

360StarLight Panorama Creation and VR Live Streaming System – Stitcher

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1. Functional Description

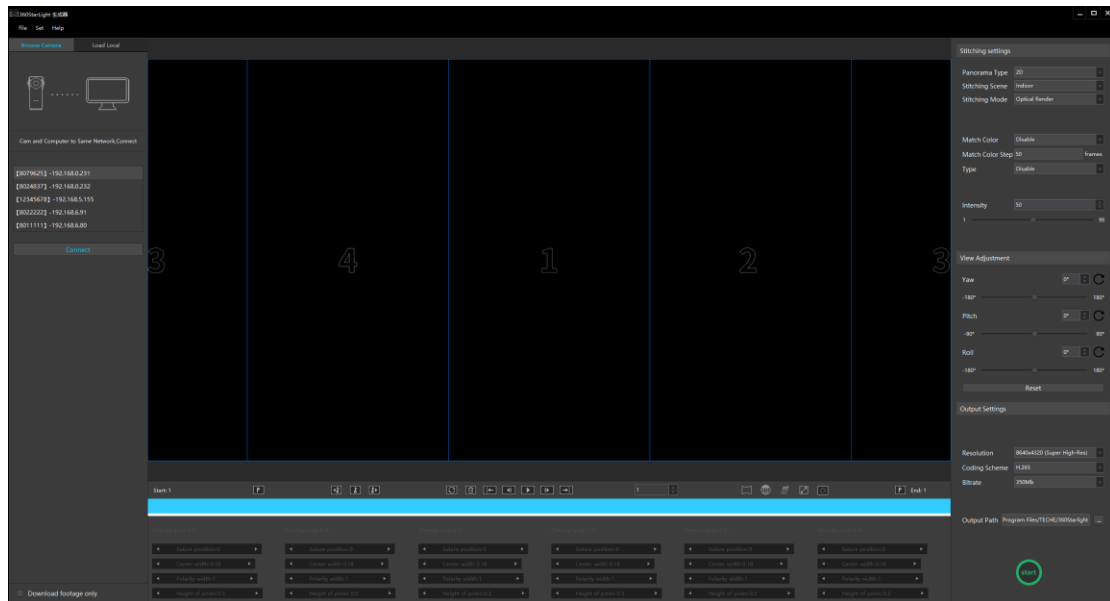
"360Starlight Stitcher" is the companion software for the Teche 360Starlight panoramic camera. It provides a convenient stitching function for VR videos/photos. With simple usage and efficient stitching, it can output high-quality panoramic videos and photos using its own algorithms.

2. Operating Environment

Hardware	System Requirements
CPU	Intel Core i7 or higher-grade CPU
RAM	8G
Graphics card	GTX 1060 or higher
Graphics memory	6G or higher
Operating system	Windows 10 64-bit operating system or higher

3. User Interface Introduction

a) UI Structure: After launching the stitcher, the system will display the main page, which can be mainly divided into a navigation bar, a material selection area, a preview area for the stitching effect, a timeline selection area, and a parameter setting area.



b) Feature List

Menu Bar	Settings	Chinese	
		English	
	Help	About	
Material Selection Area	Browse Camera	File Types Select	All
			Photo
			Time-Lapse
			Video
	Load Local	Edit	Download
			Delete
		Batch Stitching	
	Preview Mode	Select directory	
		Drag directory	
		Tiling	

Preview area for the stitching effect		VR
		Full Screen
	Lens number display	Display
		Hide
Timeline selection area	Preview Control	Preview frame-by-frame
		Preview previous frame
		Preview first frame
		Preview next frame
		Preview last frame
		Jump to specified frame
	Stitching range selection	Set as start frame
		Set as stop frame
Parameter Setting Area	Panorama Type	2D
	Stitching Mode	PTGUI
		Optical Render
	Stitching Scene	Indoor
		Outdoor
	View Adjustment	Yaw
		Pitch
		Roll
	Output Settings	Resolution(Photo,Video)
		Coding Scheme(Video)

