

Machine Learning Mid-Semester Report

Topic: Foreground-Background Segmentation for Human tracking in Real-Time video.

1401001 - Deep Parekh

1401011 - Jeet Parekh

1401035 - Krima Doshi

1401061 - Maharshi Bhavsar

Abstract—The feature of detecting and separating moving objects from the background is required by cameras in many areas. The basic technique used for separating moving and static objects is background separation. Background separation will subtract the current frame from the reference frame of static objects. This method is not capable of handling multiple backgrounds like moving water in a fountain. Hence, other models like unimodal model, MOG, Kernel, CB, etc. can be used. Here we have used a Gaussian filter, which further could be developed into a MOG system.

I. INTRODUCTION

Foreground-background segmentation is required when motion of objects need to be detected. The moving objects can be considered as foreground and the stationary objects can be considered as background.

Applications include traffic supervision, gesture tracking, person tracking, model-based video coding, and content-based video retrieval.

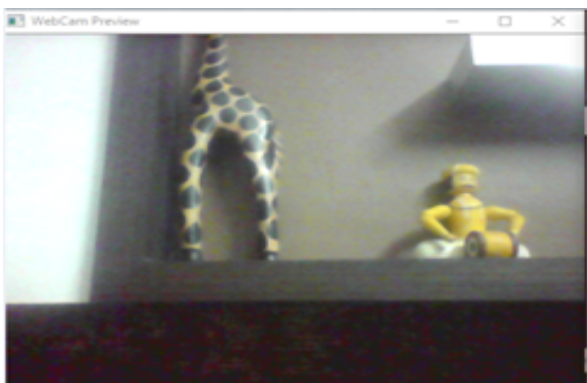
II. LiteratureReview^[1]

Kyunghnam Kim, Thanarat H. Chalidabhongse, David Harwood, Larry Davis - Real-time foregroundbackground segmentation using codebook model

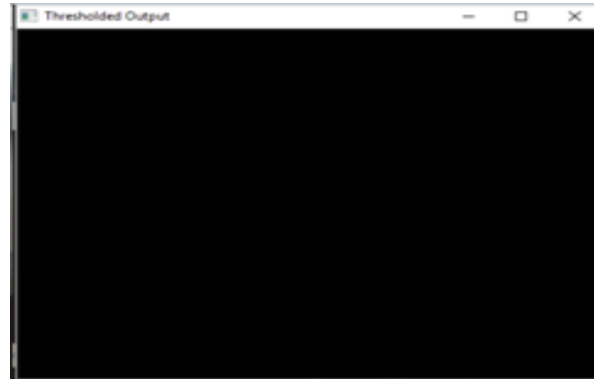
This paper presents a real-time algorithm for foreground-background segmentation. Codebook means a vector of occurrence counts of a vocabulary of local image features.

III. RESULTS

A. Webcam output and Filtered Output when there is no object and no motion.

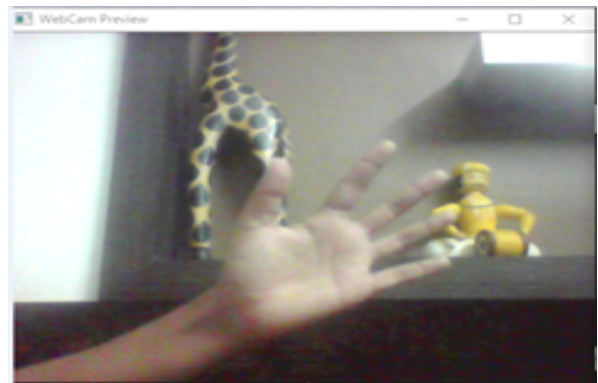


web cam preview of background



Background subtracted

B. Webcam output when the moving object comes into frame and Filtered output which also detect only a moving object.

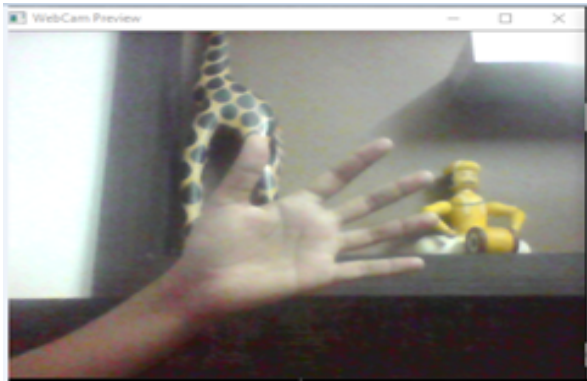


web cam preview of moving object

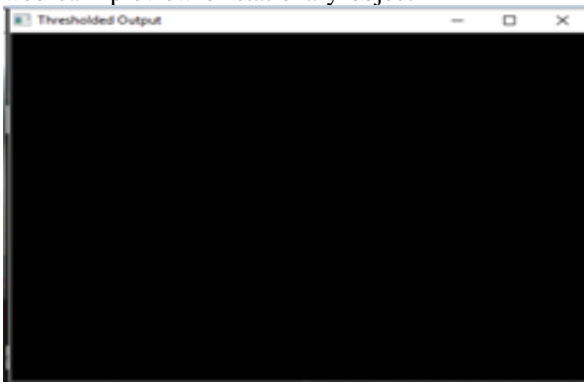


Background subtracted

C. After few frames, the object is still there but it is not in the motion, so the here is the output of Webcam and Filtered output which does not detect any motion as well.



web cam preview of stationary object



Background subtracted

IV. WHAT IS HAPPENING ACTUALLY

We all know that motion is always with reference to another object.

Here we are using the same concept in order to detect the motion. After each specific no. of iteration, a reference frame is being updated. And we are detecting the motion by differentiating the current frame and that reference frame. So once the object comes into the picture with some motion, it will get detected. But when it stops moving, the reference frame will be updated and eventually the current frame and the reference frame will be the same. So no motion will be detected.

V. FURTHER PLANNING

We are still trying to make the Gaussian Filter accurate for better accuracy and enhancement. After that we will be trying to decide that what portion of the filtered output should be considered as a moving object and which portions of the frames are connected and should be considered as the one single object. And how to represent the moving objects that has been detected.

VI. DISCUSSION

Our initial attempts were in MATLAB, but since the MATLAB camera module isn't easily available, we started parallel attempts using python and OpenCV. The results shown above are produced using python and OpenCV.

REFERENCES

- [1] Kyungnam Kim, Thanarat H. Chalidabhongse, David Harwood, Larry Davis - Real-time foregroundbackground segmentation using codebook model 1077 - 2014/ - r 2005 Elsevier Ltd. All rights reserved. doi : 10.1016/j.rti.2004.12.004
- [2] opencv dev team, "Getting Started with Videos", http://docs.opencv.org/3.0-beta/doc/py_tutorials/py_gui/py_video_display/py_video_display.html, Nov 10, 2014
- [3] Alexander Mordvintsev, Abid K., "Background Subtraction", http://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_video/py_bg_subtraction/py_bg_subtraction.html, 2013