Dental Imaging System

User Manual

2024-04

Catalog

1.Summary

The digital intraoral imaging board control system software (DTFC) is mainly used to read and display the image of intraoral imaging board, as well as patient management and inspection tube Management, image storage, image printing and other functions.

1.1 System Function Overview

The software of digital intraoral image board scanning and processing system is composed of several modules, each of which completes specific functions, so as to realize the case examination process and provide effective diagnostic image data.

Patient management: To be examined, registered and examined, mainly for patient information management;

Image acquisition: Image reading, tooth position marking, processing and saving;

Image viewing: Processing, display, layout and tools, mainly for image viewing and processing;

Configuration: System management, inspection management, user management and password modification, mainly for system configuration.

2. Installation / Upgrade

2.1 Install DTFC

- Insert the USB flash drive and sensors;
- Open the USB flash drive;
- Open the Software folder;
- Install DTFC
- Import the calibration file

Double-click DTFC.exe to start the installation, and the following interface will appear:

1) Select Language.

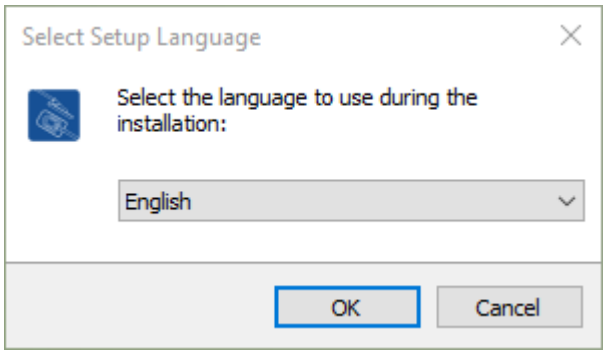


Figure 2.1.1

2) If it is an upgrade software, the following interface will appear. Click "Yes" to proceed to the next step of installation:

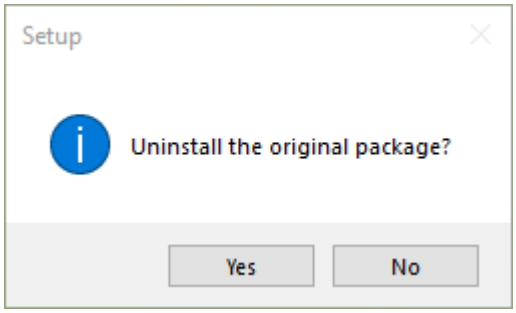


Figure 2.1.2

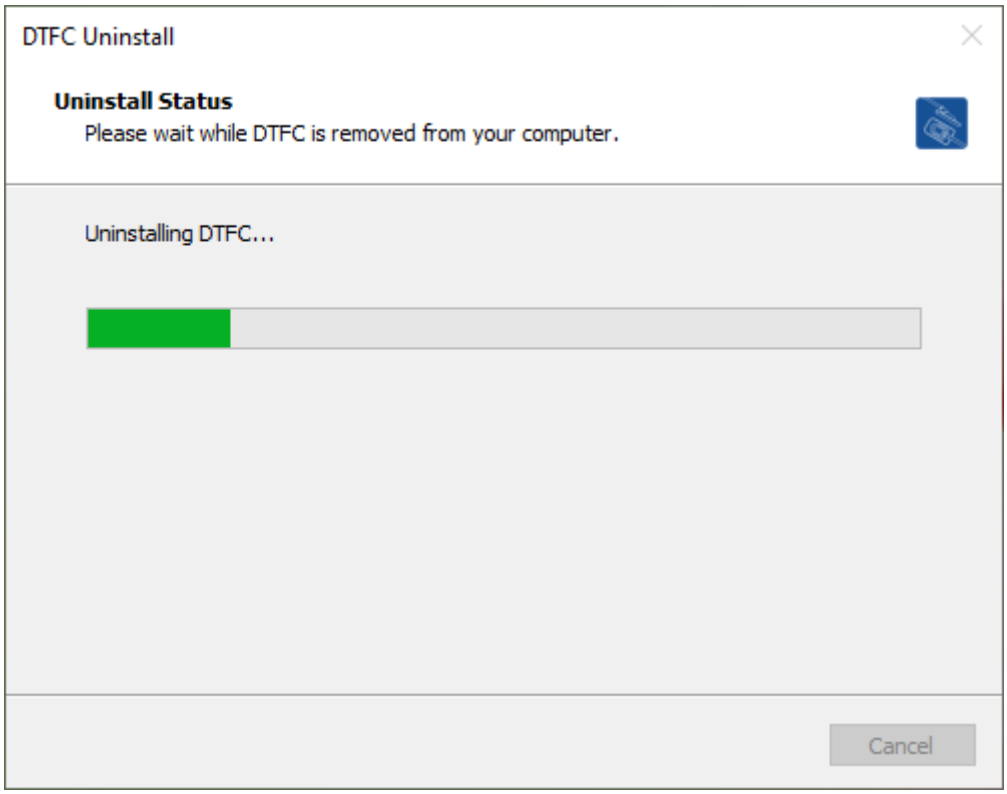


Figure 2.1.3

3) Select the installation directory, don't install it on your USB flash drive. Make sure you have enough space to save the image.

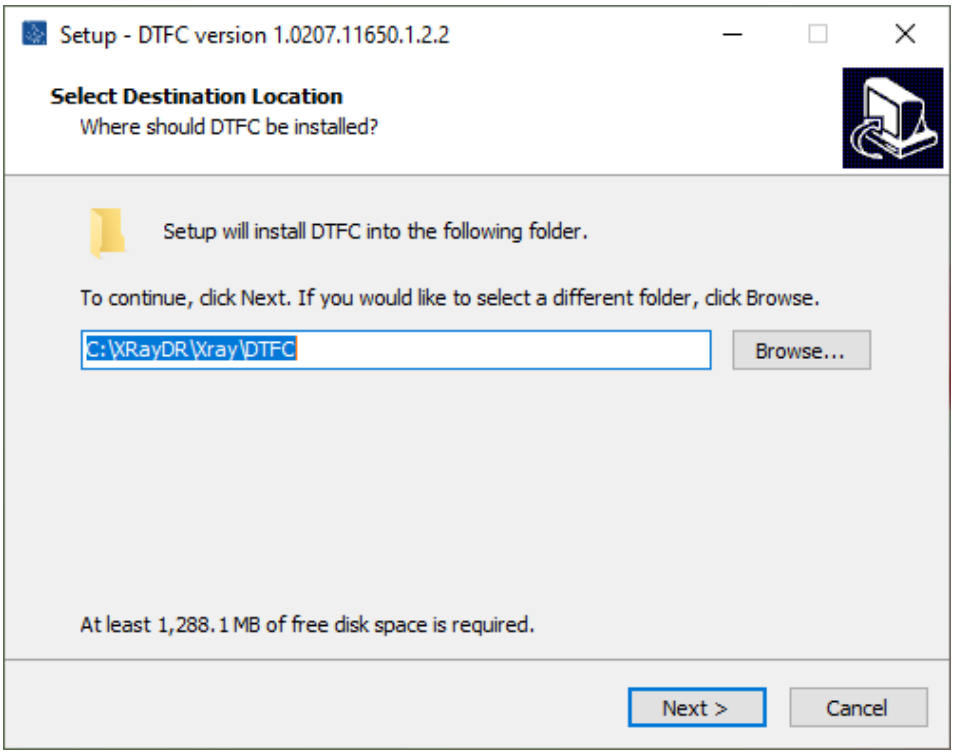


Figure 2.1.4

4) Select a version.

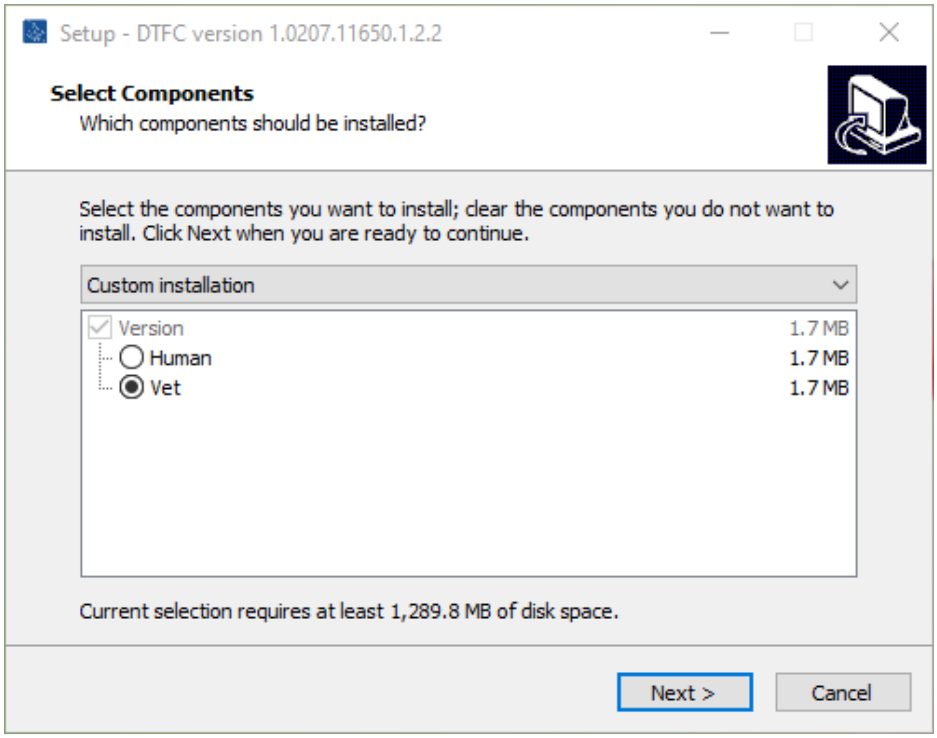


Figure 2.1.5

5) Installing:

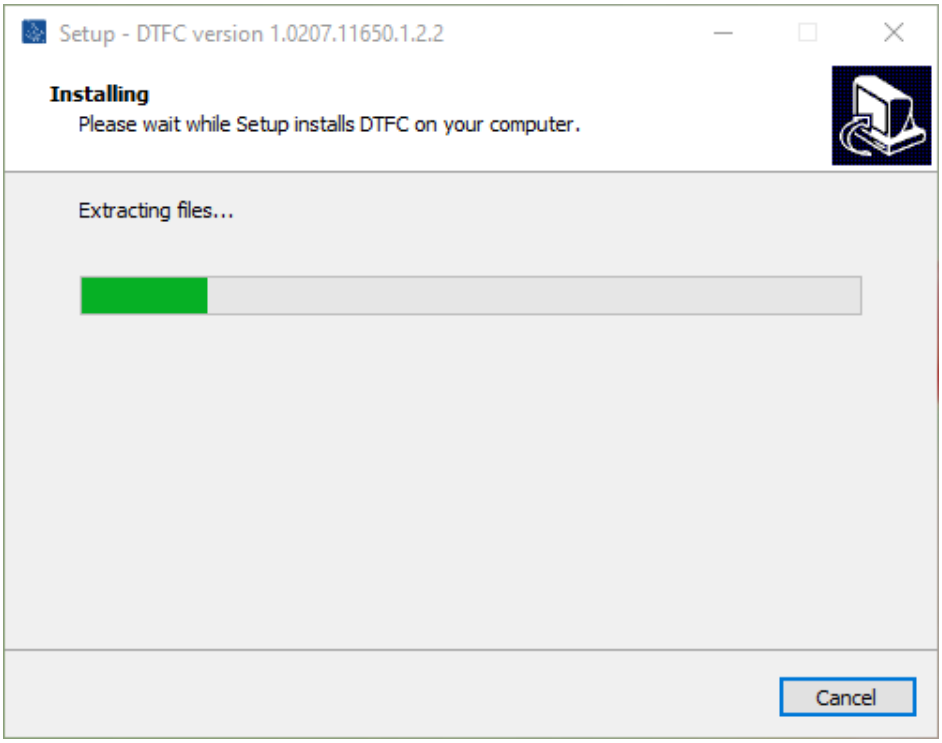


Figure 2.1.6

6) If using the sensor for the first time, select No. If it's a reinstall or upgrade, select yes to restore your data.

