**MIT School of Engineering**

**Department of Computer Science and Engineering**

**Mini Project Synopsis**

**Date: 01/01/2020**

**Group ID:13**

**Project Title: Photo component detector**

**Group Members: 4**

| **Enrollment Number** | **Roll No.** | **Name of student** | **Email Id** | **Contact Number** |
| --- | --- | --- | --- | --- |
| MITU19BTCS0169 | 2193088 | Chinmay Mandavkar | chinmaymandavkar@gmail.com | 9082990473 |
| MITU19BTCS0001 | 2193032 | Aman Bharti | amanbharti751@gmail.com | 7859073654 |
| MITU19BTCS0014 | 2193104 | Gaurav Kumar | gaurav22102000@gmail.com | 8875264409 |
| MITU19BTCS0002 | 2193033 | Aman Raj | rajbuilderaman@gmail.com | 9931607258 |

**Problem Statement:**  Image Components Detector

**Abstract:**

Real time object detection and object segmentation methods have helped in many computer vision areas, such as scene representation & interpretation, content based image retrieval, object tracking in videos, medical applications, video surveillance, robot navigation and vehicle navigation. Object tracking is the process of locating an object or multiple objects using either a static or dynamic camera. Even though high powered computers are used for object detection and tracking algorithms, most of the object detection algorithms such as background subtraction, temporal difference, foreground extraction and simple differencing require long time to detect objects ,require more storage space and no robustness against illumination changes. Recently computer vision research has to address the Multiple object detection and tracking in dynamic environments.

Main aim of this project is to extract important data from images. Using this extracted information description, interpretation and understanding of the scene can be provided by the machine. Main point of image processing is to modify images in the desired manner. In other words, altering and analyzing pictorial information of images. In our daily life we come across different types of image processing. The best example of image processing in our daily life is our brain sensing a lot of objects/images when we see images with eyes and processing is done in very less time.

**Literature Survey:**

In [1], Qiang Ling et.al, developed a feedback based object detection algorithm. It adopts a dual layer updating model to update the background and segment the foreground with an adaptive threshold method and object tracking is treated as an object matching algorithm. [BACKGROUND MODEL BASED DETECTION AND TRACKING]

A salient feature point based algorithm for multiple object tracking in the presence of partial object occlusion has been proposed in [2]. In this method, extract the prominent feature points from each target object and then use a particle filter based approach to track the feature points in image sequences based on various attributes such as location, velocity and other descriptors. They used a rectangular bounding box for object representation. But this algorithm may not successfully track feature points with different velocities. Hence this algorithm needs more flexible object representation and also they used a static camera for capturing the video. [POINT DETECTION AND TRACKING].

A Scene feature based algorithm was proposed in [12] for detecting counter flow in security related surveillance in airports. They addressed the two main problems: 1. Most of the cameras deployed in security surveillance networks have poor resolution. It will create negative effects on tracking algorithm. 2. 24/7 basis operation of automatic video analytics algorithms sometimes will provide higher false positive rate in tracking. To avoid such problems they used novel classifier to identify scene feature in the image and KLT optical flow tracking algorithm.[KLT POINT DETECTION AND OPTICAL FLOW TRACKING]

A structured labelling information in the partial least square analysis algorithm for simultaneous object tracking and segmentation was proposed in [4].This algorithm allows for novel structured labelling constraints to be placed directly on the tracked object to provide useful contour constraint to alleviate the drawback of the online-learning-based tracking method is their sensitivity to drift, i.e, they gradually adapt to non-targets. Also, this algorithm considers the challenges in the problem of detection and tracking include appearance changes of the object, illumination variations, occlusions, background clutters, non rigid shape changes etc. In order to avoid the gap between the detection and segmentation, this algorithm performed tracking and segmentation simultaneously. [Active Contour Segmentation based Object Detection and Silhouette Tracking].

When the number of discretely moving objects increases, the understanding of video scenes becomes more difficult. Motion feature (viz location, scale, score (magnitude), direction and velocity) filtering based event detection was proposed in [5] to detect events in crowded areas. This method is different from others in terms of choice and calculation of the motion feature, uses a rich set of motion features and spatial & temporal precision is limited to relatively coarse quantization. [BACKGROUND MODEL BASED DETECTION].

Due to the high computational cost, few of the object tracking methods can be used for real time application even though plenty of object tracking methods are available. To achieve better real time tracking performance, an adaptive robust framework for object tracking based on Camshift approach has been proposed in [30]. This algorithm avoids the distractions from the surrounding background and object region. In this algorithm, kalman filter is used for object prediction. [POINT DETECTION AND CAMSHIFT TRACKING].

Due to the variability of background and appearance model, monocular multi object detection with static cameras is challenging one. Most of the current methods focus carefully on camera placement to avoid occlusion [7]. Severin Stalder,et. Al., proposed Cascaded Confidence Filter for Improved Tracking by detection. They combined Background and appearance model. Their approach significantly improves especially in case of partial occlusion, changing background, and similar distracter. [HYBRID APPROACH: BACKGROUND BASED AND APPEARANCE MODEL BASED DETECTION AND TRACKING]

**Proposed System (Block Diagram):**

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**Conclusion:**

The goal of this project is to design an all purpose application using various ways of image processing and object detection. Going through different options available, the program will be capable of color recognition, face detection, human counting, and image recognition.

For future work, we can conduct a more thorough test of our matching algorithm using larger dataset and more rigorous diagnostics of the algorithm.

**References:**

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[4] Bineng Zhong, Xiaotong Yuan, Rongrong Ji, Yan Yan , Zhen Cui, Xiaopeng Hong, Yan Chen, Tian Wang, Duansheng Chen and Jiaxin

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[7] Severin Stalder, Helmut Grabner and Luc Van Gool, ‖ Cascaded Confidence Filtering for Improved Tracking-by-Detection‖, Springer Computer Vision – ECCV 2010 Lecture Notes in Computer Science Volume 6311, 2010, pp 369-382

**Annexure:**

**Annexure 1: Form A-Title Approval**

**Annexure 2: Form B-Market and financial feasibility**

**Annexure3: Literature Survey Paper**