Description of multimodal remote sensing image matching software 2.0

The designed system depends on the prior geo-referenced information of RS image to eliminate obvious geometric distortions before the fine registration. Therefore, if the sensed image does not come up with the geo-referenced information or RPCs, our system will not be applicable.

一、GEO

The first category is both the sensed and the reference images that have been geometrically corrected (i.e., L2 data).

The multi-modal image pairs of test 1 in the paper have been uploaded to Google Drive. You could download them from the following web.

Web:https://drive.google.com/file/d/1MZ4yUr-fU_q5XjMa1gLz1c-xdL_whBem/view?usp=sharing

1、 Double click to open the following exe file:

'1-SFOC-Multimodal_Remote_Sensing_Image_Registration_System.exe'.

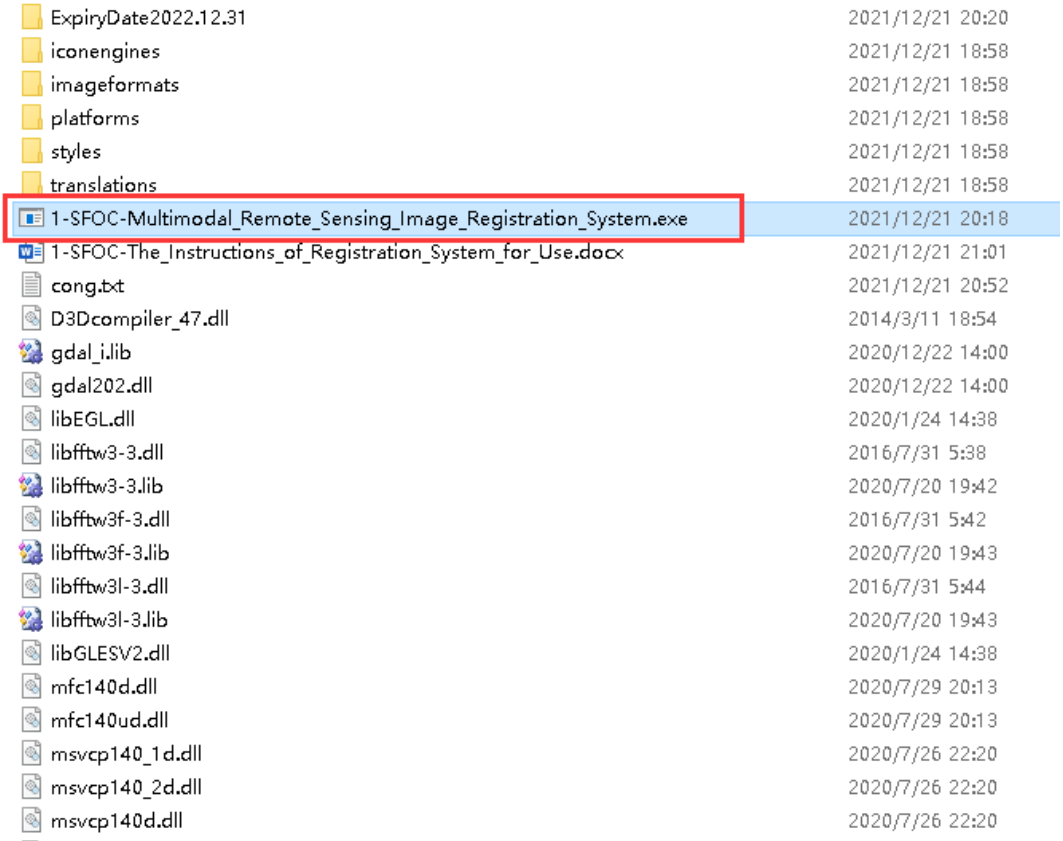

Figure 1

2、 Click the "Browse" button to set the path of the sensed image and

the reference image. The projection of the sensed and the reference image must be the same. (DEM is required for the sensed image comes with a file that includes the RPCs parameters (i.e., L1 data).)

