

Real-Time People Counting and Queue Monitoring Solution



This project is an inference solution that processes a video file to monitor and raise an alert if more than a specified number of people (e.g., 4) are visible continuously for over 1 minutes. The region to monitor is predefined, and an alert is displayed in the video when the conditions are met.

Table of Contents

- Real-Time People Counting and Queue Monitoring Solution
 - Table of Contents
 - Overview
 - Repository Link
 - Tech Stack
 - Features
 - Installation
 - Usage
 - Approach
 - Demo Video

Overview

This project was built as part of a task to detect overcrowding in a designated area using YOLOv10 for object detection. The goal is to raise an alert if more than a certain number of people are queuing or standing in the region for a prolonged time, exceeding 1 minutes (Due to limited video length, the alert is raised after 1 minutes not 2 minutes).

Repository Link

<https://github.com/sayyidan-i/People-Queue-Alert>

Tech Stack

- **Python:** Main programming language
- **OpenCV:** For video processing and object detection display
- **YOLOv10:** Pre-trained model for person detection

Features

- Detects and tracks the number of people in a specified region (ROI) of the video using YOLOv10.
- Raises an alert if the count exceeds a threshold (e.g., 3 people) for more than 1 minutes.
- Provides visual feedback with bounding boxes around detected people and the elapsed time of detection.
- Handles missed detections by allowing a tolerance of up to 60 frames before resetting the detection count.

Installation

1. Clone the repository:

```
git clone https://github.com/sayyidan-i/People-Queue-Alert  
cd People-Queue-Alert
```

2. Install dependencies:

Use `pip` to install the required packages:

```
pip install -r requirements.txt
```

Usage

1. Store the input video in the `input_video` folder and create an `output_video` folder to store the processed video output. You can get the video from [Google Drive](#).

Original Video link: [Youtube](#)

2. Running the Script:

You can run the script on a video file as follows:

```
python people_tracking.py
```

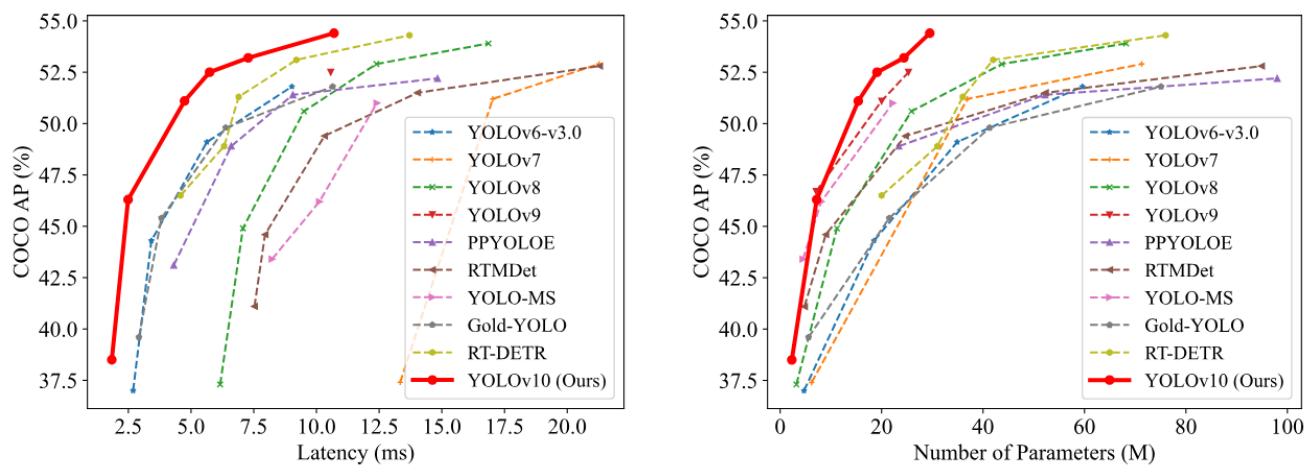
3. Output Video:

The output will be saved to the specified location as a video with bounding boxes and alerts:

```
output_video_path = 'output_video/tracked_output.mp4'
```

Approach

- Person Detection:** YOLOv10, developed with the Ultralytics Python package by Tsinghua University researchers, enhances real-time object detection by improving model architecture and eliminating non-maximum suppression (NMS). It offers significantly better performance than previous YOLO versions, which is why we chose this model. Comprehensive experiments show its superior accuracy-latency balance across different model sizes.



Comparison with others in terms of latency-accuracy (left) and size-accuracy (right) [source](#)

- Region of Interest (ROI):** A specific region of interest (ROI) is defined within the video, and only people detected in this region are considered for counting.

3. Counting & Alert:

- The script counts people whose bounding boxes overlap with the ROI by more than 50% to ensure accurate counting.
- If the number of people in the ROI exceeds a set threshold (e.g., 4) for more than 1 minutes (60 seconds), an alert message is displayed.
- Missed detections are tolerated for up to 2 seconds to account for momentary occlusions or detection inaccuracies.

- Alert Display:** If an alert condition is met, a blinking warning message is shown in the video output indicating that the queue has been too long.

Demo Video

[Link to demo video](#)