Reeplayer Camera

Calibration Guide

(V1)

Change Log

01/29/2022

- Initial version of the calibration guide

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1. Introduction

This document includes a simple guide for calibration, with current camera software version 0.6.0.

2. Connect to camera with WebUI

The camera system will be set as a WiFi access point (AP) for the final product, and the client devices (PC, laptop, tablet, or smartphone) will connect to the camera by connecting to the camera's AP SSID and password. In this case, using default information as below:

- Camera's AP SSID: Reeplayer
- Camera's AP password: Reeplayer
- WebUI URL: http://10.0.0.1:8085/camera

But during development and testing, the camera system may be set to work with a WiFi router, and the client devices connect to the camera through the WiFi router. In this case, we need to know the IP address of the camera as a client of the WiFi router, let's suppose the IP is "192.168.1.218", then the URL for WebUI is:

- WebUI URL: http://192.168.1.218:8085/camera

For both above cases, the operations for WebUI are identical.

3. Cameras calibration

Current implementation of cameras calibration takes three steps: (1) recording of video clips for calibration, (2) complete cameras calibration and save the calibration data, (3) disable/enable the video recording, or restart the system to apply the new calibration data.

One-step real-time calibration will be implemented for the final production, once the calibration algorithm is evolved to be perfect.

3.1. Record the video clips for calibration

The calibration will use the raw video from the two cameras. So we need to record the video first using the "RECORDING" page of the WebUI.

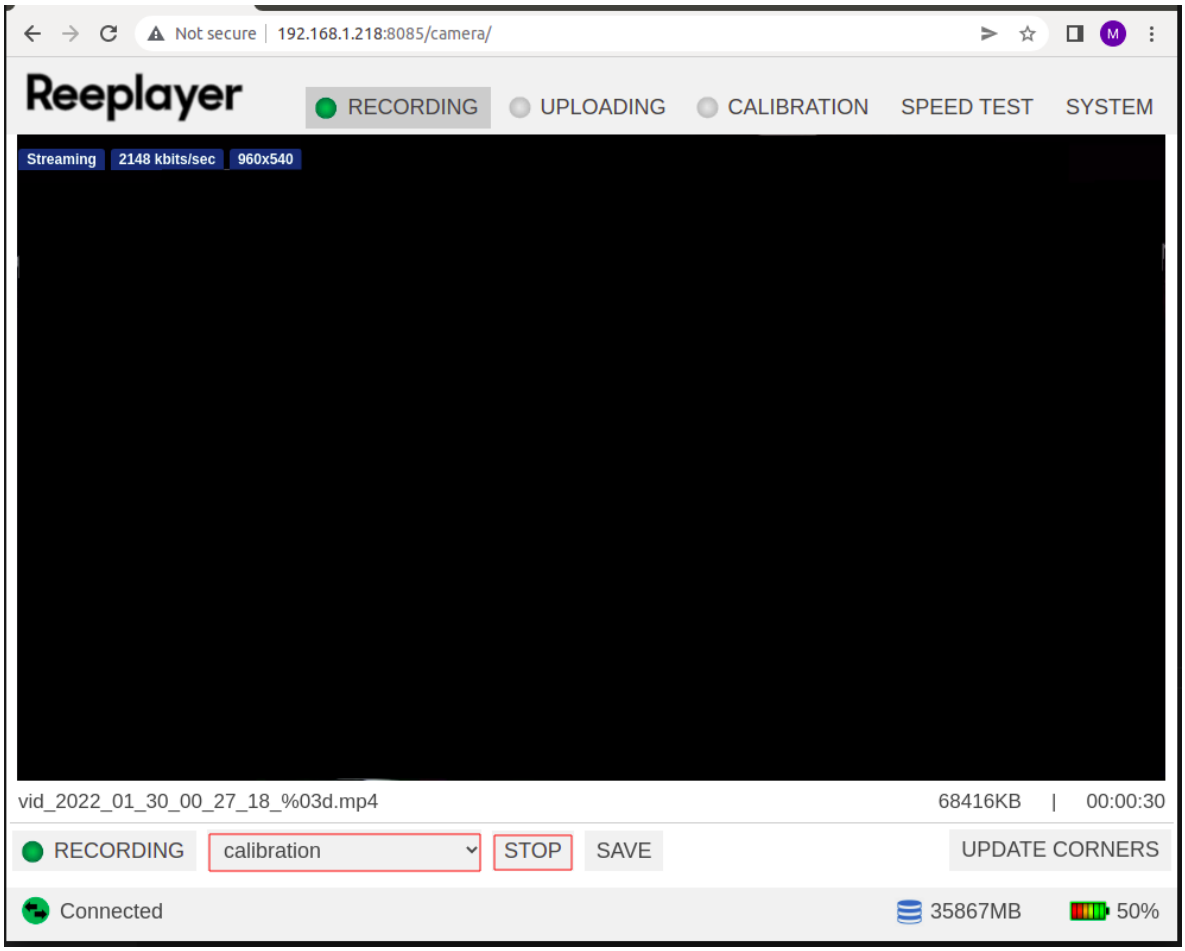
1. The calibration only needs to extract several frames from the video files, so it is not necessary to record too long video, seval seconds to tens of seconds is enough.

