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pip install ultralytics opencv-python numpy
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→ Requirement already satisfied: ultralytics in /usr/local/lib/python3.11/dist-packages (8.3.86)
Requirement already satisfied: opencv-python in /usr/local/lib/python3.11/dist-packages (4.11.0.86)
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```

```
from ultralytics import YOLO
import cv2
```

```
import numpy as np

# Load the pre-trained YOLOv8 model
model = YOLO("yolov8n.pt") # Use "yolov8n.pt" for the nano model (smallest and fastest)

# Define the geofence (polygon vertices)
geofence = np.array([[100, 100], [600, 100], [600, 400], [100, 400]], np.int32)

# Open the video feed (webcam or video file)
cap = cv2.VideoCapture(0) # Use 0 for webcam, or replace with video file path

while True:
    ret, frame = cap.read()
    if not ret:
        break

    # Run YOLOv8 inference on the frame
    results = model(frame)

    # Process detections
    for result in results:
        boxes = result.boxes # Get bounding boxes
        for box in boxes:
            x1, y1, x2, y2 = map(int, box.xyxy[0]) # Get box coordinates
            confidence = box.conf[0] # Get confidence score
            class_id = int(box.cls[0]) # Get class ID
            label = model.names[class_id] # Get class label

            # Check if the detected object is a "person"
            if label == "person" and confidence > 0.5:
                # Draw bounding box
                cv2.rectangle(frame, (x1, y1), (x2, y2), (0, 255, 0), 2)
                cv2.putText(frame, f"Student {confidence:.2f}", (x1, y1 - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 255, 0), 2)

                # Check if the student is inside the geofence
