IMAGE PROCESSING

In [19]:
```
#pip install opencv-python
```

In [5]:
```
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
from PIL import Image
```

In [23]:
```
import cv2
```

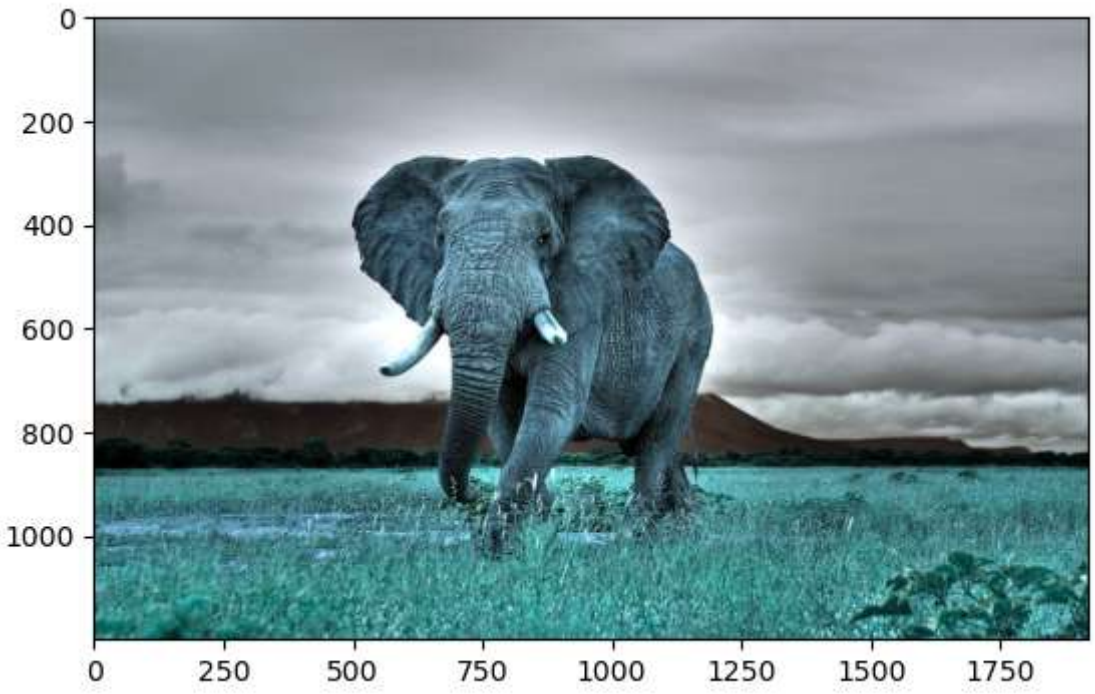
In [25]:
```
img = cv2.imread(r"C:\Users\User\Ifeakachukwu_IT_Material\elephant.jpg")
type(img)
```

