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Batch: D ¶

Branch: IT

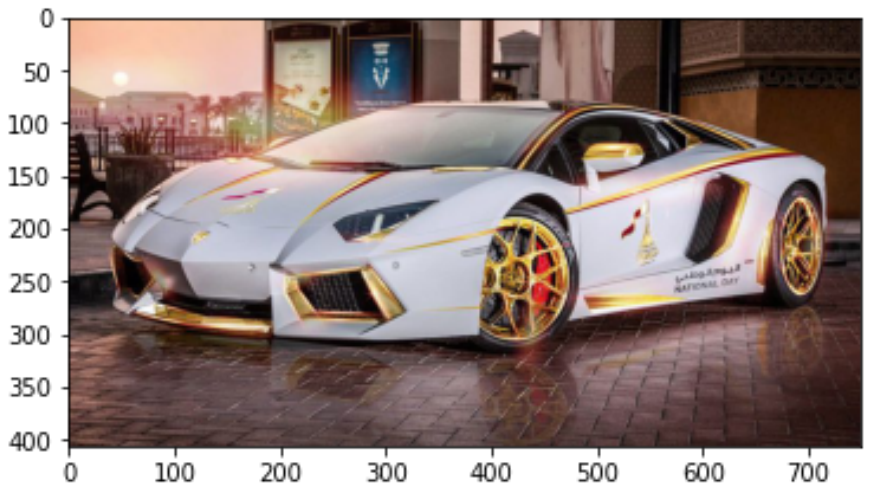
In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import cv2
from PIL import Image
```

In [2]:
```
img_path = '/content/drive/MyDrive/Sem-7/DIP-Lab/RLE/DIP_RLE_Image.jpg'
```

In [3]:
```
input_img = Image.open(img_path)
```

In [4]:
```
plt.imshow(input_img)
```

Out[4]:
```
<matplotlib.image.AxesImage at 0x7fba8588e990>
```



In [5]:
```
img = np.asarray(input_img)
```

In [6]:
```
img
```

Out[6]:
```
array([[[243, 185, 148],
        [243, 185, 148],
        [244, 186, 149],
        ...,
        [ 49,  34,  31],
        [ 39,  24,  21],
        [ 41,  25,  25]],

       [[243, 185, 148],
        [243, 185, 148],
        [243, 185, 148],
        ...,
        [ 40,  25,  22],
        [ 32,  17,  14],
        [ 42,  27,  24]],

       [[243, 185, 148],
        [243, 185, 148],
        [243, 185, 148],
        ...,
        [ 31,  16,  13],
        [ 26,  11,   8],
        [ 43,  28,  25]],

       ...,

       [[ 37,   9,   5],
        [ 42,  14,  10],
        [ 47,  19,  15],
        ...,
        [ 28,  10,  10],
        [ 35,  17,  17],
        [ 38,  19,  21]],

       [[ 69,  41,  38],
        [ 68,  40,  37],
        [ 67,  39,  36],
        ...,
        [ 28,  10,  10],
        [ 31,  13,  13],
        [ 32,  13,  15]],

       [[ 88,  58,  58],
        [ 82,  54,  53],
        [ 79,  51,  50],
        ...,
        [ 27,   9,   9],
        [ 30,  12,  12],
        [ 31,  12,  14]]], dtype=uint8)
```

In [7]:
```
img.shape
```

Out[7]:
```
(406, 750, 3)
```

In [8]:
```
img_arr=img.flatten()
```

In [9]:
```
img_arr
```

Out[9]:
```
array([243, 185, 148, ...,  31,  12,  14], dtype=uint8)
```

In [10]:
```
len(img_arr)
```

Out[10]:
```
913500
```

In [11]:
```
def encode(img_arr):
  encoded_arr=[]
  ind=0
  i=0
  while i < len(img_arr):
    count = 1
    while i+1 < len(img_arr) and img_arr[i] == img_arr[i+1]:
      count += 1
      i += 1
    encoded_arr.append(img_arr[i])
    encoded_arr.append(count)
    i += 1
  return encoded_arr
```

In [12]:
```
def decode(encoded_arr):
  decoded_arr=[]
  i = 0
  while i+1 < len(encoded_arr):
    for x in range(encoded_arr[i+1]):
      decoded_arr.append(encoded_arr[i])
    i += 2
  return decoded_arr
```

In [13]:
```
output_encoded=encode(img_arr)
print(np.array(output_encoded))
```

```
[243   1 185 ...   1  14   1]
```

In [14]:
```
len(output_encoded)
```

Out[14]: 1783880

In [15]:
```
output_decoded=decode(output_encoded)
print(np.array(output_decoded))
```