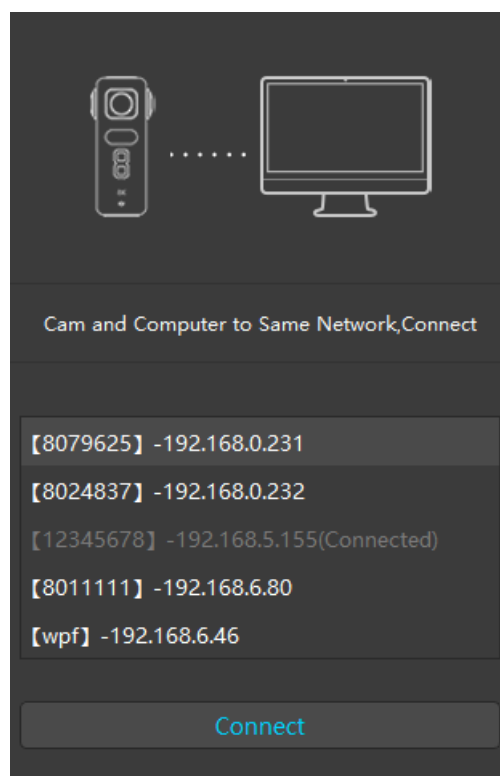
		Bitrate(Video)
		Output Path

4. User Manual

a) Loading materials

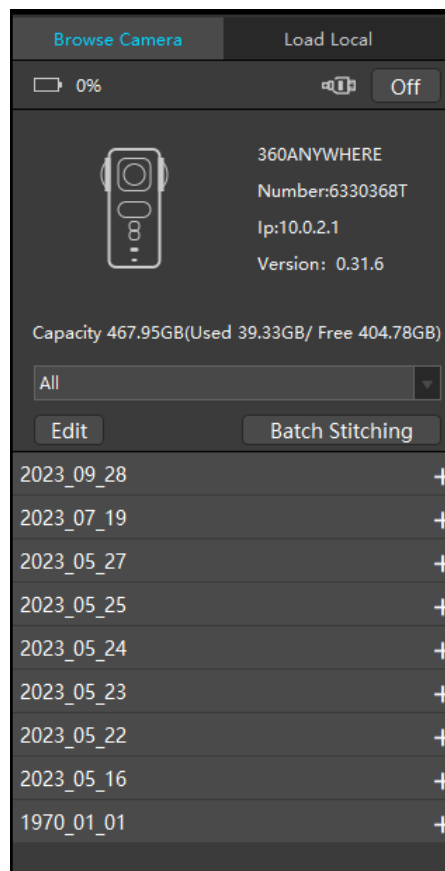
i) Camera Internal Material Loading

1). After running the stitcher, in the material selection area, the 'Cam and Computer to Same Network Connect' area will display all the cameras currently present in the network.



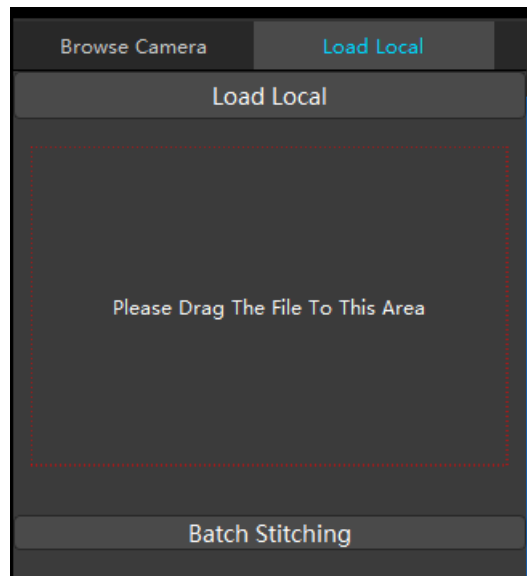
2). After selecting the desired camera and clicking the connect button, the system will establish a connection with the corresponding camera. Upon successful connection, the page will display information about the connected camera, including

device type, remaining battery level, device ID, IP address, data storage status, and all material information.