Out[25]:
```
numpy.ndarray
```

In [27]:
```
img.shape
```

Out[27]:
```
(1200, 1920, 3)
```

In [29]:
```
plt.imshow(img)      # opencv image channel BGR
plt.show()
```



In [31]:
```
img
```

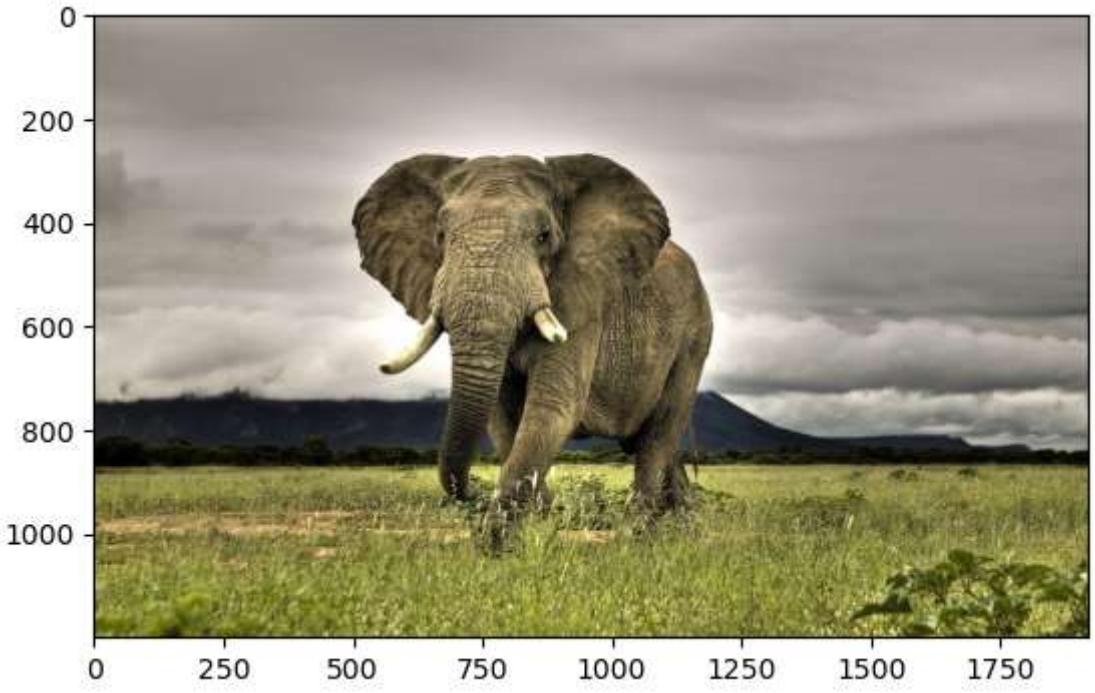
Out[31]:
```
array([[[146, 157, 165],
        [146, 157, 165],
        [146, 157, 165],
        ...,
        [157, 163, 168],
        [157, 163, 168],
        [157, 163, 168]],

       [[146, 157, 165],
        [146, 157, 165],
        [146, 157, 165],
        ...,
        [157, 163, 168],
        [157, 163, 168],
        [157, 163, 168]],

       [[146, 157, 165],
        [146, 157, 165],
        [146, 157, 165],
        ...,
        [157, 163, 168],
        [157, 163, 168],
        [157, 163, 168]],

       ...,

       [[ 57, 141, 137],
        [ 72, 156, 152],
        [ 87, 168, 165],
        ...,
        [  0,  39,  33],
        [  0,  37,  31],
        [  0,  43,  37]],

       [[ 58, 143, 139],
        [ 64, 148, 144],
        [ 68, 149, 146],
        ...,
        [ 15,  59,  53],
        [  2,  46,  40],
        [  0,  41,  35]],

       [[ 72, 157, 153],
        [ 63, 148, 144],
        [ 54, 135, 132],
        ...,
        [ 48,  89,  84],
        [ 26,  70,  64],
        [ 13,  57,  51]]], dtype=uint8)
```

In [33]:
```
#fixing the image above to the original image
fix_img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
```

In [35]:
```
fix_img.shape
```

Out[35]: (1200, 1920, 3)

In [37]:
```
plt.imshow(fix_img)
plt.show()
```



In [21]:
```
img2 = Image.open(r"C:\Users\User\Ifeakachukwu_IT_Material\dog.jpg")
```

In [11]:
```
type(img2)
```

Out[11]: PIL.JpegImagePlugin.JpegImageFile

In [19]:
```
img2_arr = np.asarray(img2)
img2_arr
```

Out[19]:
```
array([[[ 79,  94,  37],
        [ 82,  97,  40],
        [ 86, 101,  44],
        ...,
        [ 77,  88,  22],
        [ 77,  88,  22],
        [ 76,  85,  20]],

       [[ 79,  94,  37],
        [ 81,  96,  39],
        [ 84,  99,  42],
        ...,
        [ 70,  78,  19],
        [ 79,  87,  28],
        [ 85,  93,  34]],

       [[ 80,  93,  37],
        [ 81,  94,  38],
        [ 82,  95,  39],
        ...,
        [ 82,  88,  40],
        [101, 107,  61],
        [114, 120,  74]],

       ...,

       [[100,  92,  45],
        [105, 103,  54],
        [117, 126,  73],
        ...,
        [ 59,  67,  26],
        [ 62,  71,  26],
        [ 80,  90,  40]],

       [[138, 130,  83],
        [106, 104,  55],
        [100, 109,  56],
        ...,
        [148, 156, 115],
        [ 91, 100,  55],
        [ 75,  84,  37]],

       [[149, 141,  94],
        [ 85,  83,  34],
        [ 69,  78,  25],
        ...,
        [213, 221, 182],
        [137, 146, 103],
        [ 86,  95,  48]]], dtype=uint8)
```

