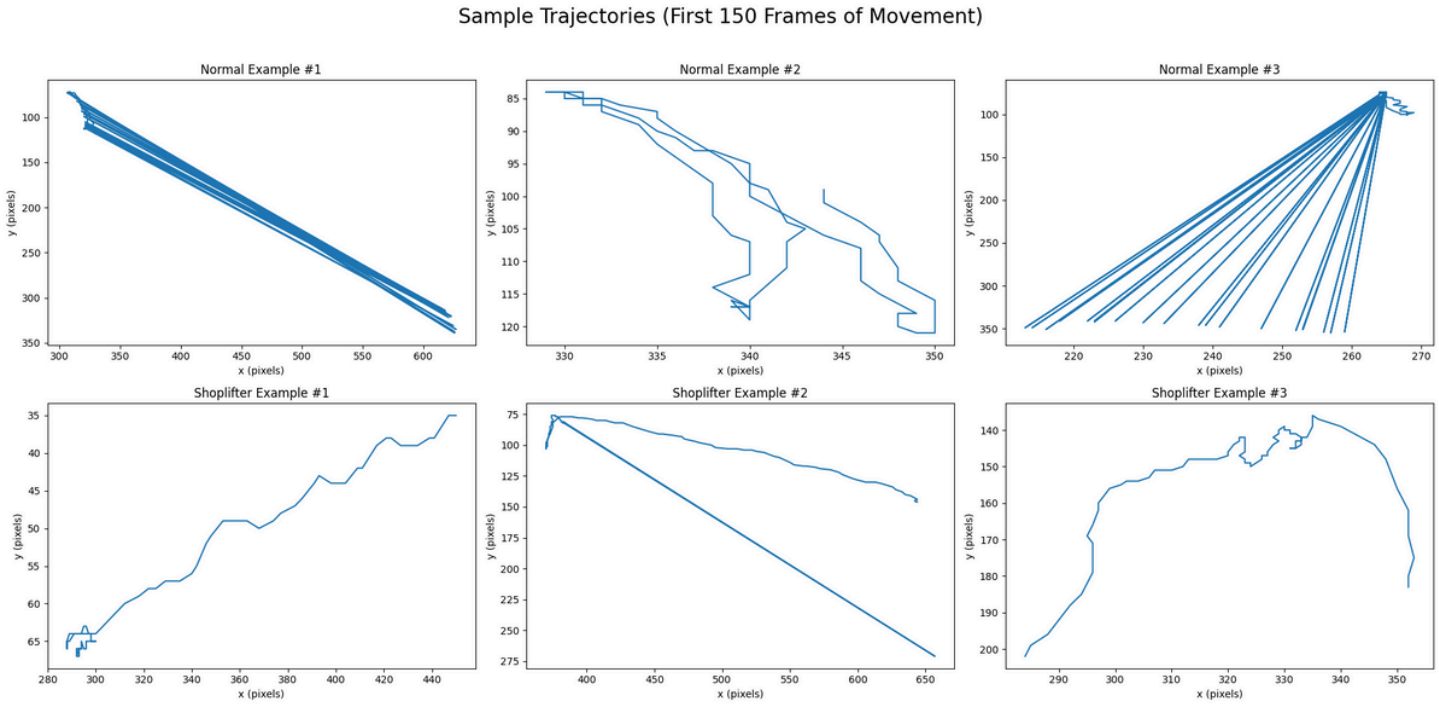
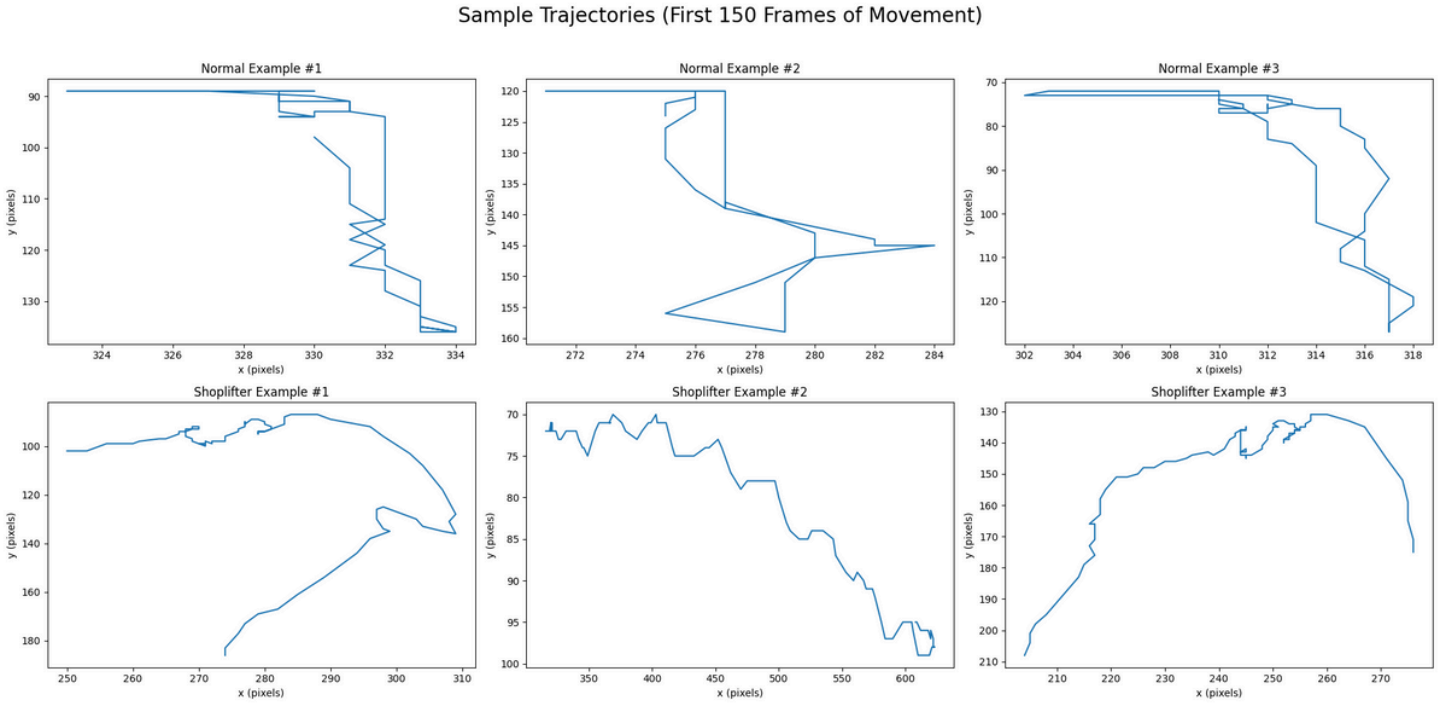
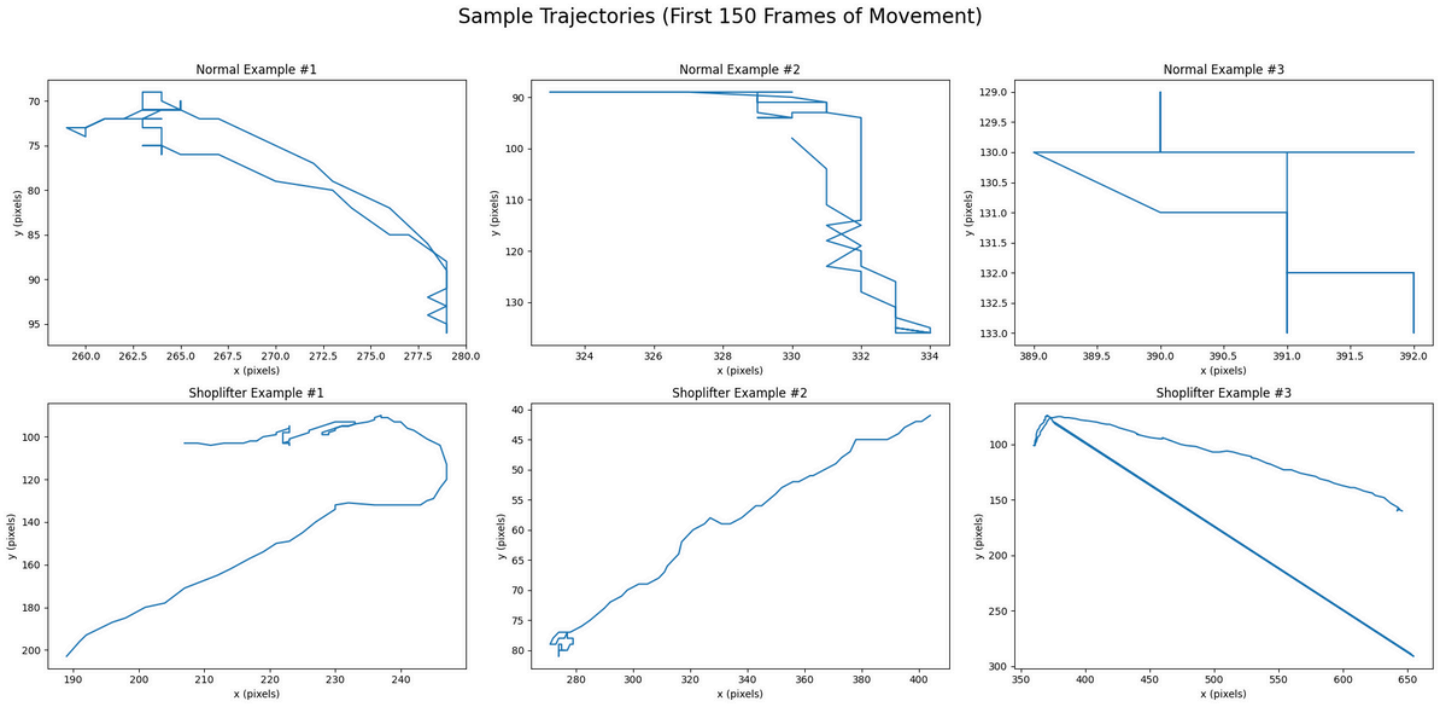
- First frames may not show the full story for shoplifting could be noise in data as no shoplifter steals in the first minute he's in the store
- but still probably should still be given to the model because it may learn implicit patterns unseen by our naked eye