                student_center = ((x1 + x2) // 2, (y1 + y2) // 2) # Calculate center of the bounding box
                if cv2.pointPolygonTest(geofence, student_center, False) < 0:
                    cv2.putText(frame, "ALERT: Student left geofence!", (10, 50), cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 0, 255), 2)

        # Draw the geofence
        cv2.polylines(frame, [geofence], True, (255, 0, 0), 2)

    # Display the frame
    cv2.imshow("Geofencing Project", frame)

    # Exit on 'q' key press
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break

# Release resources
cap.release()
cv2.destroyAllWindows()
```

```
# Install required libraries
!pip install ultralytics opencv-python numpy

# Import libraries
from ultralytics import YOLO
import cv2
import numpy as np
from google.colab.patches import cv2_imshow # For displaying frames in Colab

# Load the pre-trained YOLOv8 model
model = YOLO("yolov8n.pt") # Use "yolov8n.pt" for the nano model (smallest and fastest)

# Define the geofence (polygon vertices)
geofence = np.array([[100, 100], [600, 100], [600, 400], [100, 400]], np.int32)

# Open the video feed (webcam or video file)
cap = cv2.VideoCapture(0) # Use 0 for webcam, or replace with video file path

# Check if the video feed is opened successfully
if not cap.isOpened():
    print("Error: Could not open video feed.")
    exit()

while True:
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    # Run YOLOv8 inference on the frame
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            # Check if the detected object is a "person"
            if label == "person" and confidence > 0.5:
                # Draw bounding box
                cv2.rectangle(frame, (x1, y1), (x2, y2), (0, 255, 0), 2)
