International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 06 | June 2020 www.irjet.net p-ISSN: 2395-0072

IOT BASED AUTOMATED LOST BAG

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Abstract - *Most of the public places like Railway Station are having major problem of bag lost in the platforms (or) many abandoned bags are found. When the bag is lost, the valid things in it cannot be found and detected and it will be a serious issue. In this work, Railway Surveillance system is used to detect the unattended bags (or)lost bags that are present. The objective of this work is to detect the unattended bags by obtaining the image sequences acquired with a camera placed on each platform .Images will be processed by the local PC-IoT system ,devoted to detect the presence of unattended bags.When an unattended bag is detected , a alert message will be given to the remote control centre that is connected to the locally connected PC.*

Key Words: IMAGE ACQUISITION, OBJECT DETECTION, CLASSIFICATION

1. INTRODUCTION

Nowadays, the whole world is worried about terrorism and lost things. The probability of an emergency situation is especially high in crowed places. In such situation any bag left unattended can be either lost or contained of abandon materials. Therefore, the problem of abandoned object detection is of the great importance for ensuring security in the public places. Additionaly, it is a challenging task in the crowded unconstrained environments since Occulations, appearance, lighting changes, speed and density of moving objects in the scene should be taken into account. In this method we detect the unattended object that is being left in the public places. The unattended bags are those that has not been touched by a person for some long time. The increasing request for security in the field of public transportation systems, like Railway Station, has resulted in a corresponding increasing interest in the use of the most advanced IOT based Railway surveillance techniques in order to provide an automatic continuous monitoring of railways infrastructures. It is still an open problem because of there is no object type of category that can be assumed as having been abandoned. Generally, foreground/background extraction techniques are more suitable for identifying static foregrounds regions as abandoned objects than training particular object detectors. In today's digital world demands for automatic video surveillance system as a concern of security with fast analysis. In last decade, some traditional algorithms were developed but it needs manual interference for analyze a big data generated by cameras. These methods had less accuracy and time consuming. For this reason, automatic video interpretation is welling as a solution to operators in focusing their attention on security related events. The detection of abandoned object had become challenging research topic in crowed area such as hospital, railway stations and malls. An application has been developed for abandoned object detection which is useful for monitoring a specific area and resulting an appropriate action which will avoid some hazardous accidents.

2. RELATED WORKS

[1] Ibrahim Kajo et al[2][2]Tasks such as abandoned luggage detection and stopped car detection, Stationary Foreground Objects (SFOs) need to be detected and properly classified in real time. Different methods have been proposed to detect SFOs, but they are mainly focused on certain types of objects. In this paper, an incremental singular value decomposition-based method is presented to detect all types of SFOs such as abandoned objects and removed objects. The proposed method decomposes the video tensor spatiotemporally and divides it into background and foreground

components. Furthermore, the unique structure of the pixel time series of each category allows identifying the category of the detected objects, whether they are abandoned or removed, and detecting the exact time of the start and end of each event. The results demonstrate that the proposed method achieves a superior performance in detecting SFOs at both object and pixel levels. It uses video tensor to decompose SFO into foreground and background components which is better than conventional technique. It is used to detect the start and end times of the stopped objects .It provides robust performance against color similarity, occlusion, against several challenge Different methods of SFO are detected but only focused on main types of objects. Only decomposes the video tensor spatiotemporally.

[2] Ling Hu and Qiang Ni [1] Automated object detection algorithm is an important research challenge in intelligent urban surveillance systems for IOT and smart cities applications. In particular, smart vehicle license plate recognition (VLPR) and vehicle detection are recognized as core research issues of these IOT-driven intelligent urban surveillance systems. They are key techniques in most of the traffic related IoT applications, such as road traffic real-time monitoring, security control of restricted areas, automatic parking access control, searching stolen vehicles. We use this novel method to determine and pick out the highest energy frequency areas of the images from the digital camera imaging sensors, that is, either to pick the vehicle license plates or the vehicles out from the images. Our proposed method can not only help to detect object vehicles rapidly and accurately, but also can be used to reduce big data volume needed to be stored in urban surveillance systems. It is used to detect either the vehicle license plates or the vehicles from the digital camera imaging sensor. It is used to reduce the big data volume that is generated everyday from the urban cities. It will be used to detect only the highest energy frequency areas from the images.

