

Task 1: Image Filtering and Enhancement

Write a Python program to read an image from the file system using OpenCV.

```
[5]: import cv2  
import numpy as np  
  
[2]: img = cv2.imread('cat.jpg')  
  
[34]: img_gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
```

Implement different image filtering techniques, such as blur, Gaussian, and median filters, on the image to reduce noise and smooth the image.

```
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[27]: blurred = cv2.blur(img, (5,5))  
• [12]: show_img([blurred])  
• [25]: gaussian = cv2.GaussianBlur(img, (5,5), 0)  
median = cv2.medianBlur(img, 5)  
  
[35]: hist_equalised = cv2.equalizeHist(img_gray)  
  
[57]: show_img(  
    {'gaussian':gaussian,  
     'median': median,  
     'blurred':blurred,  
     'gray': img_gray,  
     'Histogram Equalisation': hist_equalised  
)  
  
[56]: gamma = 1.5  
gamma_corrected = np.power(img / 255, gamma)  
# gamma_corrected = np.uint8(gamma_corrected * 255)  
  
show_img({'gamma corrected': gamma_corrected,  
          'normal': img})
```

Additionally, apply histogram equalization and gamma correction to enhance the image's contrast and brightness.

Display the original image and the processed images side by side for comparison.