```
[243 185 148 ...  31  12  14]
```

In [16]:
```
len(output_decoded)
```

Out[16]: 913500

In [17]:
```
img.shape
```

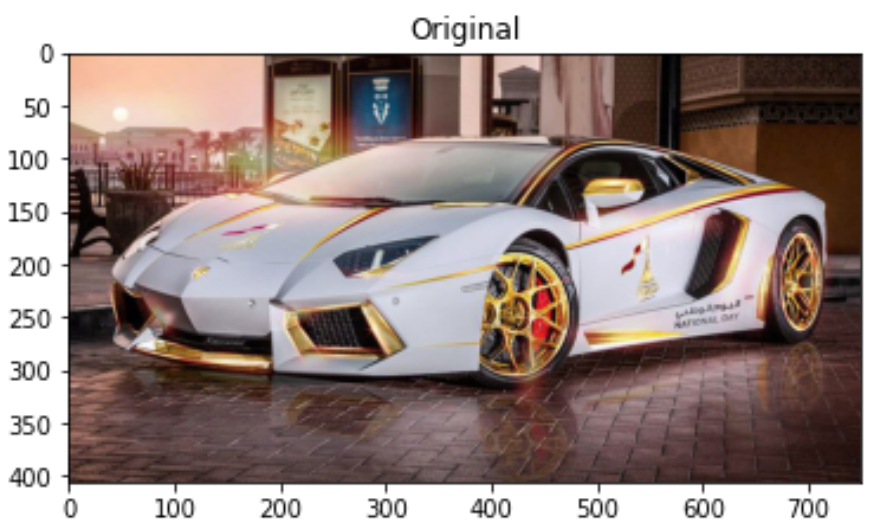
Out[17]: (406, 750, 3)

In [18]:
```
decoded_img=np.array(output_decoded)
decoded_img=decoded_img.reshape(img.shape,order='C')
print(decoded_img)
```

```
[[[243 185 148]
  [243 185 148]
  [244 186 149]
  ...
  [ 49  34  31]
  [ 39  24  21]
  [ 41  25  25]]

 [[243 185 148]
  [243 185 148]
  [243 185 148]
  ...
  [ 40  25  22]
  [ 32  17  14]
  [ 42  27  24]]

 [[243 185 148]
  [243 185 148]
  [243 185 148]
  ...
  [ 31  16  13]
  [ 26  11   8]
  [ 43  28  25]]

 ...

 [[ 37   9   5]
  [ 42  14  10]
  [ 47  19  15]
  ...
  [ 28  10  10]
  [ 35  17  17]
  [ 38  19  21]]

 [[ 69  41  38]
  [ 68  40  37]
  [ 67  39  36]
  ...
  [ 28  10  10]
  [ 31  13  13]
  [ 32  13  15]]

 [[ 88  58  58]
  [ 82  54  53]
  [ 79  51  50]
  ...
  [ 27   9   9]
  [ 30  12  12]
  [ 31  12  14]]]
```

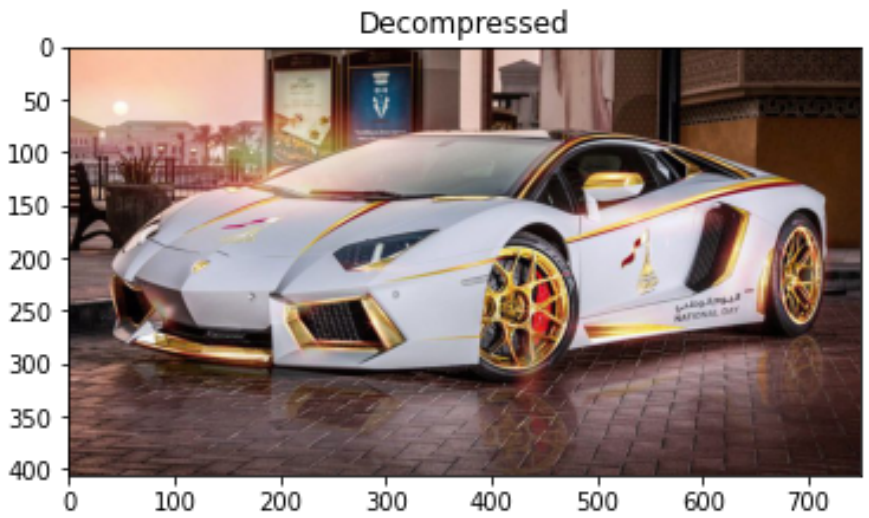
In [19]:
```
plt.title("Original")
plt.imshow(input_img)
```

Out[19]: <matplotlib.image.AxesImage at 0x7fba837f4c10>



In [20]:
```
image = Image.fromarray(np.uint8(decoded_img)).convert('RGB')
plt.title("Decompressed")
plt.imshow(image)
```

Out[20]: <matplotlib.image.AxesImage at 0x7fba83774fd0>



Conclusion : Performed RLE Compression and then decompressed the image to get the output as the original image