[3] Claudio Sacchi and Carlo S.Regazzoni[3] . In this paper, a distributed video-surveillance system for the detection of dangerous situations related to the presence of abandoned objects in the waiting rooms of unattended railway stations is presented. The image sequences, acquired with a monochromatic camera placed in each guarded room, are processed by a local PC-based image-processing system, devoted to detecting the presence of abandoned objects. When an abandoned object is recognized, an alarm issue is transmitted to a remote control center, located few miles far from the guarded stations. A multimedia communication system based on direct sequence code-division multiple-access (DS/CDMA) techniques aims at ensuring secure and noise-robust wireless transmission links between the guarded stations and the remote control centre, where the processing results are displayed to the human operator. Results concern the performances of each local image processing system in terms of false-alarm and misdetection probabilities, and the performances of the CDMA multimedia transmission system in terms of bit error rates (BERs) and quality of service (QOS). This system is used to monitor wide range of unattended environments. It is used to capture the abandoned object images and provides an alarm issue.It is used to make aware of abandoned object to the remote control center. The performance of each local images processing system due to false-alarm and misdetection. The performance of CDMA Multimedia transmission is low due to bit error rates and QOS.

[4] Apoorva Raghunandan et al[3]. Object Detection algorithms find application in various fields such as defence, security, and healthcare. In this paper various Object Detection Algorithms such as face detection, skin detection, colour detection, shape detection, target detection are simulated and implemented using MATLAB 2017b to detect various types of objects for video surveillance applications with improved accuracy. Further, various challenges and applications of Object Detection methods are elaborated. Object Detection algorithms find application in various fields such as defence, security, and healthcare. In this method Color Detection, Face Detection, Object Detection Algorithms, Skin Detection, Target Detection are more accurate in detection. In LIBS method, the model fails to provide the most accurate results in the presence of dynamic objects in the background. In W4

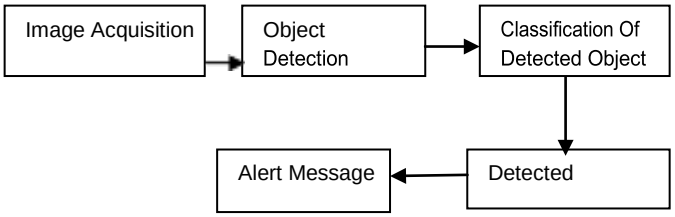
method, only people in upright position can be detected using the cardboard model. If people are in different poses, or are crawling and climbing, it becomes challenging. In Behavior Subtraction method, detection of spatial anomalies like U-turns is challenging in this method. Kalman Filter, Mean Shift Algorithm and GMM face the challenge of detecting multiple objects when there is slight occlusion. Multiple object when there is slight occlusion.

[5] KetakiShet - Talathiand S.V. Khobragade . Many bomb blast was done with the help of abandoned objects, so effective and efficient detection and Real time localization of abandoned objects is very important to prevent attacks .This paper presents an effective hardware implementation approach or Abandoned Object Detection in video surveillance .We had combined long term and short term background model for foreground extraction .Change detection is done with the help of fuzzy clustering using log ratio and mean ratio operators .In proposed system SVM classifier is used to classify detected static object and its location is traced by GPS, further alter process is handled by embedded module. Overall communication is done through IoT**.** This work is uses long term and short term model for foreground extraction.Change detection is done using fuzzy clustering using log ratio and mean ratio operators. This method uses SVM classifier classifies the detected static object and its location is traced by GPS and handled by embedded module. Unable to detect Occulated objects and false alarm rate increases in crowded areas. Speed of the process and data storage is not upto expectation level and must be improved.

[6] Weilong Huangetal[6]. Abandoned object detection is a crucial problem in many computer vision tasks. Traditional method based on foreground/background extraction techniques leads to a high false alarm rate. In this paper, we propose a novel detection algorithm based on change detection and blob separation. Our proposed approach suits more practical scenarios in which objects located near each other. Experiments are conducted on several well-known benchmarks to validate the efficacy of the algorithm proposed in this paper. This paper proposes a detection algorithm based on change detection and blob separation. With the correlation map method is used to find the candidates. The problem of stability of detection cannot be overcome so that it uses the time information to improve the performance.

