Human tracking detection

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Problem

I am solving the problem of knowing what people are seen on camera/ footage to see if someone happens to commit a crime in a public area we can identify who it was or what path they took using tracking

This can help police, cashierless shops and even retailers.

It's important since we can identify if someone happens to steal or commit a crime overall it helps narrow down suspects and helps plan a shops layout for better foot traffic management.

Solution

My system will make a specific box for a specific person every time they're on the screen and follow that person frame by frame to have a unique quick identifier.

It will solve it via object detection and tracking with the use of YOLOv8 and DeepSORT.

I will make it so that anyone that happened to be on the scene or in the footage can be ruled out without intensive questioning. For ex in the case of a robbery or if we need to identify if someone paid in a cashier less grocery store.

Technical Approach

I will be using object detection.

I will be using Yolov8 as my model with assistance of deepsort.

I will be using Ultralytics as my framework

I will be using these since YOLOv8 does a good job in object detection as far as speed and accuracy for real time video processing, ultralytics since it has built in models such as YOLOv8 so it seemed like the obvious choice.

Data Plan

I will be using COCO for the source

100 video samples seemed to be too much information for a small model so i stuck with one video but our data frame has 505 rows.

I am detecting humans, ID'ing them and tracking their movement while they are in view.

For the most part I will be cleaning and analyzing the data.

System Diagram

The inputs we will be using will be the video datasets uploaded.

We use open Cv2 for the video loading aspect and then perform human tracking using yolov8 in ultralytics along with deep-sort for better multi-object tracking..

We then use data extraction and analysis, visualization for our analysis and we save the outputs of the videos for further analysis.

The other outputs are tracking results of unique ids, frames and displacement.

Success Metrics

Primary Metric

Confidence score in grounding boxes and bounding boxes displacement.

Week by Week Plan

10 (Oct 30) Get dataset, set up environment
Dataset ready

11 (Nov 8)   Train or fine-tune model   Model working

12 (Nov 13) Test and improve   Good accuracy

13 (Nov 20) Create demo / video   Demo ready

14 (Nov 27) Final testing / documentation   Everything
done

Challenges and Backup Plans

If I don't have a big enough dataset with videos I can use one for animals too not just crowds.

I could try and use ByteTrack or implement DeepSort to better my tracking capabilities.

Resources Needed

Compute : Google Colab

Frameworks : Ultralytics, deepsort

Estimated cost : 0$