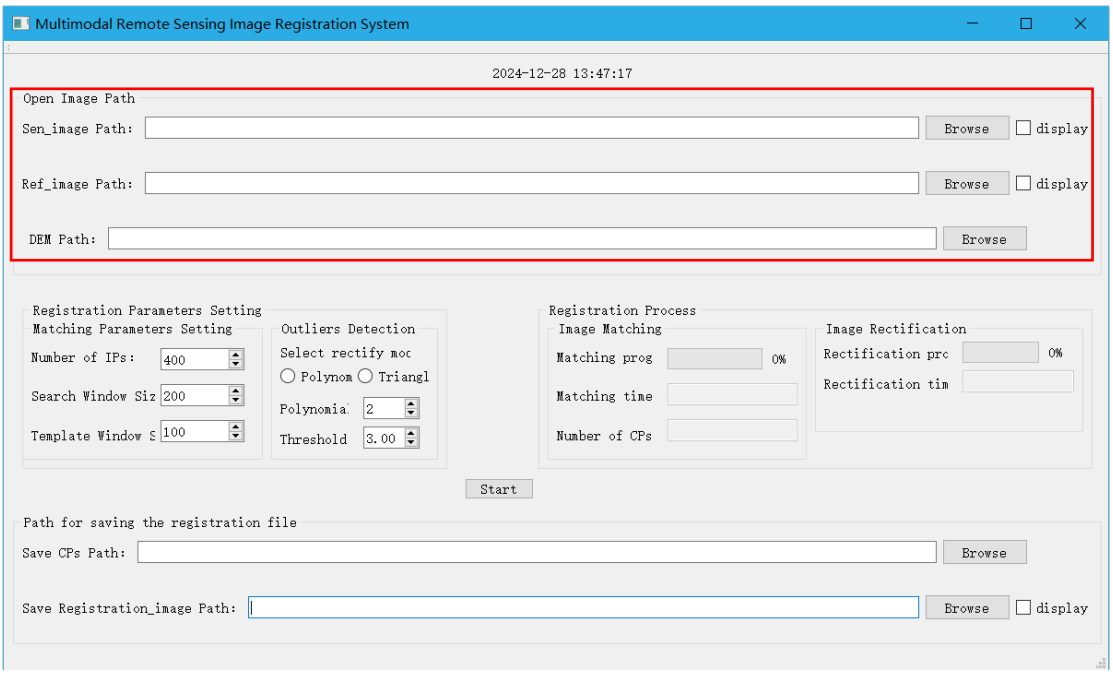

Figure 2

3、Setting the registration parameters (you can adjust the parameters based on your requirements). The default value is used if no special requirements are required.

Matching parameters setting:

Num of Ips: the default number is 400, and the adjustable range is [100, 3000]

Search Window Size: the default number is 200, and the adjustable range is [200, 500]

Template Window Size: the default number is 100, and the adjustable range is [24,200]

Outliers detection:

Polynom: Use Polynomial Model to rectify

Triangl: Use Triangular grid Model to rectify

Polynomial: Default 2-order Polynomial, can choose 1, 2, or 3-order polynomial

Threshold: The default value is 3 pixels and can be adjusted from 0 to 30

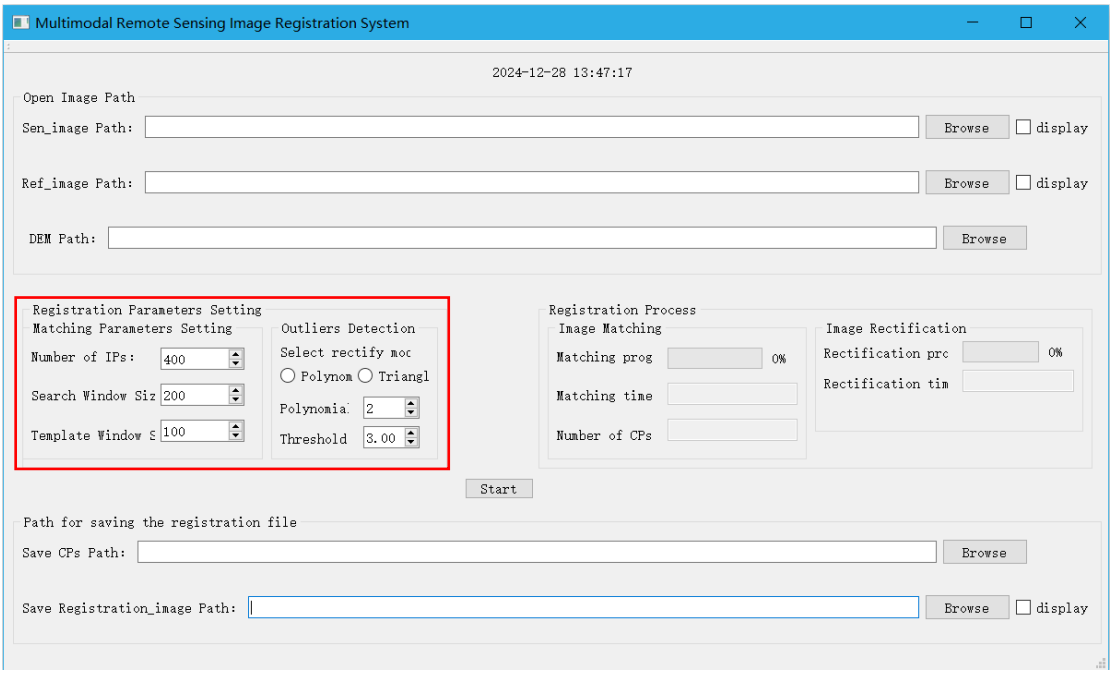

Figure 3

4、 Set the path for saving the registration file, including the path for saving CPs and the path for saving the registration image.

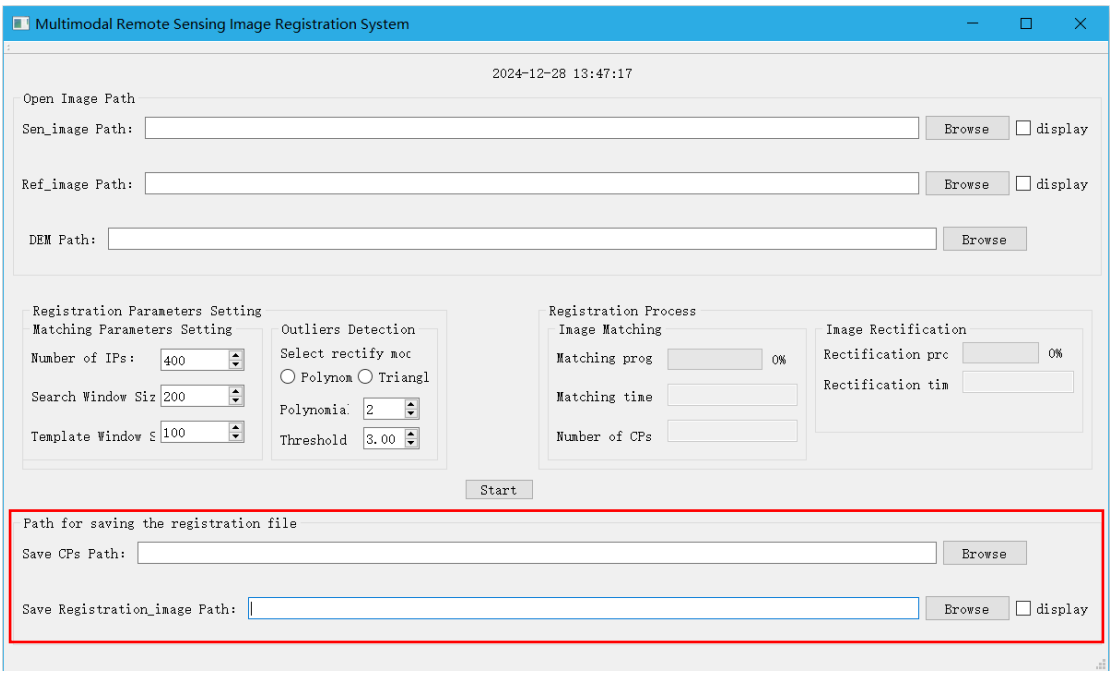

Figure 4

5、 After the path is set, click "Start ".