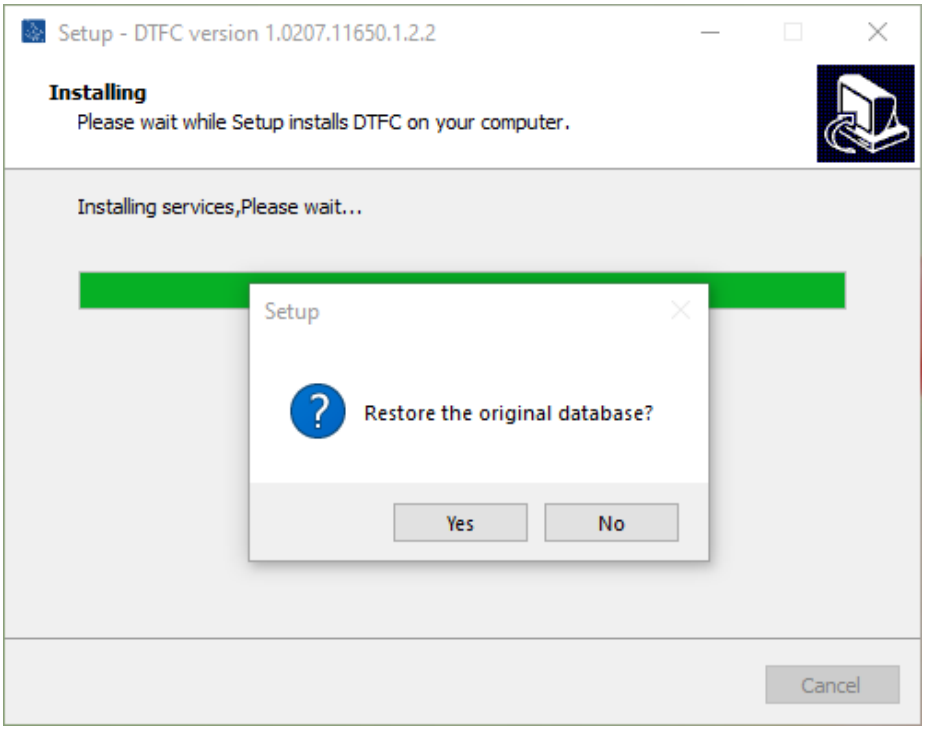


Figure 2.1.7

7) Import the calibration file, click OK will automatically import calibration files from you USB flash drive. You can also manually import the calibration file after installation.

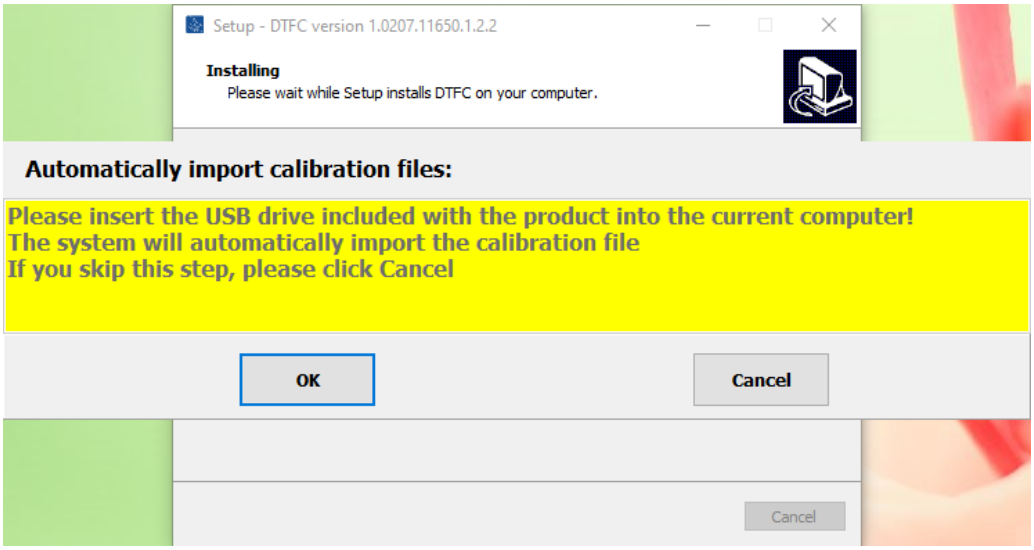


Figure 2.1.8

8) Finish.

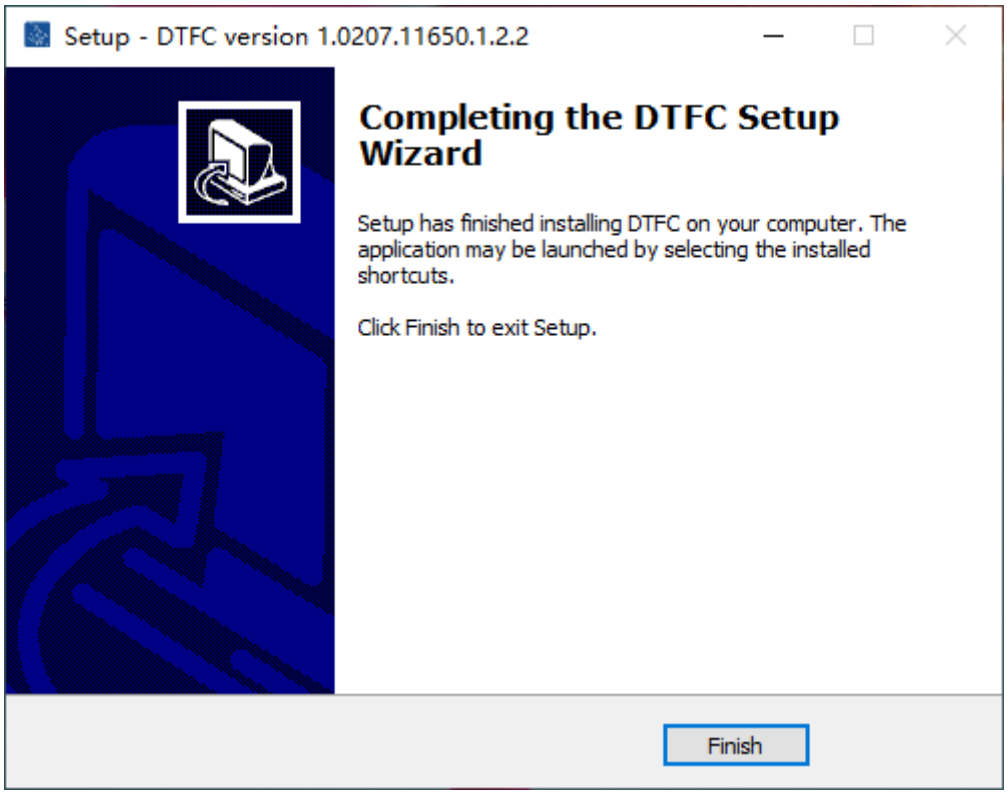


Figure 2.1.9

3. Software Function

3.1 Case Management

- Case management function: including the management of patient information, examination information and image;
- DICOM3. 0 standard worklist query service, which can query and download case data from his / PACS.

3.2 Image Acquisition

- digital photography function;
- select mirror image and rotation according to different positions;
- real time automatic window width and window level adjustment;
- patient information / examination information / equipment information / image information can be displayed;
- real time prompt the number of images that the system can store;
- real time edge enhancement.

3.3 Image Processing

- Window width and window level adjustment.
- Positive and negative film conversion, image zooming, translation, mirroring, rotation and magnifying glass display.
- you can select the original display, full screen display, histogram display, window width and window level adjustment of the region of interest.
- image annotation function, including orientation and text.

3.4 Image Output

- DICOM3. 0 standard archiving service, which can archive images to the server and support automatic sending in the background.
- Image backup function, backup images to CD / DVD, and the backup disc has its own browser to automatically play images.
- Image export, which can export the patient examination to the specified location, supports DCM, TIFF, PNG, JPG and BMP, and supports standard format and compression format.

4. Working Conditions

computer system	Recommended configuration	Minimum configuration
	CPU: Intel Core i3 (R) frequency≥ 3.5G	CPU: Intel Pentium(R) frequency≥ 3.0G
	Memory: 8G DRR3 / 4 high speed memory	Memory: 4G DDR3 / 4 high speed memory
	Hard disk: 1t high speed hard disk	Hard disk: 500g high speed hard disk
	Display: resolution 1920×1080	Display: resolution 1280×768
	Network card: pci-e100m adaptive network card	Network card: pci-e100m adaptive network card
Other hardware	Serial communication support, USB2.0 interface	
Computer operating system	Win7/ Win10/ win11	

5. Basic Inspection Operation

This part mainly explains how to check a patient through the digital intraoral imaging board control system software. Before basic inspection, confirm that the phosphor has been connected to the computer and debugging is completed.

The console is the main part of the interaction between the digital intraoral video board scanning processing system and users. Actions that the console can perform:

- login system
- register locally, add a new patient, and edit the existing patient information for this patient.
- images obtained by exposure.
- browse images, delete, save or export them.
- after taking all images of an inspection, close the inspection.
- select the output destination of the image.
- modify the patient information of the obtained image.