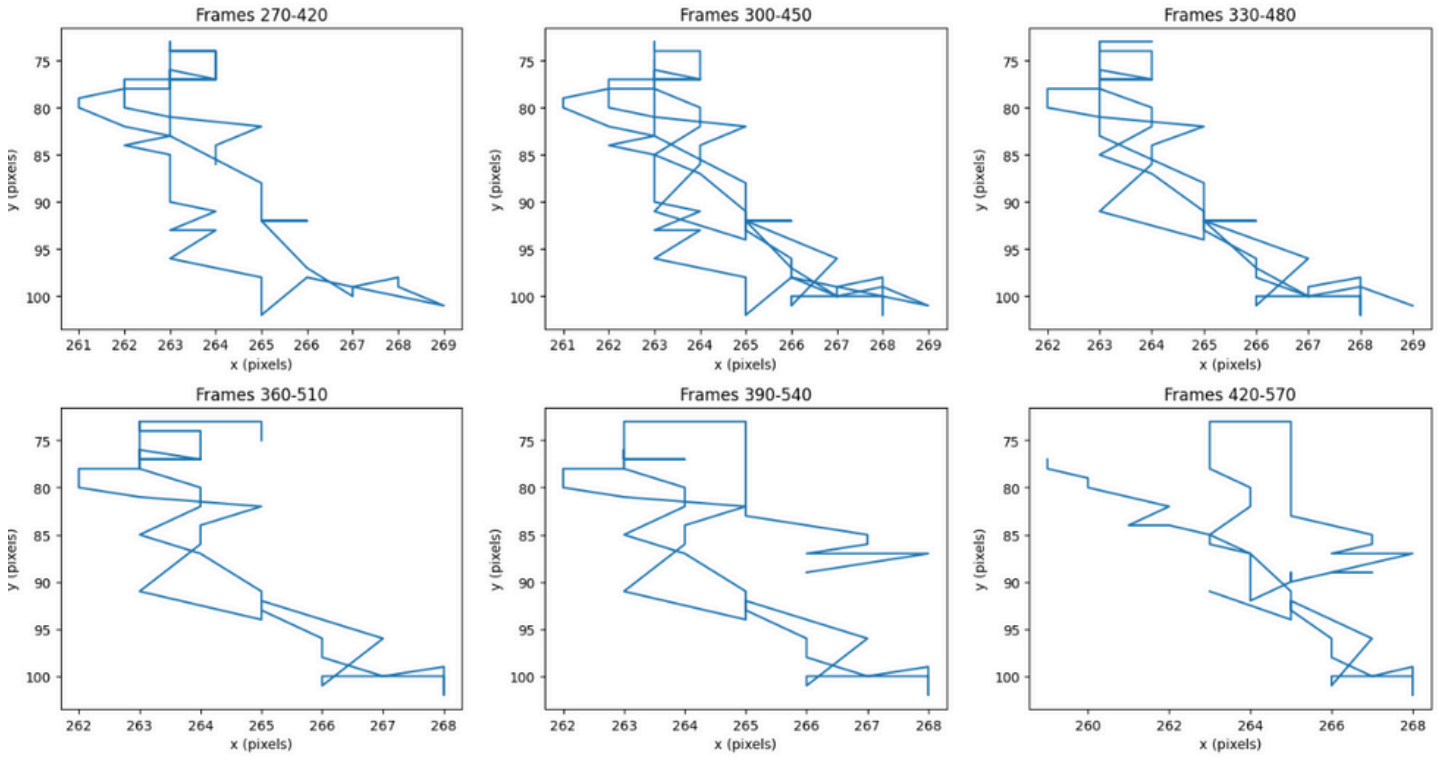


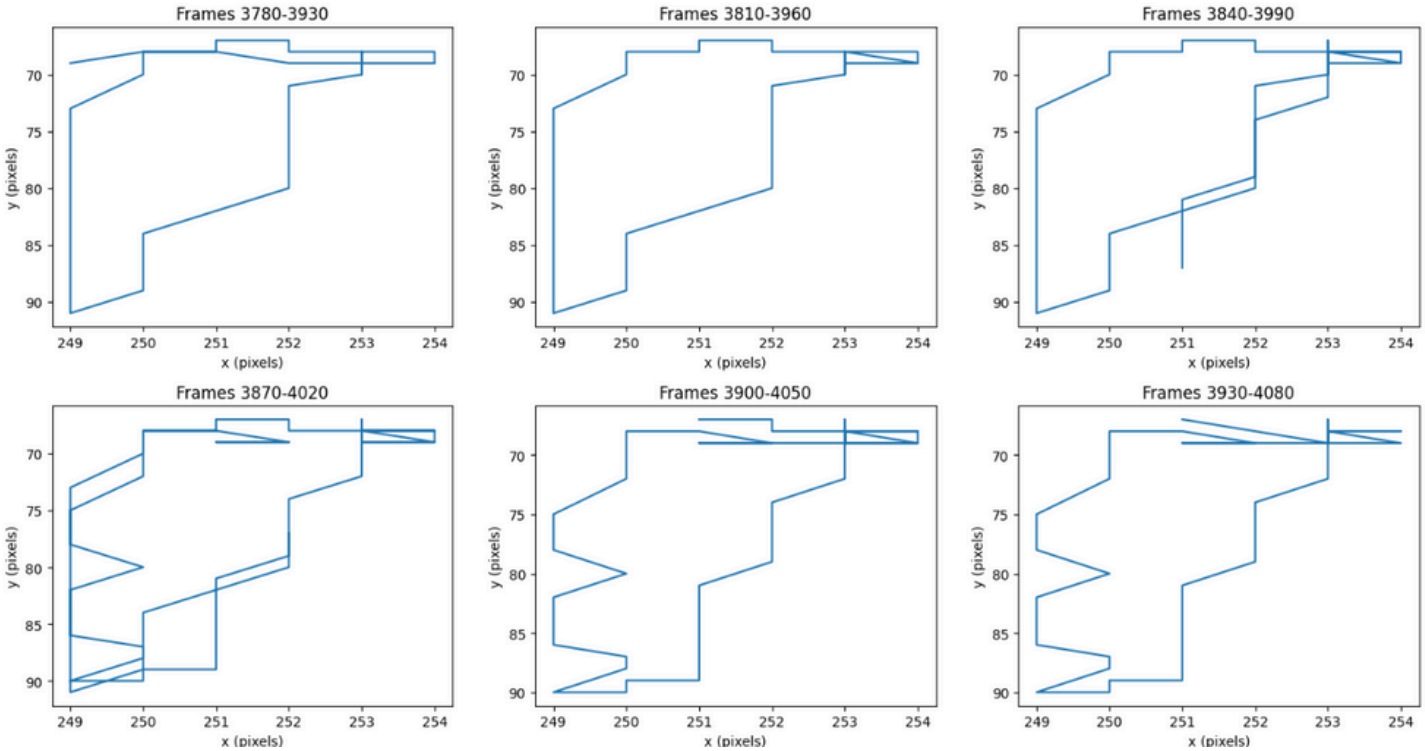


Comparison of more frames later on in the video