2. The calibration can use images from different video files, so it is possible to record multiple video files with different viewpoints and use them to improve the calibration quality.

3. Please note that the scenes used for calibration should be as close as possible to the real scenes for the application. So the viewpoints for calibration could be varied a little bit to adapt to different scenes, but should not vary too much.

The recording page is shown as below. Follow the steps below for recording:

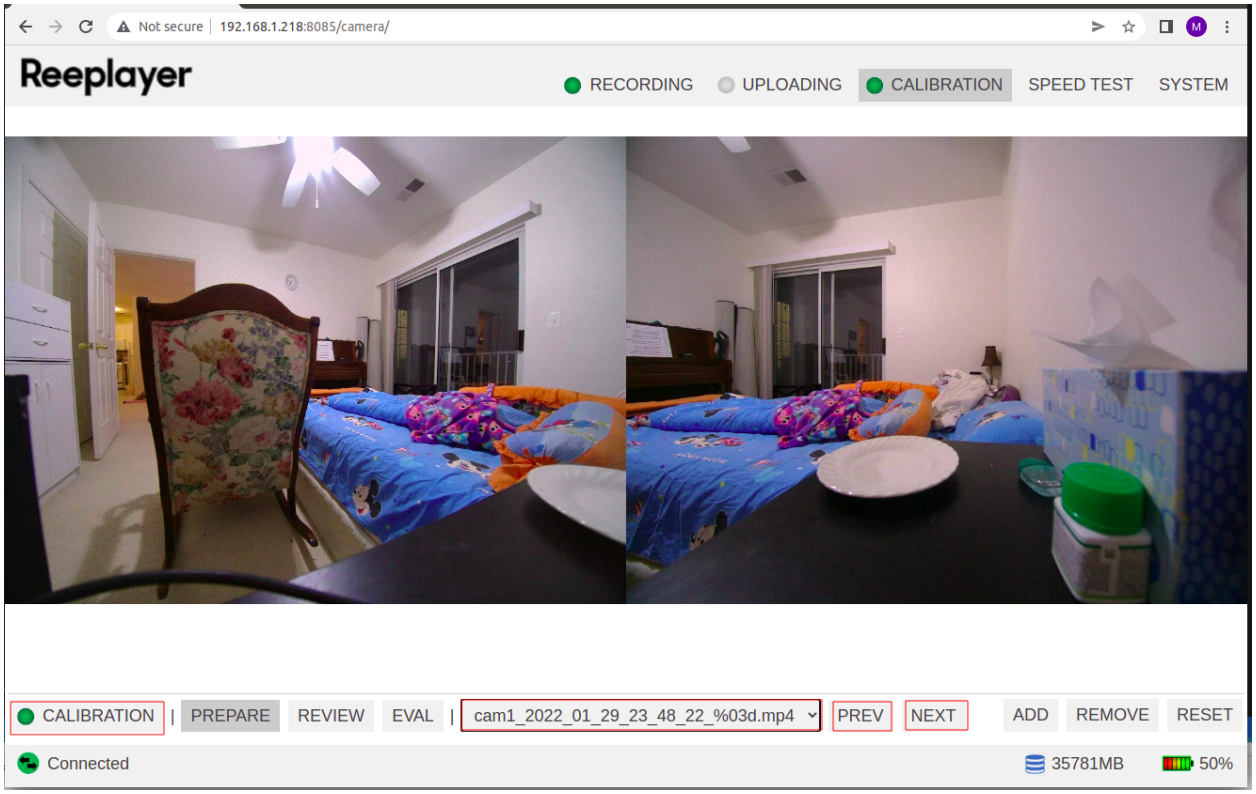
1. Make sure the “recording” service is enabled. If not, click the “RECORDING” button to enable it;
2. Make sure to choose the “calibration” as target footage in the drop box; (Current implementation still has small issues, so please double check before every “START” recording;)
3. Click the toggle button “START/STOP” to start and stop the video file;
4. (It is better to display the two raw videos on the screen for recording, but now the web page can only display the stitched video.)



