image-processing

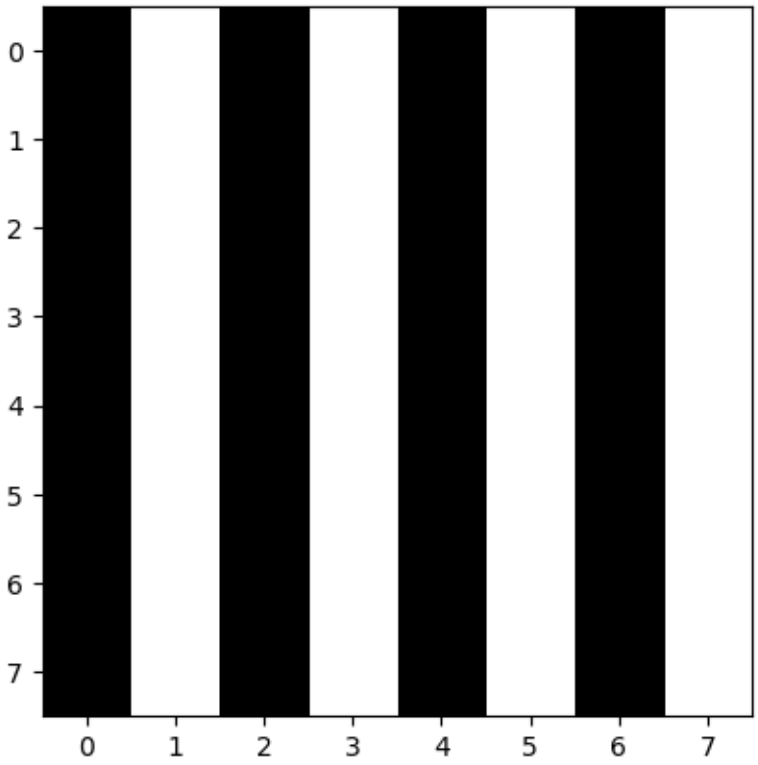
January 19, 2024

[1]:
```
import numpy as np
import matplotlib.pyplot as plt
```

0.1 Gray scale images

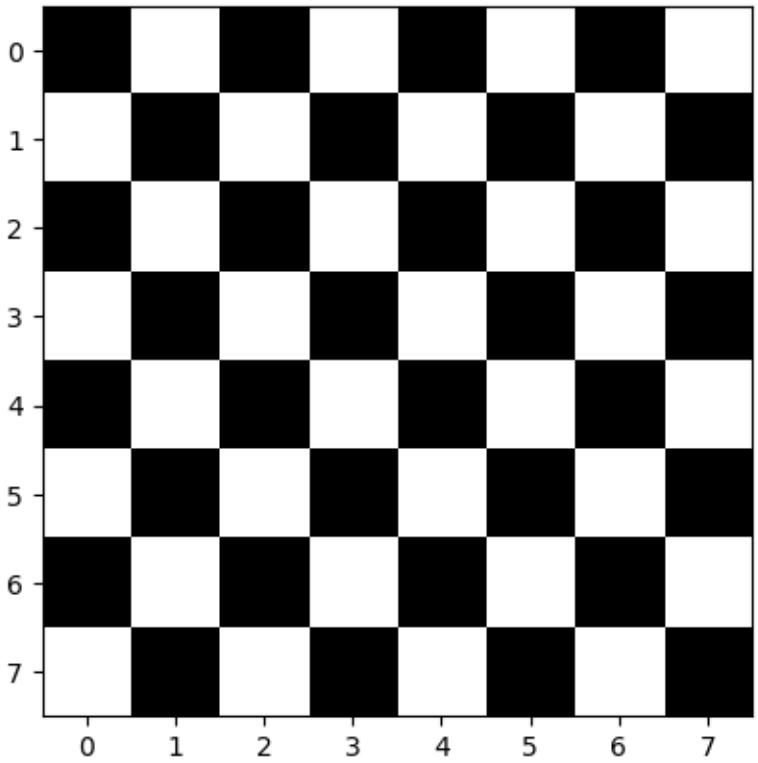
[3]:
```
# This is 8 x 8 pixel gray imgage i.e 64 pixels total. Here, 0 is black and 255␣
 ↪is white
x = np.array([ [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255],
               [0,255,0,255,0,255,0,255] ])
plt.imshow(x, cmap='gray')
x.shape
```

