ABANDONED LUGGAGE DETECTION

A Report Submitted in fulfilment
of the Requirements of the problem
statement for EE722 video Analytics

by

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Problem Statement

Unattended luggage detection

OBJECTIVES::

1. Detect luggages
2. detect persons around luggage
3. Definition of Unattended luggage
4. Classification of unattended luggages

Main Content

1 Approaches

The problem statement was to detect luggages which are unattended. Here we have a dilemma of when a bag is said to be unattended. the definition choosen in this project is that:: "A bag is said to be unattended when there is no presence of a person near the bag for a particular time". the important parts of the project are:-

1. detection of objects in the footage
2. classification of the objects into luggage and persons
3. identification of abandoned luggages

1.1 Yolo v8

The object detection and classification is done by pretrained yolo v8 model. yolo v8 is trained on coco dataset and detects 50 different objects. Out of this our interest is in 4 classes of objects. namely 0.person 24. backpack 26. handbag 28. suitcase. we restrict the predicted objects to these four classes.

1.2 Algorithm

step 1. We use opencv library to import the video file to the program.
step 2. Each frame is passed to the model and results are stored.
step 3. We filter out only object class and bounding box from the result.
step 4. Then we iterate through each object detected.
step 5. With each pass we check if the object is a bag or person.
step 6. if not we skip and go to next object.
step 7. if yes we check if the object is a bag. If no we goto step 10.
step 8. if yes we iterate through all the objects again and identify the persons.
step 9. calculate euclidian distance between bag and the persons and store the value.
step 10. draw bounding boxes for all the objects.
step 11. if all the euclidian distances are greater than threshold count is incremented. else count is set to zero.
step 12. if the count is above threshold turn the bounding box of bag to red. and print abandoned baggage.

2 Highlighted points

1. yolo v8 model is modified to detect bags and persons.

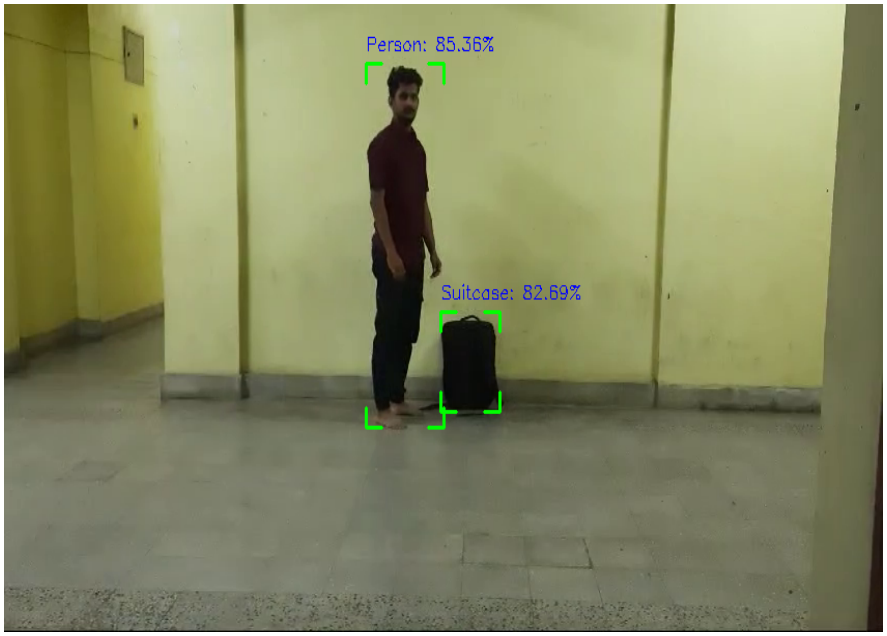
2. Defined the definition of abandoned luggage and implemented it in code.