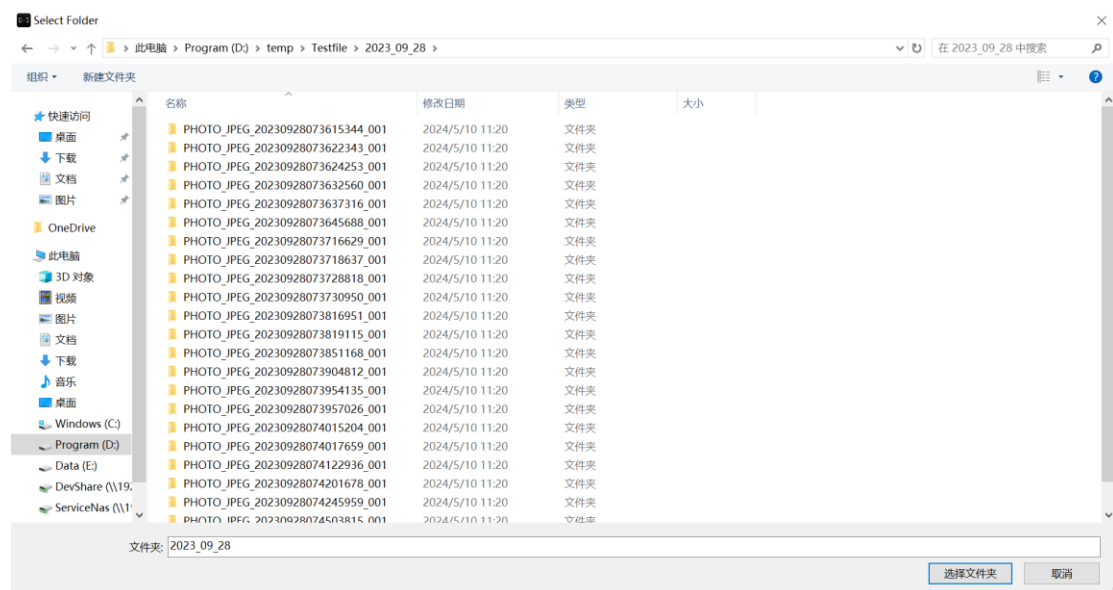


ii) Local Material Loading

- 1) After running the stitcher, in the material selection area, go to the 'Load Local' tab and click the 'Load Local' button or you can drag the data into the red area on the left.

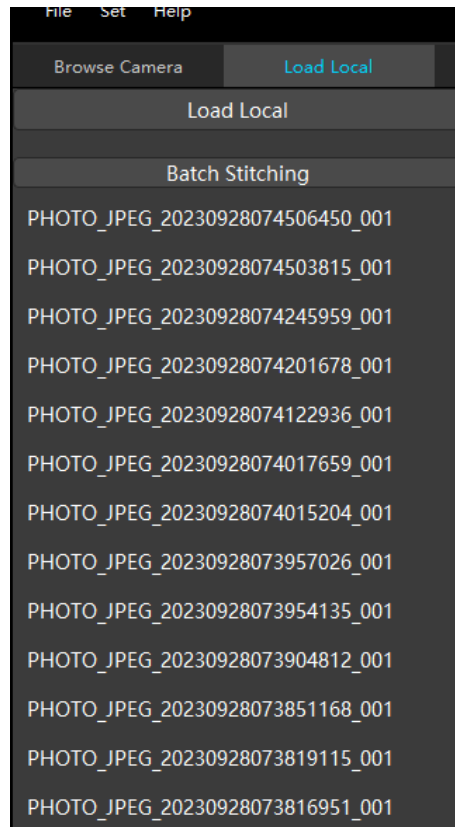


- 2) If you have clicked the 'Load Local' button, then select the directory where the materials are stored.



Note: When loading or dragging materials, load the level of the date, which is one level above the directory where the materials are located.