[3]:
```
(8, 8)
```



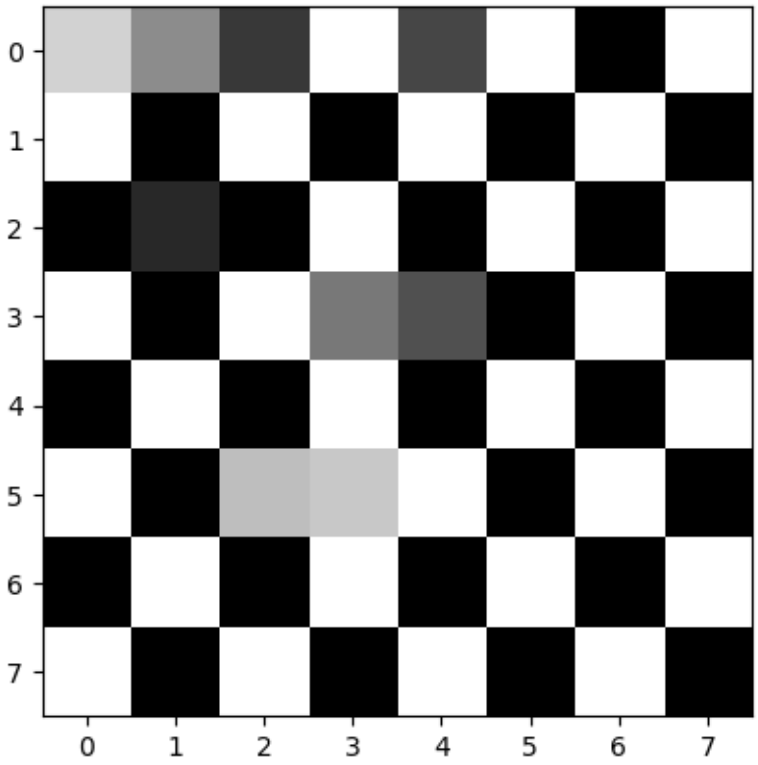
[4]:
```
# This is 8 x 8 pixel gray imgage. If we want to make this as chess board type
  ↪image. Hear, 0 is black and 255 is white
x = np.array([ [0,255,0,255,0,255,0,255],
               [255,0,255,0,255,0,255,0],
               [0,255,0,255,0,255,0,255],
               [255,0,255,0,255,0,255,0],
               [0,255,0,255,0,255,0,255],
               [255,0,255,0,255,0,255,0],
               [0,255,0,255,0,255,0,255],
               [255,0,255,0,255,0,255,0] ])
plt.imshow(x, cmap='gray')
x.shape
```

[4]:
```
(8, 8)
```



[5]:
```
# This is 8 x 8 pixel gray imgage. Now let us twick values of various pixel␣
 ↪between 0 to 255. Hear, 0 is black and 255 is white.
x = np.array([ [210,140,56,255,70,255,0,255],
               [255,0,255,0,255,0,255,0],
               [0,40,0,255,0,255,0,255],
               [255,0,255,120,80,0,255,0],
               [0,255,0,255,0,255,0,255],
               [255,0,190,200,255,0,255,0],
               [0,255,0,255,0,255,0,255],
               [255,0,255,0,255,0,255,0] ])
plt.imshow(x, cmap='gray')
x.shape
```