In [23]:
```
plt.imshow(img2)
plt.show()
```

In [41]:
```
img_gray = cv2.imread(r"C:\Users\User\Ifeakachukwu_IT_Material\elephant.jpg", cv2.I
```

In [43]:
```
img_gray.shape
```

Out[43]:
```
(1200, 1920)
```

In [45]:
```
img_gray
```

Out[45]:
```
array([[158, 158, 158, ..., 164, 164, 164],
       [158, 158, 158, ..., 164, 164, 164],
       [158, 158, 158, ..., 164, 164, 164],
       ...,
       [130, 145, 158, ...,  32,  30,  36],
       [132, 137, 139, ...,  52,  39,  34],
       [146, 137, 125, ...,  83,  63,  50]], dtype=uint8)
```

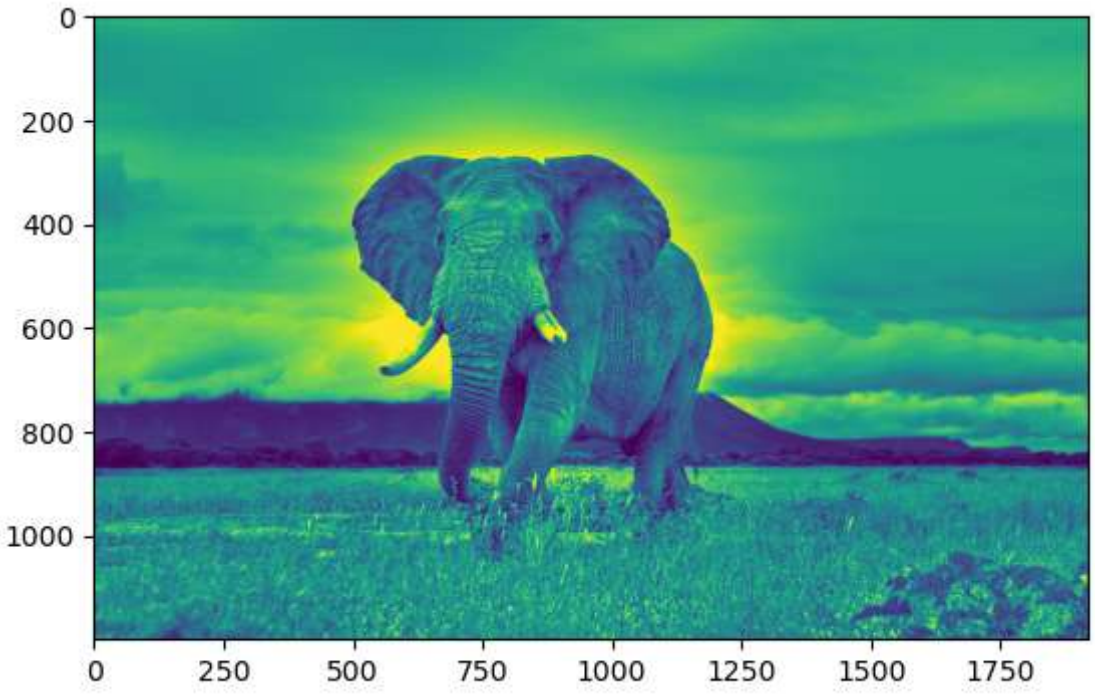
In [47]:
```
img_gray.min()
```

Out[47]:
```
0
```

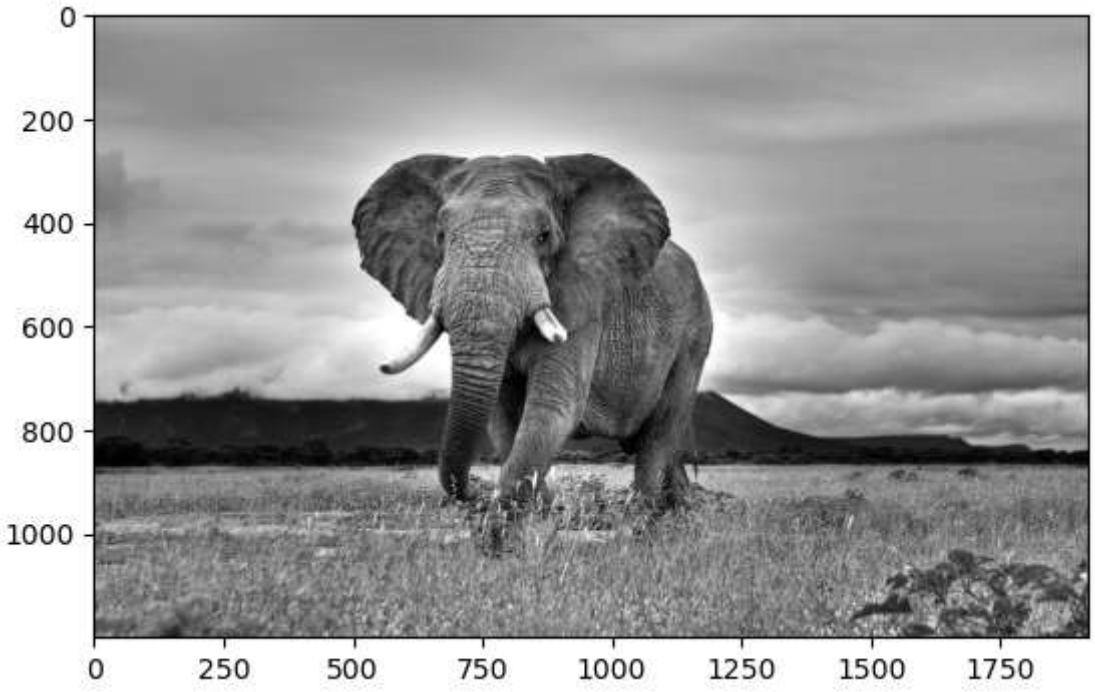
In [49]:
```
img_gray.max()
```

Out[49]:
```
255
```

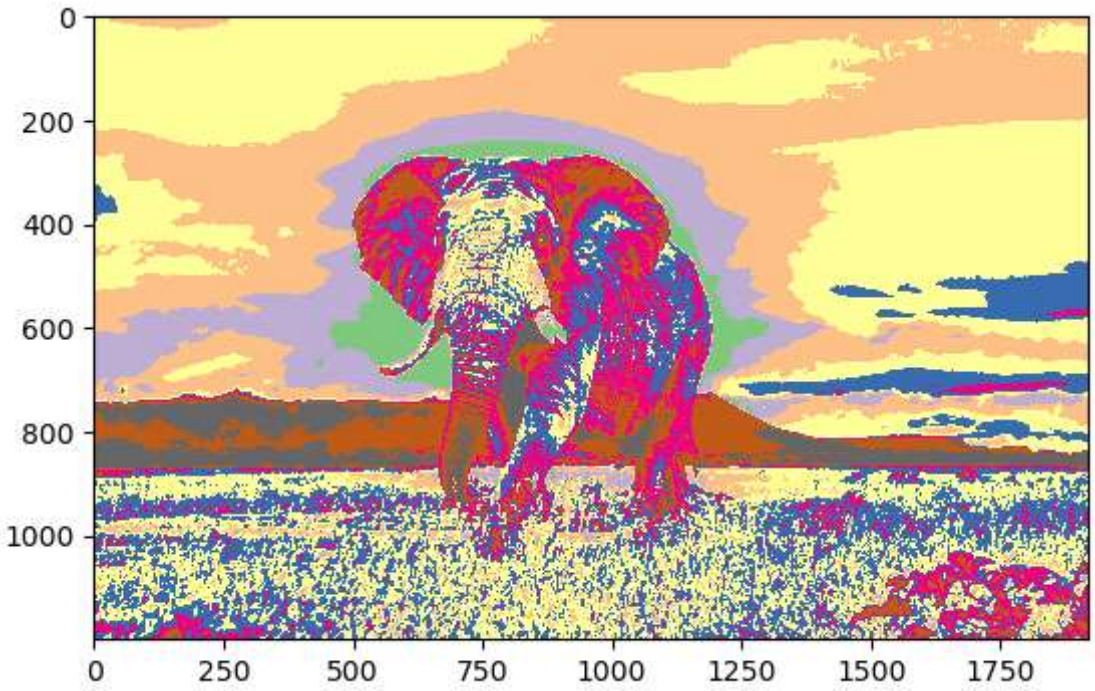
In [51]:
```
plt.imshow(img_gray)
plt.show()
```