5.1 Login Console Software

1) Start the console software (the system can also set this software to automatic startup) and the console software will pop up login during startup

2) Sign in:

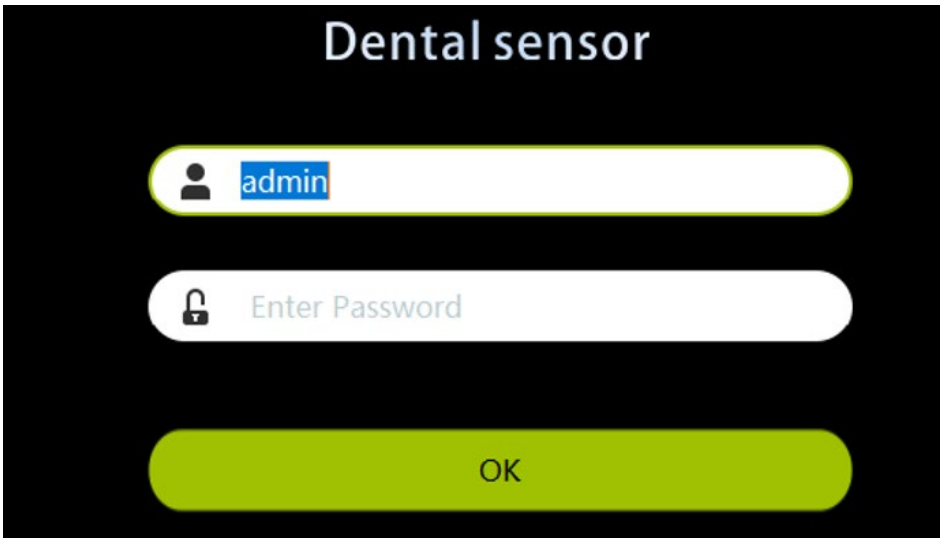


Figure 5.1.1

3) In the user login window, enter the correct user name and correct user password, and press the [OK] button to enter the login interface; If you don't want to enter the system, click the [Close] button in the upper right corner to exit. (if you do not know your login password, please consult your system administrator). By default, there is only one user admin and no password.

Note: passwords are case sensitive. If you need to change your password, please refer to system management settings.

4) After successful login, the main interface of console software appears:

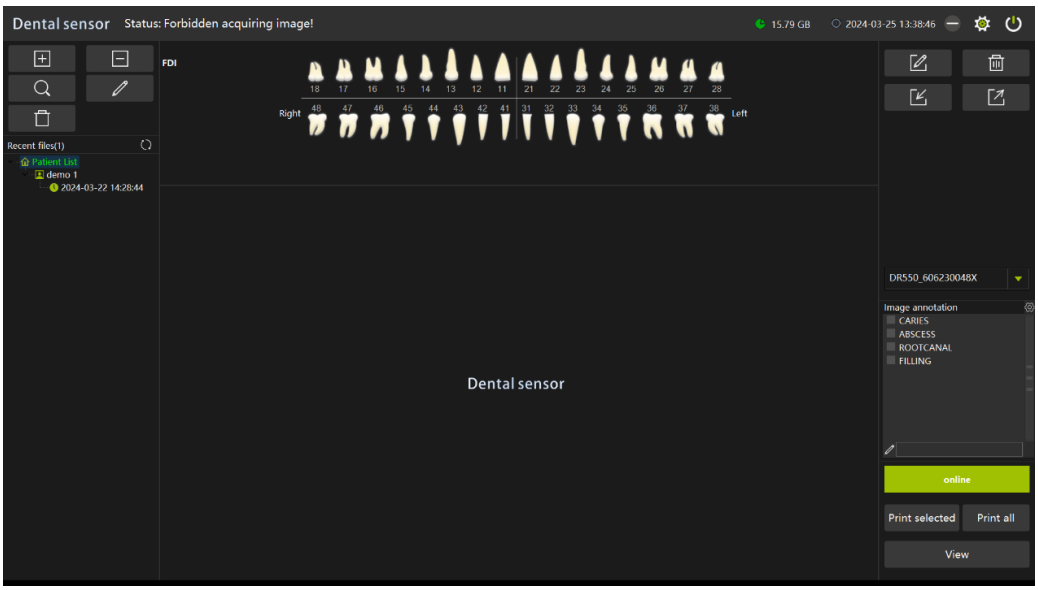


Figure 5.1.2

5.1.1 Register Patient Information

After the system logs in successfully, it enters the main interface of the system. Before image acquisition, the patient and examination information corresponding to the image must be determined.
In the registration window, the information in the check list can come from local registration or RIS registration.

5.1.2 Add Study

1) Click [Add Study] in the main interface of the software to enter the patient registration interface:

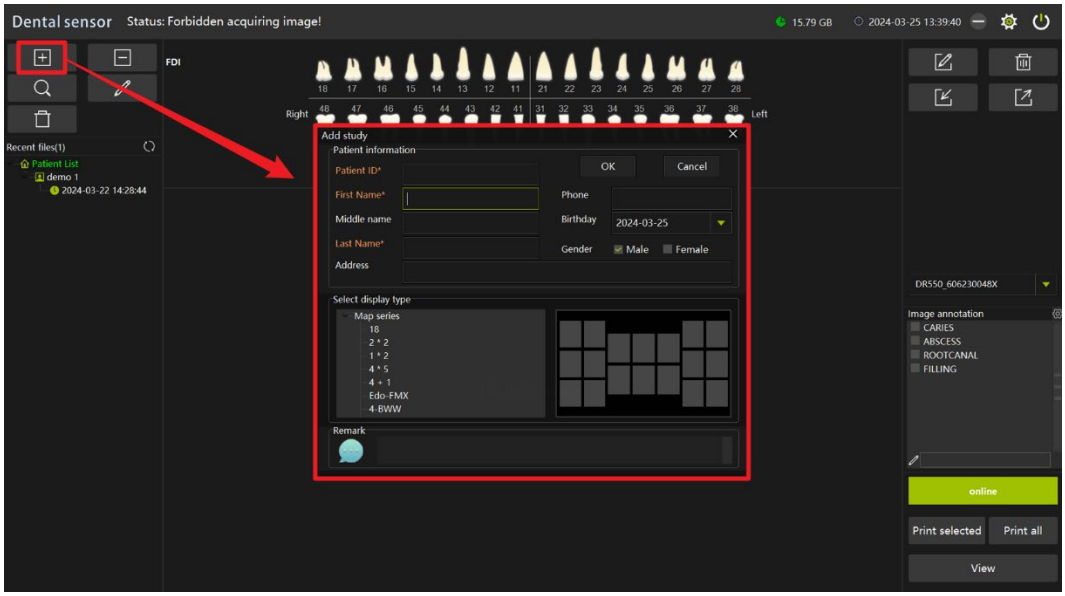


Figure 5.1.3

Enter patient information in the corresponding column of the new examination interface, including patient ID, last name*, first name*, telephone, date of birth, gender, selection series, remarks and other information. You can press tab to switch between items.

Note: items marked with * are required to ensure that the patient ID and other information are correct. The patient ID numbers of different patients are different. Incorrect input will lead to repeated input of the same patient or increase the difficulty of query in the future; For convenience and uniqueness, the system will the patient ID is generated automatically and cannot be changed manually by the user.

Note: when creating a new inspection, select it and click the [new inspection] button to enter the "new inspection" interface without prompt column; Additional inspection reference b)

2) When adding an inspection, select the record to be added, as shown in (figure 5.1.4), and click the [new inspection] button to pop up a prompt box, as shown in (figure 5.1.5); In (figure 5.1.5) check "New check" to add a new record:

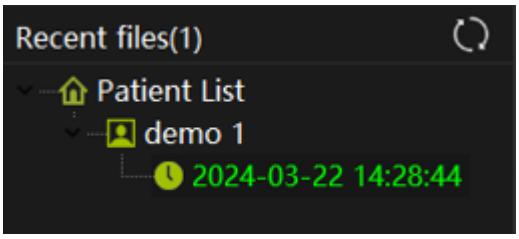


Figure 5.1.4

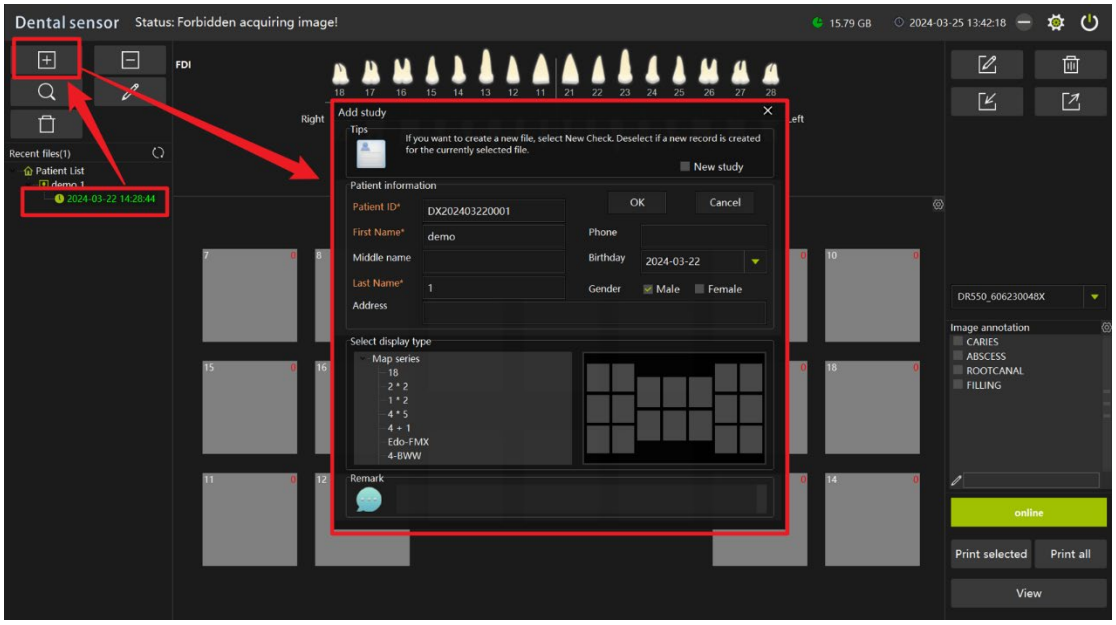
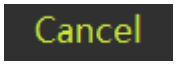


Figure 5.1.5

c) After entering the patient information in the new examination interface, click  [OK] to enter the examination interface.

d) In the new inspection interface, click  [Cancel] to exit the new inspection interface.

5.1.3 Delete study

In the main interface of the software, select the inspection items to be deleted, and click  [Delete study] to pop up the "prompt" interface for secondary confirmation to prevent accidental deletion:

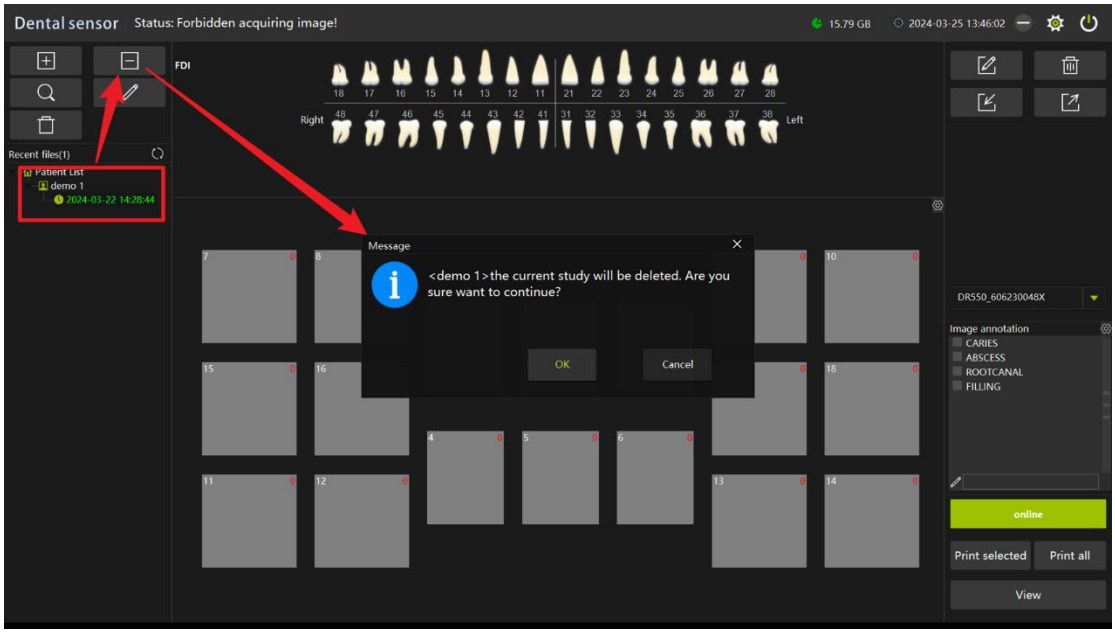


Figure 5.1.6

1) Click OK [OK] to delete the selected inspection item;

2) Click Cancel [Cancel] to not delete the selected inspection item.

