COSC6373 Computer Vision HW 4 Report

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Background Models:

Get the n number of previous frames right ahead the current reading frame to build the background model.

Mean filter: simply use the mean of each pixel among these n frames to represent the background model.

Median: Use the median of the pixels sequence of these frames.

Gaussian: fit a gaussian model to determine the std and the mean of pixel of these frames.

Knn: use the knn algorithm to build the background model.

Mixed gaussian: use the multy gaussian model to fit and determine the background model.

Subtract background:

Use the current frame to subtract the background mode to separate the foreground picture contained only the objects. Set a threshold to judge if the variation of pixel from background salient enough.

Morphologic operation:

Because there are some discontinue line and isolate noise so I used erosion and dilation operation to erase the noise and fill the holes inside the object.

Object detection:

I used the opencv find contours function to detecte the contours. And convert the contour points sequence to bounding box. Set the centroids of the bounding box as my detection output sent to the tracking part.

The background subtraction results depend on the model choosing, the threshold setting and the number of previous frames setting.

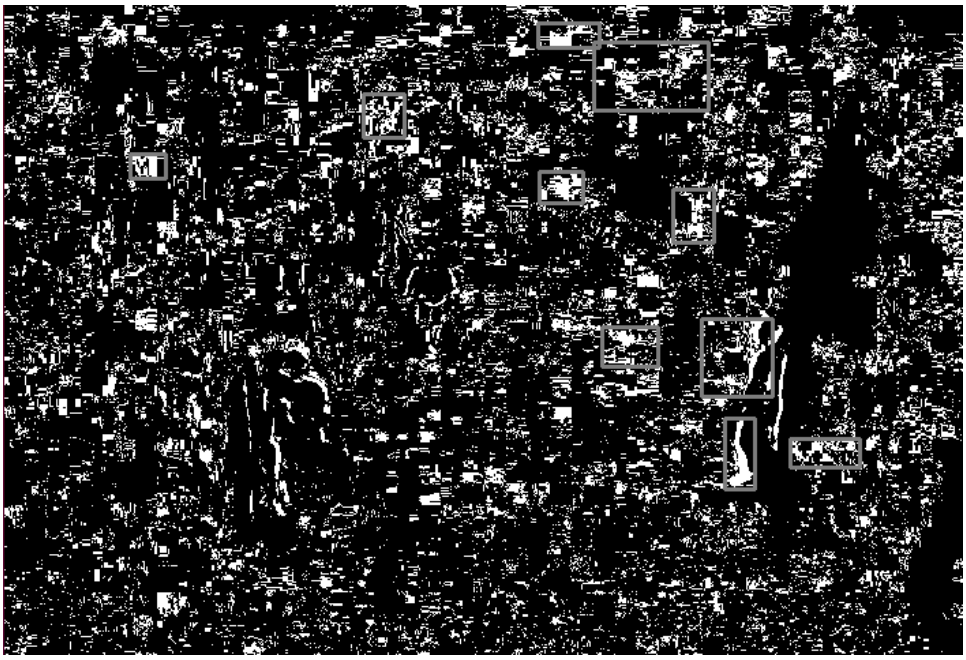
The detection results depend on the quality of the background subtraction and the morphologic operation.

The tracking results depend on the quality of the previous two modules. From the result I can see the mean and median have better detection ability. But the KNN and the MOG have faster implement speed. I have not figure out why the tracking results of mean and median is a incline lines. I checked all the centroids of the bounding box are returned correctly for tracking.

Appendix:

The detection results:

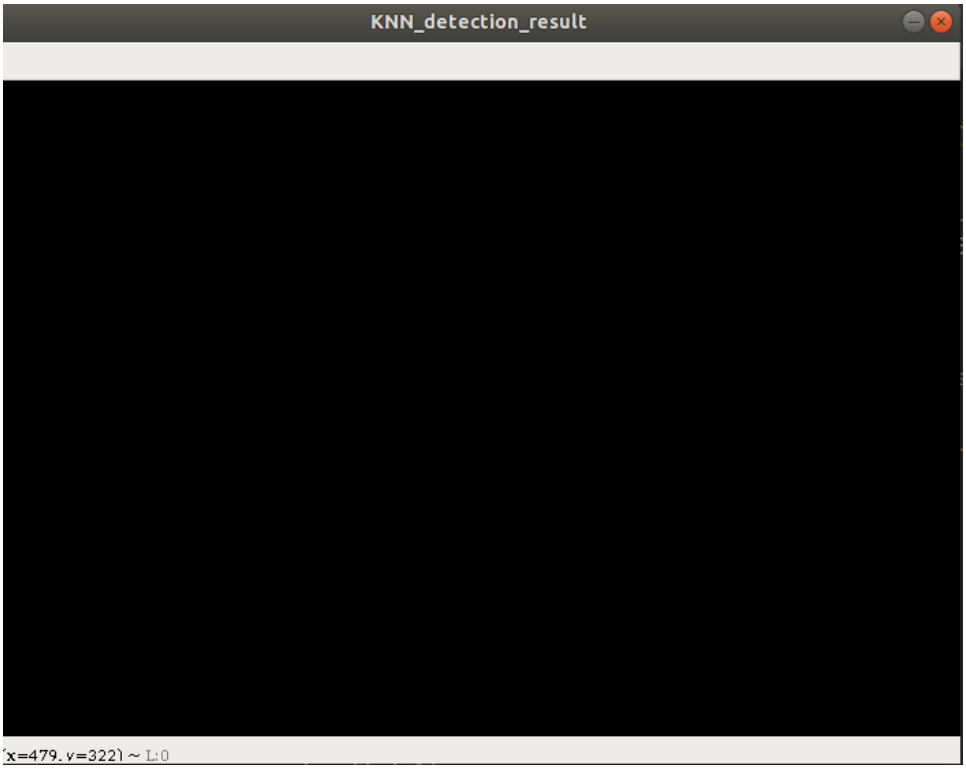
Gaussian model with threshold > 1 stand deviation



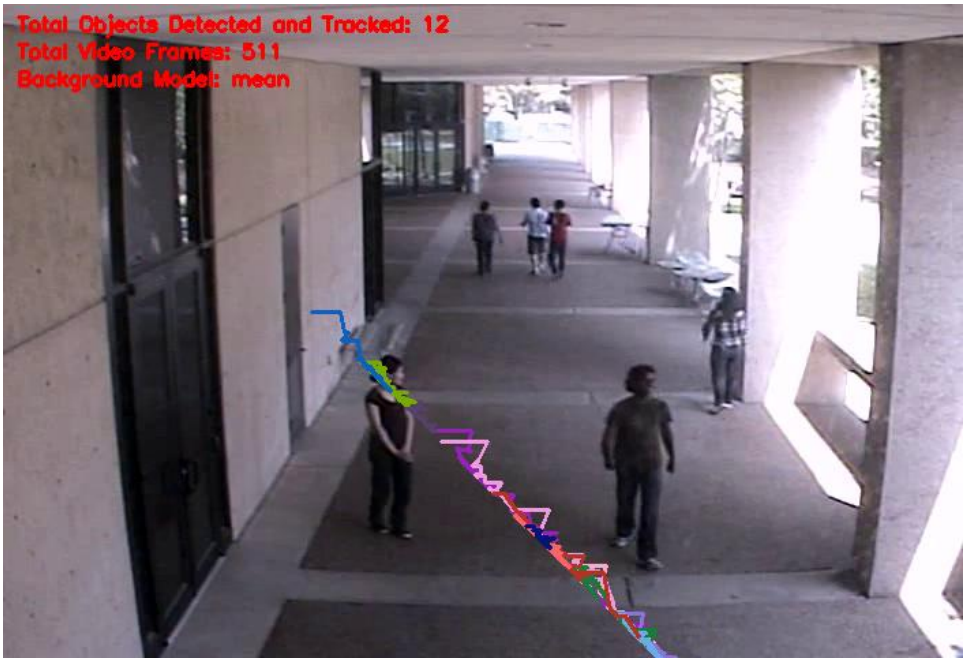
Gaussian model with threshold > 2 stand deviation