                cv2.putText(frame, f"Student {confidence:.2f}", (x1, y1 - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 255, 0), 2)

                # Check if the student is inside the geofence
                student_center = ((x1 + x2) // 2, (y1 + y2) // 2) # Calculate center of the bounding box
                if cv2.pointPolygonTest(geofence, student_center, False) < 0:
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            # Draw the geofence
            cv2.polylines(frame, [geofence], True, (255, 0, 0), 2)

    # Display the frame in Colab
    cv2_imshow(frame)
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# Exit on 'q' key press
if cv2.waitKey(1) & 0xFF == ord('q'):
    break

# Release resources
cap.release()
cv2.destroyAllWindows()

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Error: Could not open video feed.
```

```
!ls /content
└── 'file(25).enc'  gefencing.py  sample_data  Videohac.mp4  yolov8n.pt

import cv2

# Install required libraries
!pip install ultralytics opencv-python numpy

# Import libraries
from ultralytics import YOLO
import cv2
import numpy as np
from google.colab.patches import cv2_imshow # For displaying frames in Colab

# Load the pre-trained YOLOv8 model
model = YOLO("yolov8n.pt") # Use "yolov8n.pt" for the nano model (smallest and fastest)

# Define the geofence (polygon vertices)
geofence = np.array([[100, 100], [600, 100], [600, 400], [100, 400]], np.int32)

# Open the video file (replace with your video file path)
video_path = "/content/Videohac.mp4" # Update this path if needed
cap = cv2.VideoCapture(video_path)

# Check if the video file is opened successfully
if not cap.isOpened():
    print("Error: Could not open video file.")
    exit()