[5]:
```
(8, 8)
```



1 Colour images

In colour image each pixel is represented by 3 values - RGB

[0,0,0]: Black

[255, 255,255]: White

[255,0,0]: Red

[0,255,0]: Green

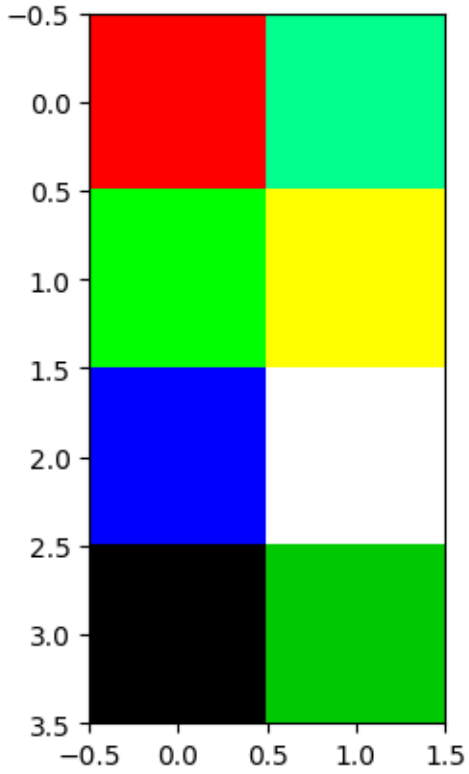
[0,0,255]: Blue

[100,0,0]: Dark Red

[6]:
```
# Let us generate colour image of 4 x 2 pixels
y=np.array([[[255,0,0],[0,255,140]],
            [[0,255,0],[255,255,0]],
            [[0,0,255],[255,255,255]],
            [[0,0,0],[0,200,2]]])
plt.imshow(y)
```

```
y.shape
```

[6]: (4, 2, 3)



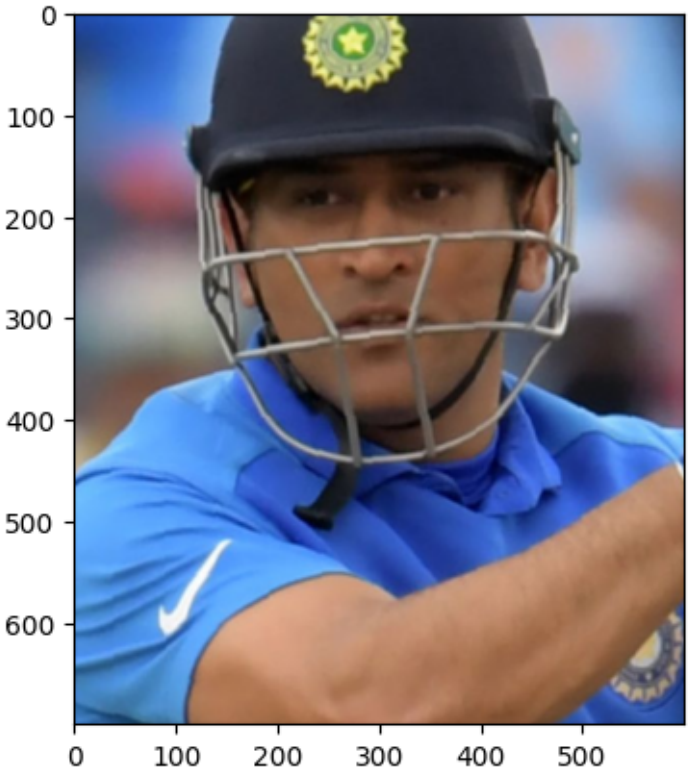
1.1 Image Processing

[7]:
```
img=plt.imread("/kaggle/input/msdhoni/ms-dhoni.jpg")
print(img.shape) # printing shape of image. It is colour so 427 x 630 image␣
↪having 3 channel - RGB
plt.imshow(img)
plt.show()
```

```
(900, 1600, 3)
```

1.2 Crop Image

[30]:
```
# Crop image
img2=img[100:800,400:1000]
plt.imshow(img2)
plt.show()
```



