README

Sport Video Tracking System

Description

This project is a video tracking system for sports, utilizing stereo cameras to track athletes' movements in real-time. Camera calibration is an essential step to ensure optimal tracking accuracy.

Features

- **Real-Time Tracking**: Precise tracking of athletes during sports sessions.
- **Camera Calibration**: Uses a chessboard pattern to calibrate stereo cameras.
- **User-Friendly Interface**: Instructions and visual feedback to facilitate usage.
- **Movement Analysis**: Tools to analyze athletes' movements.

Prerequisites

- Python 3.x
- OpenCV
- Numpy
- Mediapipe
- Pygame

Installation

1. **Install the required packages:**

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

Usage

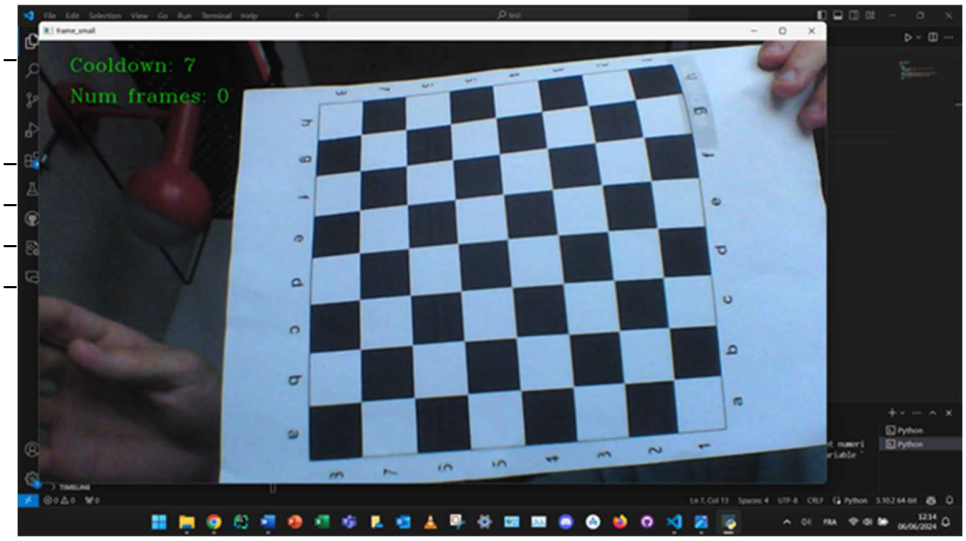
Camera Calibration

You have the possibility, if you use 2 cameras, to calbirate them.

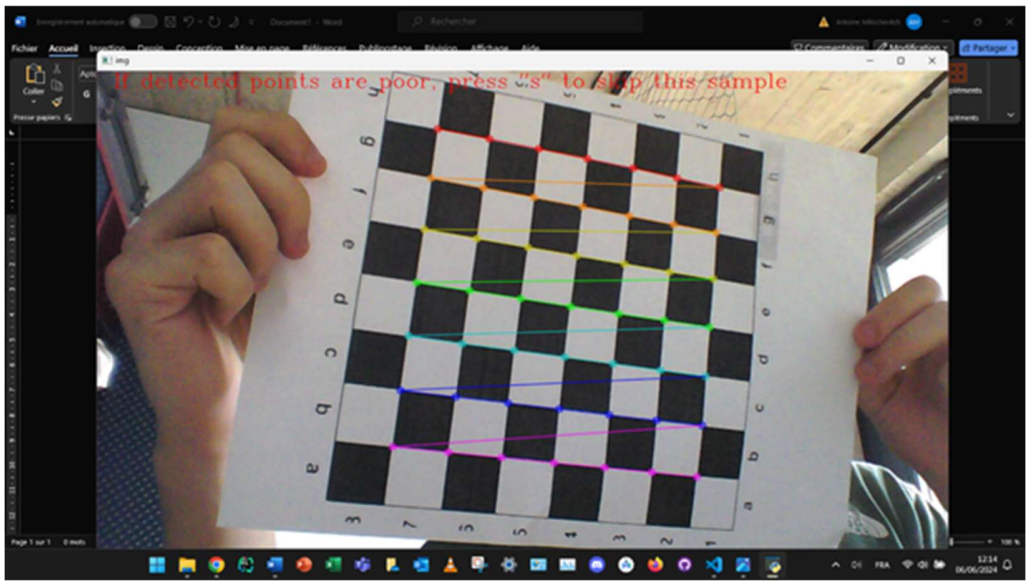
1. **Prerequisites**
   - chessboard
   - settings of your camera :you need to change the **ID** of your cameras, the **size** of your chessboard, the **image resolution** and the **size** of each side of the squares of the chessboard.

```
calibration_settings = {
'camera0': 2,
'camera1': 1,
'frame_width': 1280,
'frame_height': 720,
'mono_calibration_frames': 10,
'stereo_calibration_frames': 10,
'view_resize': 1,
'checkerboard_box_size_scale' : 2.2,
'checkerboard_rows': 7,
'checkerboard_columns': 7,
'cooldown': 100
}
```

