

CS 6870 : Digital Video Processing Assignment -1

Implementation of Pixel-wise Background Subtraction

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Problem statement

Take the last 2 digits of your Roll no. Let it be R .

Please implement the following background subtraction algorithm numbered $((R \bmod 3) + 1)$:

1. GMM (refer to the paper Stauffer and Grimson et. al [1])
2. Non-parametric method (refer to the paper - Elgammal and Davis [2])
3. Order-based (refer to the paper Mittal and Ramesh and class notes[3])

Perform BG subtraction on the following videos and document your observations. Also, obtain results from one of your friends who has implemented a different algorithm and compare your results with his/her results.

Input Videos

Download the data from [here](#). Each video file contains a sub-directory named "input" containing a separate JPEG file for each frame of the input video. Use these as input to your algorithms.

Baseline

- pedestrians, highway

Dynamic background

- fall_dynamicBG

Lighting changes, shadows

- fluidHighway_Night
- bungalows_shadow
- PETS2006

Optional: If you would like to perform additional experiments, you can download additional videos here from [ChangeDetection\[4\]](#) dataset.

Instructions

- Do not use libraries like opencv (you can use it only to read/write images).
- You can use numpy.
- Report should contain graphical results, inferences and analysis.

Suggested Programming language:

Python, C++, Matlab

Submission Guidelines

- Dead line : **23/02/2025 11:59 PM**
- **PDF & Code Upload:** In Moodle.
Include code and pdf into a zip file with naming format: **RollNo_FName_AssignmentNumber.zip**.
Ex. CS15D001_Amitabh_1.zip.
- Email submissions will not be accepted. Reduce file size (if required).
- This is not a team assignment.

TAs:

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References

- [1] C. Stauffer and W. E. L. Grimson, "Adaptive background mixture models for real-time tracking," in *cvpr*, p. 2246, IEEE, 1999.
- [2] A. Elgammal, D. Harwood, and L. Davis, "Non-parametric model for background subtraction," in *Computer Vision — ECCV 2000* (D. Vernon, ed.), (Berlin, Heidelberg), pp. 751–767, Springer Berlin Heidelberg, 2000.
- [3] A. Mittal and V. Ramesh, "An intensity-augmented ordinal measure for visual correspondence," in *2006 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'06)*, vol. 1, pp. 849–856, 2006.
- [4] N. Goyette, P.-M. Jodoin, F. Porikli, J. Konrad, P. Ishwar, *et al.*, "Changedetection. net: A new change detection benchmark dataset.," in *CVPR Workshops*, no. 2012, pp. 1–8, 2012.