3. SYSTEM OVERVIEW

The proposed lost bag detection method is based on image acquisition and change detection. The next subsection states the methodology of acquisition and detection. This system is proposed for real time abandoned object detection and its addressing using IoT for enhancing our public security with the help of alert system.



A. IMAGE ACQUISITION

We are considering the video as the input to the proposed system. In this, we arre going to capture the video and it will be given as input to the system. A video stream is initially segmented into frames. The video in first stage is breached into frames. Longterm and short term background models are developed for finding reference image for comparison with the current image. Foreground image is obtained here with the help of detection module.

$$Idiff=|Ic-Ib| \quad (1)$$

Equ(1). Gives the difference image where Ic is the current image frame and Ib is background image frame which is taken at initial period but this is conventional method. To improve accuracy we had considered mean of both image.

$$Idiffm=A-B \quad (2)$$

where, A=Ic\uA uA=mean(Ic)
B=Ib\uB uB=mean(Ib)

B. OBJECT DETECTION

Change detection is nothing but process of recognizing difference between two images. The idea of optimal difference image is that unchanged pixels exhibit small values whereas changed pixels exhibit larger values. Static or abandoned object is found out by applying fuzzy clustering to the current image. Once it shows that is it is static for specific time then called as static object. With this we can neglect the object which is moving.

C. CLASSIFICATION OF DETECTED OBJECT

With the help of state vector machine classifier we classify different object based on their features because bags may have different arbitrary shape. It will classify whether the detected object is human, bag or other depending on their features calculated by system and comparing it. If the object is steady then it will check timer to classify object is bags or other. For that it will check the features i.e width to height ratio. Width to height ratio is obtained by following ratio

$$Height = \sum_{i=1}^{R} I(i,j) \quad (3)$$

$$Width = \sum_{j=1}^{C} B(j) \quad (4)$$

$$Where\ s(i) = \sum_{j=1}^{R} I(i,j) \quad (5)$$

$$B(i) = \begin{cases} 1, & if\ s(i) \geq 1 \\ 0, & if\ s(i) < 1 \end{cases} \quad (6)$$

D. ALERT

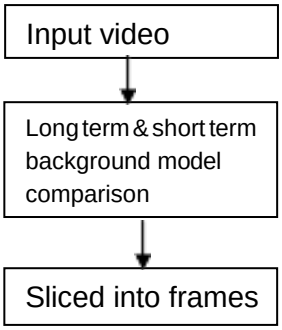
When the unattended baggage is detected by the system then the alert will be sent to the local PC that is connected and to other higher officials. This communication is done through internet of things and is used for wireless communication purpose.

4. METHODOLOGY

The proposed detection method consist of three main stages. Firstly, a video is sliced into number of frames and converted into images. This leads to the second stage of proposed method where the images are compared with the background image and traced out using the fuzzy clustering to the current image. Then with the help of state vector machine classifier we classify different objects based on their features. The three steps of the proposed method are shown below

A.PRE-PROCESSING MODULE

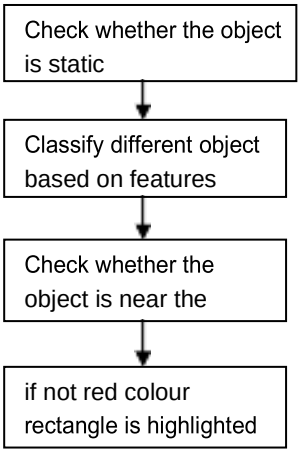
Video Pre Processing module first gets the input as video from the surveillance video in the public places that is kept. This module after getting the input video is given into the Matlab. This video is segmented into frames. The captured video in this stage is breached into frames which is stored as 2D array. Long term and short term background models are developed for finding reference image for comparison with the current image. Foreground image is obtained here with the help of detection module.



