# Improved Accuracy in Classification of Objects in Real Time Video

**[1]Mrs. C. Anuradha, [2]M. Siva Nagarjuna, [3]B. Sai Navaneeth Reddy, [4]V. Shashank, [5]G. Sridhar Rao**

[1]Assistant Professor
[1,2,3,4,5]Department of Computer Science and Engineering
Bharath Institute of Higher Education and Research Chennai, India

**Abstract: In this paper, we present a novel method for detecting thrown objects and other free-flying bodies in video sequences. Our method is designed to be used as a component in a deployed surveillance system and runs in real-time. We find interesting motion regions that meet certain size, compactness, and speed criteria, and then use the expectation maximization algorithm to find objects on parabolic trajectories over a short time window. In a large test set of indoor and outdoor videos, the system was shown to detect thrown objects of various sizes. In our project, we compared the accuracy of the following algorithms: Histogram of Oriented Gradient (HOG) and Single Shot Multibox Detector (SSMD)**

**Keywords: Objects, Real time video, Machine Learning, Histogram of Oriented Gradient, Single Shot Multibox Detector, Moving object detection.**

## INTRODUCTION

Moving object detection is a fundamentally difficult task in computer vision, which is used in video surveillance, traffic control, medical diagnosis, and other applications. The paper focuses on the HOG feature and the cloud model for representation and detection. The HOG descriptors are reminiscent of edge orientation histograms, SIFT descriptors, and shape contexts, but these descriptors use a dense grid of uniformly spaced cells and compute overlapping local contract normalizations for improved effective results. In our works, we investigate HOG in images. Video is defined as a sequence of frames that contain images, where each sequence of images is displayed at such a fast rate that the human eye cannot detect the time gap between the frames. Because two consecutive frames are closely related, continuity is required. Applications such as video surveillance, robotics, and so on have 2 a first step for identifying regions of interest (ROI). Although using a general algorithm for object detection is desirable, it is difficult to deal with objects that vary in color, shape, size, and texture. The majority of computer systems use a fixed still camera, which makes the object detection process much more feasible. Typically, a frame from a video sequence is divided into two distinct sets of pixels, the second of which is complementary to the first. The first set is for foreground objects, while the second is for background objects. The definitions of foreground and background objects vary greatly depending on the application. Normally, objects such as people, vehicles, and animals are considered foreground objects, while the rest of the things are considered background. This study considers the cloud model based the HOG and SSMD feature, which can be explained the spatial information and cloud model work well in information expressing. And our method seeks to decrease the detection time than other method based on HOG and SSMD feature.

## LITERATURE SURVEY

A literature survey is the overall description of the reference papers, which identifies the problem of existing methodologies. Also, the methods to overcome such issues can be identified

**An Efficient Real-Time Video Object Segmentation Algorithm Based on Change Detection and Background Updating.**

This paper proposes an efficient video object segmentation algorithm based on change detection and background updating that can quickly extract the moving object from video sequence. Firstly, the change detection is used to analyze temporal information between successive frames to obtain the change region. Then, the combination of frame difference mask and background subtraction mask is adopted to acquire the initial object mask and further solve the uncovered background problem and still object problem. Moreover, the boundary refinement is introduced to overcome the shadow influence and residual background problem.

**Real Time Boundary Density Based Moving Object Extraction.**

In this paper we developed a simple extraction method which was suitable for real time application. The first stage, we performed moving object detection by using frames subtraction. This yielded 3 boundary label in the motion area. This boundary label couldn't extract the whole moving object. For every row of image, we calculate the boundary density function. The probability of pixels in this density is used to extract them as foreground. The experimental result, our system can extract the moving object in computation time of 71 - 80 ms, video rate of 15 frames per second (fps) and image frame size of 640×480 pixels, which is suitable for real time application.

**Real-time color classification of objects from video streams**

This project will aim to implement object detection and color classification in MATLAB GUI. Where the objects will be detected and the color of the object will be classified in a real-world scenario for both still and real-time image. This task includes image segmentation process for still image, where only the color and the count of objects will be recognized from a still image. However, for live video processing the region of the object as well as the color of the object will be recognized.

**Real-Time Object Detection in Embedded Video Surveillance Systems**

In this paper we report a new method to detect both moving objects and new stationary objects in video sequences. On the basis of

temporal consideration, we classify pixels into three classes: background, midground and foreground to distinguish between long-term, mediumterm and short-term changes. The algorithm has been implemented on a hardware platform with limited resources and it could be used in a wider system like a wireless sensor network. Particular care has been put in realizing the algorithm so that the limited available resources are used in an efficient way. Experiments have been conducted on publicly available datasets and performance measures are reported.

