How to Run This Project

This guide will help you set up and run the Person Detection and Tracking project using YOLOv5 and OpenCV. Follow the steps below:

Step 1: Clone the Project Repository

Start by cloning the project repository from your version control platform (GitHub, GitLab, etc.).

```
bash
Copy code
git clone https://github.com/your-username/your-repository.gitcd
your-repository
```

Step 2: Set Up a Python Virtual Environment (Optional but Recommended)

It's good practice to create a Python virtual environment to isolate your project dependencies. To create and activate a virtual environment, use the following commands:

On Windows:

```
bash
Copy code
python -m venv venv
venv\Scripts\activate
```

On macOS/Linux:

```
bash
Copy code
python3 -m venv venvsource venv/bin/activate
```

Once activated, your terminal should reflect that you're in the virtual environment.

Step 3: Install Required Dependencies

The project uses several Python packages. You can install them using the `requirements.txt` file. Run the following command to install all the necessary dependencies:

```
bash
Copy code
pip install -r requirements.txt
```

This will install:

- **torch**: PyTorch for using YOLOv5 models.
- **numpy**: A package for scientific computing.
- **opencv-python**: OpenCV for handling video input and output, and drawing bounding boxes.

Step 4: Download the YOLOv5 Model

The project is set up to download the YOLOv5 model directly from the GitHub repository. The model is used for person detection. You can customize the model path in the code if needed, but by default, it will load `yolov5s.pt` from the Ultralytics GitHub repo.

The model will automatically download the first time you run the project. You don't need to do anything extra for this step.

Step 5: Prepare Input and Output Folders

Make sure you have the following folder structure in your project directory:

```
graphql
Copy code
your-project/
 |
 ├── input/      # Put the video files you want to process here
 ├── output/     # Processed videos will be saved here
 └── src/        # Contains the code files (including det.py)
```

Place your video files (in formats like `.mp4`, `.avi`, `.mov`, etc.) inside the `input` folder. The processed videos will be saved to the `output` folder after execution.

Step 6: Run the Project

You are now ready to run the project. Use the following command:

```
bash
Copy code
python src/det.py
```

This will start the video processing based on the YOLOv5 detection model. The program will:

1. Detect and classify persons in the video (as "Child" or "Adult" based on bounding box height).
2. Assign a unique ID to each person that remains constant across frames.
3. Display a bounding box around each detected person, along with the classification and unique ID.

You will also see progress updates in the terminal, showing the percentage of video processed and the estimated time remaining.

Step 7: Check the Output

After processing, check the `output` folder. You should find the processed video files with bounding boxes and labels (classification and unique ID) around detected persons.

Additional Notes:

- If you want to adjust the person classification height threshold or other parameters, modify the values inside `det.py`.
- Ensure that your input videos are placed inside the `input` folder before running the program.
- The project automatically handles video formats like `.mp4`, `.avi`, `.mov`, etc. You can add other formats by modifying the `det.py` code.

That's it! You have successfully run the project. For any issues or customizations, refer to the project's code and comments.