1.3 Increase Brightness

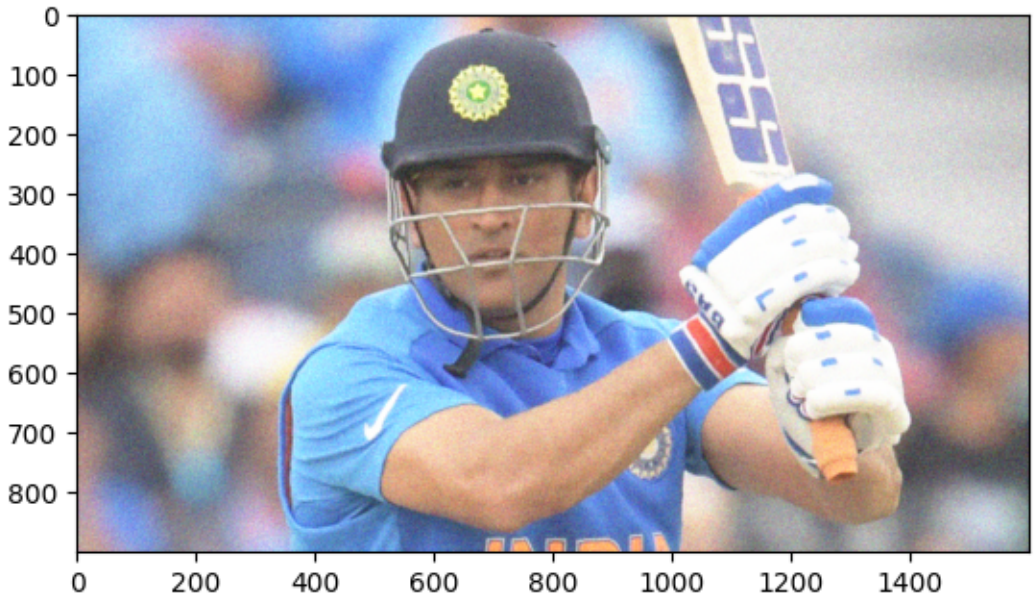
[31]:
```
# Increase the brightness
BrightnessUp = 100 * np.ones((img.shape),dtype='int32')
img3=img+BrightnessUp
plt.imshow(img3)
plt.show()
```

1.4 Decrease the brightness

[32]:
```
# Decrease the brightness
BrightnessDown = -100 * np.ones((img.shape),dtype='int32')
img3=img+BrightnessDown
plt.imshow(img3)
plt.show()
```

1.5 Add noise

[33]:
```
# Add noise to the image
AddNoise=np.random.randint(0,100,img.shape) # generating random number between␣
↪0 to 100 for the noise value
img4=img+AddNoise
plt.imshow(img4)
plt.show()
```



2 Displaying image using OpenCV

[34]:
```
import cv2
```

2.1 Reading image using OpenCv, this is default BGR format

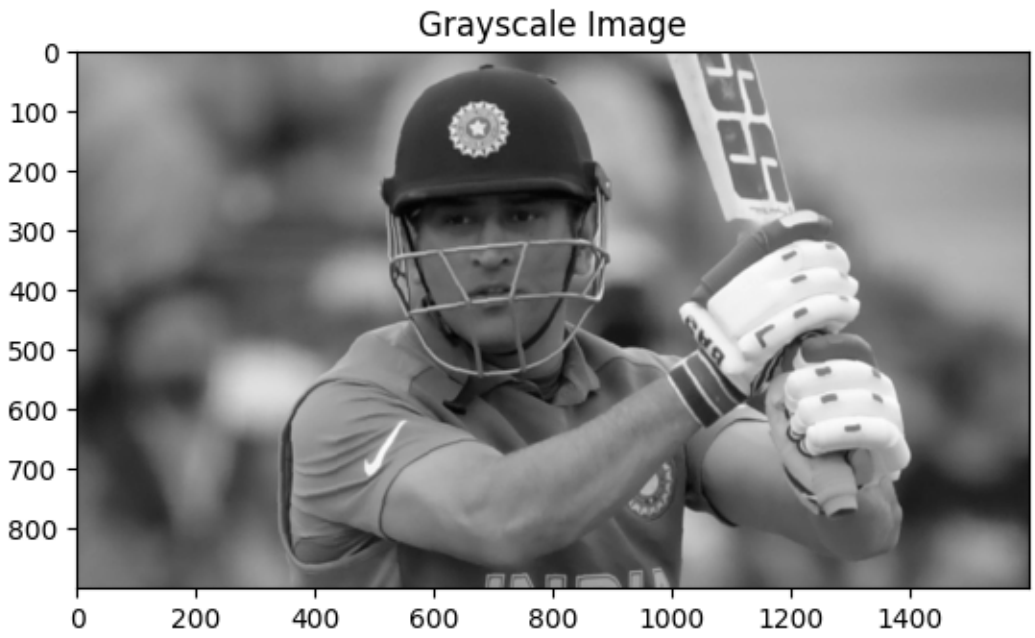
[35]:
```
imgOCV=cv2.imread("/kaggle/input/msdhoni/ms-dhoni.jpg")

plt.imshow(imgOCV)
plt.show()
```