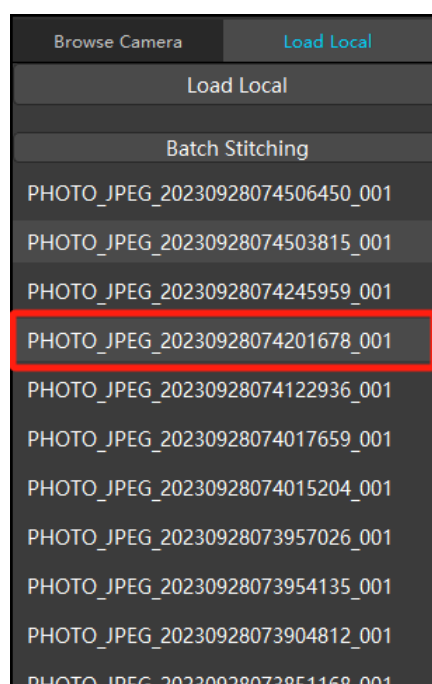
- 3) The camera will load all the materials in the selected directory.



b) Selection of Stitching Materials

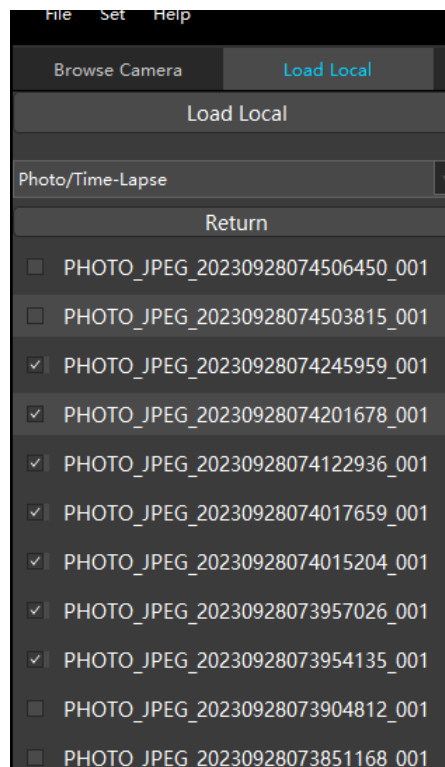
1) Single Task

In the left list, click a set of materials to stitch, which can be photos, videos, or time-lapse photography.



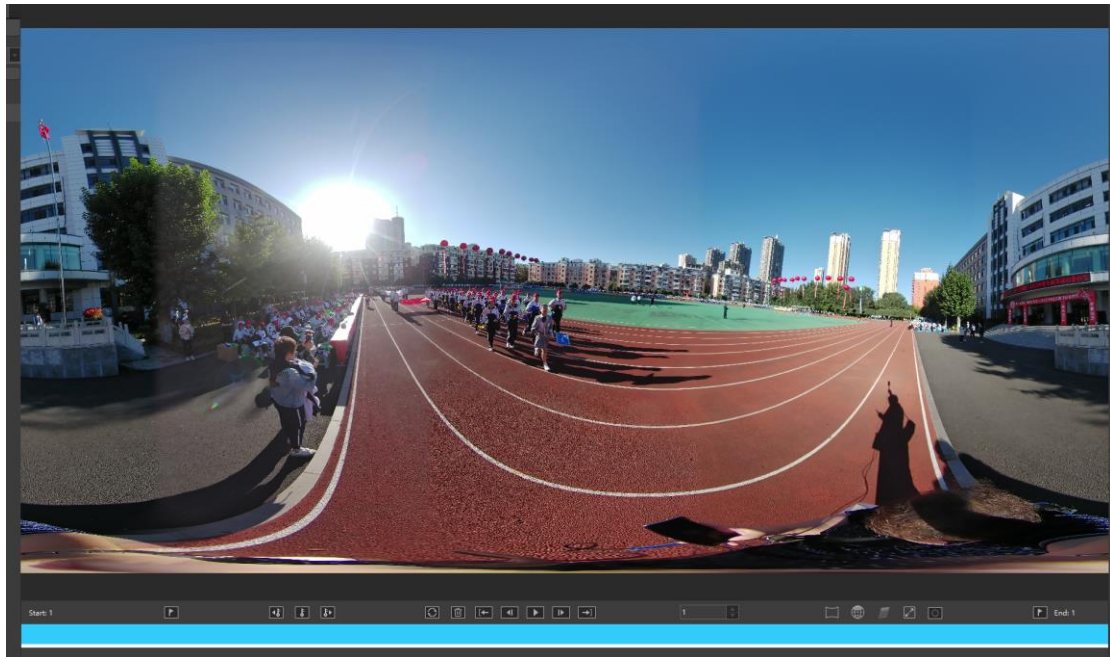
2) Batch Stitching

Click the Batch Stitching button, the left material list enters the multi-select mode, where you can choose multiple materials to stitch. You can use the Shift key for batch selection. After selecting a group of materials as the starting point, hold down the Shift key, and then click the ending point with the left mouse button. This will select all the materials between the two points.