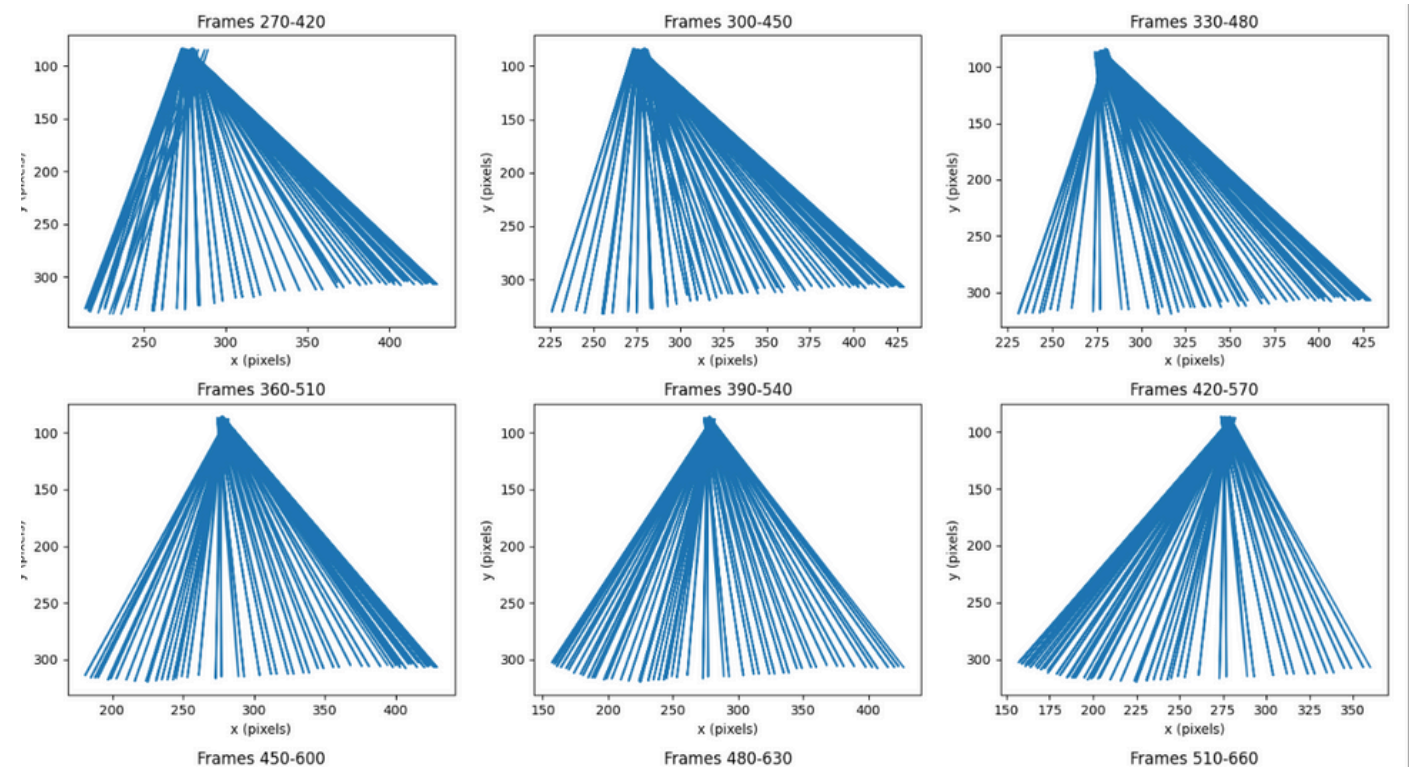
normal class picking up objects:

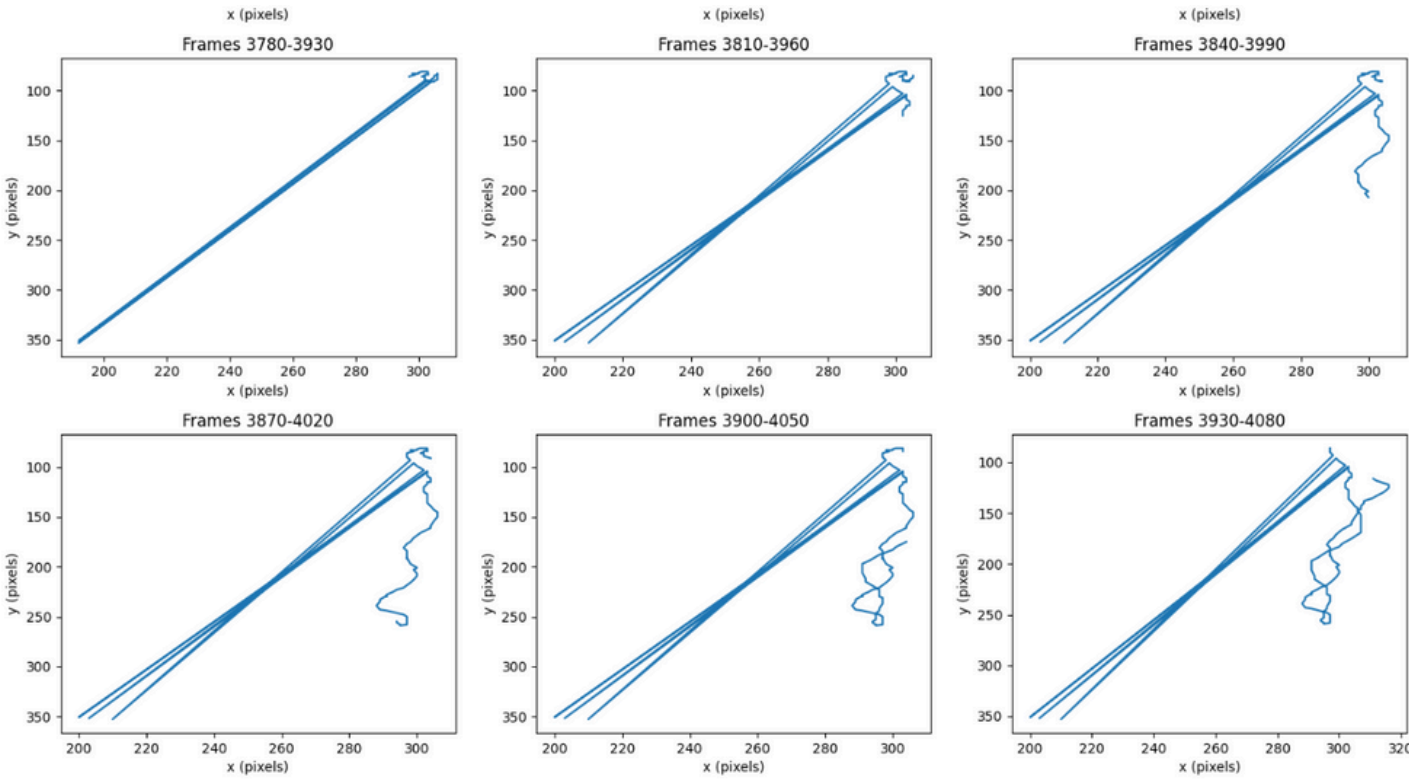
:




Frames 3780-3930
Frames 3810-3960
Frames 3840-3990
Frames 3870-4020
Frames 3900-4050
Frames 3930-4080
y (pixels)
x (pixels)

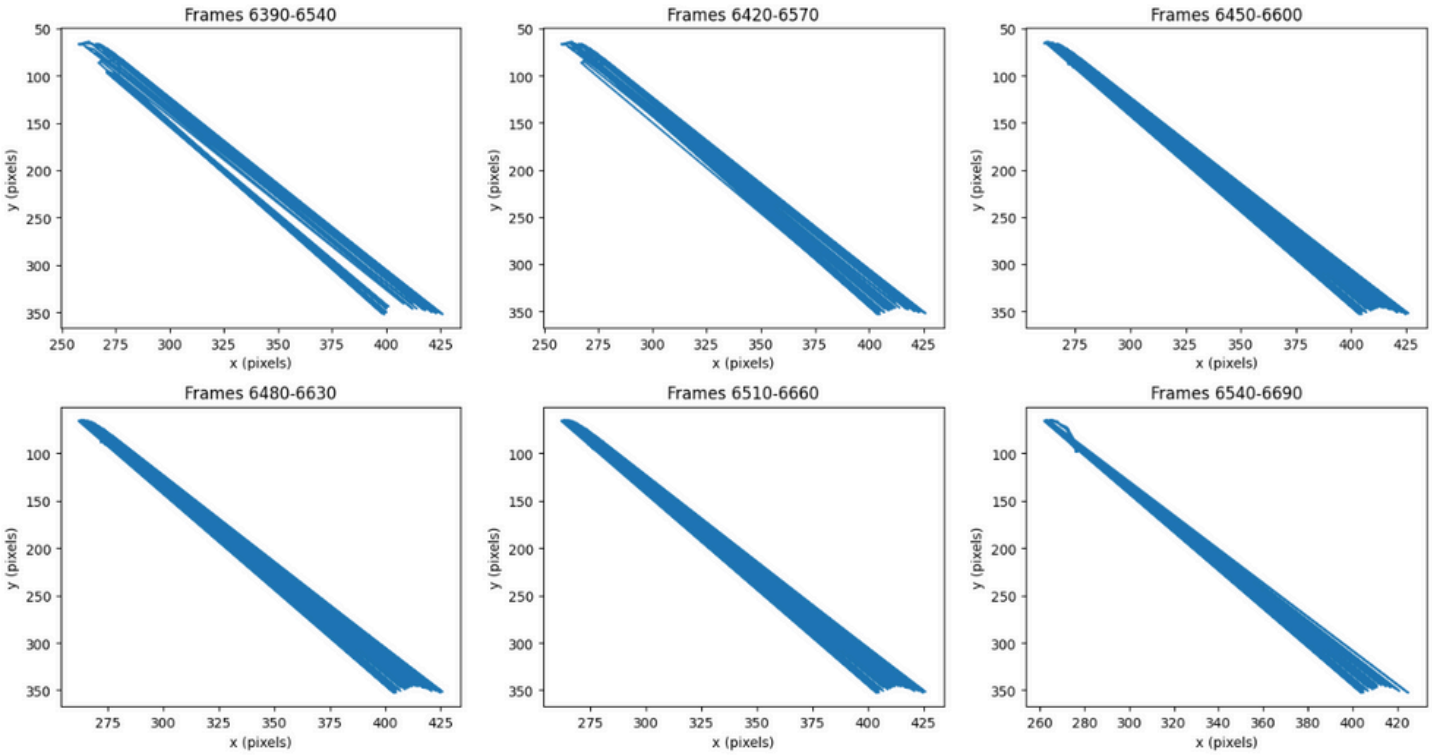
Shoplifter:


Frames 270-420
Frames 300-450
Frames 330-480
Frames 360-510
Frames 390-540
Frames 420-570
Frames 450-600
Frames 480-630
Frames 510-660
y (pixels)
x (pixels)

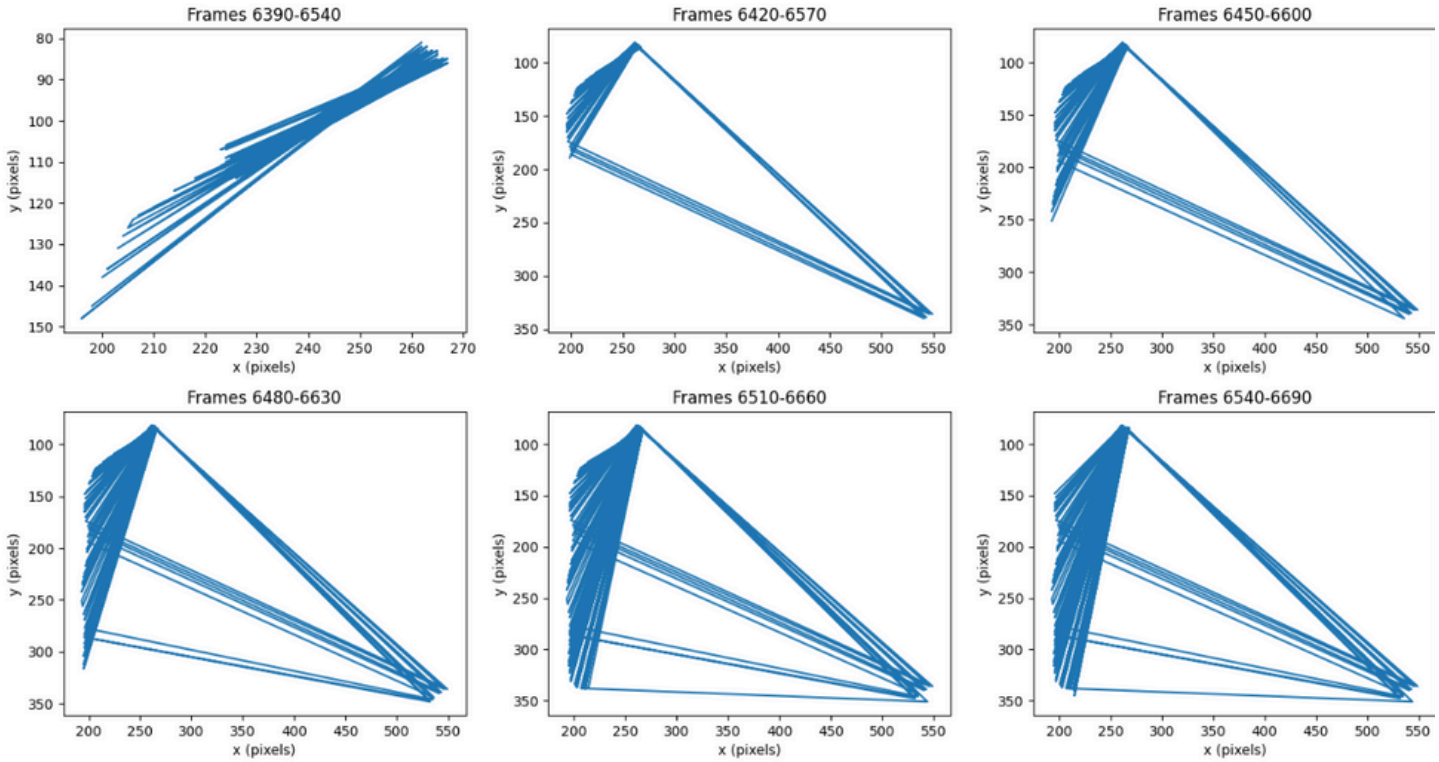


At the end of the videos people are done shopping so they may rush around looking aimlessly to see if they are forgetting something which may also confuse the model as this is shoplifting activities

normal class:

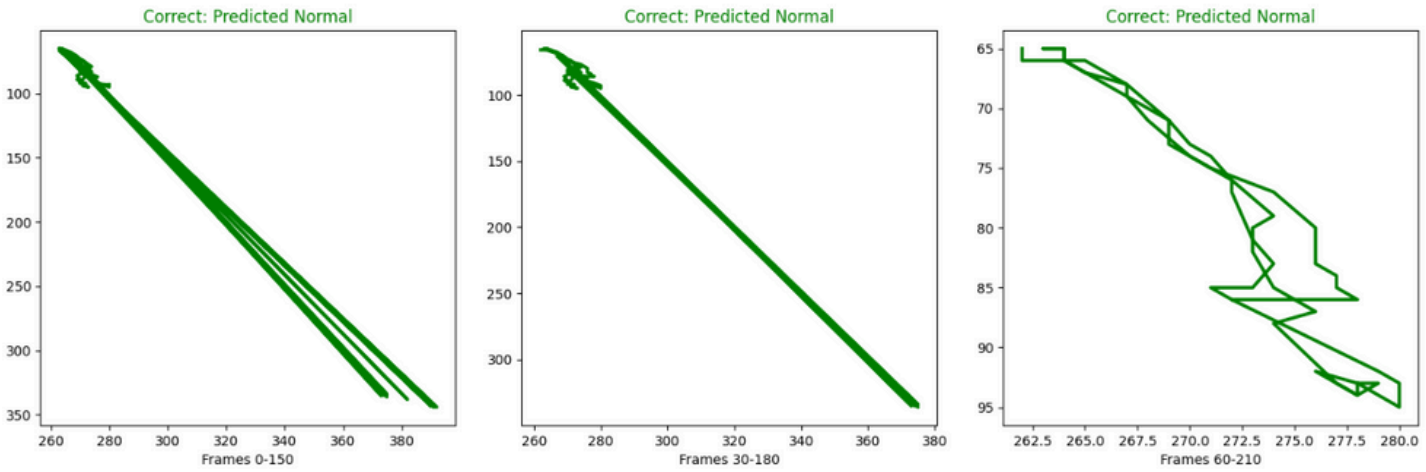


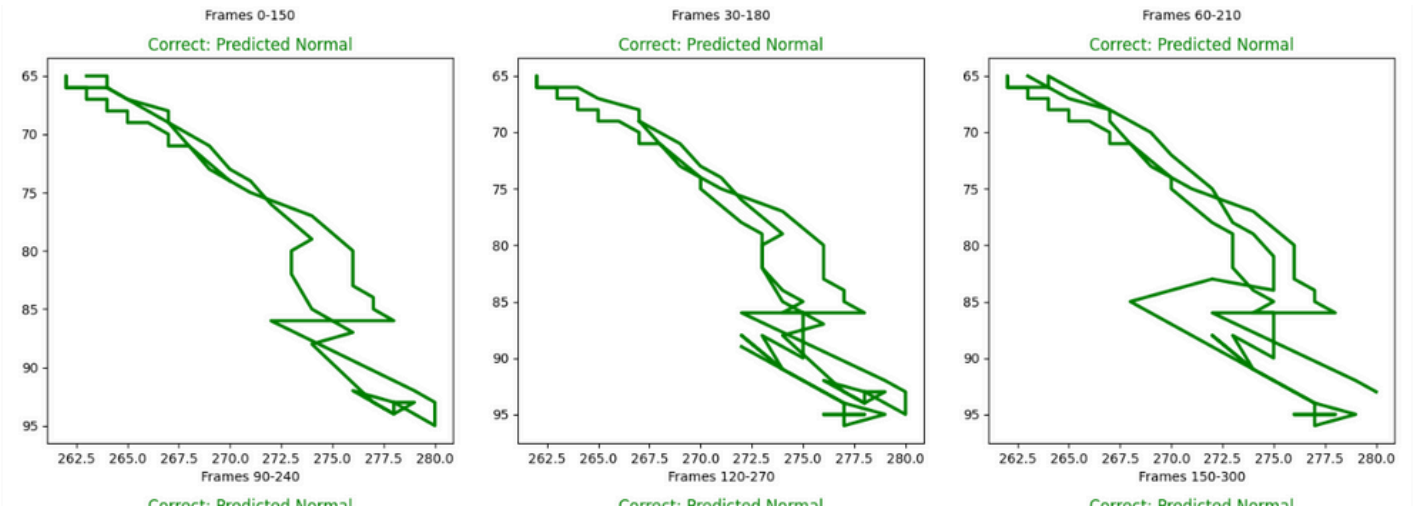
shoplifter:

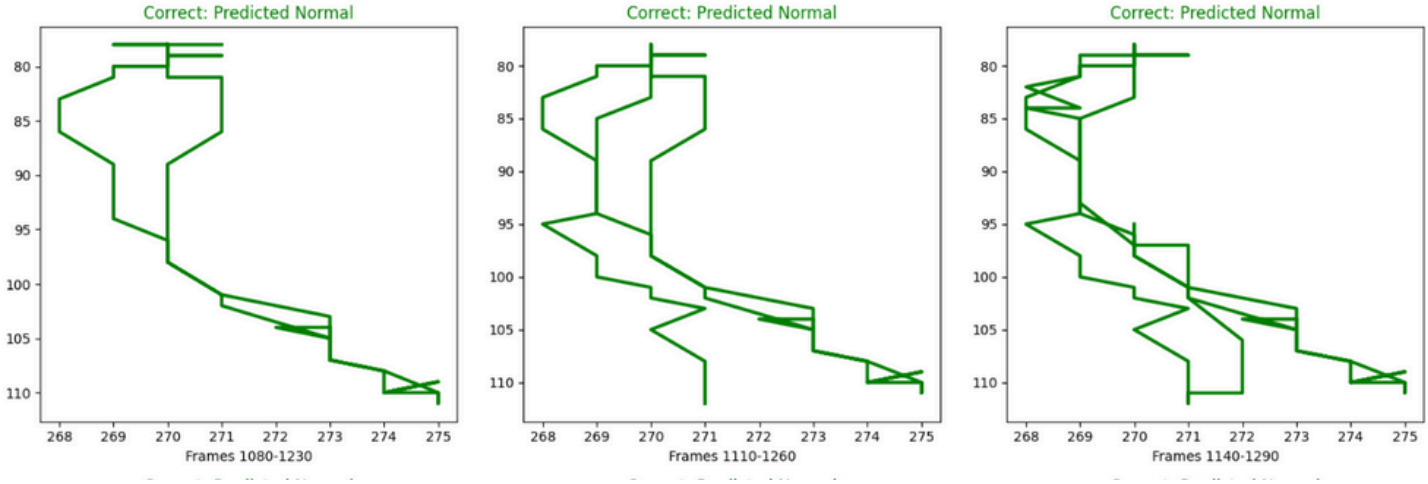


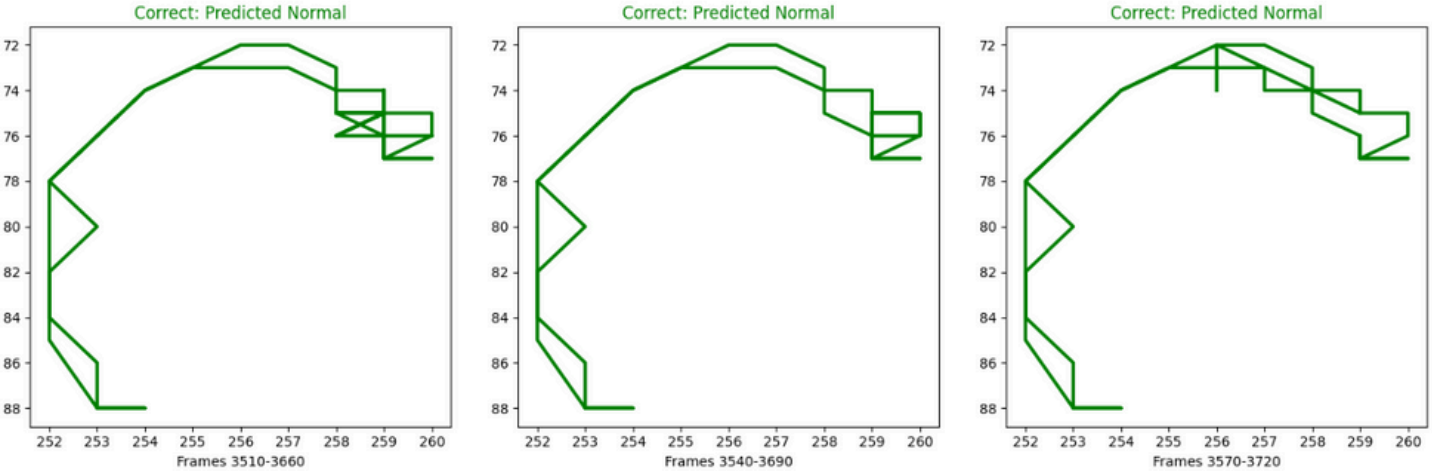
now models analysis on these same 2 videos it really shows

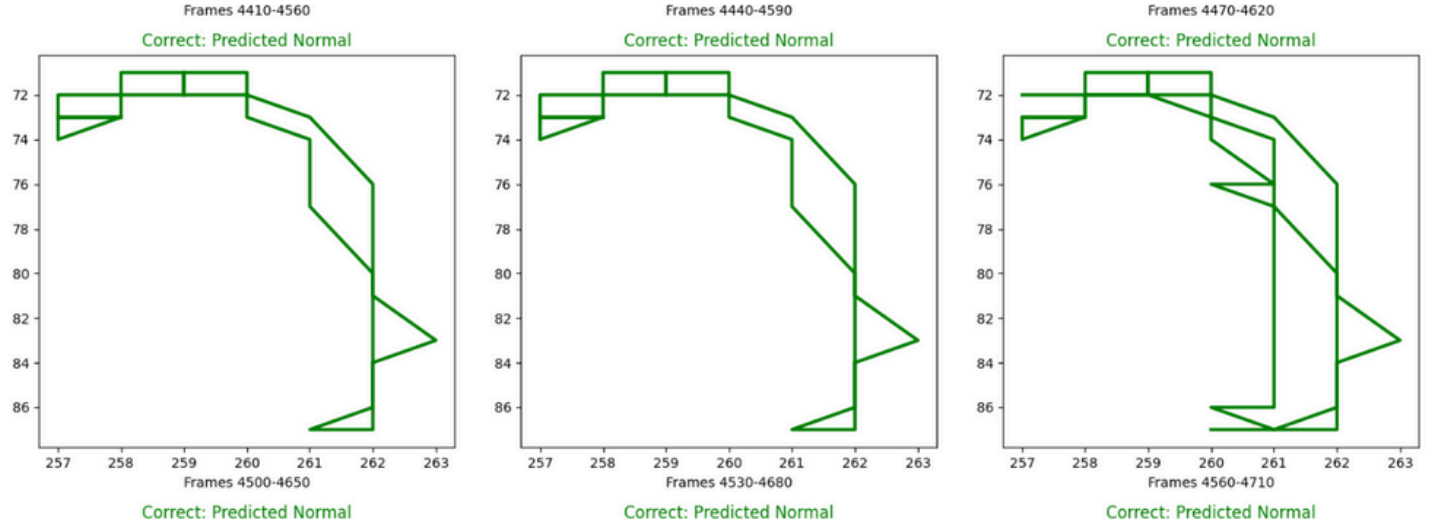
normal class:

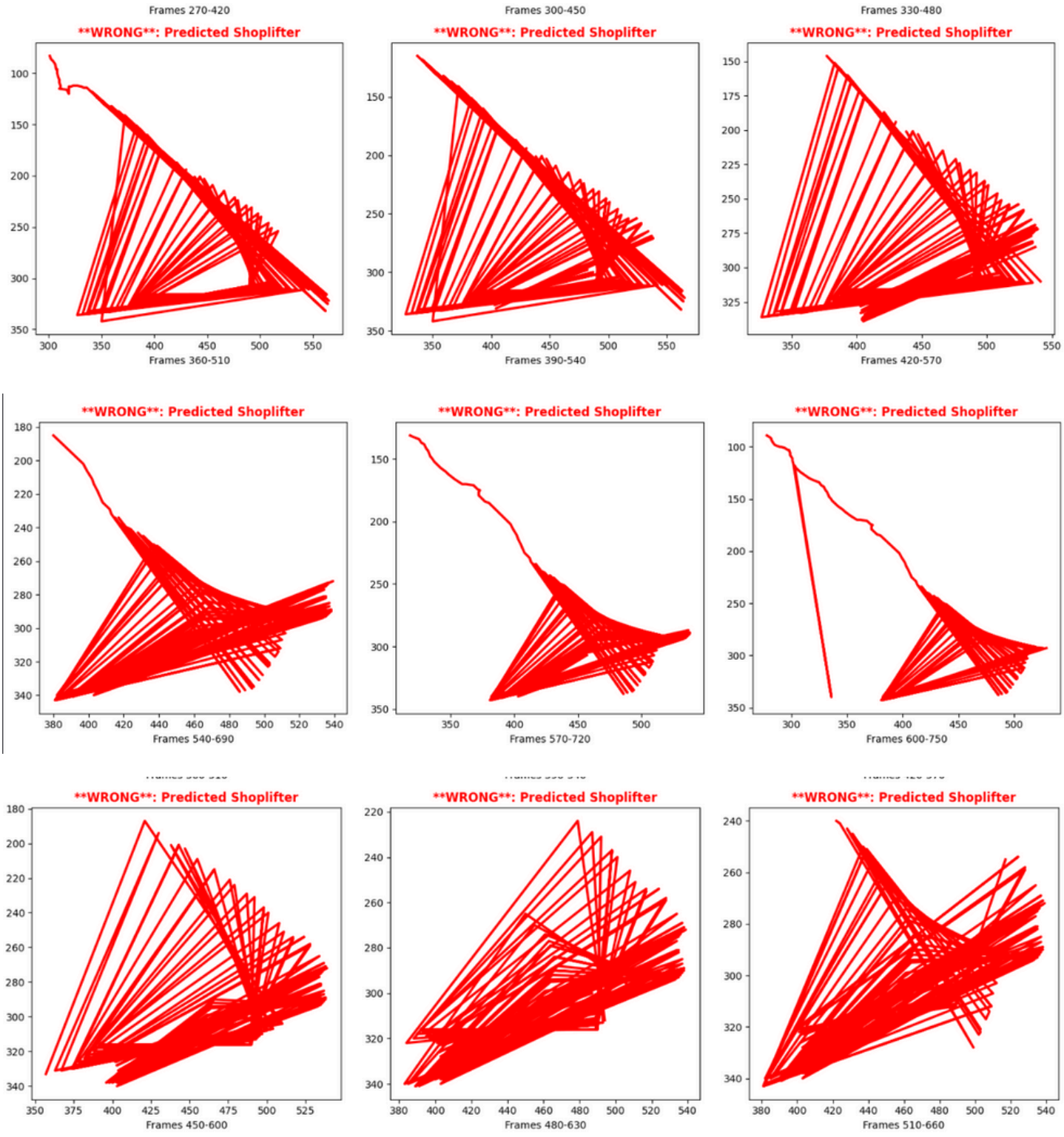



Frames 0-150
Correct: Predicted Normal
Frames 90-240
Frames 30-180
Correct: Predicted Normal
Frames 120-270
Frames 60-210
Correct: Predicted Normal
Frames 150-300