3.2. Calibration with recorded video clips

To do the calication, switch the WebUI to the “CALIBRATION” page shown as below. Follow the steps below:

1. Click the “CALIBRATION” button to enable the calibration service;
2. Choose the target video clip for calibration; Please choose the raw video file starting with “cam0” or “cam1”. Choosing one file, for example “cam1_xxxx.mp4” will automatically load the video pair of “cam0_xxxx.mp4” and “cam1_xxxx.mp4”. The video file starting with “vid” is the stitched video, which can not be used for the calibration.
3. (Current implementation has an issue so you may need to select another “camx” file to load the video, even a “cam0” or “cam1” file has been displayed in the drop box after the “CALIBRATION” is enabled.)
4. The loading of the images from the video file will take some time, so please wait for a while after clicking a button, until the images are displayed in the window.
5. Click the “PREV” and “NEXT” button to navigate the video frames. Because the image frames may be very close, you may even not notice the image is changed. Improving by skipping some frames will be done in next version.



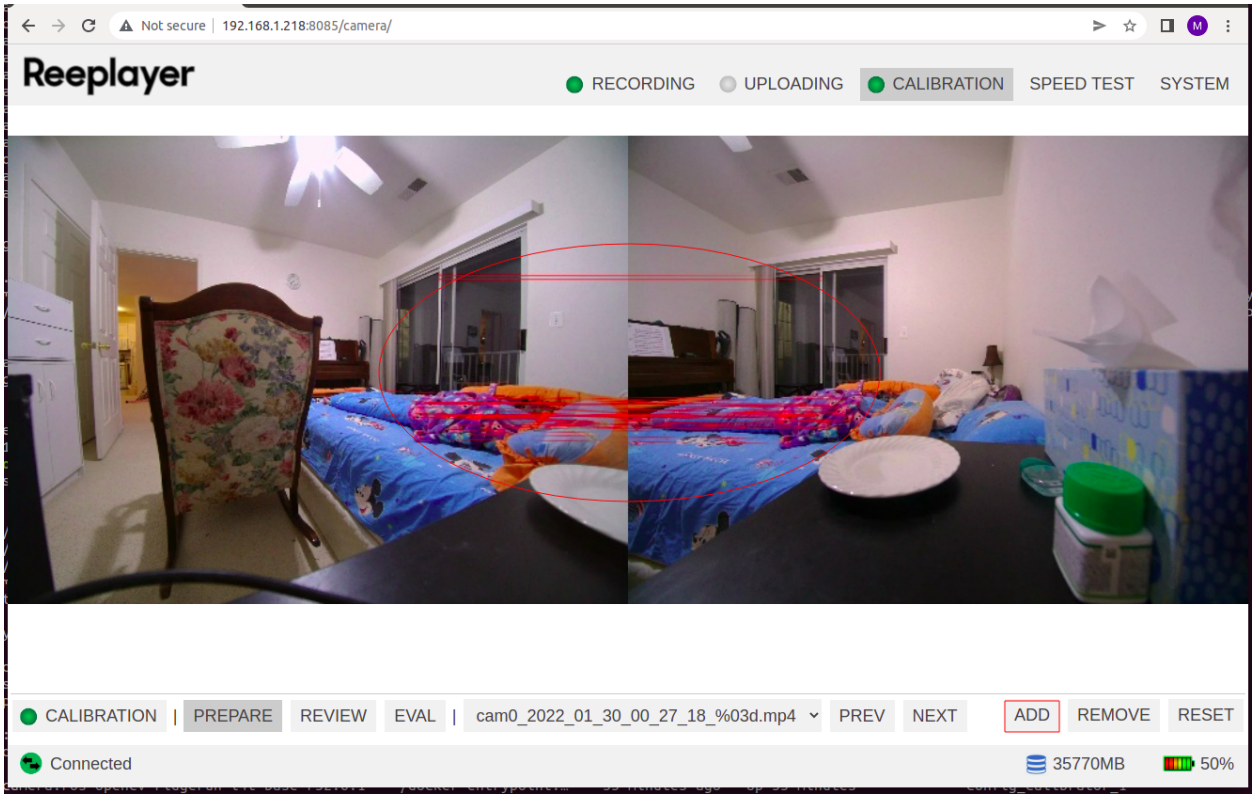
While navigating the video files, follow the steps below to collect features and matching.