while True:
    ret, frame = cap.read()
    if not ret:
        break

    # Run YOLOv8 inference on the frame
    results = model(frame)

    # Process detections
    for result in results:
        boxes = result.boxes # Get bounding boxes
        for box in boxes:
            x1, y1, x2, y2 = map(int, box.xyxy[0]) # Get box coordinates
            confidence = box.conf[0] # Get confidence score
            class_id = int(box.cls[0]) # Get class ID
            label = model.names[class_id] # Get class label

            # Check if the detected object is a "person"
            if label == "person" and confidence > 0.5:
                # Draw bounding box
                cv2.rectangle(frame, (x1, y1), (x2, y2), (0, 255, 0), 2)
                cv2.putText(frame, f"Student {confidence:.2f}", (x1, y1 - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 255, 0), 2)
```

```
# Check if the student is inside the geofence
student_center = ((x1 + x2) // 2, (y1 + y2) // 2) # Calculate center of the bounding box
if cv2.pointPolygonTest(geofence, student_center, False) < 0:
    cv2.putText(frame, "ALERT: Student left geofence!", (10, 50), cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 0, 255), 2)

# Draw the geofence
cv2.polyline(frame, [geofence], True, (255, 0, 0), 2)

# Display the frame in Colab
cv2.imshow(frame)

# Exit on 'q' key press (may not work in Colab)
if cv2.waitKey(1) & 0xFF == ord('q'):
    break

# Release resources
cap.release()
cv2.destroyAllWindows()
```

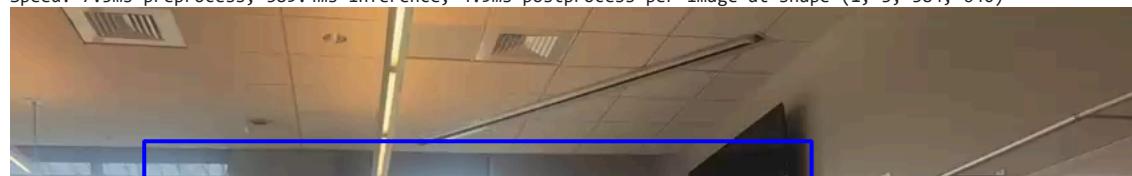
```

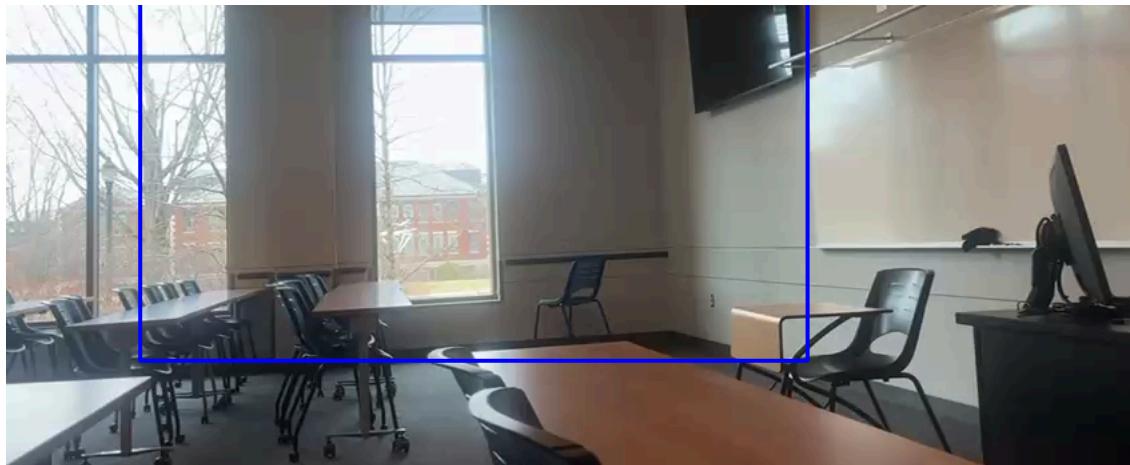
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Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.11/dist-packages (from ultralytics) (1.13.1)