2.2 convert image read by openCV in BRG format to RGB format

[36]:
```
imgOCV1=cv2.cvtColor(imgOCV,cv2.COLOR_BGR2RGBA)
plt.imshow(imgOCV1)
plt.show()
```

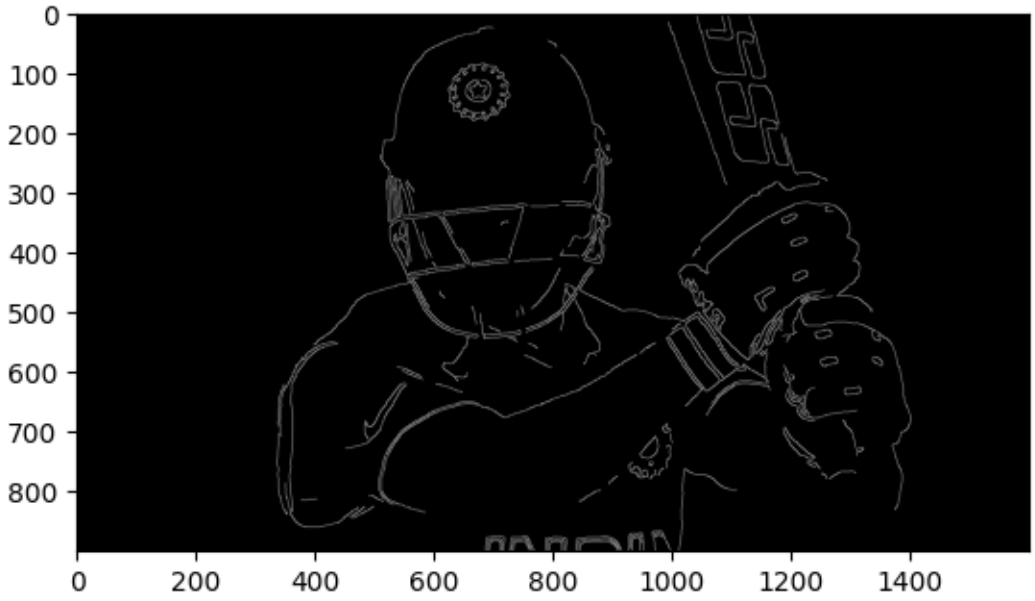
2.3 Reading image in grayscale using openCV

[39]:
```
# Convert to grayscale
imgGray = cv2.cvtColor(imgOCV, cv2.COLOR_BGR2GRAY)

# Display the grayscale image
plt.imshow(imgGray, cmap='gray')
plt.title('Grayscale Image')
plt.show()
```



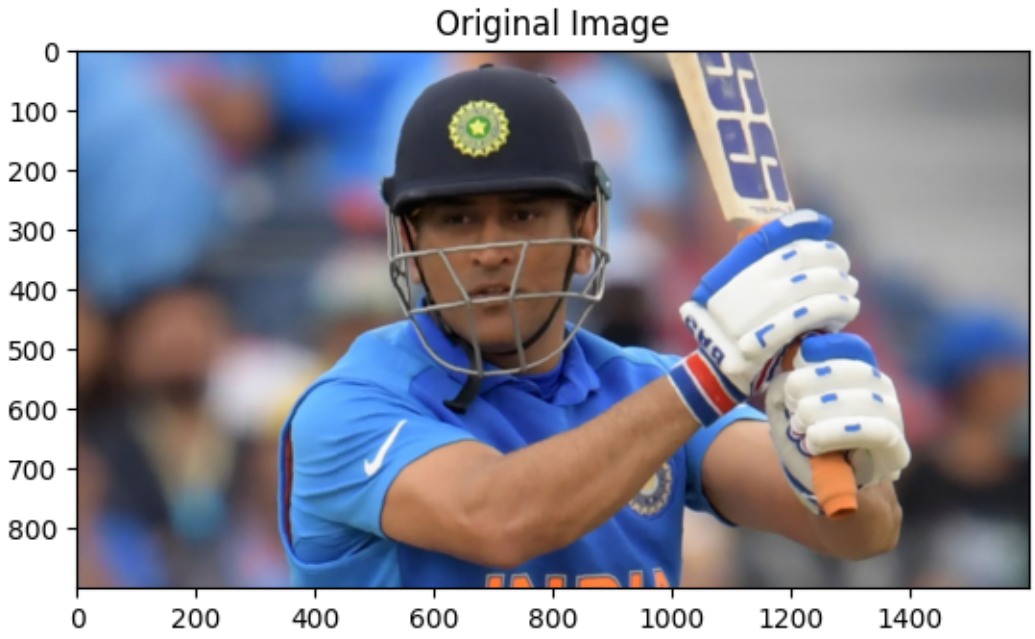
2.4 Detecting boundries of the objects in image

