Weekly Update: 09/23/2022

Group: F-22-028-D-ASFS

Supervisor: Dr. Hasan Mujtaba

Work on Loitering Detection (Suspicious Activity):

Approach#1: Using Pose Estimation models to detect loitering.

This approach gets pose estimation coordinates (x, y) for multiple parts of body and makes predictions based on these coordinates. Models tried: OpenPose, MediaPipe, PoseNet & YOLO V7 Pose Estimation Model.

Issues faced with this approach:

- Object detection of pose estimation models not good enough.
- Very limited data (will need to annotate data and research on motion coordinates to get somewhat decent results)
- Even using segmentation would not help Pose Estimation model to detect object.

Finding:

- YOLO V7 pose model seems to perform better than others but its research paper hasn't been published yet and current repositories have limited support.
- Using Pose Estimation models will take a lot of time and still not guarantee results so we've decided to discard this approach for now.

Approach#2: Using YOLOV3 with DeepSort to track person and make loitering prediction based on the movement.

In this approach we're going to use YOLO to get coordinates around a person (bounding box), then use DeepSort to track that person based on the coordinates from YOLO model. DeepSort tracks objects not only based on the velocity and motion of the object but also the appearance of the object so the output will not be vulnerable to obstructions. We are progressing with this approach for now. We've applied YOLO with DeepSort and are getting coordinates (need to analyze and work on those coordinates now)

Work on Fire & Arson Detection (Threat Detection):

We've trained YOLOV5 on custom dataset but results need improvement (Will need to train on more data with more diversity).