Requirement already satisfied: torch>=1.8.0 in /usr/local/lib/python3.11/dist-packages (from ultralytics) (2.5.1+cu124)
Requirement already satisfied: torchvision>=0.9.0 in /usr/local/lib/python3.11/dist-packages (from ultralytics) (0.20.1+cu124)
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Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.11/dist-packages (from ultralytics) (2.2.2)
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Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0->ultralytics) (24.2)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0->ultralytics) (3.2.1)
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Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas>=1.1.4->ultralytics) (2025.1)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas>=1.1.4->ultralytics) (2025.1)
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Requirement already satisfied: networkx in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (3.4.2)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (3.1.5)
Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (2024.10.0)
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Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil>=2.7->matplotlib>=3.3.0->ultralytics) (1.17.0)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.11/dist-packages (from jinja2->torch>=1.8.0->ultralytics) (3.0.2)

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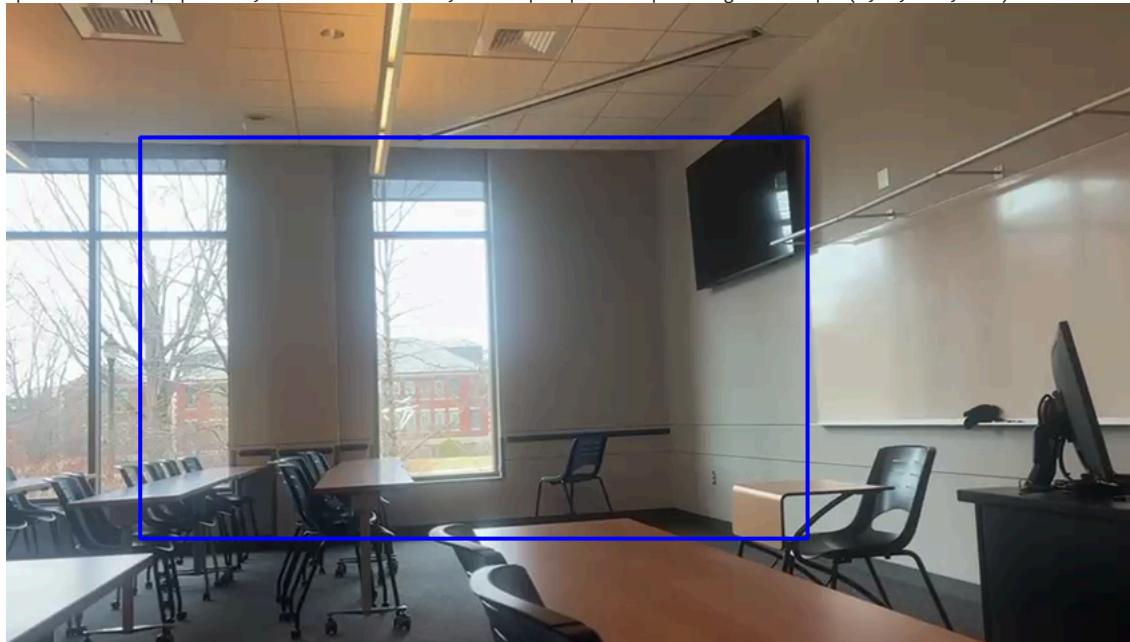
0: 384x640 1 person, 8 chairs, 2 dining tables, 1 laptop, 389.4ms

Speed: 7.5ms preprocess, 389.4ms inference, 4.9ms postprocess per image at shape (1, 3, 384, 640)



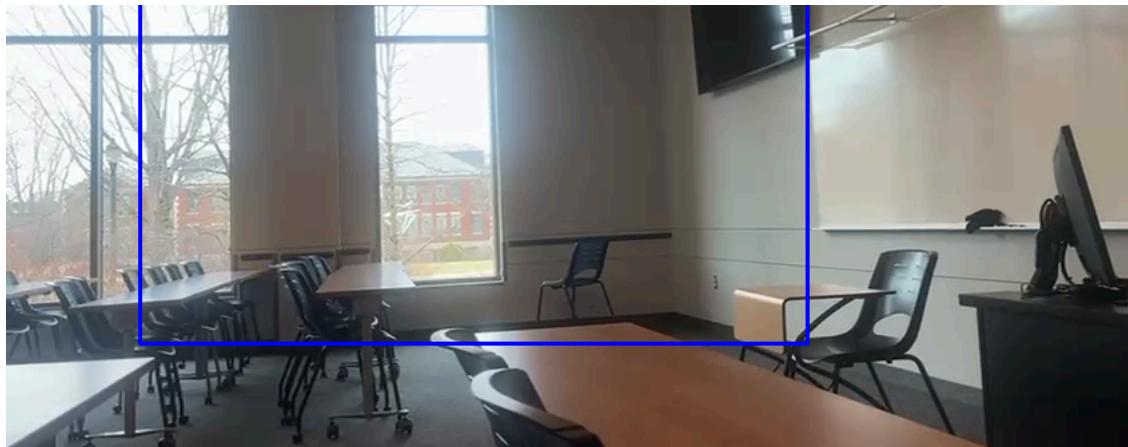


0: 384x640 8 chairs, 2 dining tables, 1 laptop, 591.1ms  