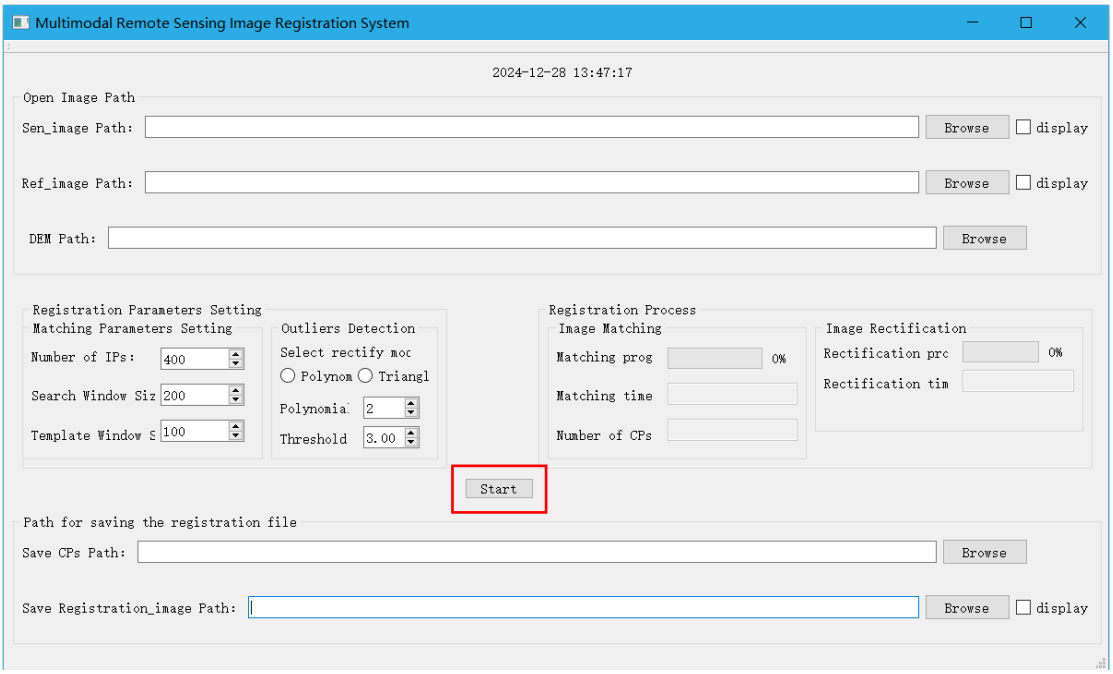

Figure 5

6、 After the registration is complete, a dialog box is displayed indicating the matching time, number of CPs, and Rectification time.

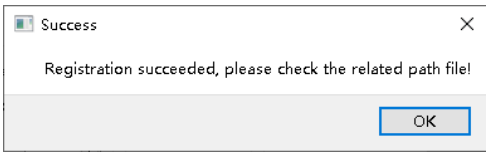

Figure 6

二、RPC

The second category is the sensed image with RPCs (i.e., L1 data).

The multi-modal image pairs of test 4 in the paper have been uploaded to Google Drive. You could download them from the following web.

Web:https://drive.google.com/file/d/1t_QgAYuSe45feGUnD9cDjTp9kG9y3O3U/view?usp=sharing

1、 Double click to open the following exe file:

'1-SFOC-Multimodal_Remote_Sensing_Image_Registration_System.exe'.