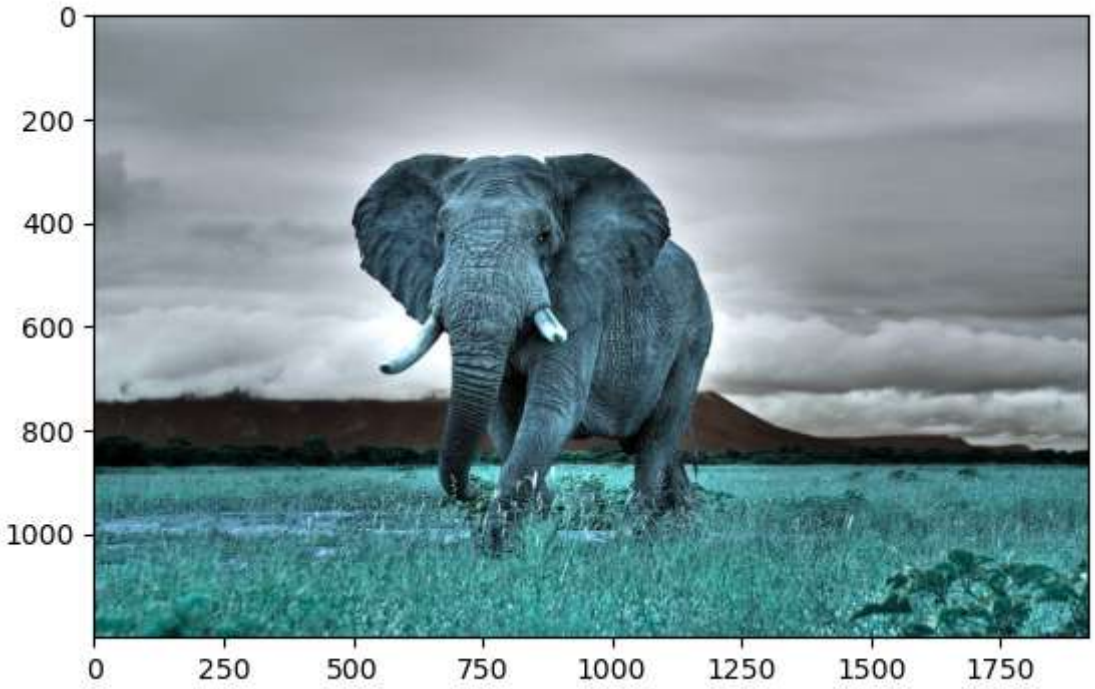
In [53]:
```
plt.imshow(img_gray, cmap='gray')
plt.show()
```



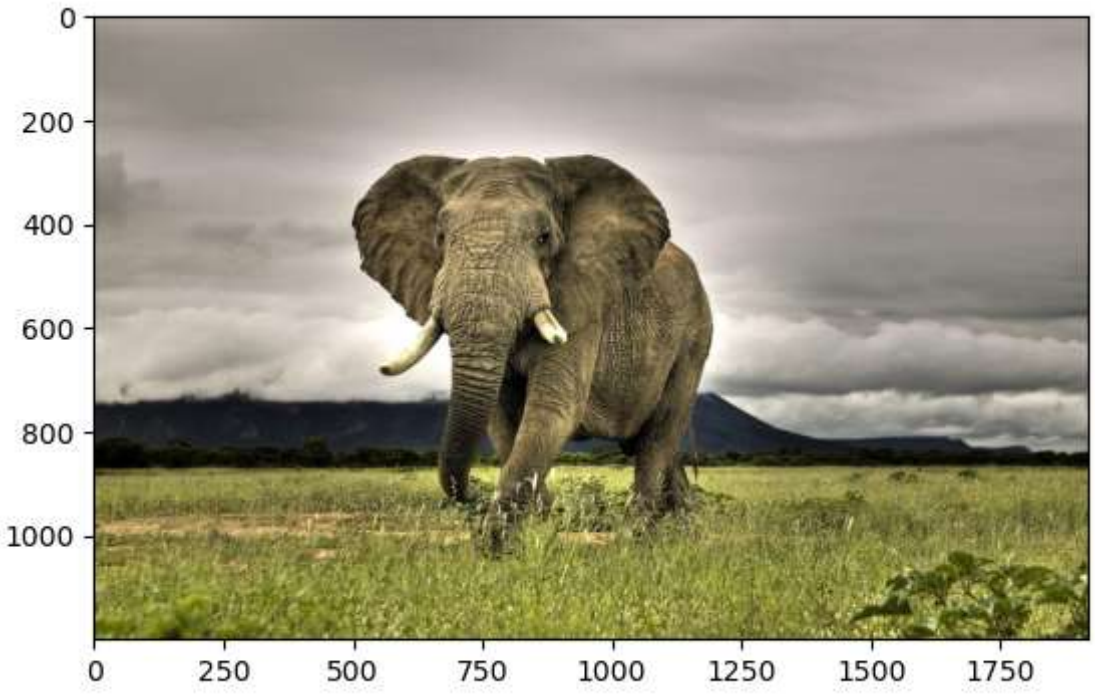
In [55]:
```
plt.imshow(img_gray, cmap='Accent_r')
plt.show()
```