Speed: 10.3ms preprocess, 591.1ms inference, 1.5ms postprocess per image at shape (1, 3, 384, 640)

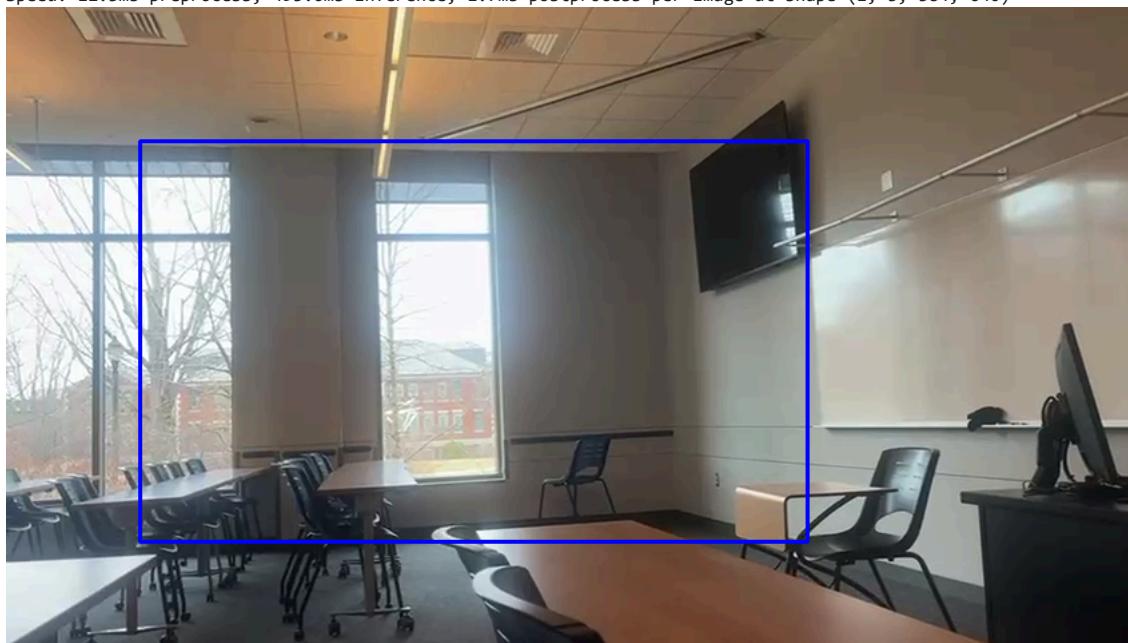


0: 384x640 6 chairs, 2 dining tables, 1 laptop, 489.5ms  
Speed: 4.0ms preprocess, 489.5ms inference, 2.0ms postprocess per image at shape (1, 3, 384, 640)

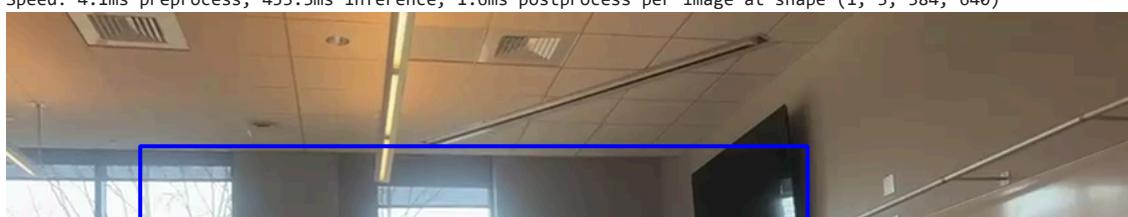


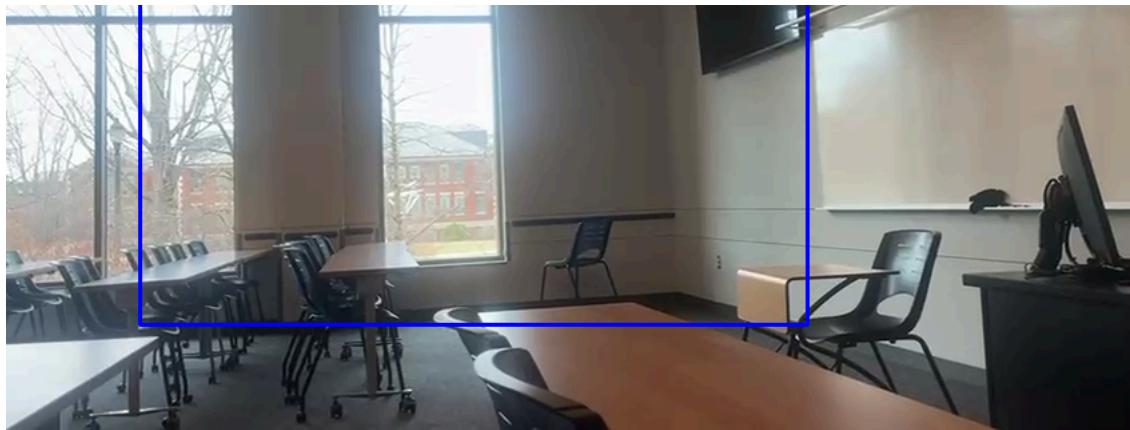


0: 384x640 8 chairs, 2 dining tables, 1 laptop, 493.6ms  
Speed: 12.3ms preprocess, 493.6ms inference, 1.7ms postprocess per image at shape (1, 3, 384, 640)

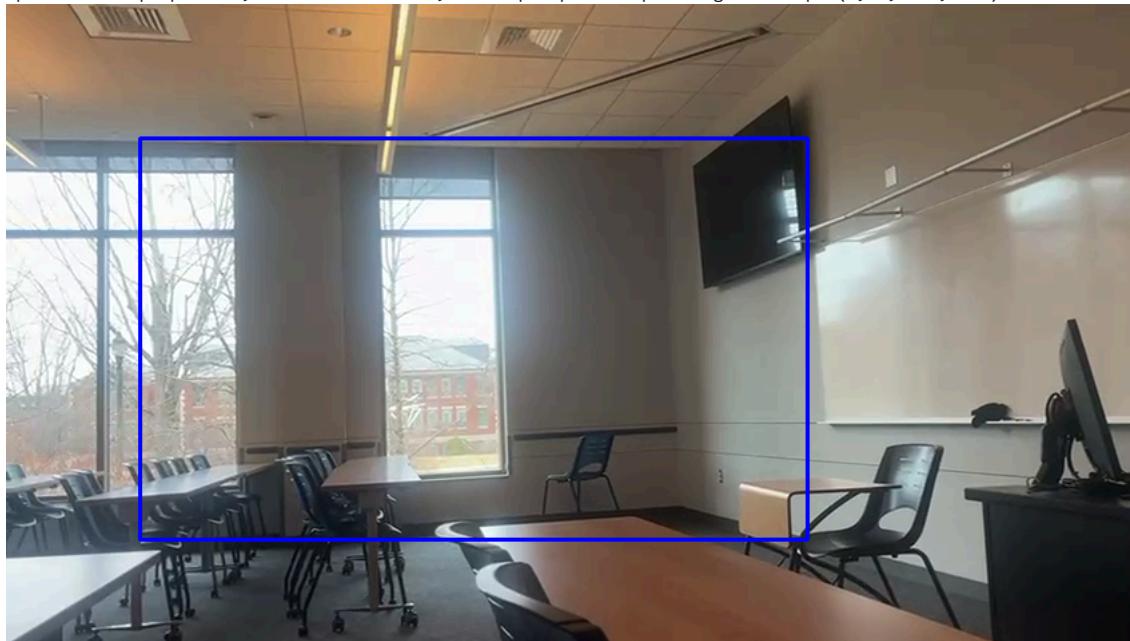


0: 384x640 8 chairs, 1 dining table, 1 laptop, 453.3ms  
Speed: 4.1ms preprocess, 453.3ms inference, 1.6ms postprocess per image at shape (1, 3, 384, 640)

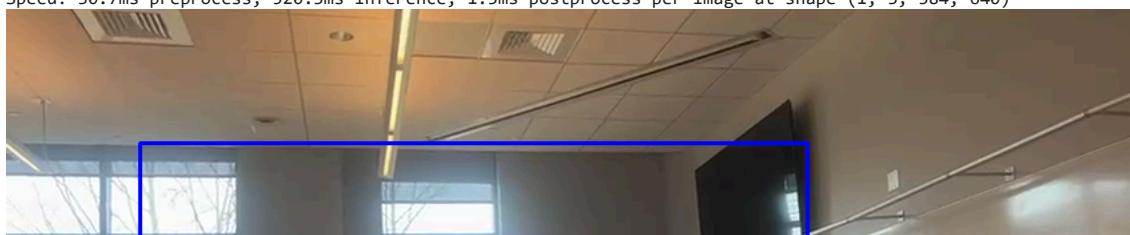


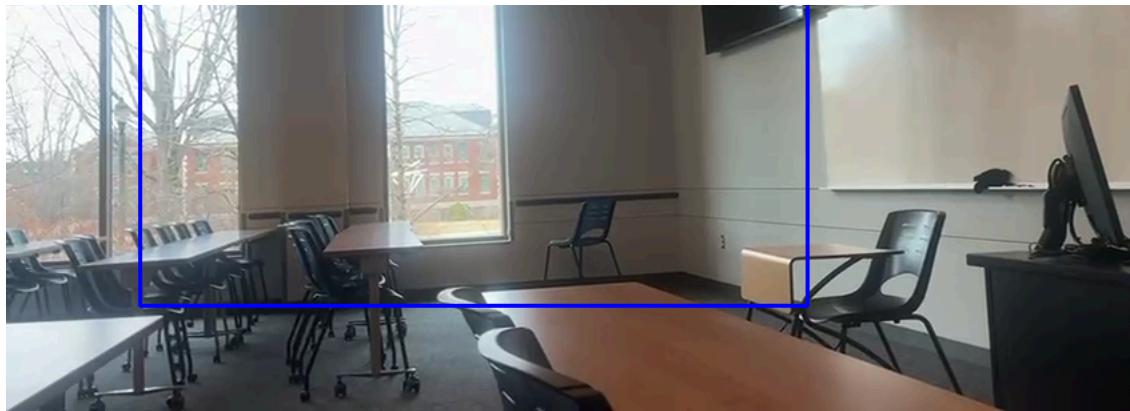


0: 384x640 6 chairs, 1 dining table, 1 laptop, 440.0ms  
Speed: 3.9ms preprocess, 440.0ms inference, 8.9ms postprocess per image at shape (1, 3, 384, 640)

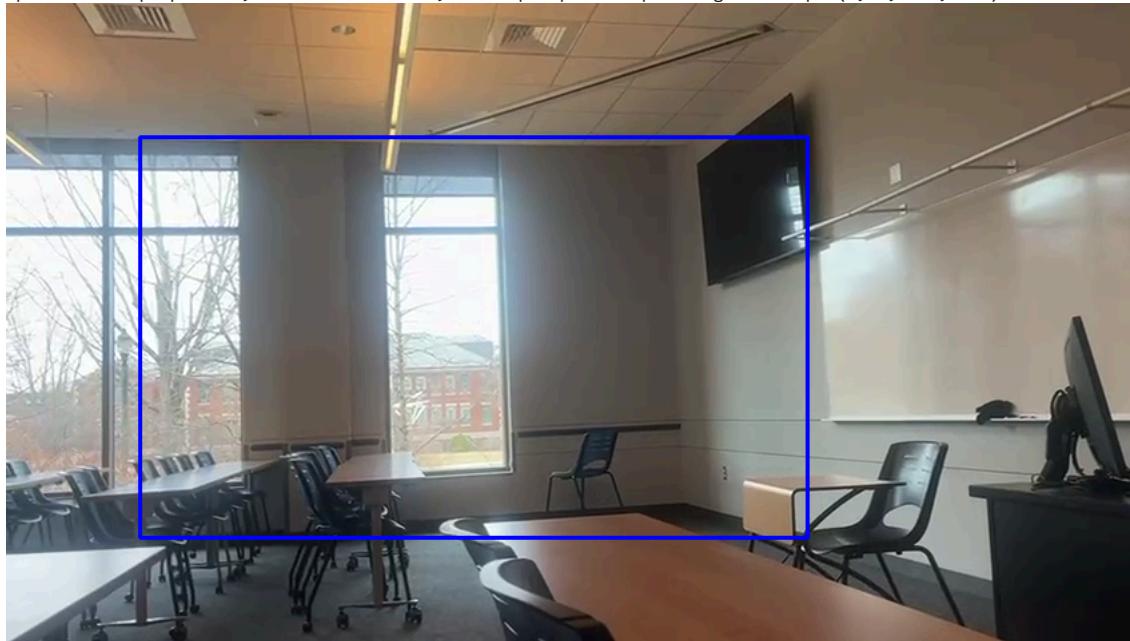


0: 384x640 5 chairs, 1 dining table, 1 laptop, 520.3ms  
Speed: 30.7ms preprocess, 520.3ms inference, 1.5ms postprocess per image at shape (1, 3, 384, 640)

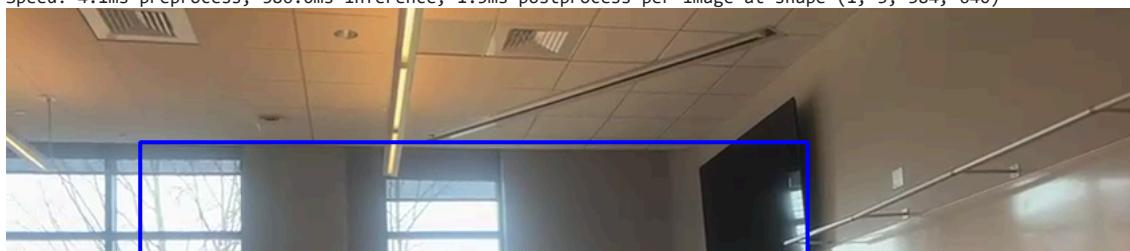


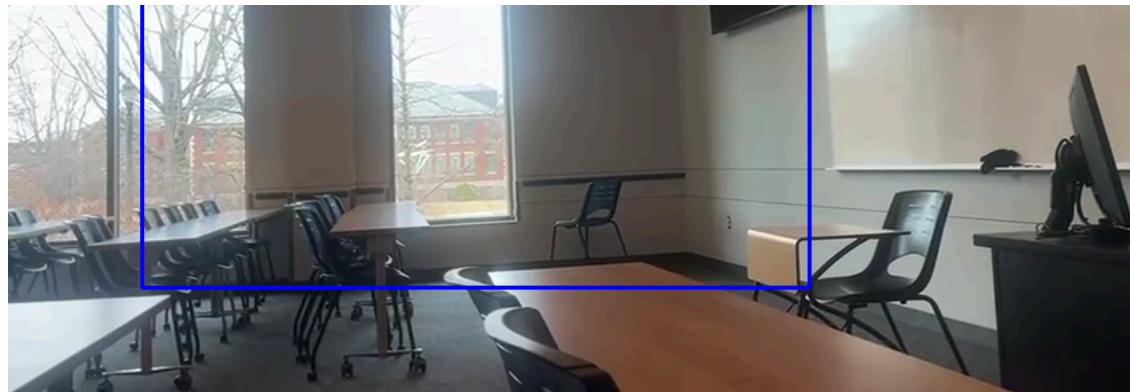


0: 384x640 5 chairs, 1 dining table, 445.4ms  
Speed: 3.9ms preprocess, 445.4ms inference, 3.7ms postprocess per image at shape (1, 3, 384, 640)

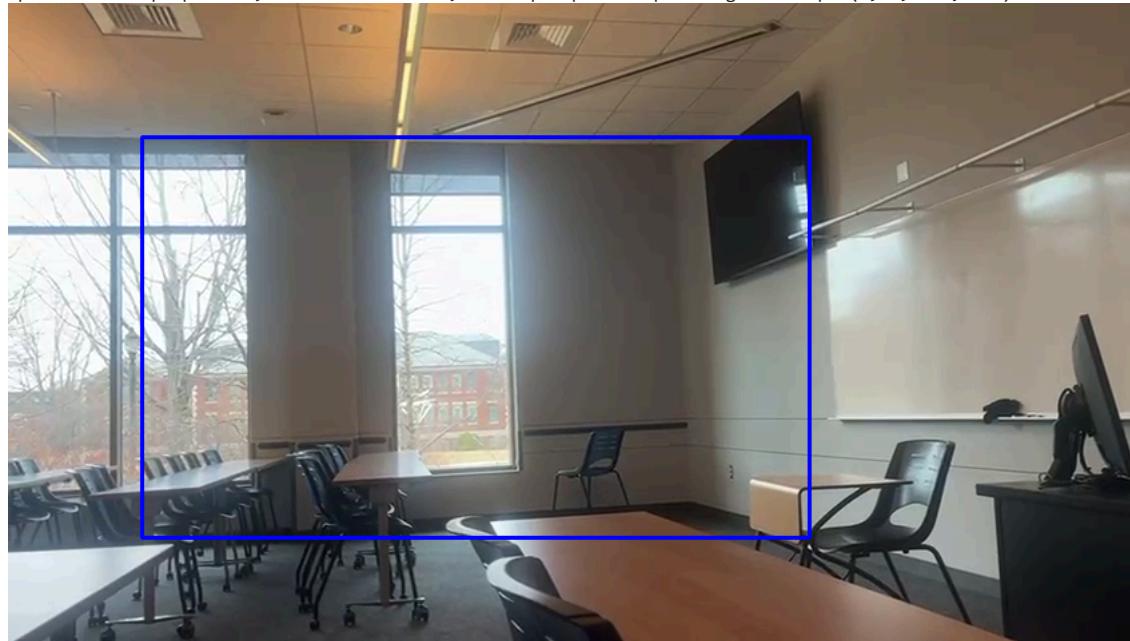


0: 384x640 1 car, 7 chairs, 2 dining tables, 1 laptop, 386.0ms  
Speed: 4.1ms preprocess, 386.0ms inference, 1.5ms postprocess per image at shape (1, 3, 384, 640)

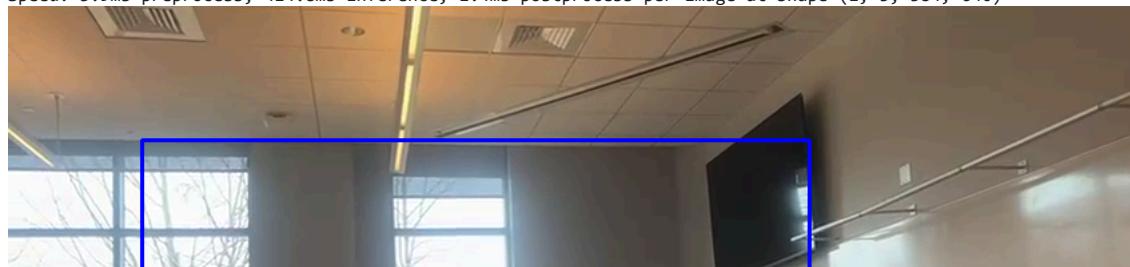


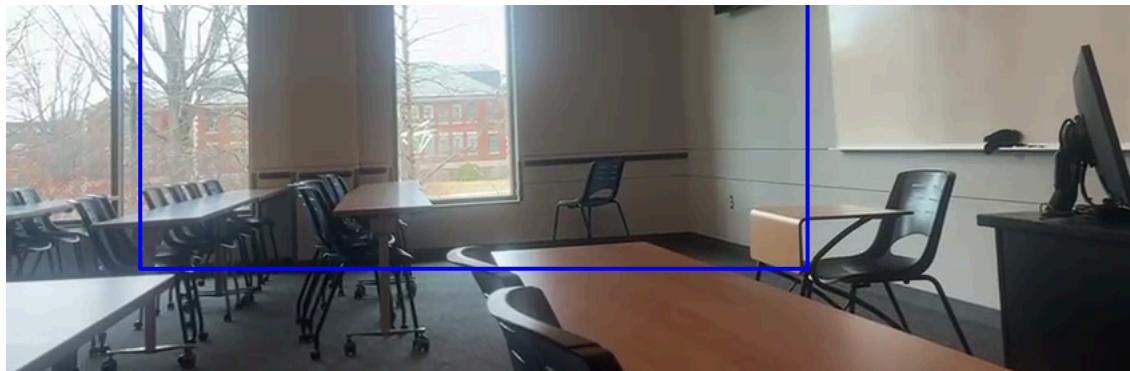


0: 384x640 1 car, 6 chairs, 2 dining tables, 1 laptop, 709.7ms  