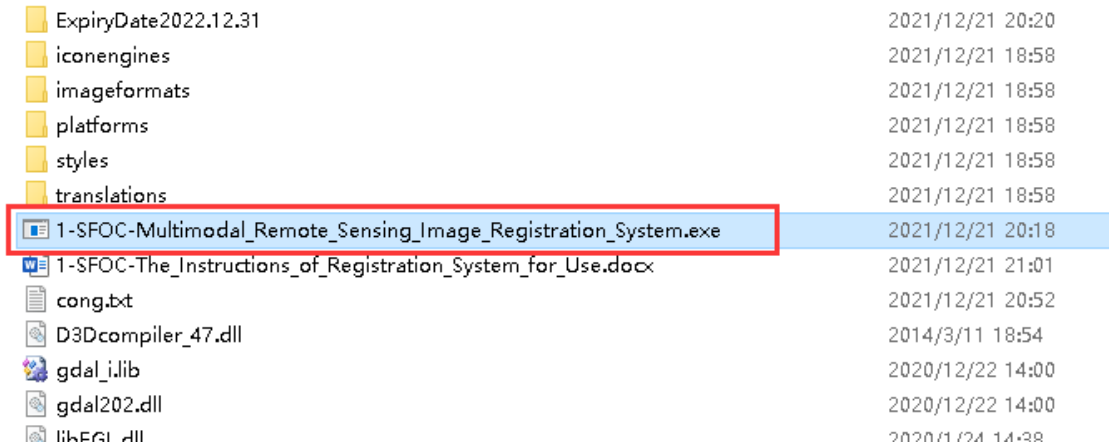

Figure 7

2、 Click the "Browse" button to set the path of the sensed image, the reference image, and the DEM image. The projection of the reference image must be the WGS 84 (see figure 8).

The path of DEM image can be empty, and generally more CPs will be matched with DEM, especially in mountainous areas.