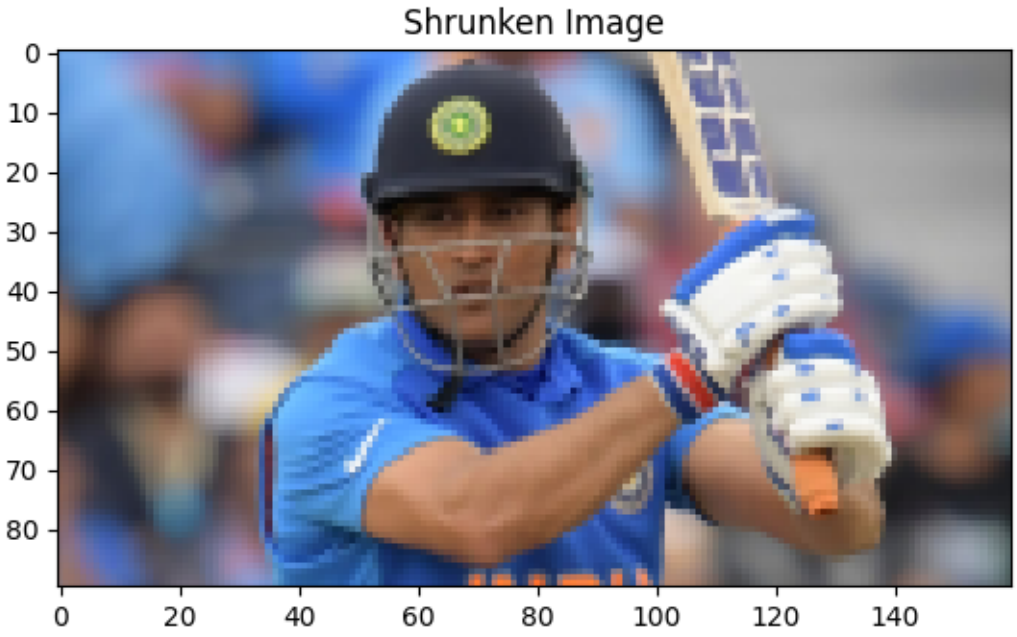
[40]:
```
imgOCV3 = cv2.Canny(imgOCV,150,255)

plt.imshow(imgOCV3, cmap='gray')
plt.show()
```