5.1.4 Search study

In the main interface of the software, click the [Search study] button to pop up the "query" interface, including input box, query button and time selection:

1) Only "patient ID" or "name" can be entered in the input box. Fuzzy query and accurate query are supported. If it is blank, all records will be queried;
2) The default time is "today", which represents the current date of the system;
3) If "three days" is selected for the time, the date will automatically change to, and the current date will be pushed forward by 3 days;
4) If "one month" is selected as the time, the date will automatically change to, and the current date will be pushed forward by one month;
5) Click the time selection drop-down box to freely select the query date. The start date is less than the end date.

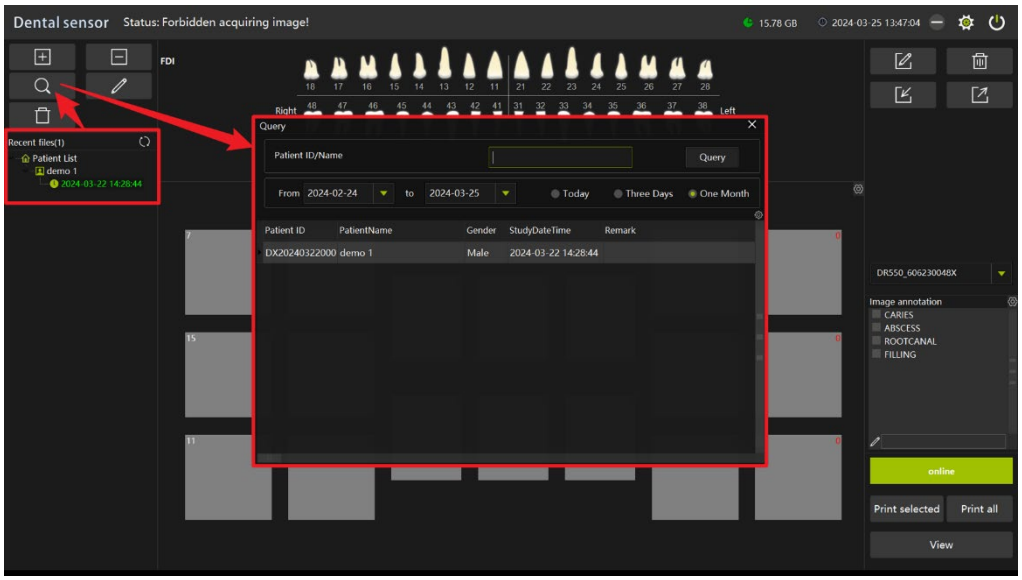


Figure 5.1.7

Start date: The time point at which the query inspection starts. Click 

the input box to enter the modification date. Click  the inverted triangle button to pop up the date pop-up box.

On the calendar pop-up window, click  the button to subtract one year from the current computer date. Click  the button to add one year to the current computer date. Click  the button to subtract the month from the current computer date; Click the button  to add a month to the current computer date;

End date: the same as the start date

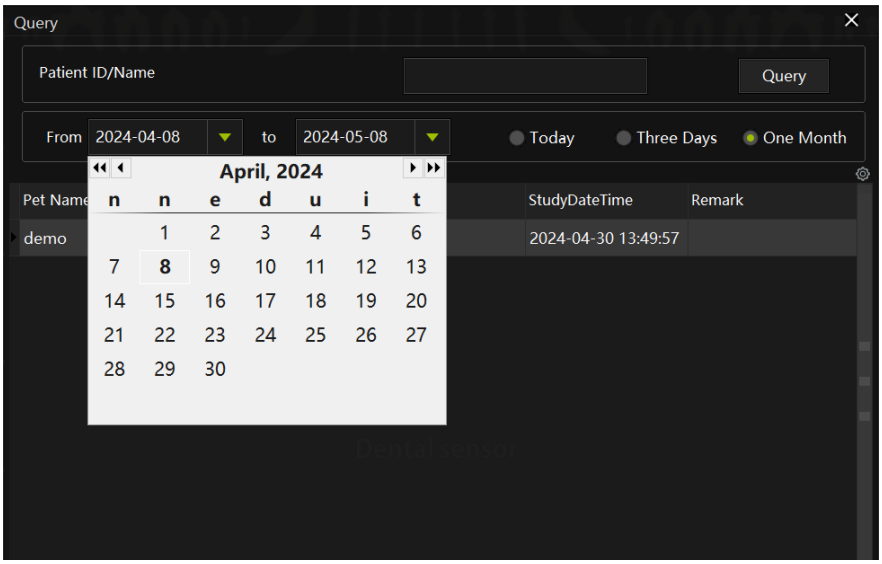


Figure 5.1.8

5.2 Update patient information

In the patient list, select the examination item whose patient information needs to be updated, and click  [update patient information] to pop up the patient information interface:

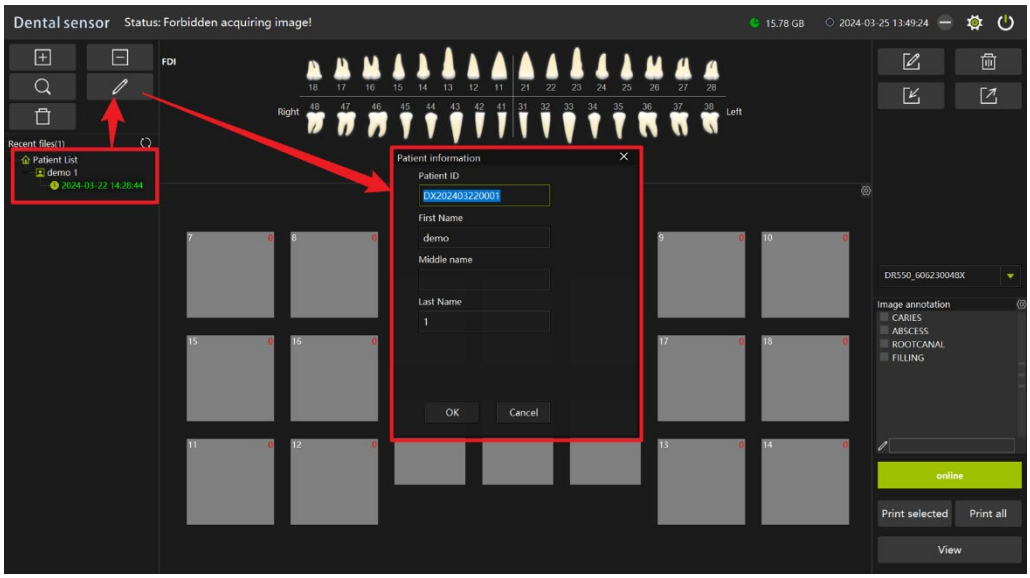


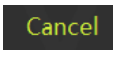
Figure 5.2.1

The patient information interface includes patient ID, last name, first name, OK button and cancel button:

a) The patient ID does not support modification. For convenience and uniqueness, the system will automatically modify it the patient ID is generated automatically, and the user cannot change it manually;

b) After entering the correct "last name" and "first name", click 

[OK] to modify successfully and return to the main interface;

c) In the patient information interface, click 

[Cancel] to return to the main interface.

5.3 Recent files

The latest file displays the registered files, and the number of entries is associated with the default query days under system management - UI. If one month is selected as the default query days, the patient list displays the data of one month (30 days before the current system date).