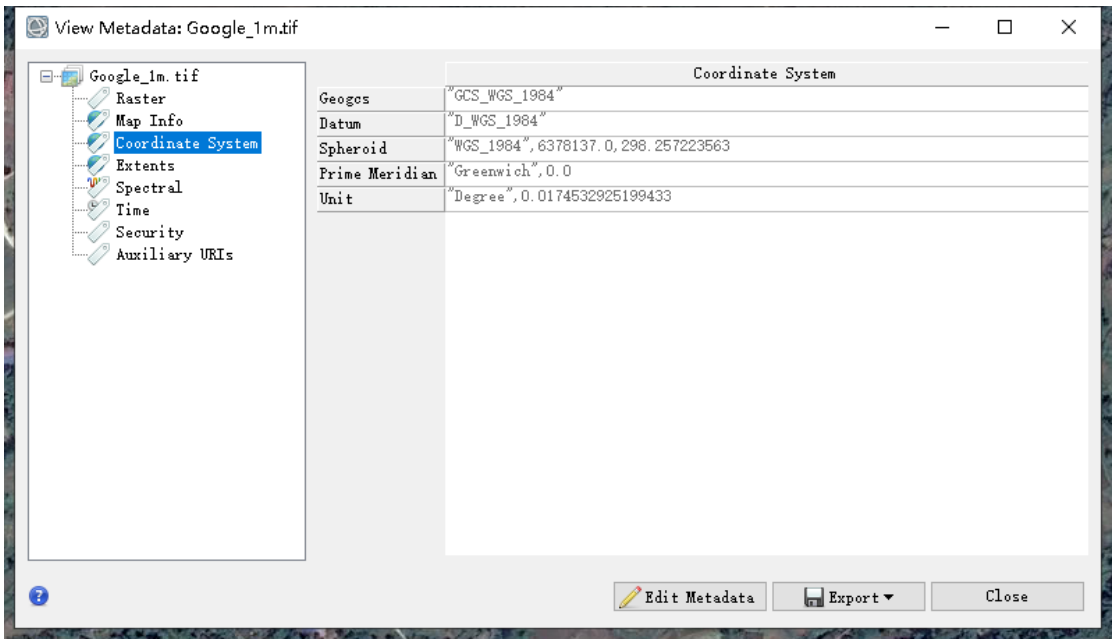

Figure 8. The projection of the reference image

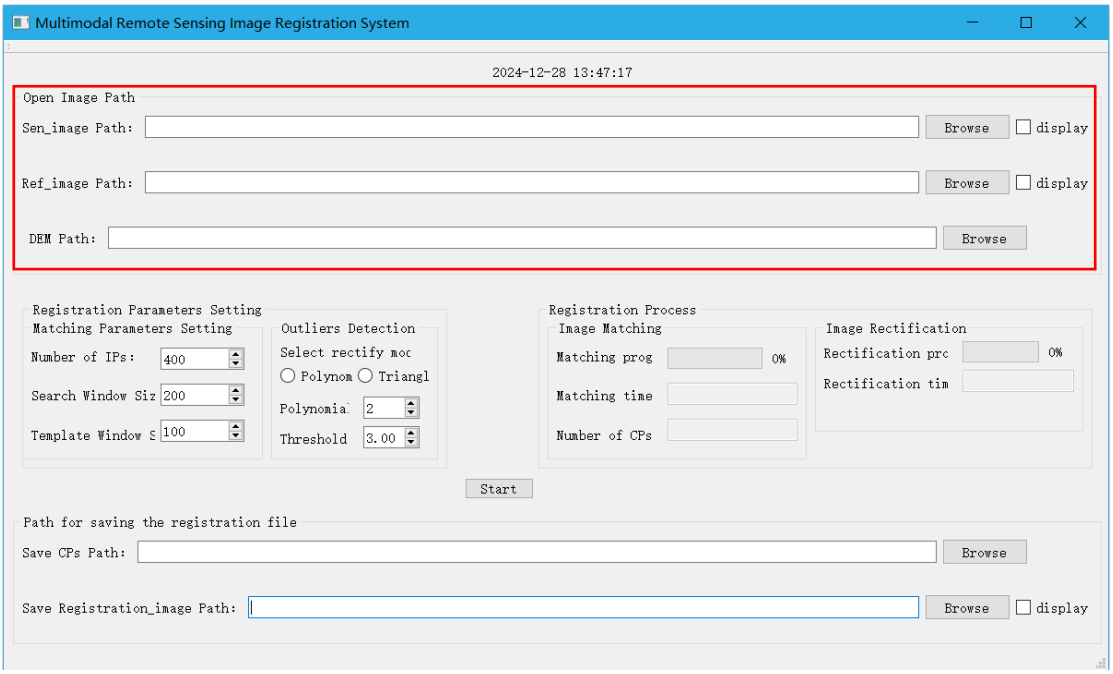

Figure 9

Note: The name of the RPC file must be the same as the image, and the suffix should be ". RPB ", as shown below:

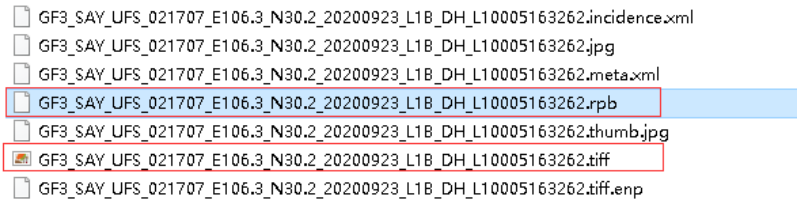

Figure 10

3、Setting the registration parameters (you can adjust the parameters based on your requirements). The default value is used if no special requirements are required.