2.5 Image Bluring

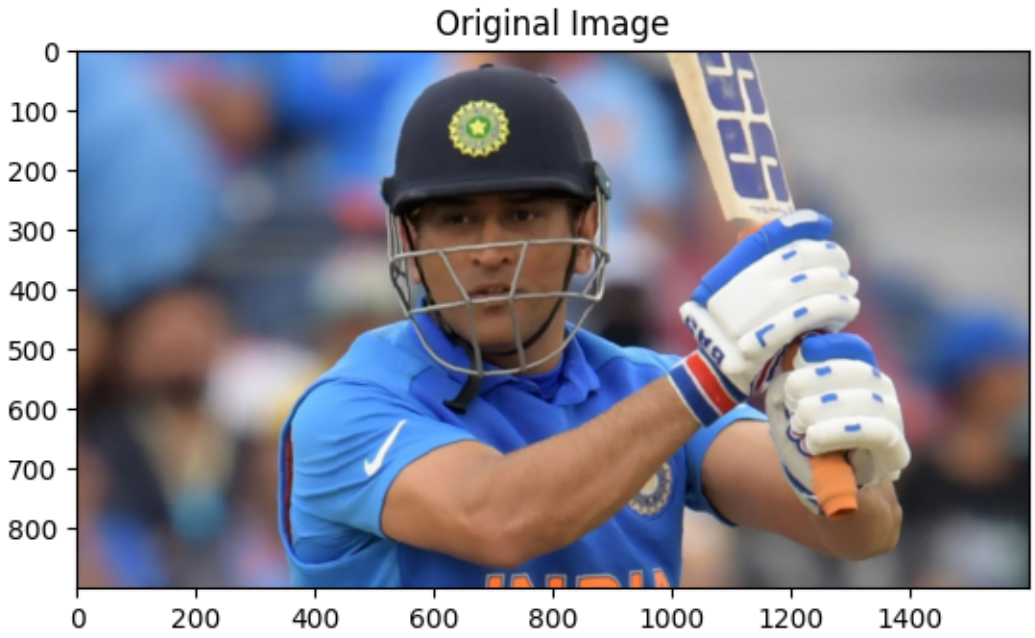
[46]:
```
# Display the original image
plt.imshow(cv2.cvtColor(imgOCV, cv2.COLOR_BGR2RGB))
plt.title('Original Image')
plt.show()

# Resize the image (shrink by a factor of 0.5 in both dimensions)
shrunken_img = cv2.resize(imgOCV, None, fx=0.1, fy=0.1, interpolation=cv2.
 ↪INTER_AREA)

# Display the shrunken image
plt.imshow(cv2.cvtColor(shrunken_img, cv2.COLOR_BGR2RGB))
plt.title('Shrunken Image')
plt.show()
```



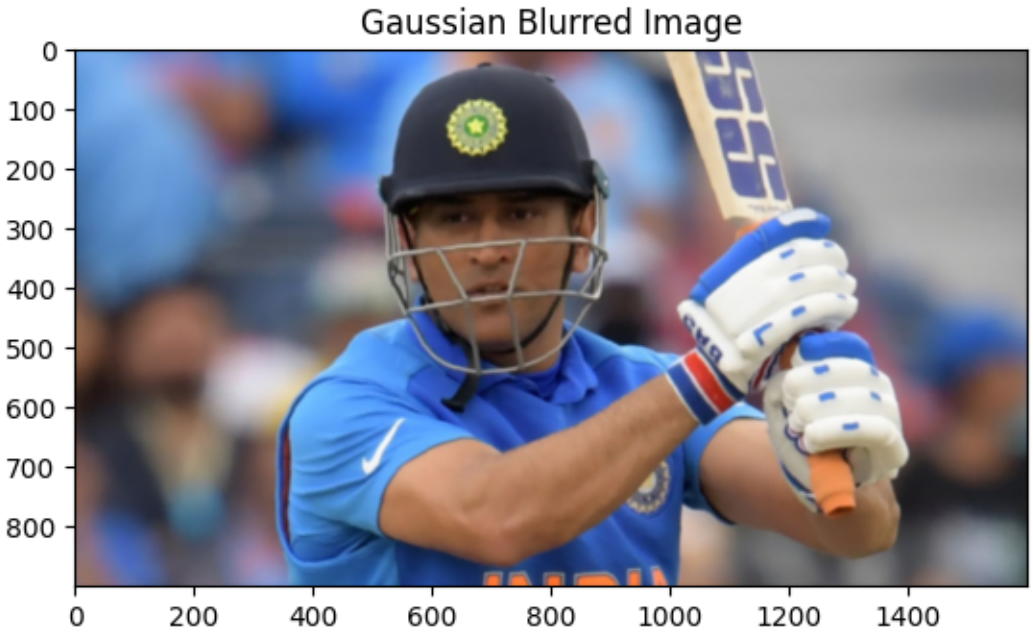


[49]:
```
# Blurring - smoothes the image out
imgOCV8 = imgOCV1

blur = cv2.blur(imgOCV8,(18, 18))
```

```
gblur = cv2.GaussianBlur(imgOCV8,(7,7),0)

plt.imshow(imgOCV8), plt.title('Original Image')
plt.show()
plt.imshow(blur), plt.title('Blurred Image')
plt.show()
plt.imshow(gblur),plt.title('Gaussian Blurred Image')
plt.show()
```




Blurred Image
0
100
200
300
400
500
600
700
800
0
200
400
600
800
1000
1200
1400


Gaussian Blurred Image
0
100
200
300
400
500
600
700
800
0
200
400
600
800
1000
1200
1400