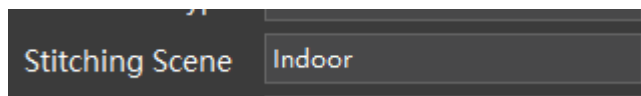
c) Parameter Settings

i) After selecting the materials to be stitched in the material list, the stitching effect browsing area will display the stitching effect of the selected materials. You can browse them in different ways. By clicking the 'Display Lens Number' button, lens numbers can be marked. All settings will be reflected in this area in real-time.



ii) In the 'Stitching Settings' section of the parameter adjustment area

- 1) Under 'Shooting Scene', the system provides options for 'Indoor' and 'Outdoor'. Choose according to the actual shooting scenario.



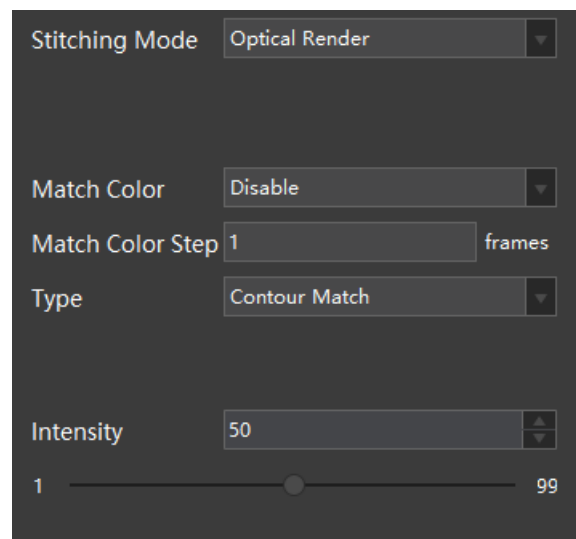
- 2) There are two stitching methods available, PTGui and Optical Flow

Rendering:

- a) For PTGui stitching, PTGui software needs to be installed on the system, and its path should be configured in the Program.ini file under 'PtguiPath'.



- b) Optical Flow Rendering will provide better stitching results. It requires a computer with an NVIDIA RTX series graphics card with a minimum of 6GB VRAM.



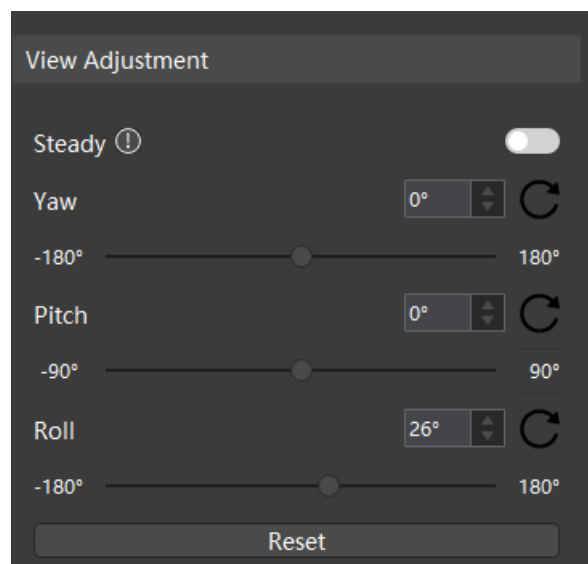
- i. The parameters for Optical Flow Rendering include: Match Color, Match Color Step, Optical Flow Type, and Optical Flow Intensity. Users can improve the stitching quality by adjusting these parameters according to their needs. Specific parameter information is as follows:

1. Color Match

- a) Disable: Color Matching not performed.

