

Suspicious Human Activities

Recognition in Railway Stations

Team Members:

Ajinkya Bedekar (U101116FCS183) (C5)

Ankit Gupta (U101116FCS267) (C5)

Deeptonabho Dutta

Dhruva Agarwal

Project Problem and proposed solution in project plan.

In today's world, security has been a major concern for whether it is a bank, airport, railway station or a grocery shop or an individual, everyone wants themselves or their things to be safe from getting their valuable items harmed. Detecting such activities through a system is a challenging task, as most of them remains to be unambiguous, and people may misinterpret into other things.

Our project is to identify various suspicious activities that happen in a railway station. Activities like pickpocketing, theft, fights, crossing of railway track are most common, specially in India, where some individuals take advantage of the huge crowd to execute their vicious plans. Even if there was a system that can track human activities, detecting them is a challenging task as most of them has a probability of ambiguity. For example, two people running in a railway station can be interpreted as a person running after a robber or both individuals are running to catch their train.

Our group has proposed a model that can overcome the above problem in a more efficient way. We executed it in the following way:

1. Accounting only those activities that highly remain unambiguous such as fights.
2. Making a dataset of suitable images that contain the specified activity. We can do this by either taking a video where such activity is occurring and converting it into frames.
3. Annotating the images using LabelImg software and bounding the relevant parts of the image that shows the execution of the activity.
4. Choosing a training model that works the most efficient way in a particular system.
5. Dividing the dataset into 90:10 ratio which accounts 90% for training and 10% for testing.
6. Feeding the annotated XML file and the images into that model for training.
7. Stop the training process when the total loss reduces to less than 1% in tensorboard graph.
8. System is built.

List of all achieved and working functionalities in last presentation which were committed by the team in project plan.

- The model was able to detect the objects accurately.
- The developed model was able to detect the humans correctly.
- The human activities were getting perfectly detected.
- A sufficient dataset of 3,956 images for three classes of activities, i.e., Snatching of Objects, Luggage Left Unattended, and Crossing of Railway Stations was developed.
- It was able to detect the suspicious activities defined while training the custom model.
- All the above functionalities were implemented in real-time using the webcam of the laptop.

Any functionality / module remained unimplemented or not working but was in your proposal (1st project plan). Why if so?

- The tracking of objects for a longer duration of time was remained unimplemented because the dataset required for this project was not available freely on Internet. So, the dataset that we developed on our own was not significant to achieve the Object Tracking.
- Sending the alarm to the admin team was not achieved because until the Object Tracking is not implemented, the model cannot be developed to send the alarm to admin if the activity was not really suspicious and was done by a person willingly. For example, if a person leaves his/her bag aside willingly waiting for the train in the railway station, then the present model, if implemented will send alarm to admin informing about “Luggage Left Unattended” though this activity is not suspicious. So, this module will be implemented once the Object Tracking module is implemented.

Is your project qualifies for further implementation in Capstone - 2?

The modules that are yet to be implemented in our project such as Object Tracking and Alarming The Admin needs a lot of research as the dataset needs to be developed in such a way that the model can be trained on that dataset and hence detect whether an activity is really suspicious or willingly done by a person. Also, presently, the model is trained for only 3 classes of activities, so it can be further extended to detect more number of activities. Thus, we feel that our project qualifies for further implementation in Capstone - 2.