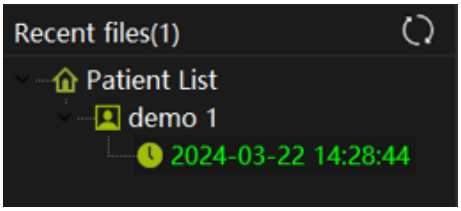


Figure 5.3.1

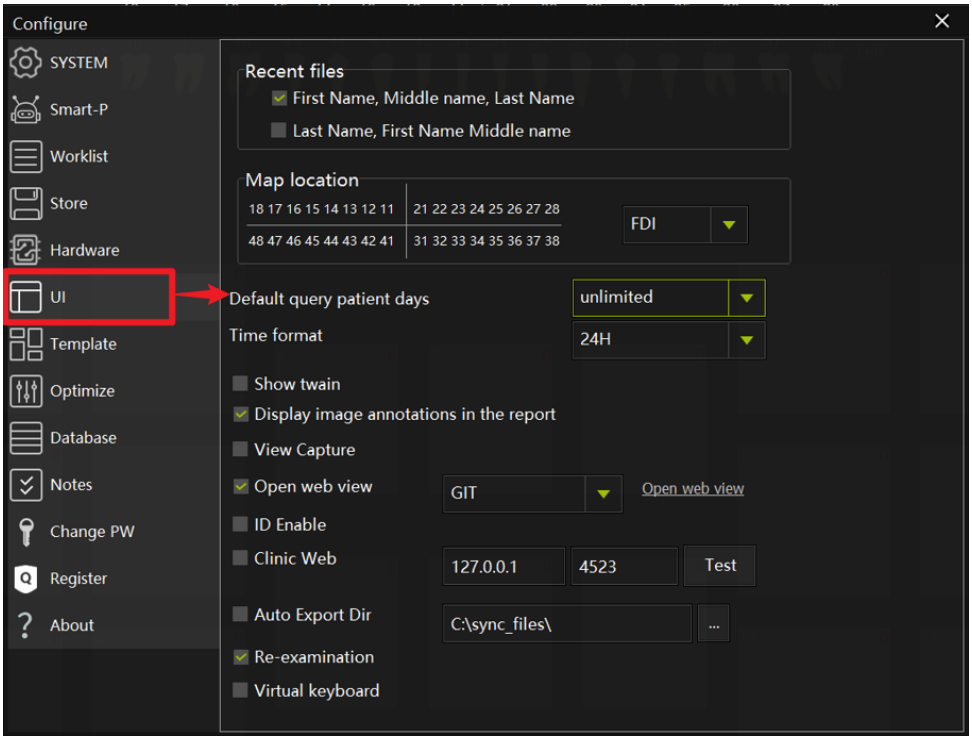


Figure 5.3.2

5.4 Image acquisition

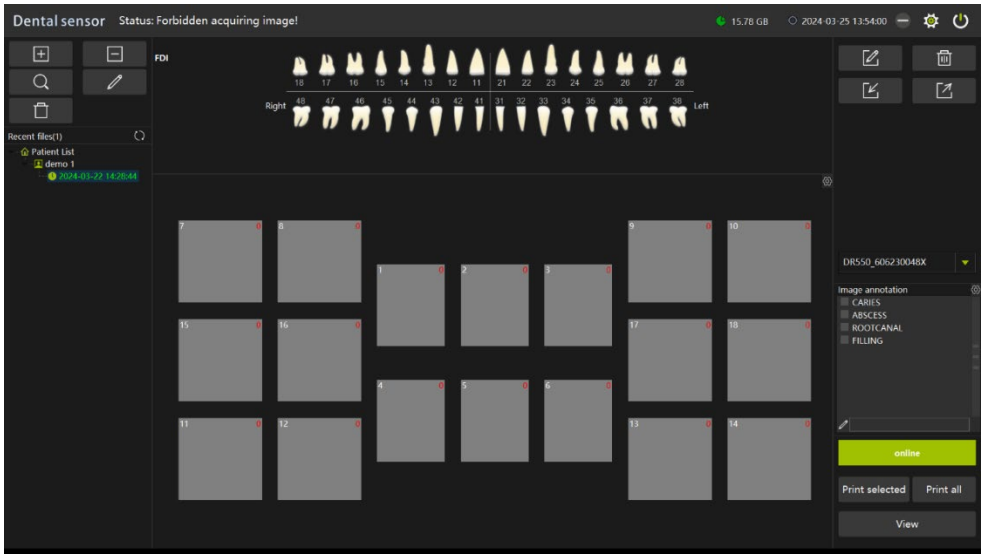


Figure 5.4.1

1) Select the empty rectangle to collect the image. After collecting the image, the image will be displayed in the selected empty rectangle;

2) Rectangle of image already exists, unable to collect image again.

5.5 Edit

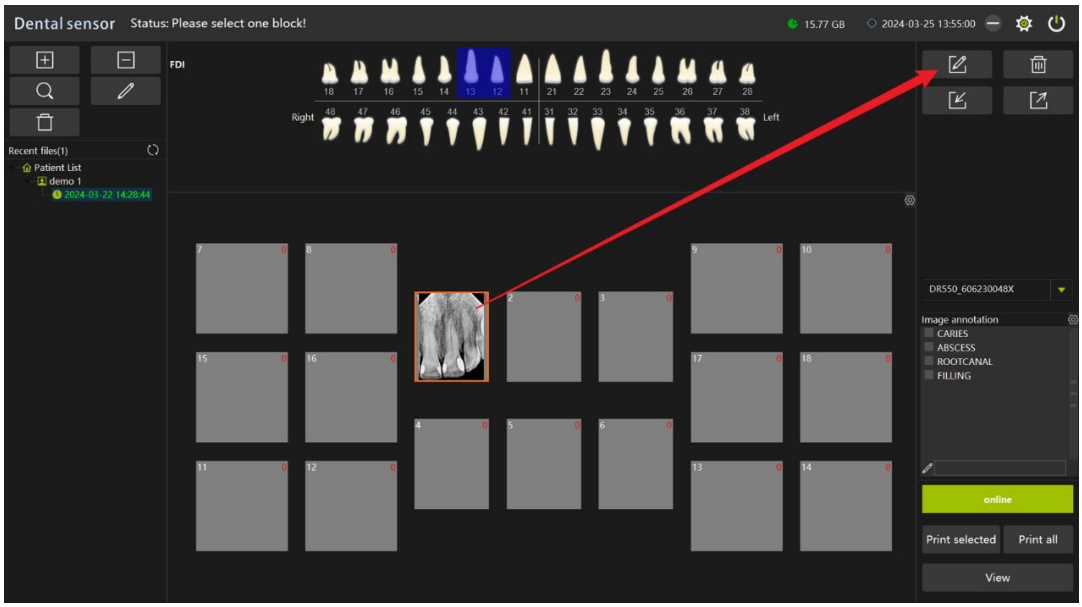


Figure 5.5.1

1) Select the rectangle of the collected image in the main interface, and click  [Edit] to enter the film reading interface;

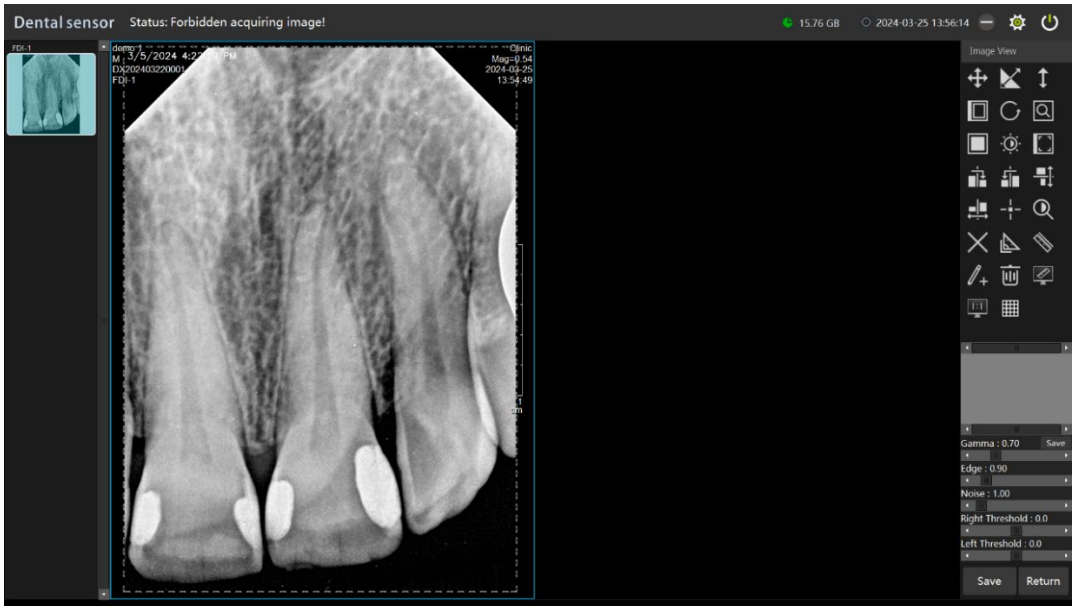


Figure 5.5.2

2) If the rectangle of the collected image is not selected, click the [Edit] button, and there is no response in the interface.

5.6 Delete image

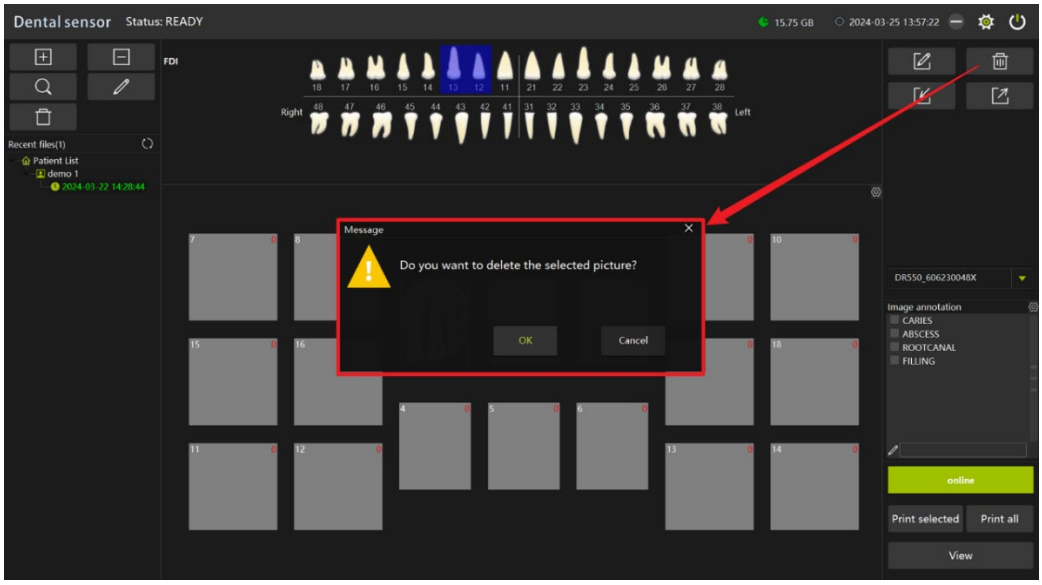
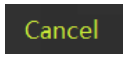


Figure 5.6.1

a) Select the rectangle of the collected image and click  [delete] to pop up the prompt interface;

d) Click  [OK] to delete successfully and return to the main interface;

e) Click  [Cancel] to return to the main interface without deleting.

5.7 Import

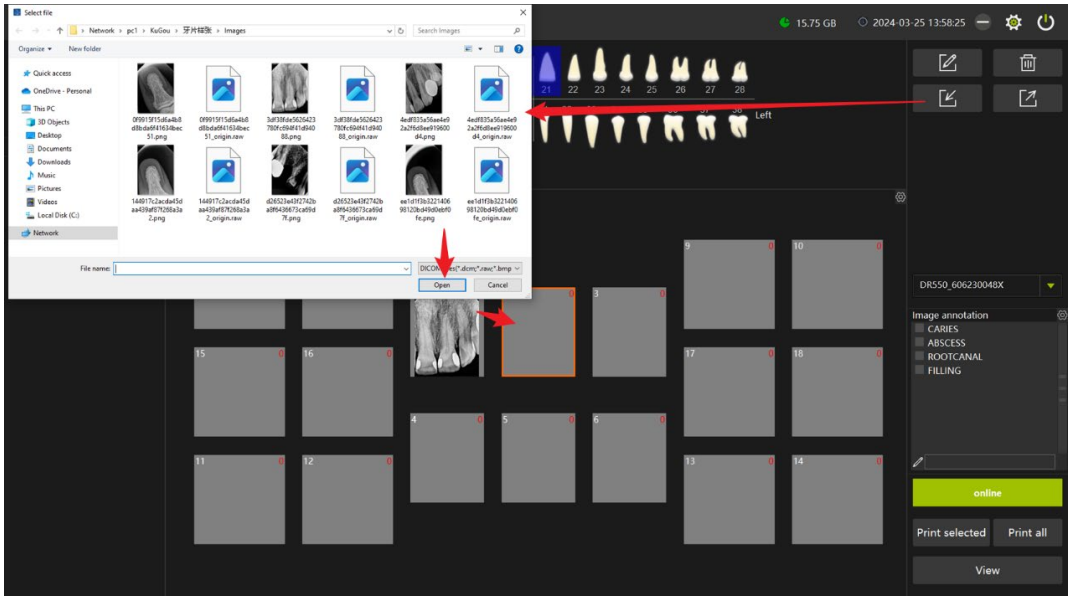


Figure 5.7.1

1) Select an empty rectangle and click [Import] to open the file selection interface. The imported file supports DCM, RAW, BMP, TIFF, JPEG and PNG formats; After successful import, the imported image displays normally;