- b) Fast: Uniform color for each lens according to the interval selected by the user.
 - c) Match Color Step: The value range is from 30 to the number of video frames, and it only takes effect for videos.
2. Type: For fine stitching of images, it is recommended to use Contour Match, while for videos, it is recommended to use Block Match.
 3. Intensity: When the intensity is increased from 1 to 99, it can effectively improve the gap issue, but there might be a possibility of image distortion.

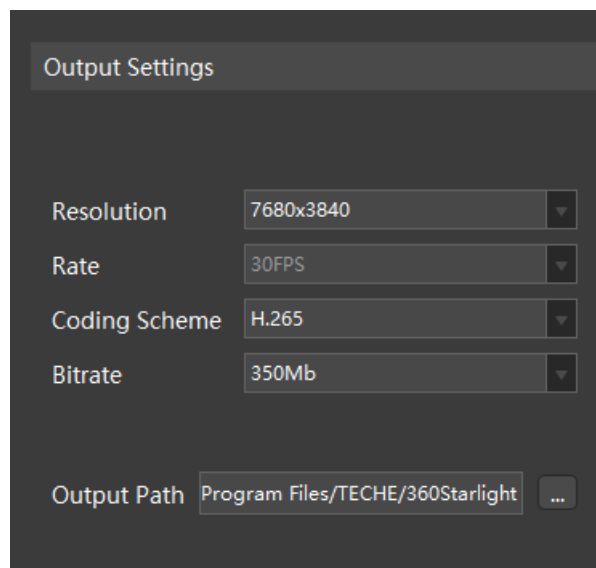
3) View Adjustment



- a) Steady: Increasing the image stability can't offset the shaking completely.

- b) Yaw: Adjusting the scroll bar from -180° to 180° changes the horizontal viewing angle of the panorama and video.
- c) Pitch: Changing the vertical center viewing angle of the panorama and video from -90° to 90°
- d) Roll: Rotating the image around the vertical axis from -180° to 180°

4) Output Settings



- a) Photos:
 - i. Resolution: 8640x4320, 8192x4096, 6400x3200, 4096x2048
- b) Videos:
 - i. Resolution: 7680x3840, 6000x3000, 3840x1920
 - ii. Coding Scheme: H.264, H.264
 - iii. Bitrate: 30-350Mbps

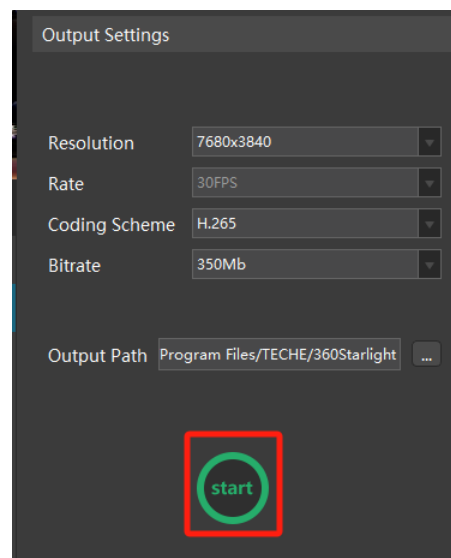
5) The selection of burst shooting and video material output area:



- a) In the timeline selection area, you can choose the browsing or output

range of the material.

- b) Click on a specific position on the timeline, then click on the "Flag" button on the left to set the selected position as the starting point.
 - c) Similarly, click on the "Flag" button on the right to set the selected position as the end point.
 - d) The blue area displayed at this time represents the selected material stitching range.
 - e) At this point, you can use the "Play" button to automatically display the stitching effect of the material in the preview area, frame by frame. Alternatively, you can manually enter the frame number to directly jump to the desired preview position.
- 6) To start exporting:



- a) After the settings are configured, click on the start button to start exporting the stitched materials.



- b) After the stitching is completed, you can view the stitched materials in the "output" directory in the output path.

7) Menu Bar

- a) Set->Language:
 - i. Chinese: To change the system display language to Simplified Chinese
 - ii. English: To change the system display language to English
- b) Help->About

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