

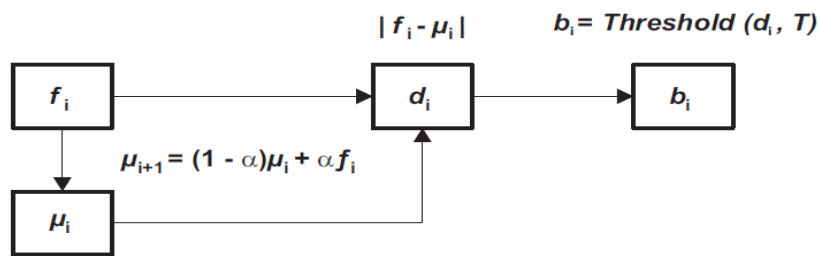
## Assignment #2 for Computer Vision

**Due: 10/November (Friday)**

- 과제 제출 방법 → 아주 BB내 과제 제출
- 총 2개 파일 제출 (따로 제출, 파일 2개 zip으로 합치지 말 것)
  - (1) Report (PDF only)
    - 절대 1페이지를 넘어가면 안됨. 2페이지 작성시 감점
    - 1페이지내에 총 두 단락으로 구성 (해당 문서의 마지막장 template 참조)
      - [1] 맨 위에 학번 이름 명시할 것
      - [2] 첫번째 단락 (10% 분량): 최종 성능 (Precision, Recall, F1 score)
      - [3] 두번째 단락 (90% 분량): 기존 대비 개선 방법 설명
        - Motivation → Contribution으로 구성 권장
  - (2) Source Code (python 또는 ipynb) 압축 파일 (Zip file only)
    - 출력 영상 제출 필요 없음 (result 디렉토리 파일)
    - groundtruth 및 input\_image 파일 제출 필요 없음
    - 개선 방향을 확인할 코드 파일만 제출할 것

## Main Algorithm

- Baseline method is made by Adaptive Background and Foreground Detection



(1)  $f_i$ : current frame (ith frame)

(2)  $\mu_i$ : background image (ith frame)

(3) Adapted Background is made by

$$\mu_{i+1} = (1 - \alpha)\mu_i + \alpha f_i$$

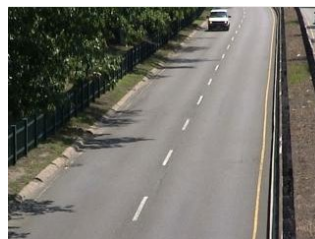
(4)  $d_i = |f_i - \mu_i|$ : difference image (or difference image between the current frame and the designed background)

(5)  $b_i = d_i > T$ : Binarized image compared with threshold

- The above-mentioned method will be recursively executed.
- You will have the following images
  - Groundtruth: The true moving objects images  
(From 1 to 469 frames, there is no GT because you need some time for adapting the background models)
  - \*\* GT image consists of black(background), white(foreground), and gray(shadow or boundary)
  - \*\* In this assignment, we only use black and white (Don't use other pixel values) regions



- input\_image: from 1 to 1700 frames



- result: You should save your result images in this directory

\*\* Foreground is white and background is black



- Evaluation code is provided (Please, check the example code)
- 조교가 만든 간단한 형태의 **baseline**은 **recall: 78%, precision: 78%**임
- 현재 제공된 뼈대 코드 Frame Difference 방식이고 recall: 44%, precision: 90%  
- [https://en.wikipedia.org/wiki/Precision\\_and\\_recall](https://en.wikipedia.org/wiki/Precision_and_recall)

#### Constraints

- Don't use opencv backgroundMOG function simply. If you want to make more advanced background estimation method, please, implement it by yourself.  
(기존 함수 사용하지 말 것, 하고 싶으면 직접 모두 작성해서 코드 제출 할 것)
- The baseline method is the "Adaptive Background and Foreground Detection" and you can improve them using different parameters (alpha and threshold) or the method you implement by yourself.
- Use small alpha. Change it from 1 to 0.001 and check the outputs according to the different alpha values.

ID		Name	
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### [1] Evaluation

Precision		Recall		F1 score	
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### [2] Motivation

- 개조식1
- 개조식2

### [3] Contribution

- 개조식1
- 개조식2