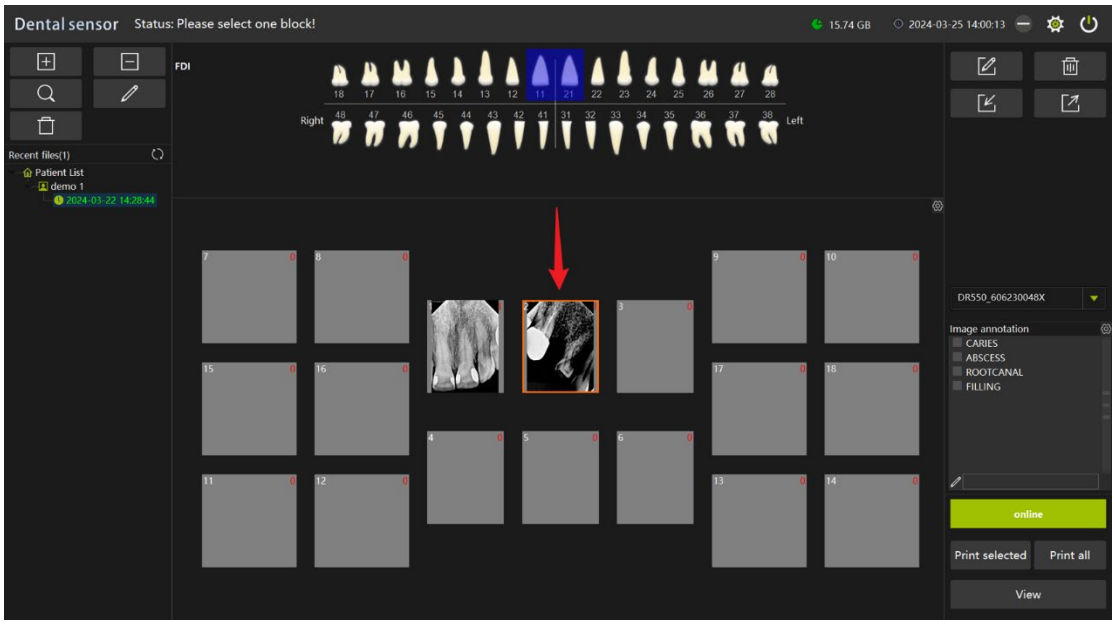


Figure 5.7.2

2) Select a non-empty rectangle and click the [import] button. There is no response.

5.8 Export

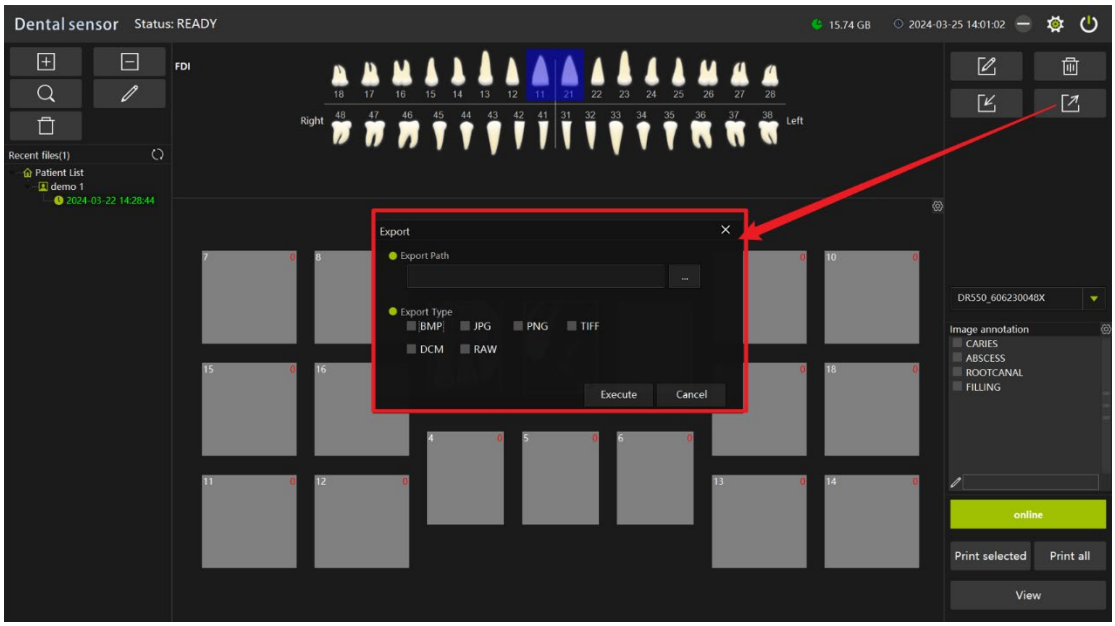


Figure 5.8.1

1) Click  export to open the export interface;

2) Click  [select export path] to open the "save file" interface. After selecting the path, you need to fill in the file name;

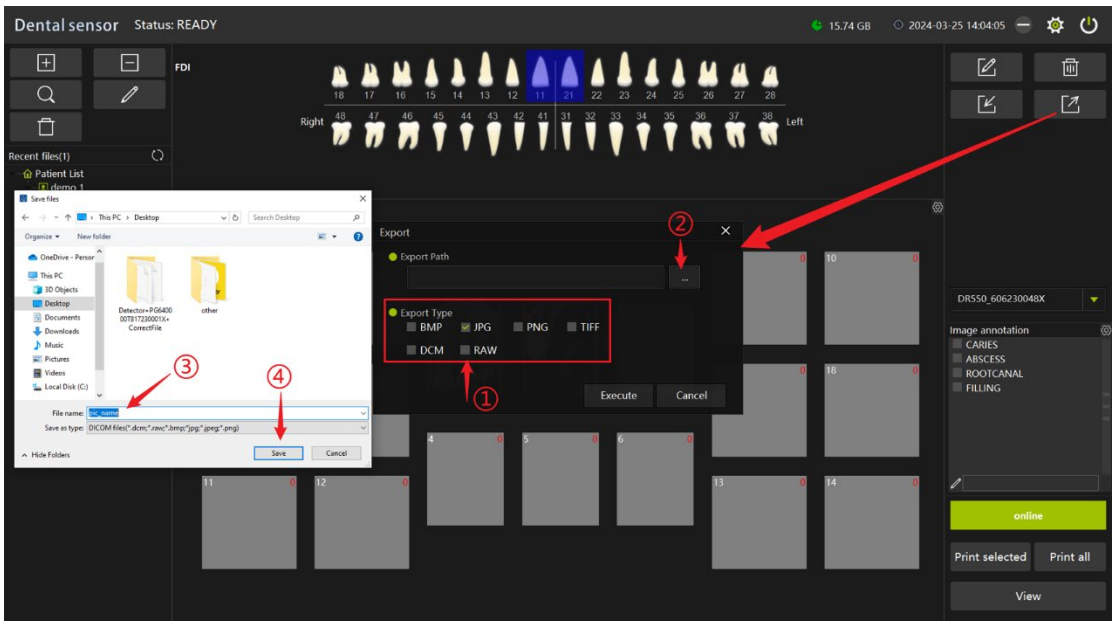
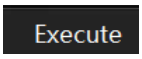
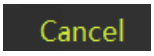


Figure 5.8.2

3) Check the export type. Multiple selections are supported;

4) Click  [execute] to export;

5) Click  [Cancel] to return to the previous level without exporting;

5.9 Select detector

In the main interface, pull the detector selection box to display all detectors connected to the computer:

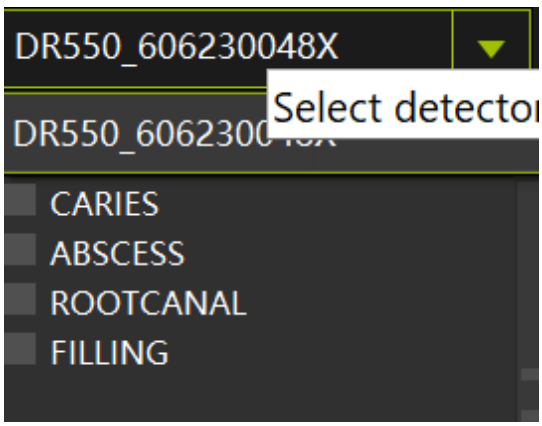


Figure 5.9.1

5.10 Edit template

1) Select the rectangle of the collected image and click the Edit [Edit] button to enter the editable state;

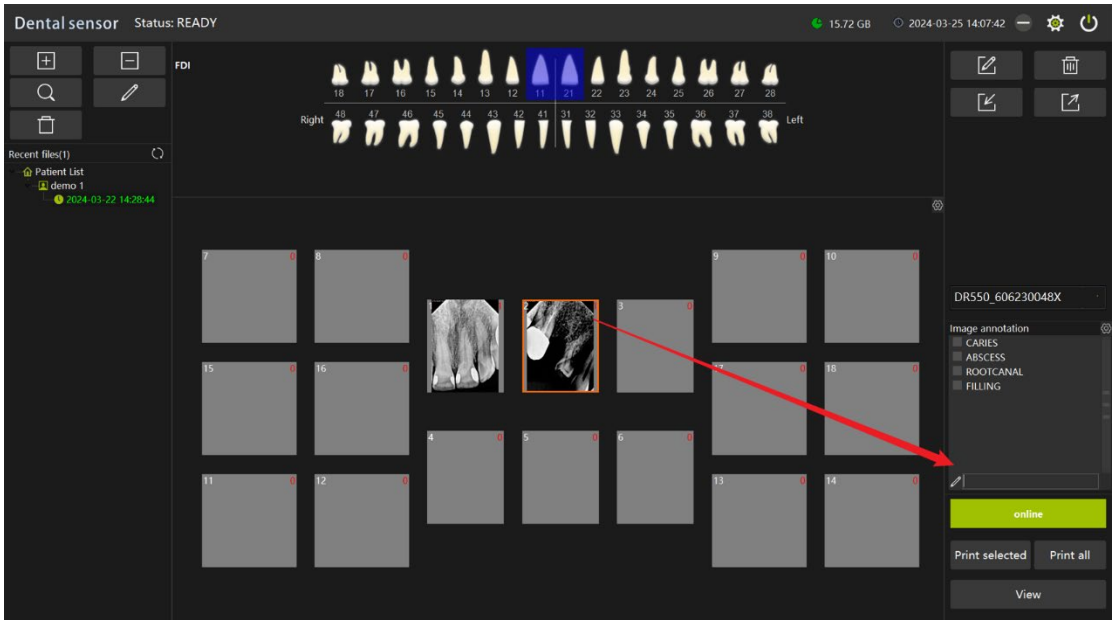


Figure 5.10.1

2) The default added template is displayed in the drop-down box;

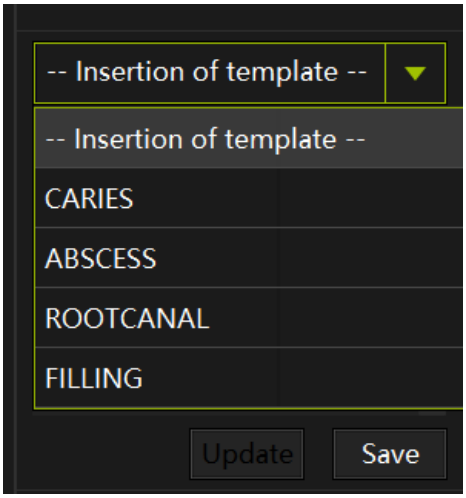


Figure 5.10.2

3) After adding or manually entering information, click Save [save] to finish editing.