B.DETECTION MODULE

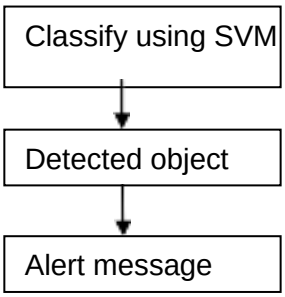
The Initial step to approach object detection classification in videos is by segmenting the moving objects out of the scene. Change detection is nothing but process of recognizing difference between two images. The underlying idea of optimal difference image is that changed pixels exhibit small values, whereas unchanged area exhibit larger values. Clustering involves the task of dividing the data points into classes so that items in same classes are as similar as possible and items are in different classes are as

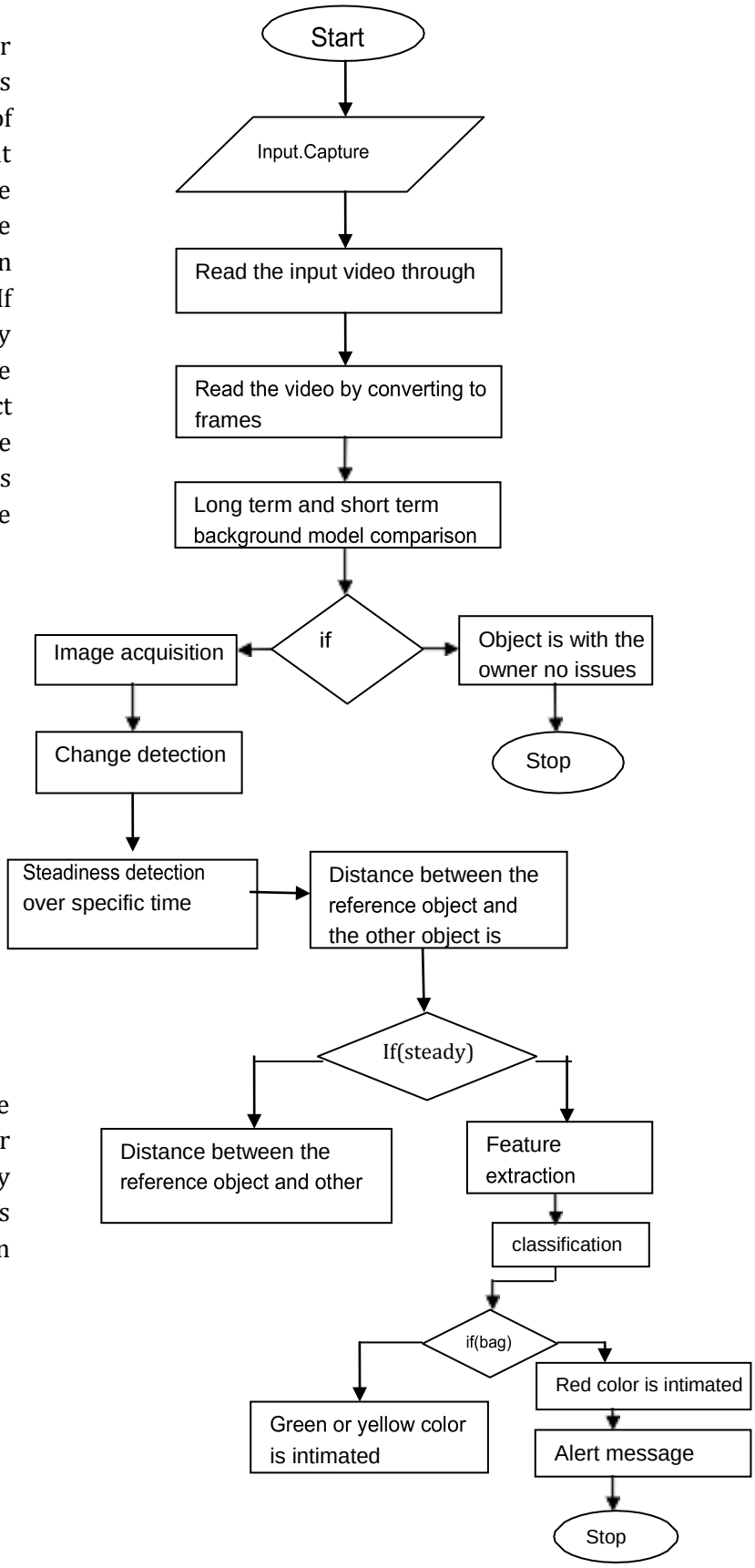
dissimilar as possible. Once it shows that is static for specific time then it is called as static object .With this we can neglect the moving objects. And with the help of state vector machine classifier we classify different object based on their features because bags may have different arbitrary shape. It will classify whether the detected object is human, bag or other depending on their features calculated by system and comparing it. If the object is steady then it will check timer to classify object is bags or other. Then after detecting that the object is the bag, if the bag is near the person the object will be rectangled in green color. If it far away from the person it will be in yellow rectangle and if the object is not with person then it will be in red color rectangle around the object.



