
```

```
In [35]: colors = ImageColor.colormap
print(colors)
#hexcode of colors
```

```
{'aliceblue': '#f0f8ff', 'antiquewhite': '#faebd7', 'aqua': '#00ffff', 'aqua
marine': '#7ffffd4', 'azure': '#f0ffff', 'beige': '#f5f5dc', 'bisque': '#ffe4
c4', 'black': '#000000', 'blanchedalmond': '#ffebcd', 'blue': '#0000ff', 'bl
ueviolet': '#8a2be2', 'brown': '#a52a2a', 'burlywood': '#deb887', 'cadetblu
e': '#5f9ea0', 'chartreuse': '#7fff00', 'chocolate': '#d2691e', 'coral': '#f
f7f50', 'cornflowerblue': '#6495ed', 'cornsilk': '#fff8dc', 'crimson': '#dc1
43c', 'cyan': '#00ffff', 'darkblue': '#00008b', 'darkcyan': '#008b8b', 'dark
goldenrod': '#b8860b', 'darkgray': '#a9a9a9', 'darkgrey': '#a9a9a9', 'darkgr
een': '#006400', 'darkkhaki': '#bdb76b', 'darkmagenta': '#8b008b', 'darkoliv
egreen': '#556b2f', 'darkorange': '#ff8c00', 'darkorchid': '#9932cc', 'darkr
ed': '#8b0000', 'darksalmon': '#e9967a', 'darkseagreen': '#8fbcbf', 'darksla
teblue': '#483d8b', 'darkslategray': '#2f4f4f', 'darkslategrey': '#2f4f4f',
'darkturquoise': '#00ced1', 'darkviolet': '#9400d3', 'deeppink': '#ff1493',
'deepskyblue': '#00bfff', 'dimgray': '#696969', 'dimgrey': '#696969', 'dodge
rblue': '#1e90ff', 'firebrick': '#b22222', 'floralwhite': '#ffffaf0', 'forest
green': '#228b22', 'fuchsia': '#ff00ff', 'gainsboro': '#dcdcdc', 'ghostwhit
e': '#f8f8ff', 'gold': '#ffd700', 'goldenrod': '#daa520', 'gray': '#808080',
'grey': '#808080', 'green': '#008000', 'greenyellow': '#adff2f', 'honeydew': '#f0ffff0',
'hotpink': '#ff69b4', 'indianred': '#cd5c5c', 'indigo': '#4b008
2', 'ivory': '#fffff0', 'khaki': '#f0e68c', 'lavender': '#e6e6fa', 'lavender
blush': '#fff0f5', 'lawngreen': '#7fcfc00', 'lemonchiffon': '#ffffacd', 'light
blue': '#add8e6', 'lightcoral': '#f08080', 'lightcyan': '#e0ffff', 'lightgol
denrodyellow': '#fafad2', 'lightgreen': '#90ee90', 'lightgray': '#d3d3d3',
'lightgrey': '#d3d3d3', 'lightpink': '#ffb6c1', 'lightsalmon': '#ffa07a', 'light
seagreen': '#20b2aa', 'lightskyblue': '#87cefa', 'lightslategray': '#778
899', 'lightslategrey': '#778899', 'lightsteelblue': '#b0c4de', 'lightyello
w': '#fffffe0', 'lime': '#00ff00', 'limegreen': '#32cd32', 'linen': '#faf0e
6', 'magenta': '#ff00ff', 'maroon': '#800000', 'mediumaquamarine': '#66cda
a', 'mediumblue': '#0000cd', 'mediumorchid': '#ba55d3', 'mediumpurple': '#93
70db', 'mediumseagreen': '#3cb371', 'mediumslateblue': '#7b68ee', 'mediumspr
inggreen': '#00fa9a', 'mediumturquoise': '#48d1cc', 'mediumvioletred': '#c71
585', 'midnightblue': '#191970', 'mintcream': '#f5ffffa', 'mistyrose': '#ffe4
e1', 'moccasin': '#ffe4b5', 'navajowhite': '#ffddead', 'navy': '#000080', 'ol
dlace': '#fdf5e6', 'olive': '#808000', 'olivedrab': '#6b8e23', 'orange': '#f
fa500', 'orangered': '#ff4500', 'orchid': '#da70d6', 'palegoldenrod': '#eee8
aa', 'palegreen': '#98fb98', 'paleturquoise': '#afeeee', 'palevioletred': '#
db7093', 'papayawhip': '#ffefcd5', 'peachpuff': '#ffdab9', 'peru': '#cd853f',
'pink': '#ffc0cb', 'plum': '#dda0dd', 'powderblue': '#b0e0e6', 'purple': '#8
00080', 'rebeccapurple': '#663399', 'red': '#ff0000', 'rosybrown': '#bc8f8
f', 'royalblue': '#4169e1', 'saddlebrown': '#b84513', 'salmon': '#fa8072',
'sandybrown': '#f4a460', 'seagreen': '#2e8b57', 'seashell': '#ffff5ee', 'sien
na': '#a0522d', 'silver': '#c0c0c0', 'skyblue': '#87ceeb', 'slateblue': '#6a
5acd', 'slategray': '#708090', 'slategrey': '#708090', 'snow': '#fffffa', 's
pringgreen': '#00ff7f', 'steelblue': '#4682b4', 'tan': '#d2b48c', 'teal': '#
008080', 'thistle': '#d8bfd8', 'tomato': '#ff6347', 'turquoise': '#40e0d0',
'violet': '#ee82ee', 'wheat': '#f5deb3', 'white': '#ffffff', 'whitesmoke': '#f5f5f5',
'yellow': '#ffff00', 'yellowgreen': '#9acd32'}
```