5.11 Print report

5.11.1 Print selected

1) Multiple choices are supported for printing reports. Press and hold the CTRL button on the keyboard, move the mouse to point to the image to be printed, click the left mouse button to mark, and click the [Print selected] 

[Print selected] button to enter the printing interface;

2) Click the  [Print] button, select the printer, click the "OK" button to print, and click the "Cancel" button to exit the print interface.

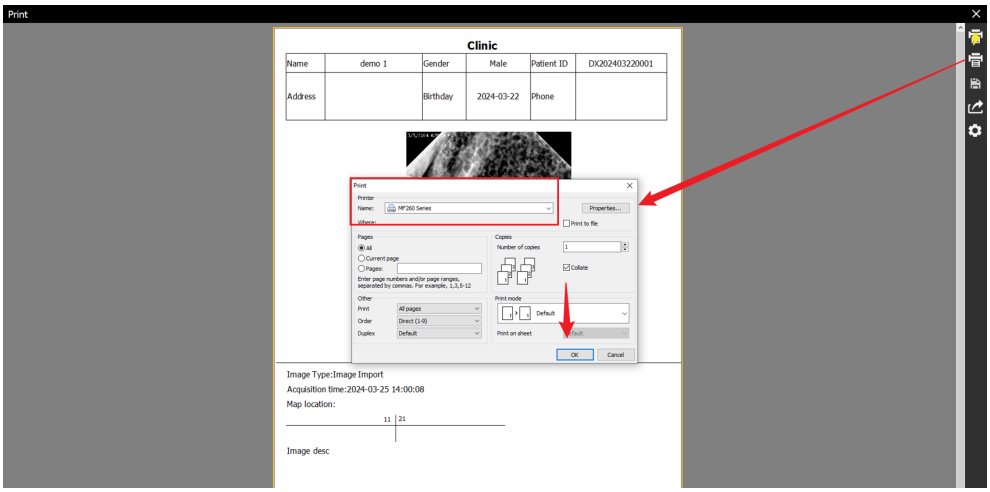
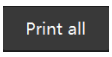


Figure 5.11.1

5.11.2 Print all

Click the [print all] 

button to print all images:

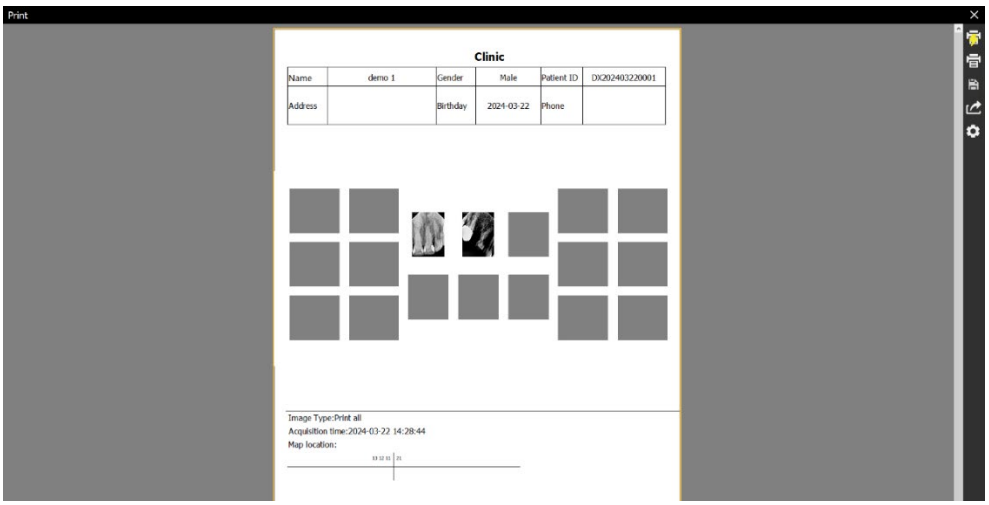


Figure 5.11.2

5.12 View

Click the View [View] button to enter the image editing interface, the same as "6. Image editing";

6. Image editing

6.1 Image browsing

The image browsing interface is the image editing interface.

6.2 Image editing

Modify the inspected image, including window width and level adjustment, tooth position modification, annotation modification, etc.

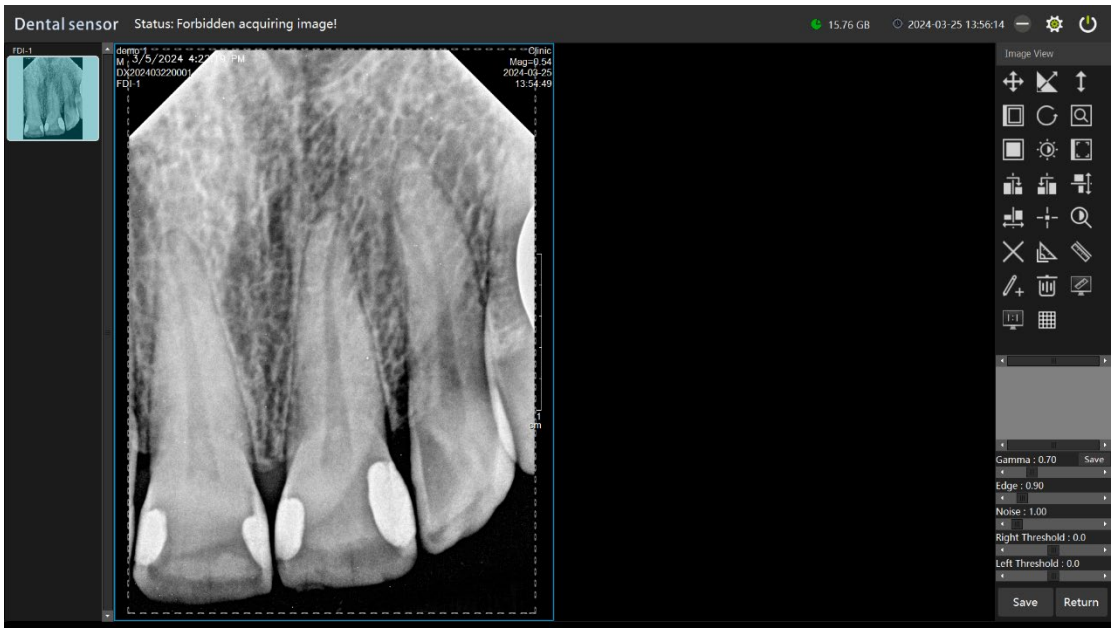


Figure 6.2.1

6.3 Tool

Button	Effect	Describe
	Move image	Press the left button in the image area and move the mouse to move the image. The initial state of the system is moving.
	Reverse	Click this button to reverse the black-and-white area of the image.
	ROI-WL	After pressing, the left mouse button is converted to the window width and window level of interest.
	Reset	Click this button to restore the image to its original state.
	Default WW/WL	Click to restore the default window width and level value.
	Zoom	Drag the mouse up the image area to zoom in; Drag down to zoom out;
	Fit image	Size of auto fill image area
	Rotate 90	Rotate 90 degrees clockwise
	Rotate -90	Rotate 90 degrees counterclockwise
	Flip vertical	Click this button to flip the image vertically and exchange up and down
	Flip horizontal	Click this button to flip the image horizontally and exchange left and right
	Angle measure	Click this button, click the mouse in the image display area to determine the starting point, vertex and end point of the good angle, and the system will automatically display the angle size. The angle is displayed at the start point.

	Distance measure	Click this button, in the image display area, press the left mouse button and drag a dimension line to activate the same angle measurement operation.
	Text labels	After clicking, the left mouse button is converted to the text annotation function, and click in the image area to display the text annotation input box. Valid only once.
	Delete image	Delete current image
	Delete tool	Deletes the current tool, including dimensions, angles, distances, crop boxes, and so on
	Point gray value	Click this button. In the image display area, the cursor will automatically switch to grayscale value. Move the cursor to the target position to see its grayscale value. Click the button again to exit the operation.
	ROI magnifier	Click the button and then click the image to pop up the zoom in area box
	magnifier	Click this button, click the left mouse button in the image display area, and the ROI magnification window appears, which displays the enlarged image of the optimized area.
	Full size	Click the button to restore the image to its original size
	Layout	Multiple panes can be displayed
	Application correction	1:1 display
	Monitor Calibration	Measure the actual length of the horizontal axis and vertical axis displayed on the display. Enter it below to calibrate the size of the image display 1:1

Use Gamma, Edge, Noise reduction adjustment:

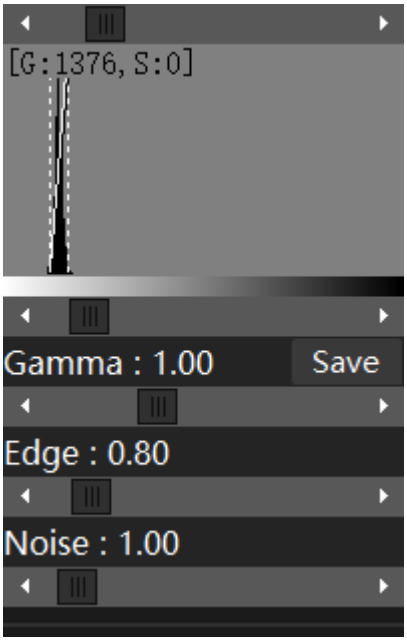


Figure 6.3.1

In order to obtain high-quality images, operators need to clearly understand the role of each parameter	
contrast ratio	Used to adjust the global contrast of the picture. The higher the contrast, the greater the black-and-white contrast of the image. The lower the contrast, the smaller the black-and-white contrast of the image.
Gamma	The principle is the same as that of gamma correction. The dark part and light part of the image signal, and the proportion of them is increased, so as to improve the image contrast effect.
Edge	Used to adjust the clarity of image edge and texture details (if trabecular bone or lung texture). The larger the edge value, the clearer the image details. However, a larger edge value will also increase the image noise.
Noise	Used to remove the noise of the picture. The greater the noise suppression value, the stronger the smoothness of the picture, but at the same time, the edge and texture details of the picture will become blurred.
Save	Save the adjusted parameters of "gamma, Edge and Noise reduction"

7. System

This part mainly introduces the control management and configuration functions related to the system.

The system main menu provides system control and management functions outside the inspection process. It mainly includes: system management, work list, storage, hardware, interface, template, optimization mode, database and annotation information.