C.POST PROCESSING MODULE

In this system with the help of state vector machine classifier we classify different object based on their features because bags may have different arbitrary shape. It will classify whether the detected object is human, bag, mobile phone, animal etc depending on their features calculated.





If the object is steady then it will check timer for classifying the object as bag. For that it will check the features i.e width to height ratio. Whenever the bag is detected by the system, it will mark it as red color rectangular box when the person is not near the object. After the red color intimation is shown immediately an alert message is generated to the local PC that is connected and to the higher officials. IoT module is used for wireless communication purpose and to alert the unattended baggage detection.

5. EXPERIMENTATION AND RESULT

A .PRE PROCESSING MODULE

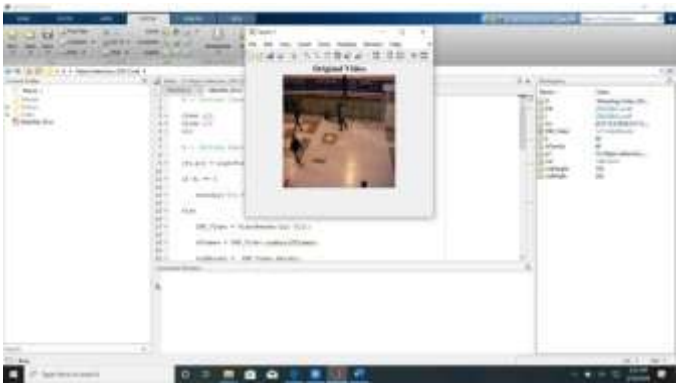


Fig.1. Original Video as Input

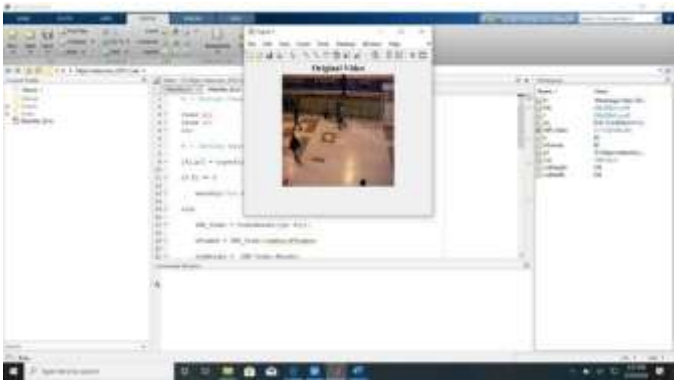


Fig .2. Frame Conversion of Original Video

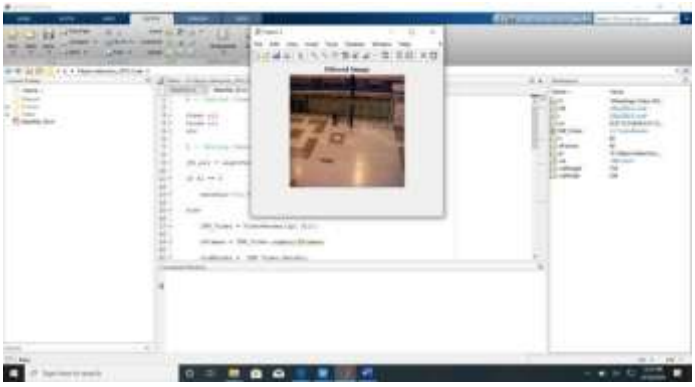


Fig 3. Filtered image

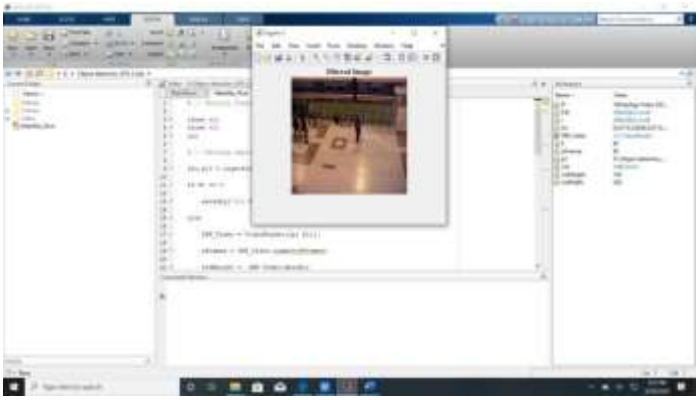


Fig. 4. Another Sample Filtered Image.

B.DETECTION MODULE

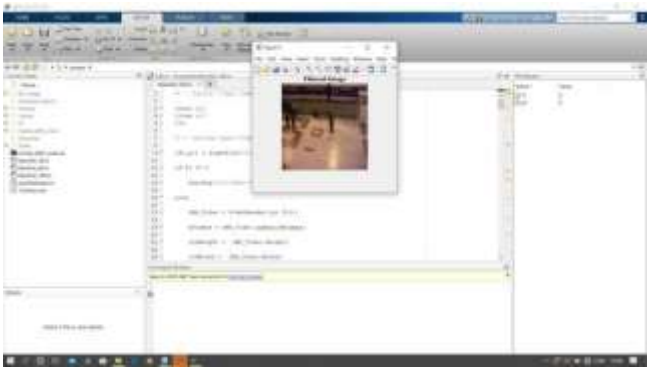


Fig .5. Static object.

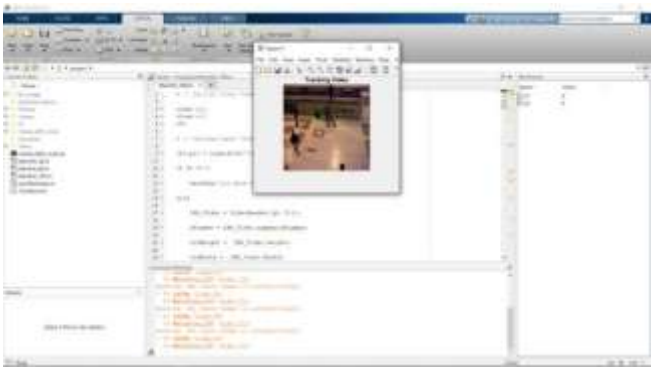


Fig .6. Person Nearby.

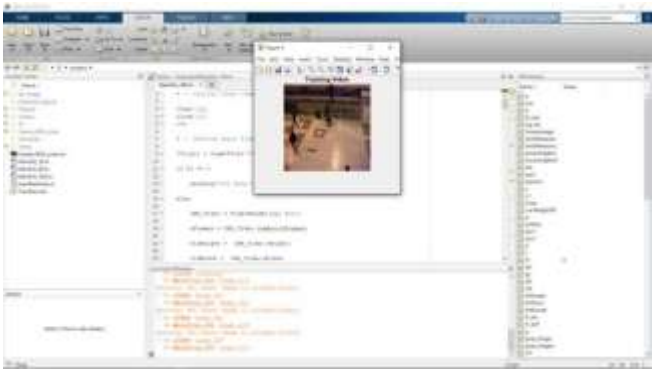


Fig. 7. Person away from the bag.