Correct: Predicted Normal
Frames 1080-1230
Correct: Predicted Normal
Frames 1110-1260
Correct: Predicted Normal
Frames 1140-1290

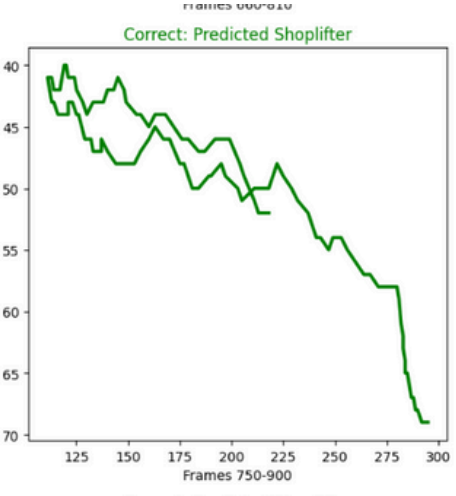

Correct: Predicted Normal
Frames 3510-3660
Correct: Predicted Normal
Frames 3540-3690
Correct: Predicted Normal
Frames 3570-3720

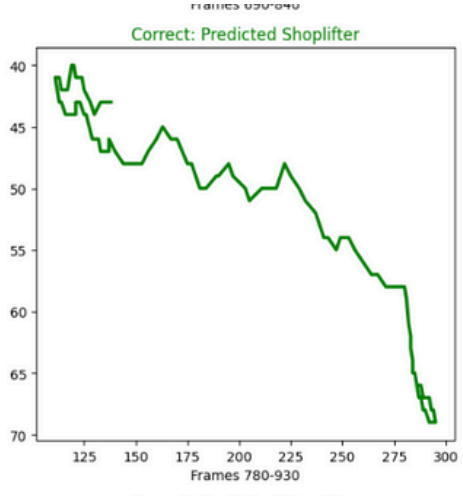

Frames 4410-4560
Correct: Predicted Normal
Frames 4500-4650
Correct: Predicted Normal
Frames 4440-4590
Correct: Predicted Normal
Frames 4530-4680
Correct: Predicted Normal
Frames 4470-4620
Correct: Predicted Normal
Frames 4560-4710
Correct: Predicted Normal

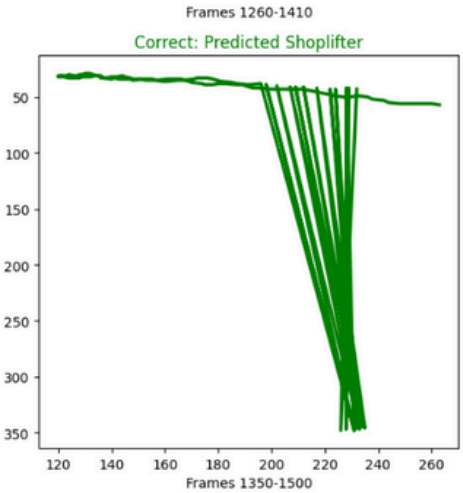


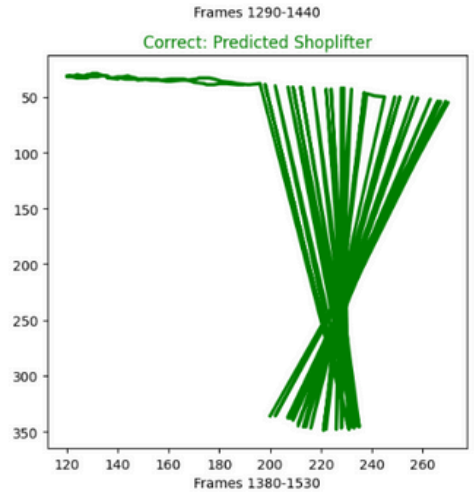
shoplifter class:

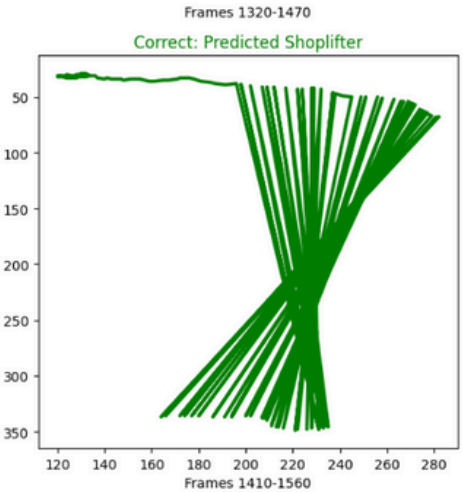

Correct: Predicted Shoplifter
Frames 720-870

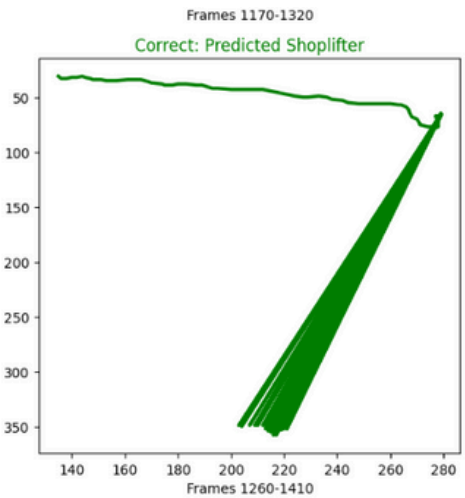

Correct: Predicted Shoplifter
Frames 750-900

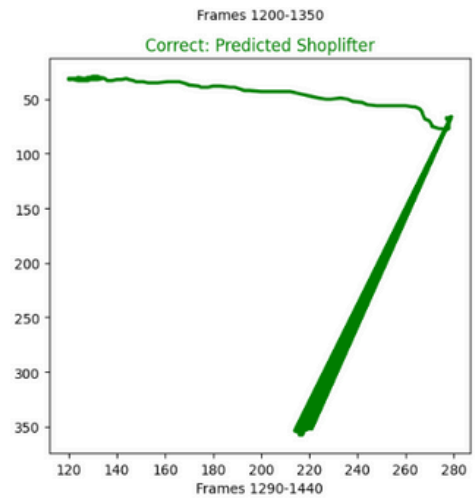

Correct: Predicted Shoplifter
Frames 780-930

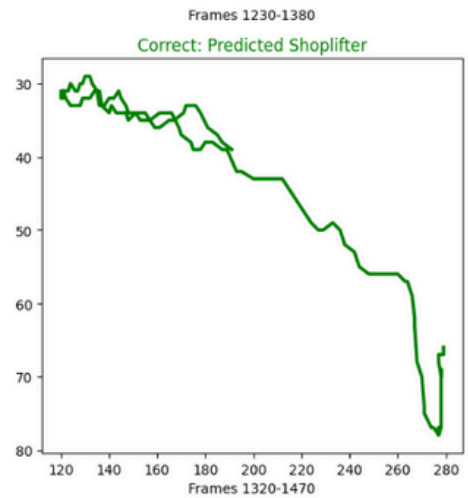

Frames 1260-1410
Correct: Predicted Shoplifter
Frames 1350-1500

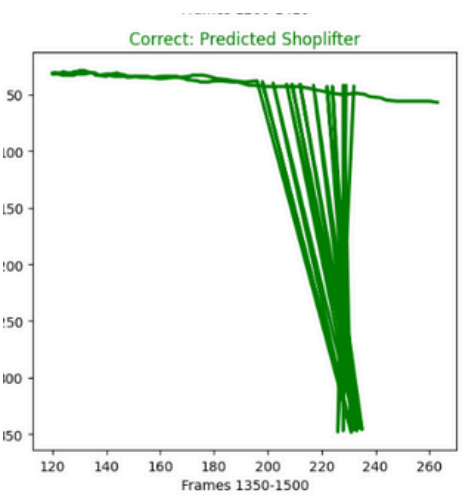

Frames 1290-1440
Correct: Predicted Shoplifter
Frames 1380-1530

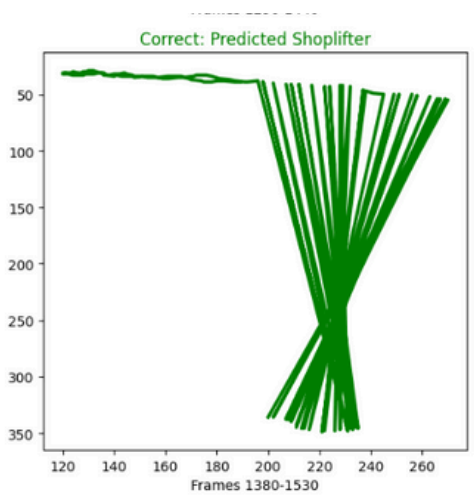

Frames 1320-1470
Correct: Predicted Shoplifter
Frames 1410-1560

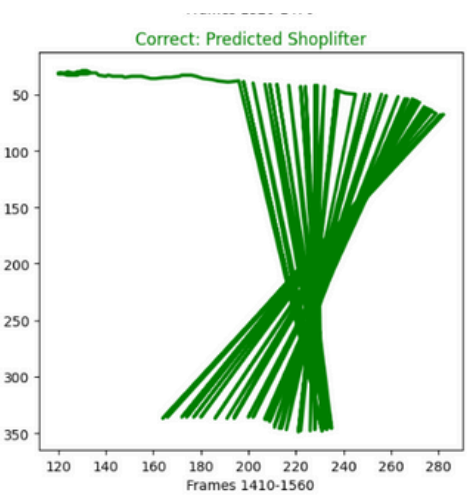

Frames 1170-1320
Correct: Predicted Shoplifter
Frames 1260-1410

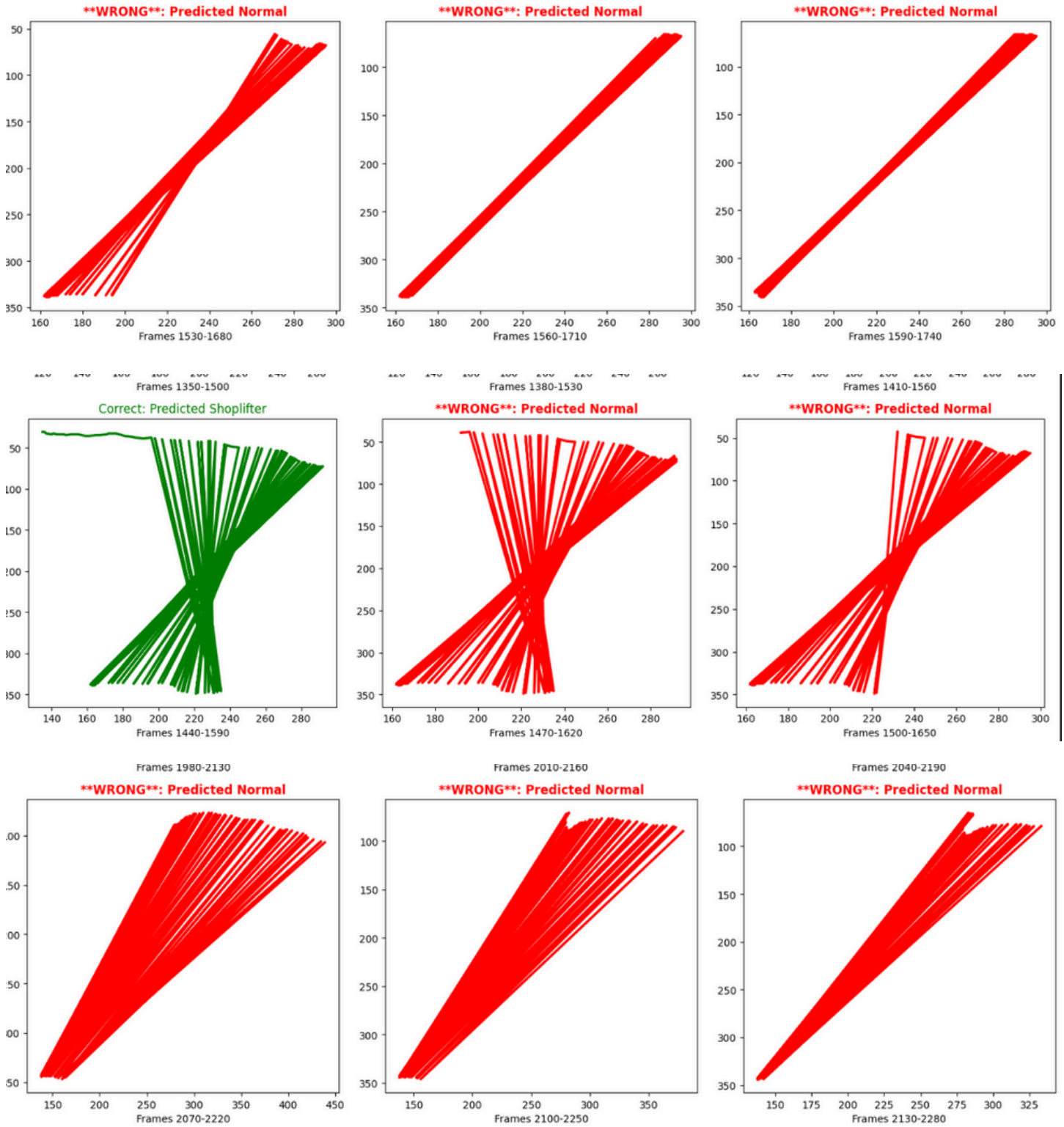

Frames 1200-1350
Correct: Predicted Shoplifter
Frames 1290-1440


Frames 1230-1380
Correct: Predicted Shoplifter
Frames 1320-1470


Correct: Predicted Shoplifter
Frames 1350-1500


Correct: Predicted Shoplifter
Frames 1380-1530


Correct: Predicted Shoplifter
Frames 1410-1560



conclusion:

- normal class : which involves small, localized movements, the overall trend is **progressive**. They move along a path, stop, interact, and then *continue along the path*
- shoplifter class: The pattern is **non-progressive and dense**. The person stays in one location, creating a tight, overlapping "hub-and-spoke" or "starburst" pattern. They are not moving *through* the scene; they are lingering *in* the scene
    - **Why the model failed:** In those specific 2.5-second windows, the shoplifter was simply walking from one point of interest to another. Their trajectory, ***when viewed in isolation***, looked identical to a normal person's. The model was shown a pattern that perfectly matched its definition of "Normal" and made a logical, but ultimately incorrect, prediction.

I believe it’s a problem with how we test the model in isolation where we give it a window and tell it is this shoplifting activity or not

but with the testing approach I’ve proposed where we do more of a probability this fault could be avoided Instead of asking "Is this single window suspicious?", we should be asking, "What is the probability this *person* is suspicious, based on the history of their last ***N*** **windows**?" This way, a single, brief moment of normal walking wouldn't exonerate a shoplifter, and a short, innocent pause wouldn't condemn a normal shopper. This holistic approach, which avoids the pitfalls of judgment in isolation, is the clear path forward to making this system robust and reliable