**Real-time object detection and tracking in an unknown environment**

This paper is the result of our research where our research team developed and implemented object detection and tracking system operational in an unknown background, using real-time video processing and a single camera. The proposed system has been extensively tested to operate in complex, real world, non-plain, light variant, changing background.

**EXISTING SYSTEM**

- Histogram of Oriented Gradient and Gaussian Mixture Model (HOG+GMM):
- The **histogram of oriented gradients (HOG)** is a feature descriptor used in computer vision and image processing for the purpose of object detection.
- The technique counts occurrences of gradient orientation in localized portions of an image. This method is similar to that of edge orientation histograms, scale-invariant feature transform descriptors, and shape contexts, but differs in that it is computed on a dense grid of uniformly spaced cells and uses overlapping local contrast normalization **for improved accuracy.**
- The essential thought behind the histogram of oriented gradients descriptor is that local object appearance and shape within an image can be described by the distribution of intensity gradients or edge directions.
- The image is divided into small connected regions called cells, and for the pixels within each cell, a histogram of gradient directions is compiled.

**DISADVANTGES OF EXISTING SYSTEM**

- Only edges are been detected.
- Time consumption is more.
- More complexity.
- Less efficiency.
- Noise is high.

**PROPOSED SYSTEM**

- Single Shot Multibox Detector (SSMD):
- SSD has two components: a backbone model and SSD head. *Backbone* model usually is a pre-trained image classification network as a feature extractor. .
- We are thus left with a deep neural network that is able to extract semantic meaning from the input image while preserving the spatial structure of the image albeit at a lower resolution.
- The SSD head is just one or more convolutional layers added to this backbone and the outputs are interpreted as the bounding boxes and classes of objects in the spatial location of the final layers activations.

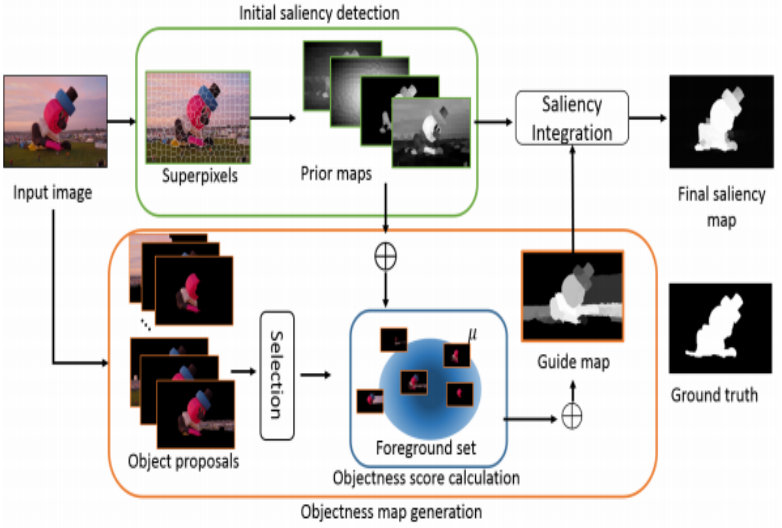
**ADVANTAGES OF PROPOSED SYSTEM**

- Prediction of object is accurate.
- Time consumption is less.
- Noise will be less.
- No Overlapping of images.
- Can be implemented to all images.

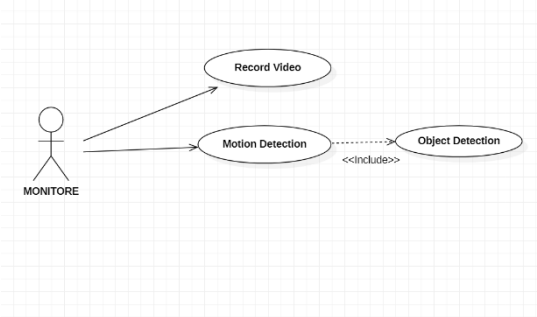
**PROPOSED ALGORITHM**

- Single Shot Multibox Detector (SSMD)
- Histogram of Oriented Gradient (HOG)

**ARCHITECTURE DIAGRAM**



**USECASE DIAGRAM**




**SYSTEM REQUIREMENTS HARDWARE REQUIREMENTS**

- Processor : Core i3/i5/i7
- RAM : 2-4GB
- HDD : 500 GB

**SOFTWARE REQUIREMENTS**

- Platform: Windows Xp/7/8/10
- Coding Language: Matlab
- Database : My Sql

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