German University in Cairo
Faculty of Media Engineering and Technology
Winter 2025

DMET 901 – Computer Vision

# Assignment #3

## Due on Thursday, 16th of December @ 11:59PM

The main aim of this assignment is to experiment with background estimation and motion detection discussed in class. For the Background estimation, it is to be implemented using the **Background Modeling by Median Filtering**, while the motion detection is to be performed by **Differential Motion Analysis.** Accordingly, the required functions are:

1. **EstimateBackground:**
    a. **Input:** grayscale video.
    b. **Output:** grayscale image.
    c. **Description:** given a video, the output is expected to be an image representing the background of the whole video.
2. **DetectMotion:**
    a. **Input:** grayscale video and a grayscale image.
    b. **Output:** binary video.
    c. **Description:** given the model image of the background, the input video is to be compared with it, frame by frame, such that:
        i. Parts of the video frame which did not move should be represented in the output in **black**.
        ii. Parts of the video frame which includes motion should be represented in the output in **white**.

**For the test Video:**

It is uploaded with the assignment description. Upload it to /content/ on colab.

**You are asked to deliver the following:**

**A notebook (.ipynb/.py) showing your implementation of the requirements alongside, representing the outputs for each function.**

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**Submission Guidelines:**

1. **Teams:**

   **· This assignment should be done in groups of 3 to 4 students. All students must be from the tutorial groups of the same TA.**

2. **Assignment Submission:**

**You should submit the assignment through submission form mentioned below taking into consideration the following notes:**

- **You are asked to deliver a notebook (.ipynb/.py) showing your implementation of all the required functions representing the outputs for each.**
- **The .ipynb/.py file containing your assignment's implementation (the notebook should be submitted showing the cells being run before and representing the output).**
- **You can use the sample video given (provided in the assignment zipped folder) to test your code.**
- **The file should be uploaded on your drive and provide us with the link and make sure to be accessible.**
- **Submit the assignment through this form: https://forms.gle/fEKxFBgXd6nSrVid7**

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**Note that:**

- **Copying code from other teams or ChatGPT is totally prohibited. A cheating detector will be used to confirm that. Any cheating case detected will be a ZERO.**
- **You are not allowed to use any predefined functions for any of the requirements.**

- **The deadline to submit the assignment is on Thursday, 16th of December, 2025 at 11:59 PM**