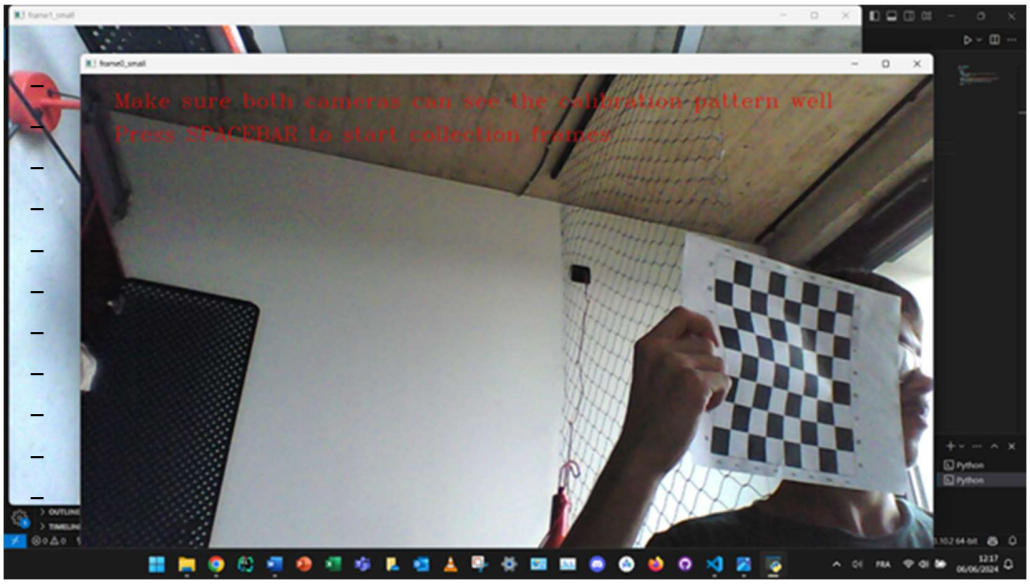
2. **Calibration of each camera**
   - For both cameras, you must first take turns presenting the board (camera 1 then 2). For each camera, **10 frames** will be captured every 100ms. To start capturing, **press the space bar.**



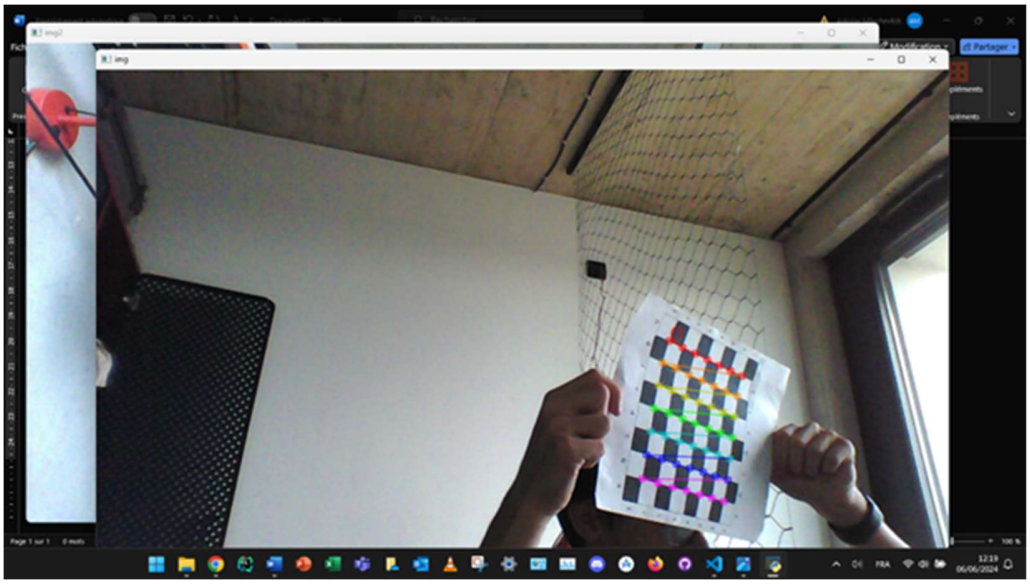
   - After capturing the frames, you must **validate** or not the images (by pressing **space to validate or S to skip**).



- Then, you need to calibrate **both cameras at the same time**. Make sure they are in their **final positions** and that the board is clearly visible to both. Press the **space bar to begin**.



- Finally, as before, **validate or not** the images by pressing **space or S** (note that this **validates the image pair**)



Video Tracking

1. **Run the Tracking Script:**

   ```
   python main.py
   ```

2. **Start Tracking:** You will have several choices : - The number of camera (1 or 2). - The type of sports (1 = curl, 2 = squats). - The possibility to calibrate the cameras. - Indicate the number of sets and repetitions.