Matching parameters setting:

Num of Ips: the default number is 400, and the adjustable range is [100, 3000]

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Polynomial: Default 2-order Polynomial, can choose 1, 2, or 3-order polynomial

Threshold: The default value is 3 pixels and can be adjusted from 0 to 30

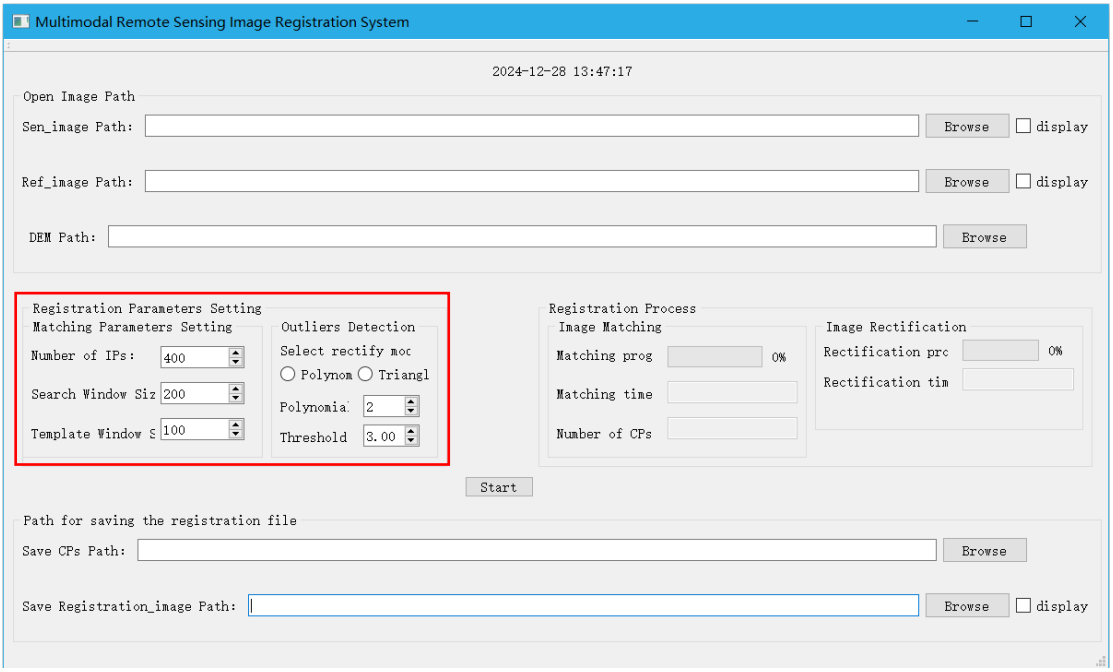

Figure 11

4、Set the path for saving the registration file, including the path for saving CPs and the path for saving the registration image.