Speed: 16.3ms preprocess, 709.7ms inference, 2.1ms postprocess per image at shape (1, 3, 384, 640)

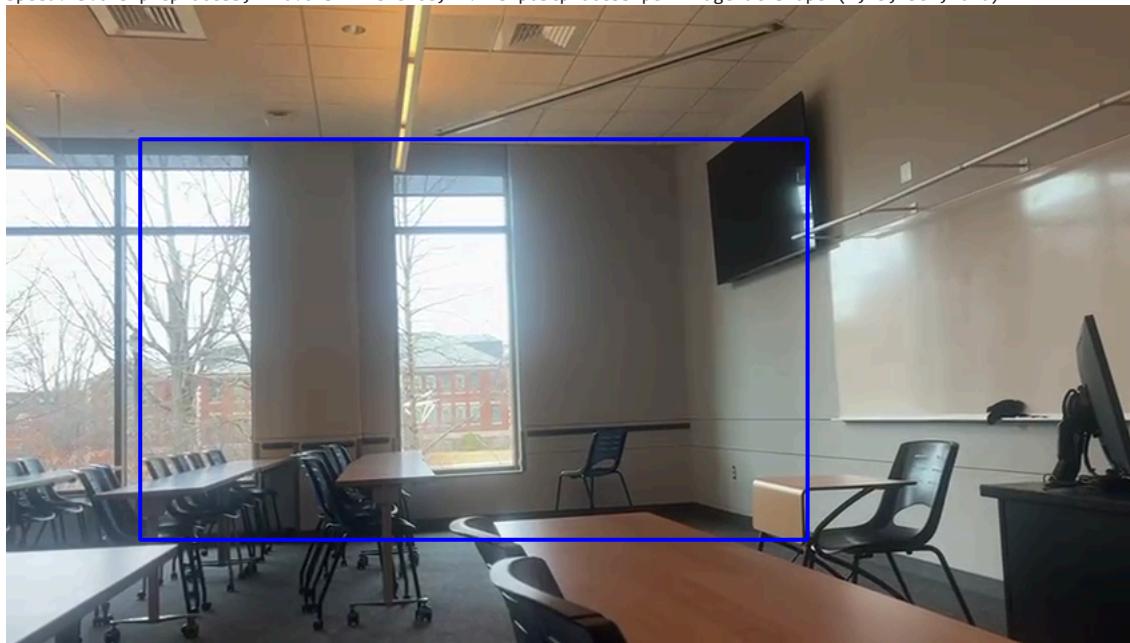


0: 384x640 1 car, 6 chairs, 2 dining tables, 1 laptop, 414.8ms  
Speed: 3.9ms preprocess, 414.8ms inference, 1.4ms postprocess per image at shape (1, 3, 384, 640)

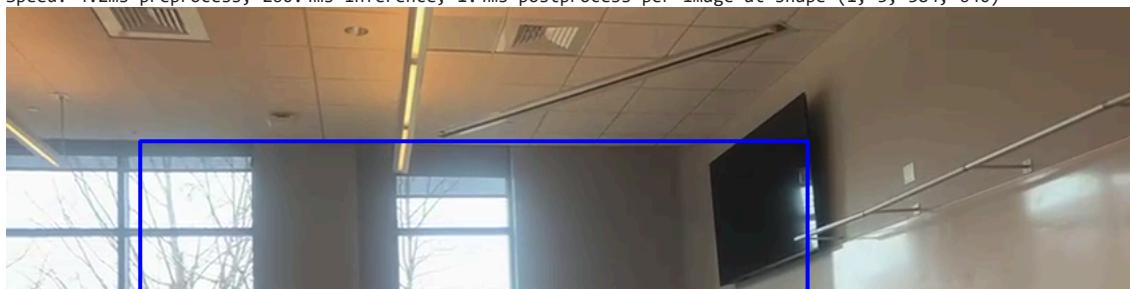


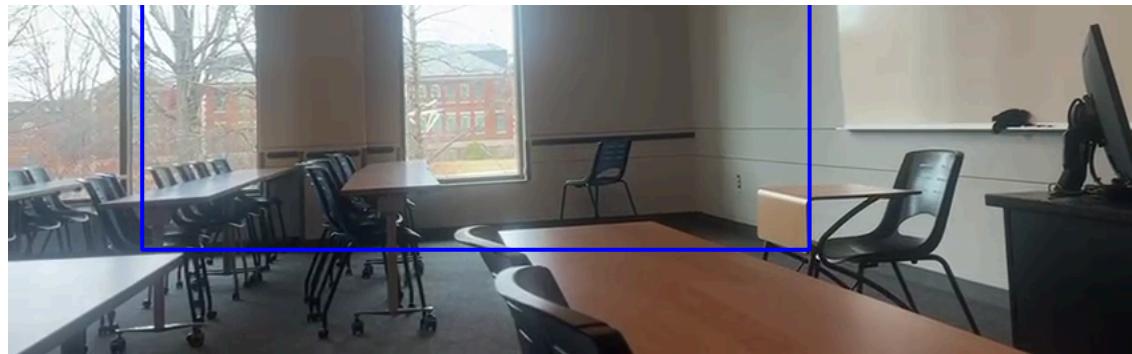


0: 384x640 1 car, 6 chairs, 2 dining tables, 270.6ms  
Speed: 5.6ms preprocess, 270.6ms inference, 1.4ms postprocess per image at shape (1, 3, 384, 640)

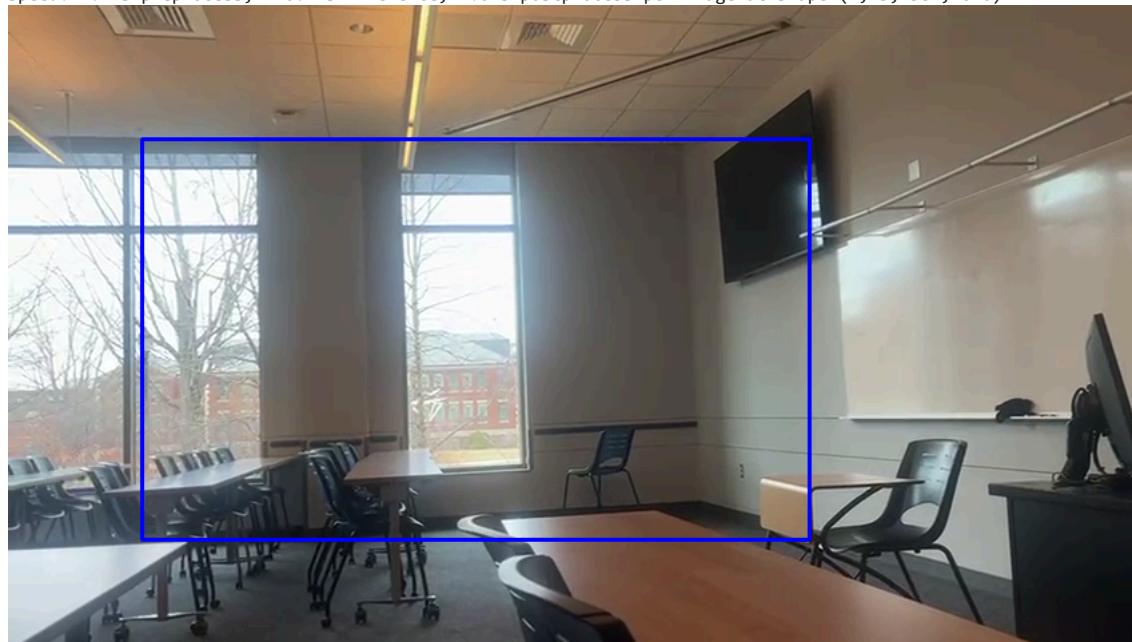


0: 384x640 10 chairs, 2 dining tables, 260.4ms  
Speed: 4.2ms preprocess, 260.4ms inference, 1.4ms postprocess per image at shape (1, 3, 384, 640)

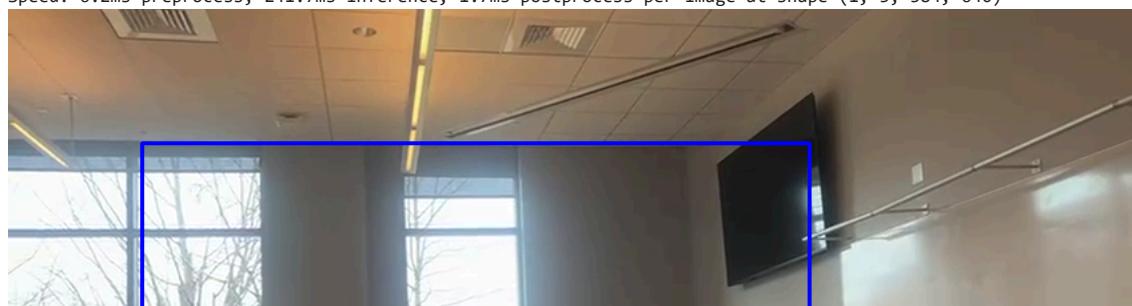


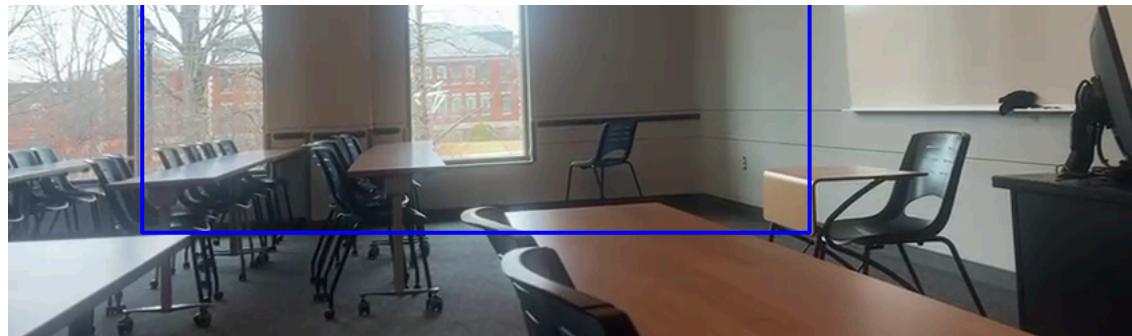


0: 384x640 7 chairs, 1 dining table, 240.7ms  
Speed: 4.2ms preprocess, 240.7ms inference, 1.6ms postprocess per image at shape (1, 3, 384, 640)

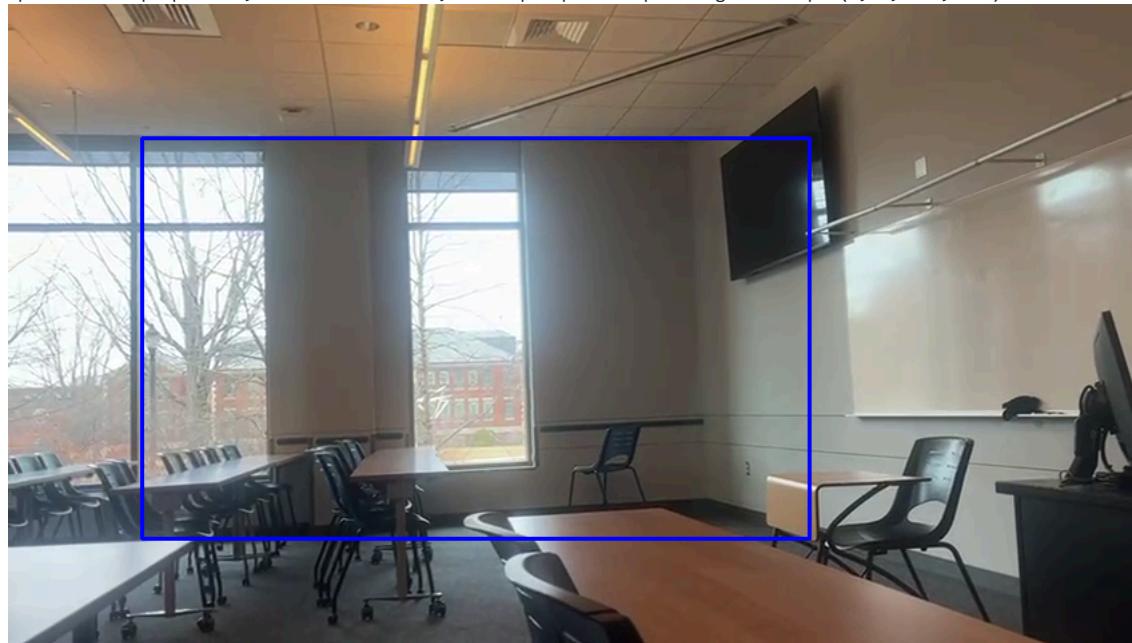


0: 384x640 8 chairs, 1 dining table, 241.7ms  
Speed: 6.2ms preprocess, 241.7ms inference, 1.7ms postprocess per image at shape (1, 3, 384, 640)

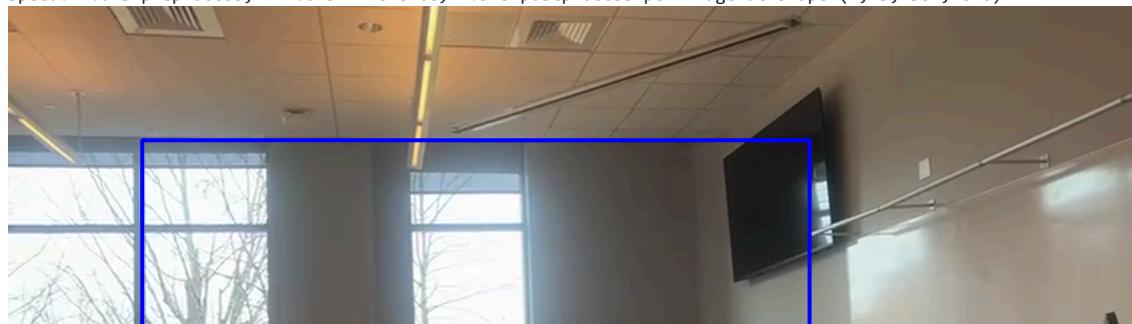


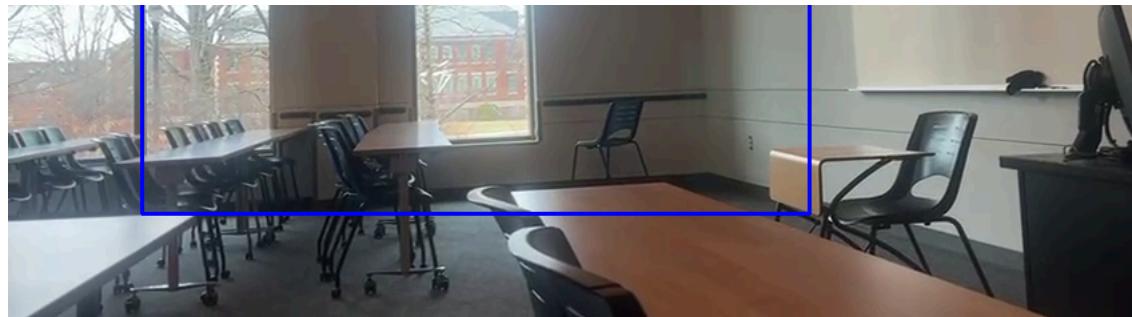


0: 384x640 7 chairs, 1 dining table, 1 tv, 234.9ms  
Speed: 4.3ms preprocess, 234.9ms inference, 1.7ms postprocess per image at shape (1, 3, 384, 640)

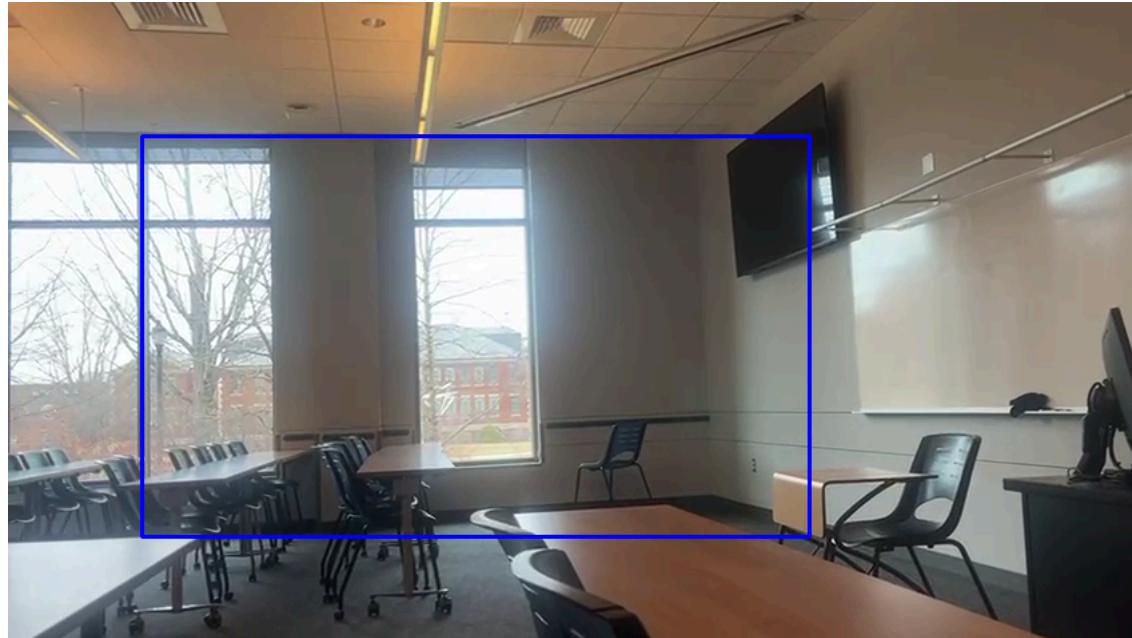


0: 384x640 9 chairs, 1 dining table, 1 tv, 242.0ms  
Speed: 4.0ms preprocess, 242.0ms inference, 1.3ms postprocess per image at shape (1, 3, 384, 640)

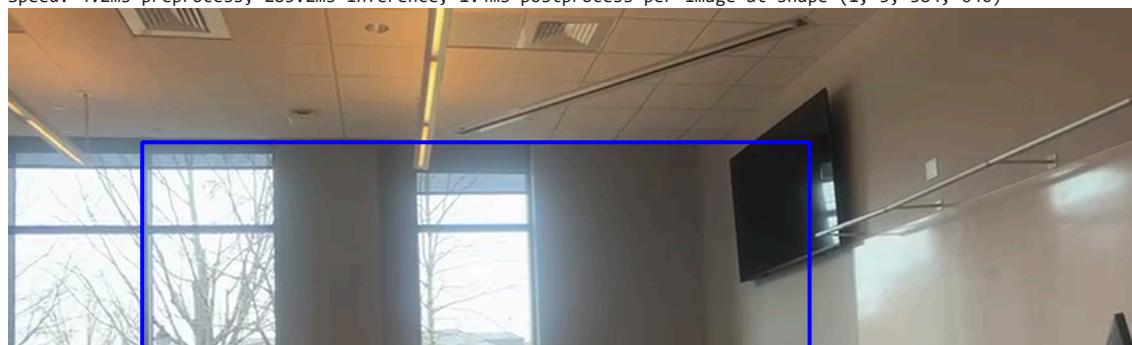


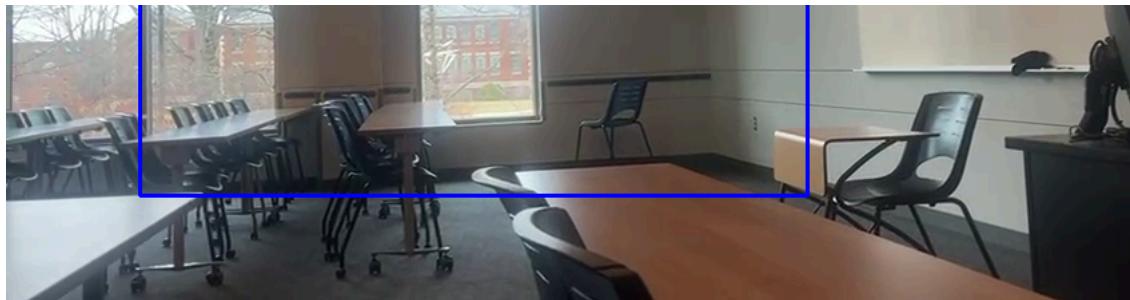


0: 384x640 10 chairs, 1 dining table, 219.7ms  
Speed: 4.4ms preprocess, 219.7ms inference, 1.4ms postprocess per image at shape (1, 3, 384, 640)