1. Click the “ADD” button to add the current frame for calibration; to collect more useful features, we should add frames with an interval.

2. After clicking the “ADD” button, it will take some time for calibration software to detect features and matching, please wait until the visual result of features matching is displayed as below.

3. We may change the input video during the features collection, so the calibration will use the images from different videos.

4. We designed the “REVIEW” mode to review the collected frames and features, and remove bad features if necessary, but this function has not been implemented yet.



(the amount of features depends on the scene and parameters)

Once we think we have collected enough features, we may try to do the calibration following the steps below until we get a satisfactory result.

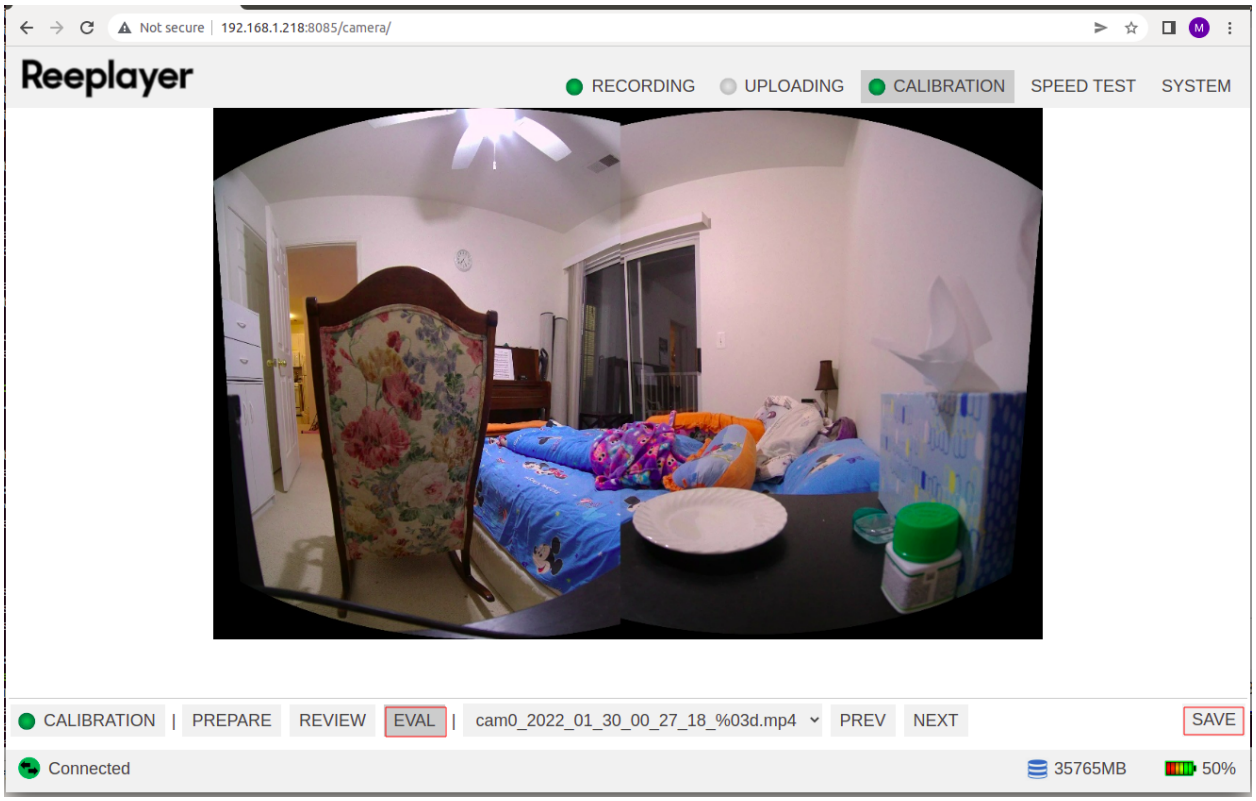
1. Click the “EVAL” button to evaluate the calibration result. (It will take some time to complete the calculation, so wait after clicking the button, until the display changes to the “stitching” mode.)