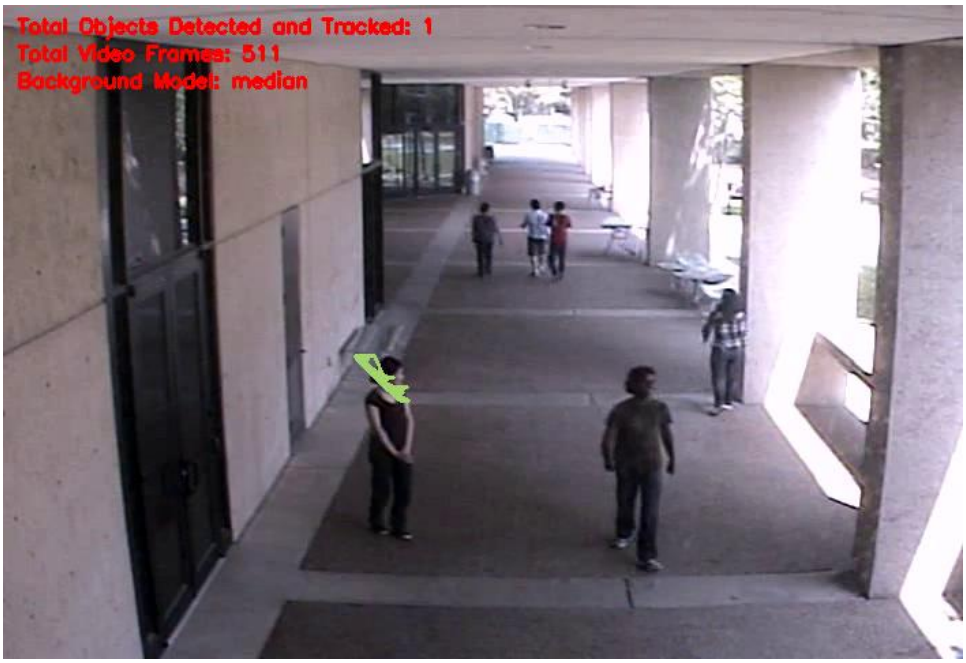
Obviously when I implement KNN and Mixture of Gaussians, there are some problem make me detect nothing.


Mog_detection_result
(x=392, y=185) ~ L:0


KNN_detection_result
(x=479, y=322) ~ L:0

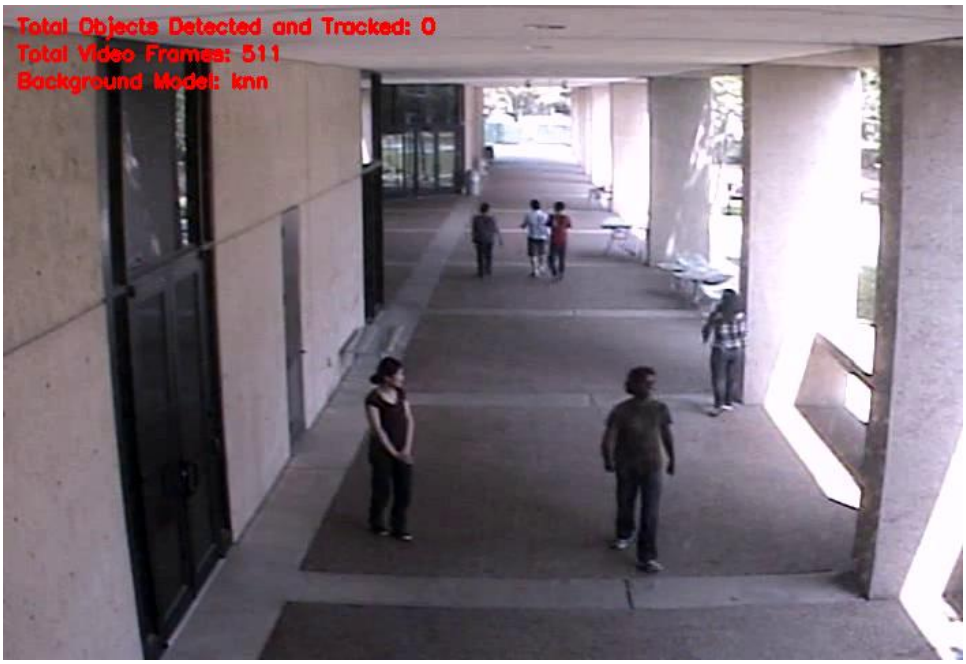
The tracking results:




Total Objects Detected and Tracked: 1
Total Video Frames: 511
Background Model: median


Total Objects Detected and Tracked: 10
Total Video Frames: 92
Background Model: gaussian


Total Objects Detected and Tracked: 11
Total Video Frames: 511
Background Model: mog


Total Objects Detected and Tracked: 0
Total Video Frames: 511
Background Model: knn