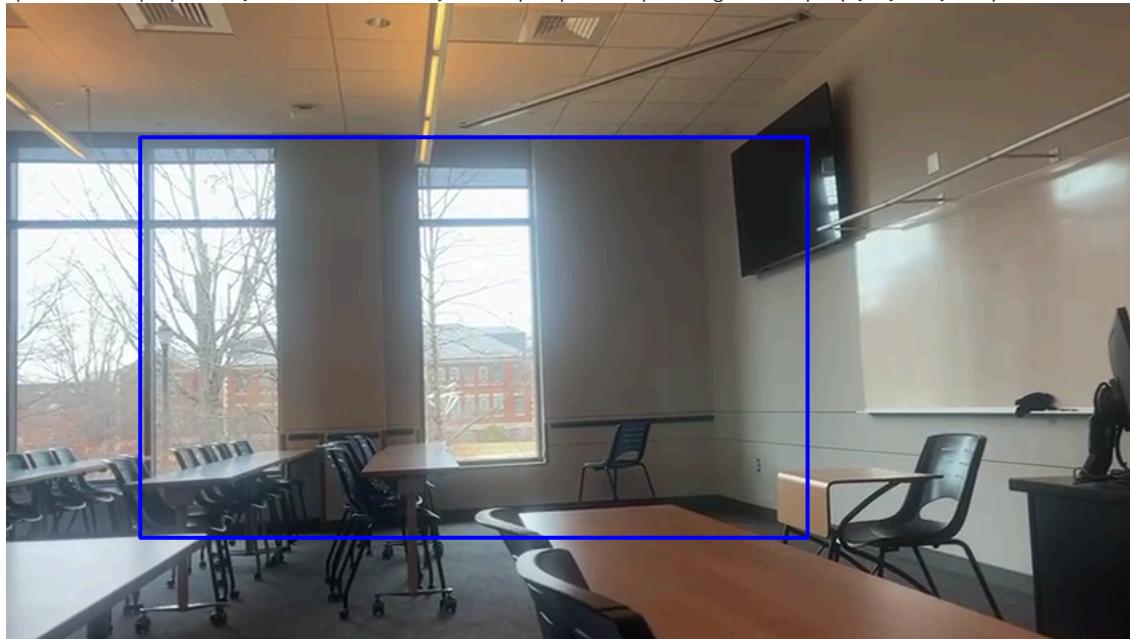


0: 384x640 10 chairs, 1 dining table, 283.2ms  
Speed: 4.2ms preprocess, 283.2ms inference, 1.4ms postprocess per image at shape (1, 3, 384, 640)



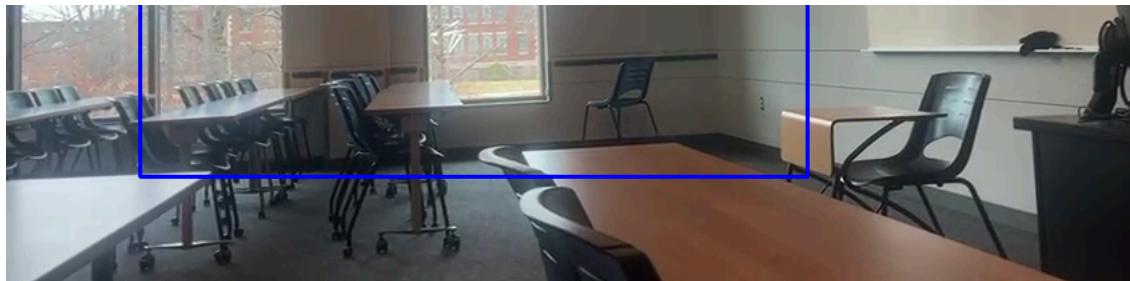


0: 384x640 9 chairs, 1 dining table, 1 tv, 277.5ms  
Speed: 4.1ms preprocess, 277.5ms inference, 1.6ms postprocess per image at shape (1, 3, 384, 640)

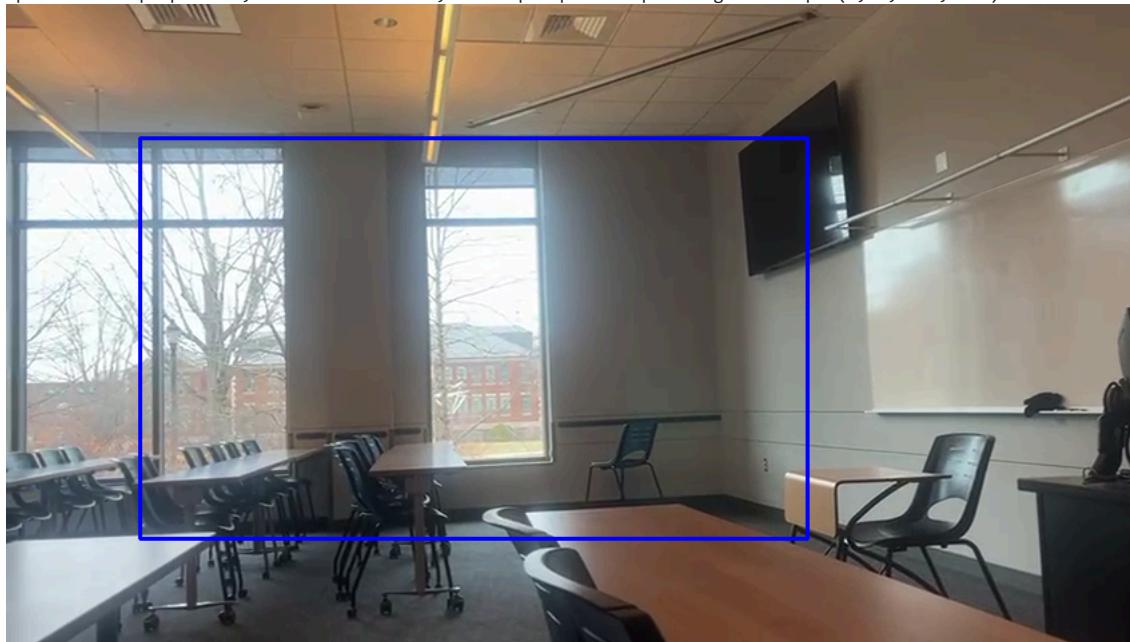


0: 384x640 12 chairs, 1 dining table, 238.6ms  
Speed: 5.8ms preprocess, 238.6ms inference, 1.5ms postprocess per image at shape (1, 3, 384, 640)

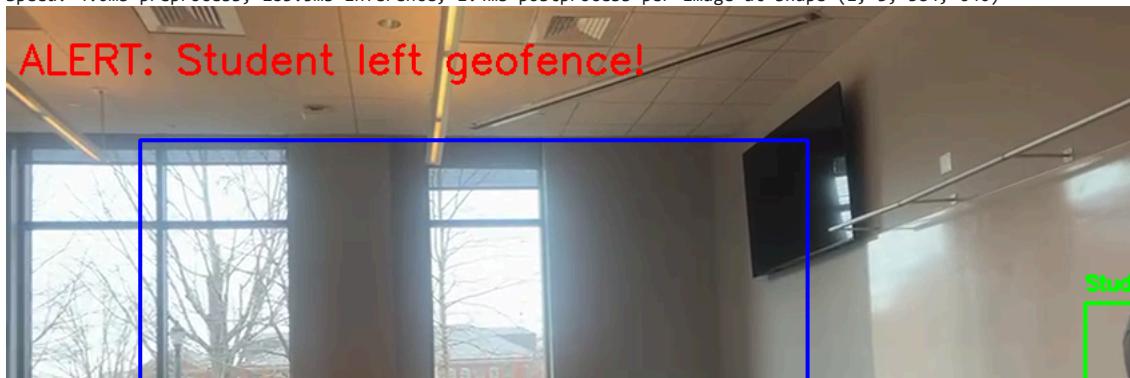


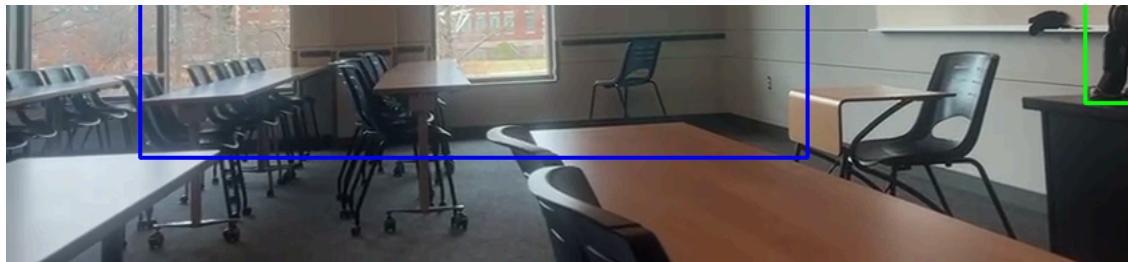


0: 384x640 1 person, 9 chairs, 1 dining table, 259.7ms  
Speed: 3.9ms preprocess, 259.7ms inference, 1.5ms postprocess per image at shape (1, 3, 384, 640)

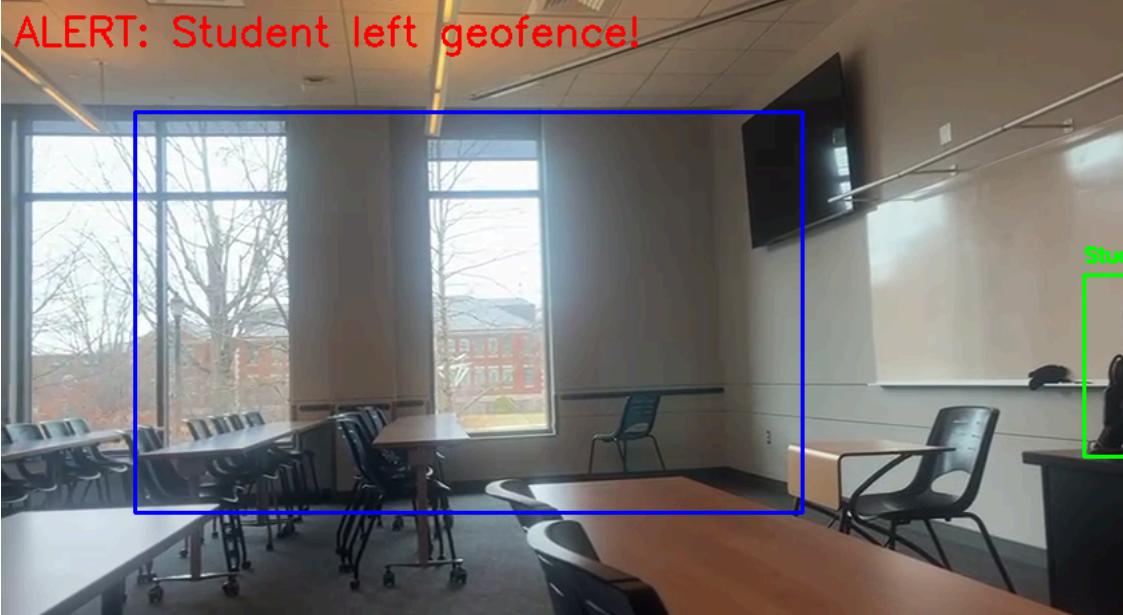


0: 384x640 1 person, 9 chairs, 1 dining table, 283.5ms  
Speed: 4.0ms preprocess, 283.5ms inference, 1.4ms postprocess per image at shape (1, 3, 384, 640)



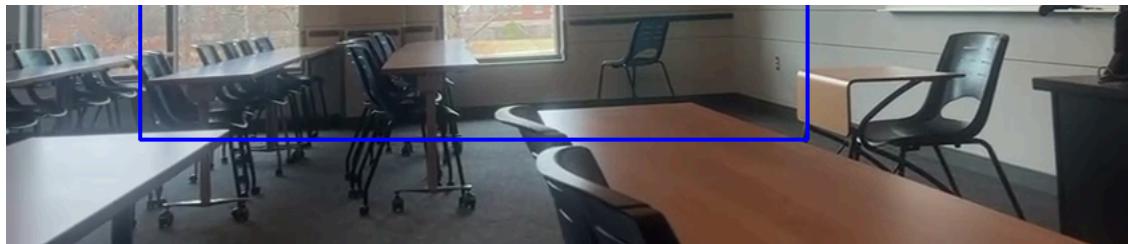


0: 384x640 2 persons, 7 chairs, 1 dining table, 278.5ms  
Speed: 4.1ms preprocess, 278.5ms inference, 1.7ms postprocess per image at shape (1, 3, 384, 640)

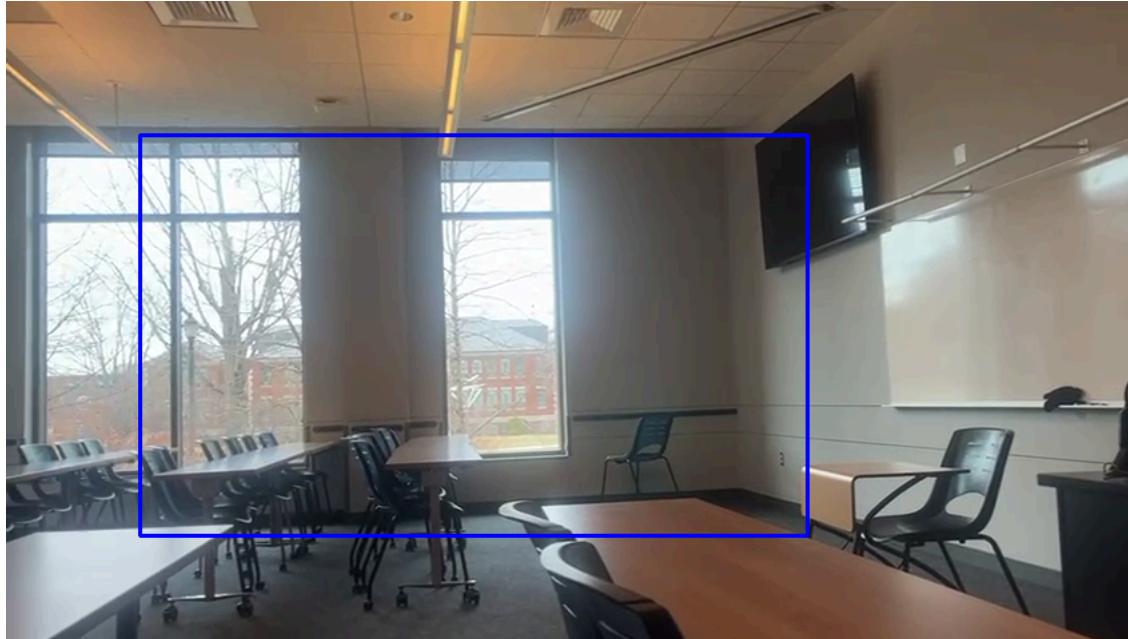


0: 384x640 1 person, 8 chairs, 1 dining table, 281.0ms  
Speed: 6.8ms preprocess, 281.0ms inference, 5.0ms postprocess per image at shape (1, 3, 384, 640)





0: 384x640 7 chairs, 1 dining table, 245.6ms  
Speed: 4.1ms preprocess, 245.6ms inference, 1.6ms postprocess per image at shape (1, 3, 384, 640)



0: 384x640 10 chairs, 2 dining tables, 226.9ms  
Speed: 4.1ms preprocess, 226.9ms inference, 1.3ms postprocess per image at shape (1, 3, 384, 640)