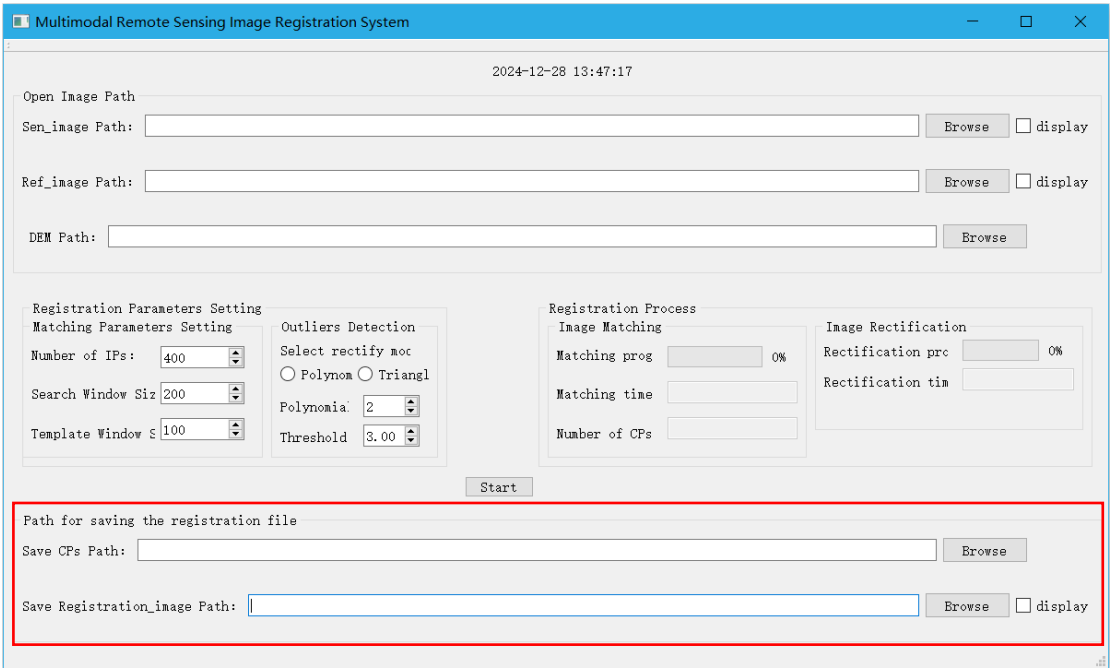

Figure 12

5、 After the path is set, click "Start ".

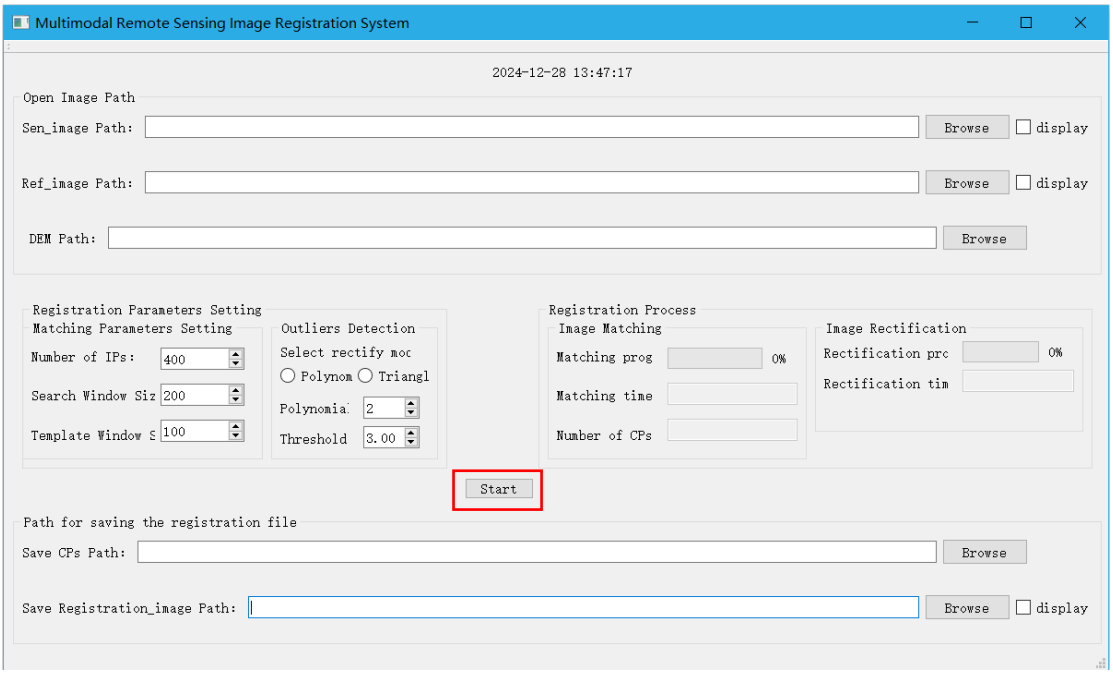

Figure 13

6、 After the registration is complete, a dialog box is displayed indicating the matching time, number of CPs, and Rectification time.

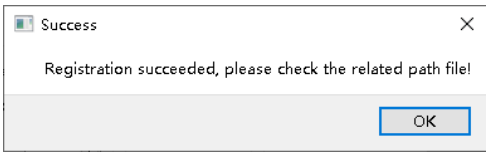

Figure 14