2. In evaluation mode, clicking the “PREV” and “NEXT” button will load more frames for the evaluation.

3. If the result is not satisfactory, click the “PREPARE” button to go back to the features collection step, and “ADD” more frames, and repeat the “EVAL” mode;

4. You may also click the “RESET” button to discard current features, and re-start the calibration process.

5. When you are satisfied with the calibration result, click the “SAVE” button to save the calibration data.

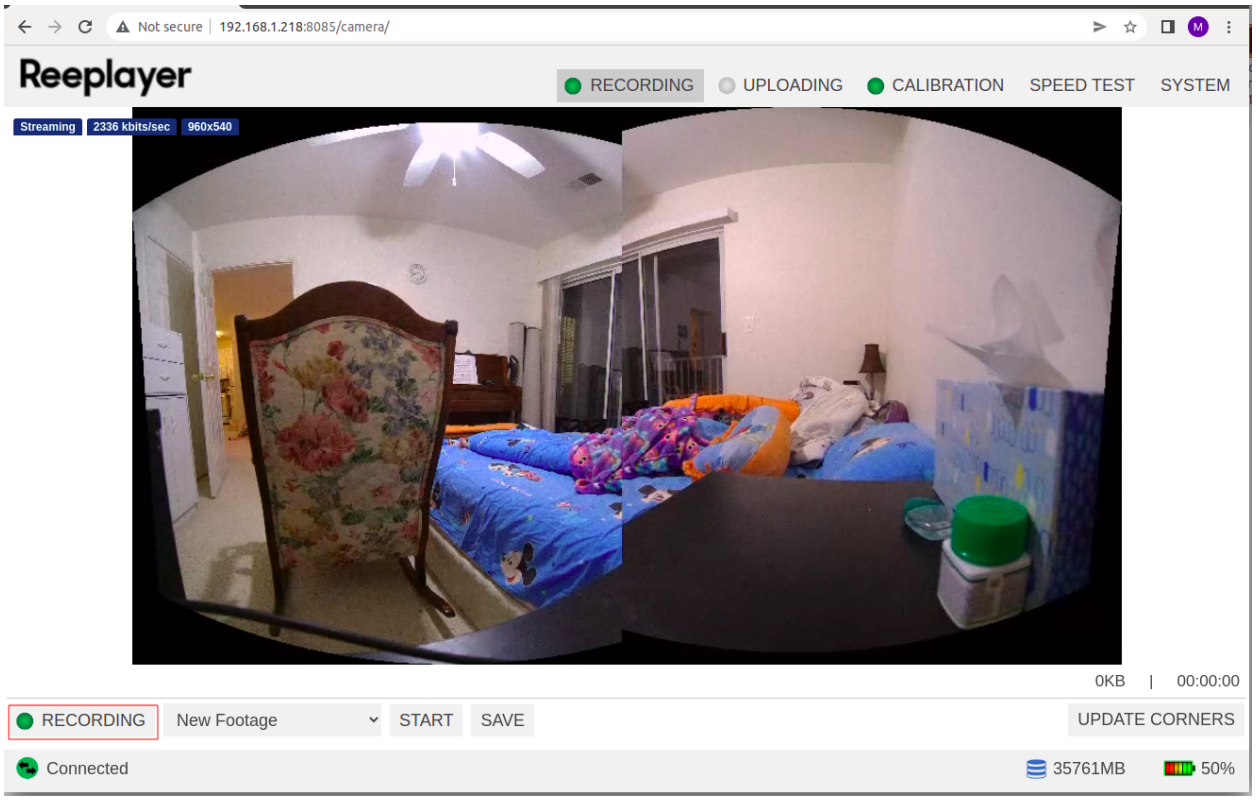


3.3. Apply the calibration result

The calibration result can be applied after the recording pipeline re-start.

1. One way is clicking the “RESTART” button in “SYSTEM” page. The camera system will re-start, then the new calibration will be applied;

2. Another way is clicking the “RECORDING” button in the “RECORDING” page to disable and enable the recording service.


Not secure | 192.168.1.218:8085/camera/
Reeplayer
RECORDING
UPLOADING
CALIBRATION
SPEED TEST
SYSTEM
Streaming
2336 kbits/sec
960x540
0KB | 00:00:00
RECORDING
New Footage
START
SAVE
UPDATE CORNERS
Connected
35761MB
50%