In [57]:
```
plt.imshow(img)
plt.show()
```



In [59]:
```
plt.imshow(fix_img)
plt.show()
```



In [61]:
```
fix_img.shape
```

Out[61]: (1200, 1920, 3)

In [63]:
```
# Resizing the image
```

In [65]:
```
fix_img_1 = cv2.resize(fix_img, (500,367))
```

In [67]:
```
fix_img_1.shape
```

Out[67]: (367, 500, 3)

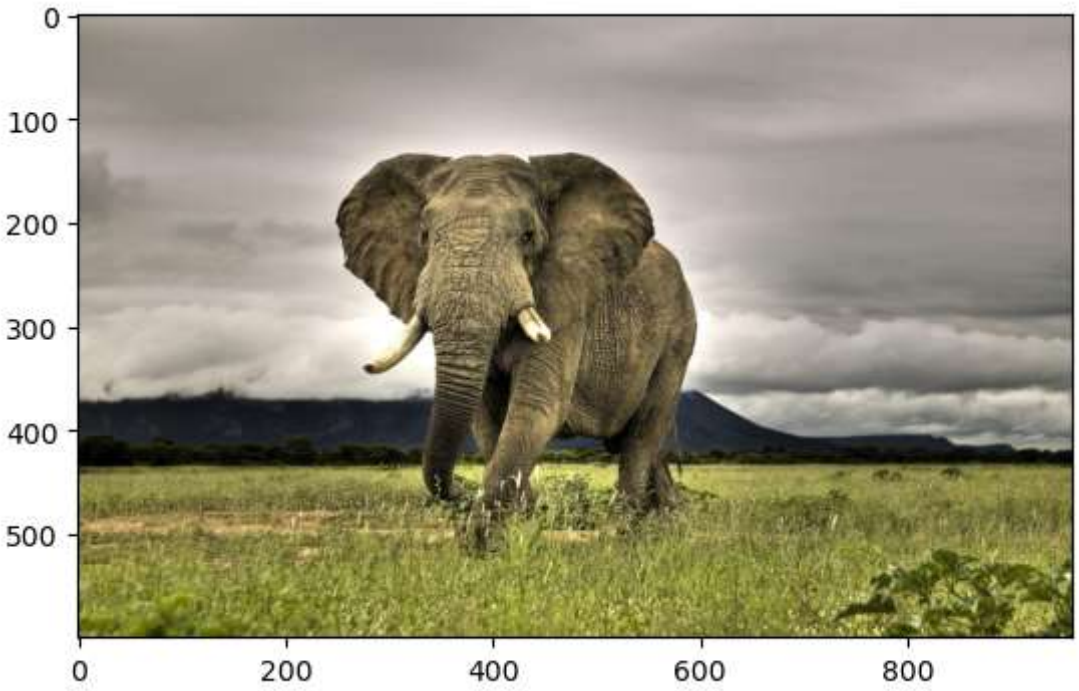
In [69]:
```
w_ratio = 0.5     # width
h_ratio = 0.5     # height
```