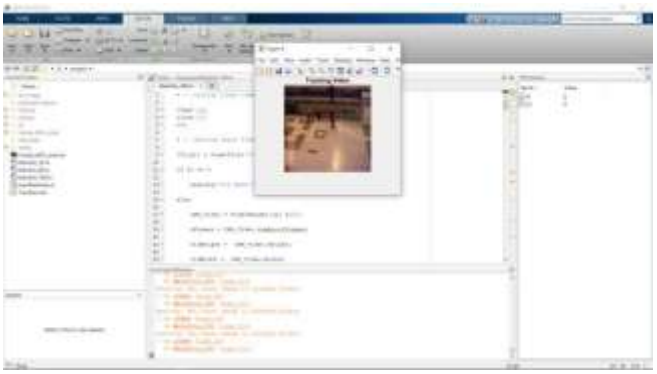


Fig. 8. Person not near the bag.

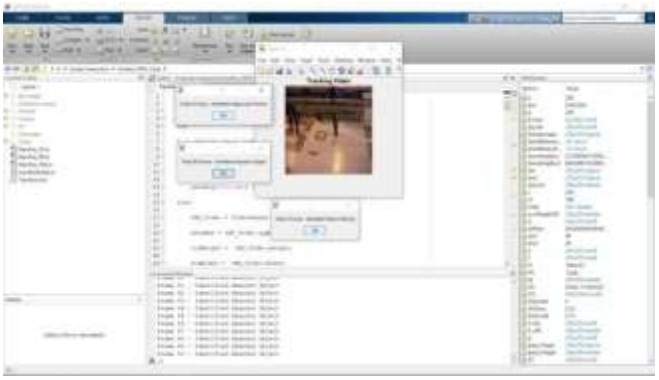


Fig 9. Alert message –Identified person and object

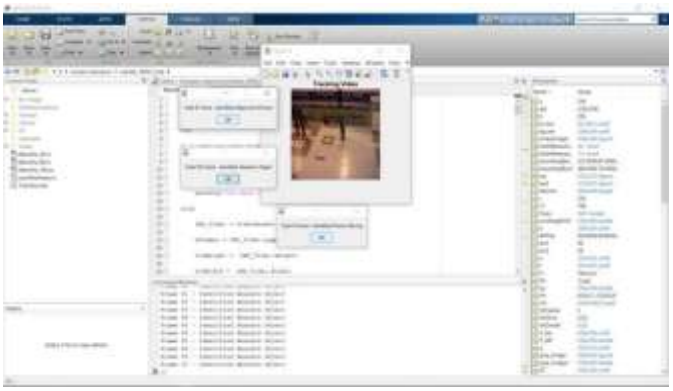


Fig 10. Alert message – Identified person moving

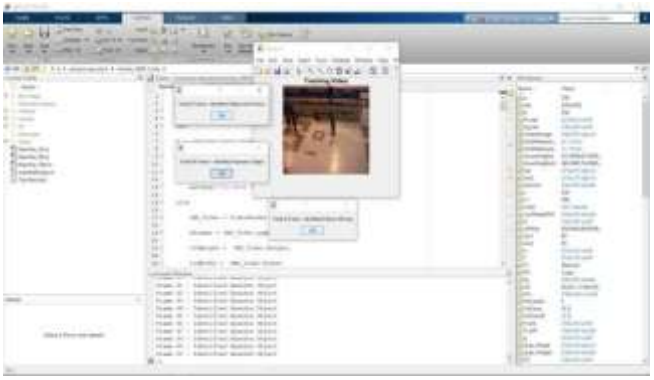


Fig 11. Alert message - Identified abandon object

5. CONCLUSION

As accuracy of unattended baggage detection completely depends on binary difference images more focus needs to be given on it. More features can be extracted in order to reduce false alert rate. During implementation of our project we studied different algorithms like SVM, fuzzy clustering. We also observed that with the use of SVM classifier accuracy of classification increased by large extent. We developed a prototype model for unattended baggage detection which gives accuracy in between 60-70%. The result of IoT were good as it was fast. Limitations of our system are unable to detect occluded objects and false alert rate. In future we can replace the IoT with cloud computing technology for speed of operation and data storage purpose. The proposed system is engaging in its stable. The proposed system utilizes a static frame as a base frame to extract object information. A future expansion of this work will be to incorporate background estimation and extraction of relationship of the objects with the owner and picking up the details and identity of the owner.

6. REFERENCES

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