3. Used euclidian distance metric to classify if bag is abandoned or not.

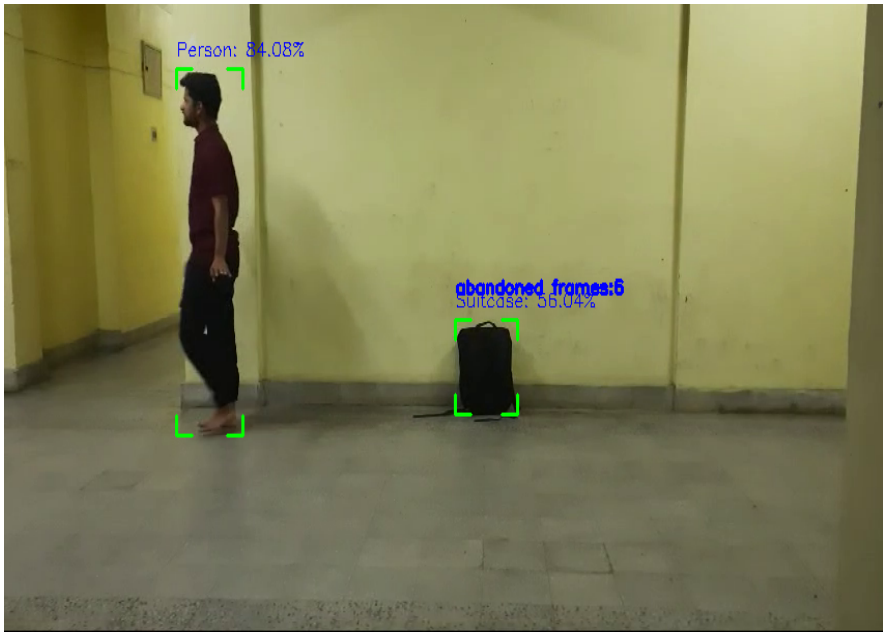
3 Conclusions

A sample video was captured to demonstrate the model. The model successfully identified the subjects in the given video. The model worked as expected and classified the bag as unattended when there was no person rear it for 20 frames. It classified the bag as attended when person came back in range. All the mentioned results are given below.

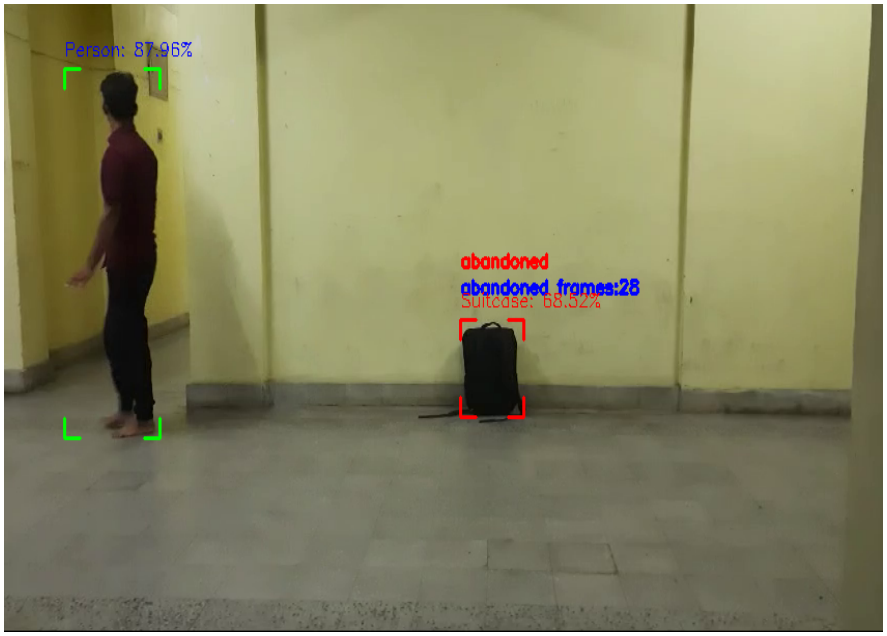
3.1 detection of objects and bounding boxes



3.2 Start of frame count when threshold is met



3.3 Bag Classified as Abandoned



3.4 Resetting when person reenters