In [71]:
```
fix_img_2 = cv2.resize(fix_img, (0,0), fix_img, w_ratio, h_ratio)
```

In [73]:
```
fix_img_2
```

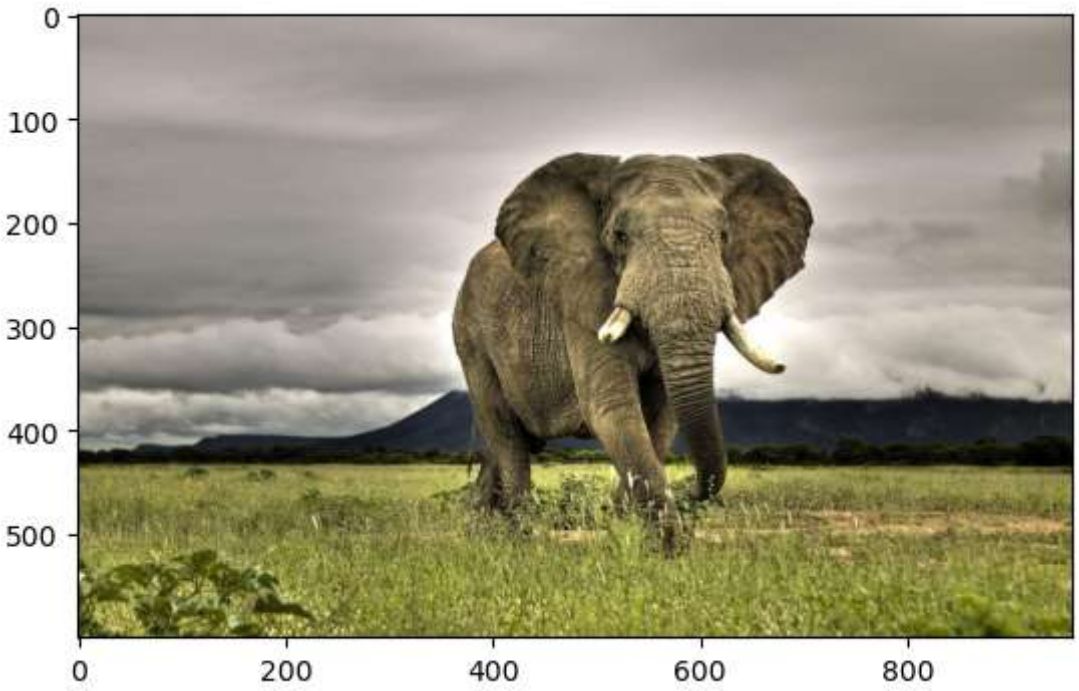
Out[73]:
```
array([[[165, 157, 146],
        [166, 158, 147],
        [166, 158, 147],
        ...,
        [168, 163, 157],
        [168, 163, 157],
        [168, 163, 157]],

       [[165, 157, 146],
        [165, 157, 146],
        [166, 158, 147],
        ...,
        [168, 163, 157],
        [168, 163, 157],
        [168, 163, 157]],

       [[164, 156, 145],
        [164, 156, 145],
        [165, 157, 146],
        ...,
        [169, 162, 156],
        [169, 162, 156],
        [169, 162, 156]],

       ...,

       [[121, 125,  41],
        [138, 141,  60],
        [152, 155,  76],
        ...,
        [ 78,  82,  25],
        [ 59,  63,  11],
        [ 38,  42,   0]],

       [[144, 148,  64],
        [164, 167,  86],
        [142, 145,  66],
        ...,
        [ 55,  58,  12],
        [ 40,  45,   2],
        [ 37,  43,   1]],

       [[145, 149,  64],
        [135, 138,  57],
        [125, 128,  51],
        ...,
        [ 58,  60,  21],
        [ 73,  78,  37],
        [ 48,  54,  10]]], dtype=uint8)
```

