**German University in Cairo**
**Department of Digital Media Engineering and Technology**
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**DMET 901: Computer Vision**

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# Assignment 2

This assignment aims to test your knowledge of image processing techniques. Image processing techniques subjects of testing are Filters, and Image Enhancement, and Edge Detection.

In this assignment, the image shown in Figure 1, alongside some corrupted variations of it (available in the images folder), are to be analysed and enhanced. This image has be a subject of a *specific* sequence of corruptions, resulting into creating the following images:

- 1.jpg: no corruption.
- 2.jpg: salt and pepper noise.
- 3.jpg: blur.
- 4.jpg: color collapsing.
- 5.jpg: blur then salt and pepper noise.
- 6.jpg: color collapsing then salt and pepper noise.
- 7.jpg: color collapsing then blur.
- 8.jpg: color collapsing, blur then salt and pepper noise.

Each of these corruption effects can be measured and corrected. Your task is to implement a system which is able to:

1. Measure:
    - Noise (using variance).
    - Blur (using edginess as 3x3 Soble kernel).
    - Color collapsing (using minimum and maximum intensities).
2. Correct:
    - Noise (using median filter).
    - Blur (using unsharp filter).
    - Color collapsing (using contrast stretching).

The system should work with respect to the following sequence:

- First, measure noise, report the percentage of noisy pixels, then run filter if necessary.
- Second, measure blur, report the percentage of blurry pixels, then run filter if necessary.

- Finally, measure minimum and maximum intensities, report the percentage of the used color range with respect to 0-255, then run contrast stretching if necessary.

Which indicates that, your system should be able to decide that 3.jpg need only unsharbing, however, 8.jpg needs all corrections for example.

Finally, the final output image should be demonstrated.

**Figure 1**

## Assignment Regulations

- You will work on this assignment *in teams of two*.
- The deadline is on the 30th of November.
- The assignment is to be implemented using openCV on either Java, C++, or Python.
- Images to work on are available on the course page under the name of imagesA2.zip.