```
In [36]: draw.text((50,30),text,fill=(255,140,0))  
plt.imshow(img)
```

```
Out[36]: <matplotlib.image.AxesImage at 0x259614ee320>
```



## Text Font

```
In [37]: from PIL import Image  
from PIL import ImageDraw  
from PIL import ImageFont
```

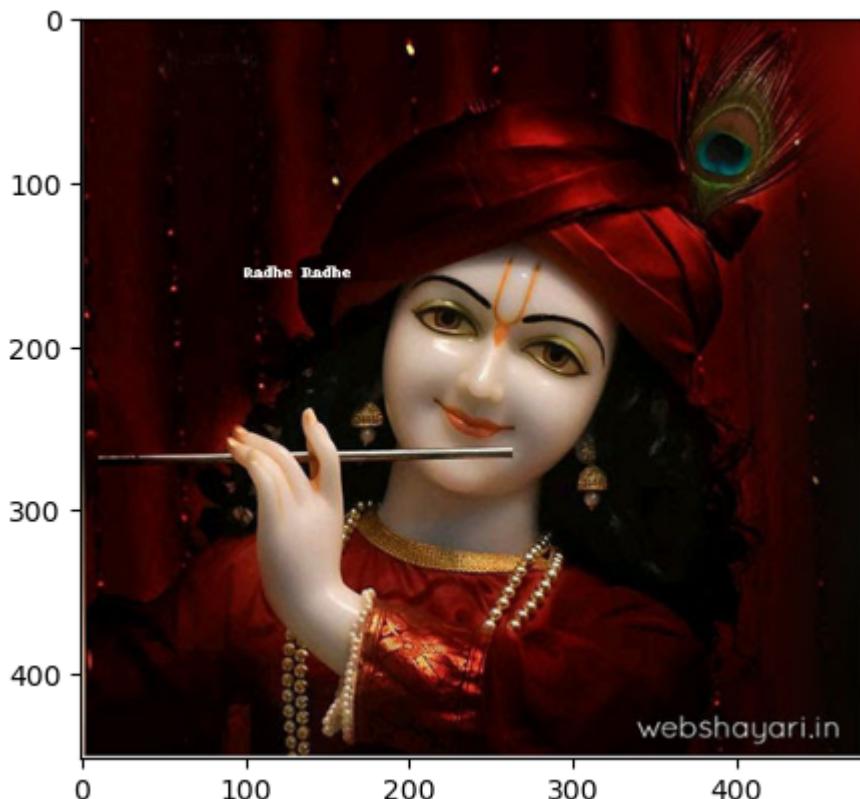
```
In [38]: img = Image.new(mode='RGB',size=(200,100))  
draw = ImageDraw.Draw(img)  
text = "Hello World!"
```

```
In [39]: #font = ImageFont.truetype('Fonts/RubikDistressed-Regular.ttf',15)  
#draw.text((50,30),text,font=font,color=(255,140,0))  
#plt.imshow(img)
```

## Add Text to Image

```
In [40]: img = Image.open('C:/Users/priya/Pictures/Saved Pictures/krishna.jpg')
DRAW = ImageDraw.Draw(img)
DRAW.text((100,150),text="Radhe Radhe",color=(0,255,0))
plt.imshow(img)
```

Out[40]: <matplotlib.image.AxesImage at 0x259615822c0>



```
In [41]: #save the image
img.save("C:/Users/priya/Pictures/Saved Pictures/krish.jpg")
```

**THANKS:)**