In [75]:
```
plt.imshow(fix_img_2)
plt.show()
```

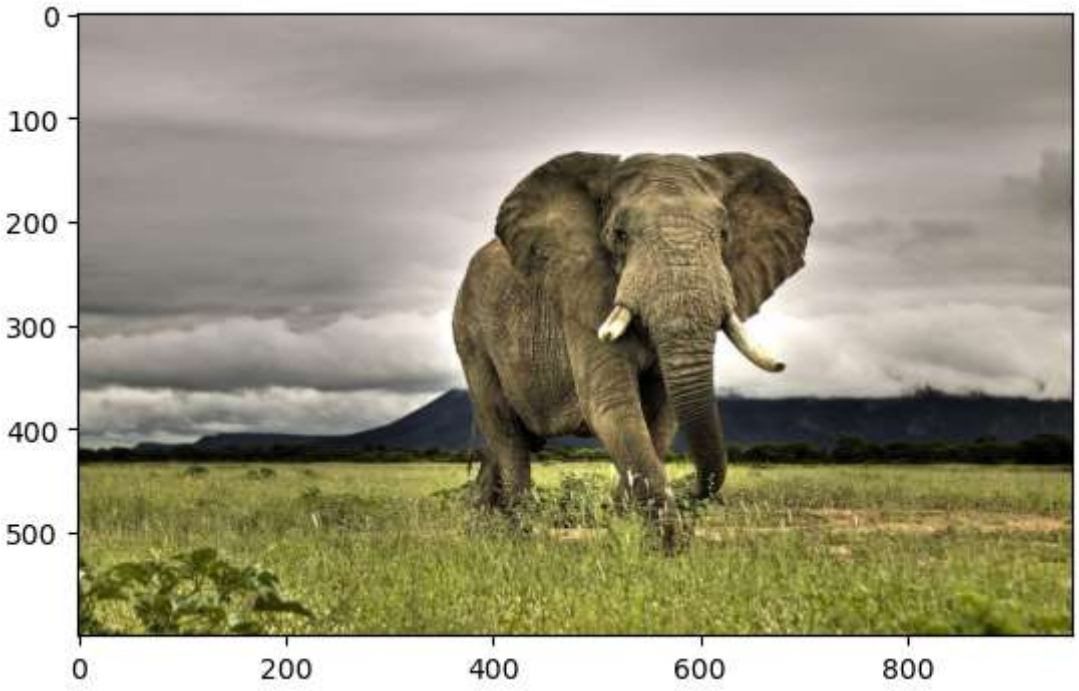


In [77]:
```
img3 = cv2.flip(fix_img_2, 0)
plt.imshow(img3)
plt.show()
```

In [79]:
```
img3 = cv2.flip(fix_img_2, 1)
plt.imshow(img3)
plt.show()
```



In [81]:
```
img3 = cv2.flip(fix_img_2, 6)
plt.imshow(img3)
plt.show()
```



In [83]:
```
fix_img_2
```

Out[83]:
```
array([[[165, 157, 146],
        [166, 158, 147],
        [166, 158, 147],
        ...,
        [168, 163, 157],
        [168, 163, 157],
        [168, 163, 157]],

       [[165, 157, 146],
        [165, 157, 146],
        [166, 158, 147],
        ...,
        [168, 163, 157],
        [168, 163, 157],
        [168, 163, 157]],

       [[164, 156, 145],
        [164, 156, 145],
        [165, 157, 146],
        ...,
        [169, 162, 156],
        [169, 162, 156],
        [169, 162, 156]],

       ...,

       [[121, 125,  41],
        [138, 141,  60],
        [152, 155,  76],
        ...,
        [ 78,  82,  25],
        [ 59,  63,  11],
        [ 38,  42,   0]],

       [[144, 148,  64],
        [164, 167,  86],
        [142, 145,  66],
        ...,
        [ 55,  58,  12],
        [ 40,  45,   2],
        [ 37,  43,   1]],

       [[145, 149,  64],
        [135, 138,  57],
        [125, 128,  51],
        ...,
        [ 58,  60,  21],
        [ 73,  78,  37],
        [ 48,  54,  10]]], dtype=uint8)
```

In [85]:
```
img3 = cv2.flip(fix_img_2, 0)
plt.imshow(img3)
plt.show()
```

In [87]:
```
cv2.imwrite('New Genai image.jpg', img3)     # to save the image
```

Out[87]:
```
True
```

In [89]:
```
pwd
```

Out[89]:
```
'C:\\Users\\User\\Ifeakachukwu_IT_Material'
```

In [ ]:
```

```