Note: administrator level users can perform all management functions in the system menu, and the users with their permissions depend on the permissions granted.
Enter management  options from system management in the status bar:

7.1 System

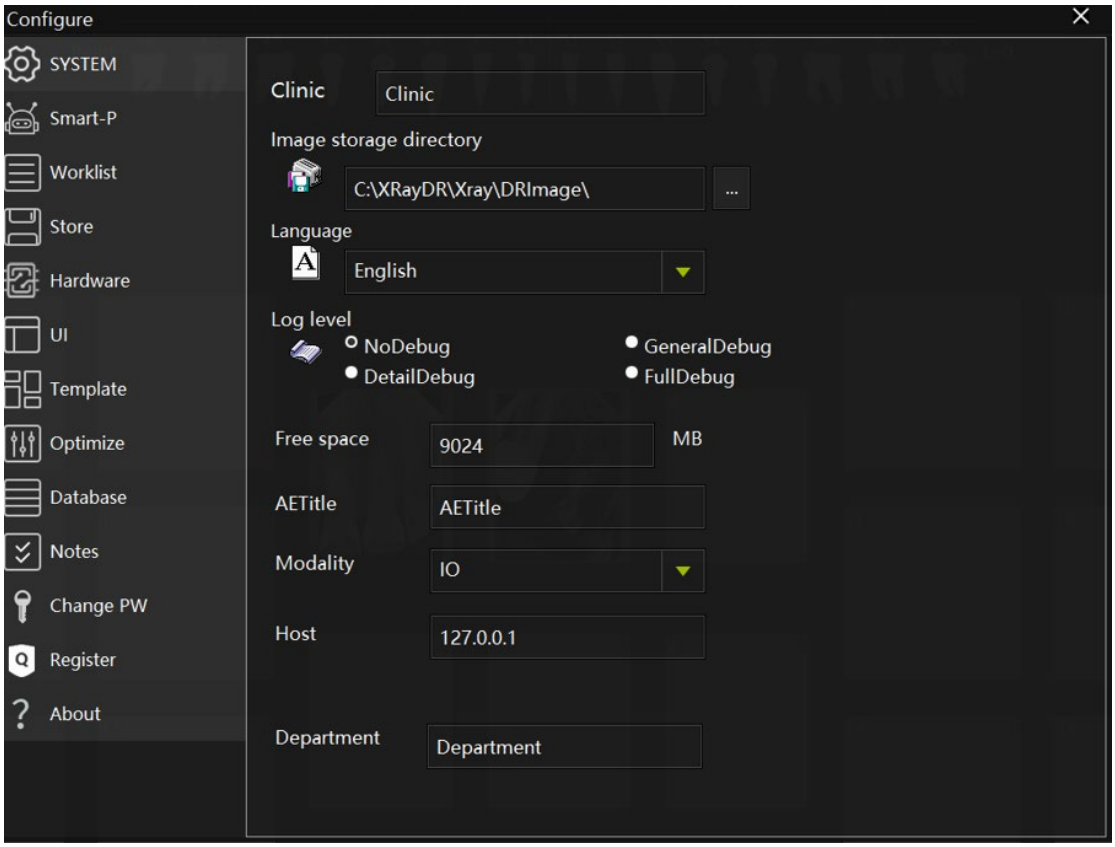


Figure 7.1.1

- **Clinic:** displayed in the report and image interface;

- **Image storage directory:** image storage path, which is under the installation path by default;
- **Language:** switch language selection, including Chinese, traditional Chinese, English, Spanish, Portuguese, Japanese, Korean, etc.
- **Log level:** includes normal mode, normal mode, detailed log and full tracking. The default is normal mode;
- **Free Space:** configure the size of the remaining space on the disk. When the storage space is less than the set size of the remaining space, it will prompt that it cannot be exposed;
- **AETitle:** configure this device name;
- **Modality:** including DX, Cr, Mg, Dr;
- **Host:** local IP address by default.
- **Department:** displayed in the report and image interface;

7.2 WorkList

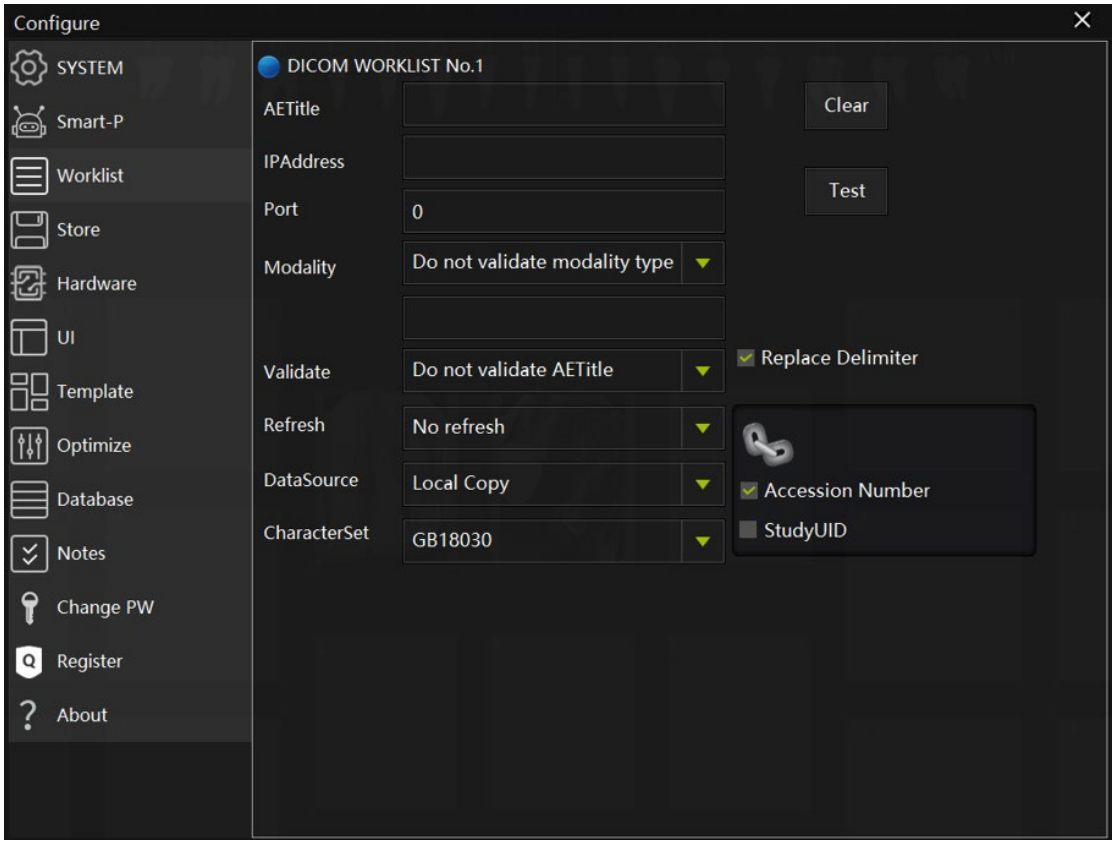


Figure 7.2.1

When registering with RIS through worklist service, worklist server parameters need to be configured here. For work list related knowledge, please refer to DICOM standard;

- **AE Title:** dicomaetitle of worklist server;
- **IP address:** IP address of worklist server;
- **Port:** service port number of worklist server;
- **Modality:** three options are provided: ignore verification device name, verification device type and user-defined device type;
- **Validate:** whether the consistency of AEtitle is recognized;
- **Refresh:** never refresh or specify the time to refresh the worklist service;
- **Data Source:** saved locally;
- **Character Set:** the character set of worklist server.

7.3 Store

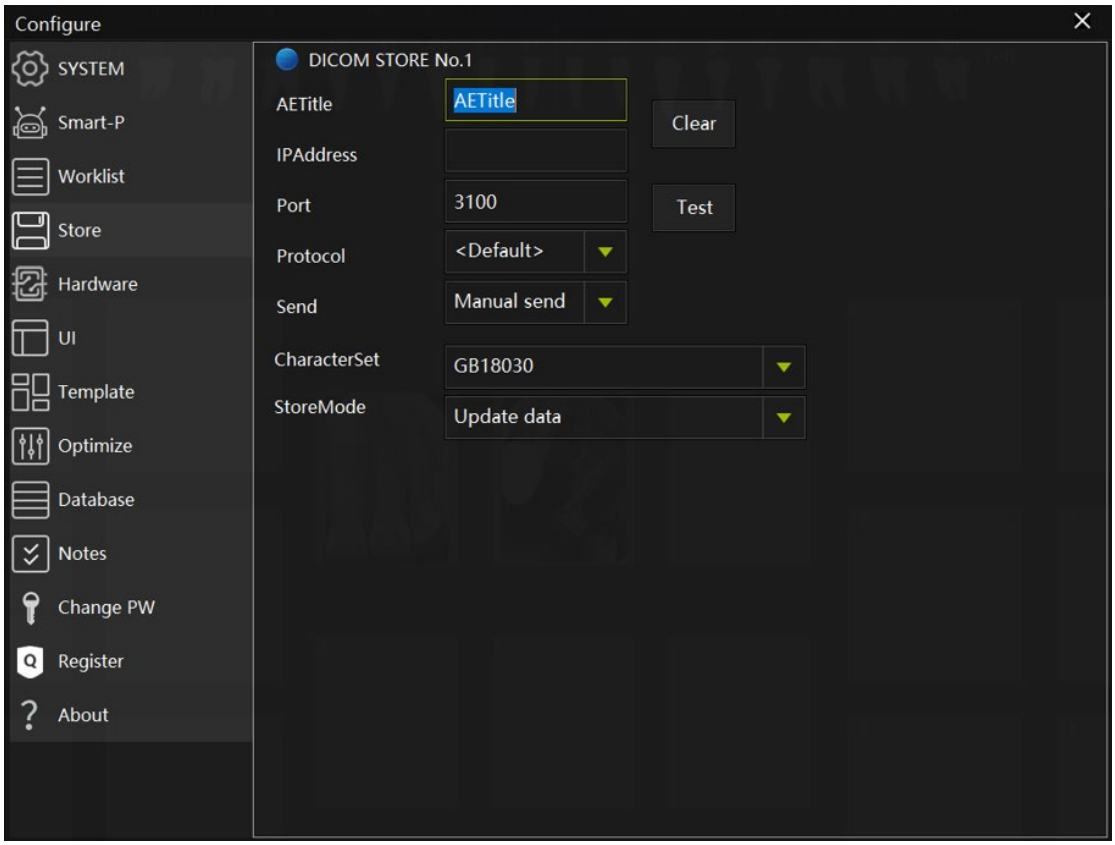


Figure 7.3.1

During archiving, PACS server parameters need to be configured here. For DICOM storage related knowledge, please refer to DICOM standard;

- **AETitle:** dicomaetitle of PACS server;
- **IP address:** the IP address of the PACS server;
- **Port:** service port number of PACS server;
- **Protocol:** transmission protocol stored in DICOM;
- **Send:** after collecting the image, click Save to determine whether to conduct automatic DICOM archiving, so that manual archiving is not required every time;
- **CharacterSet:** the character set of worklist server;
- **StoreMode:** there are two options: update data and save data as. The default is update data.

7.4 Hardware

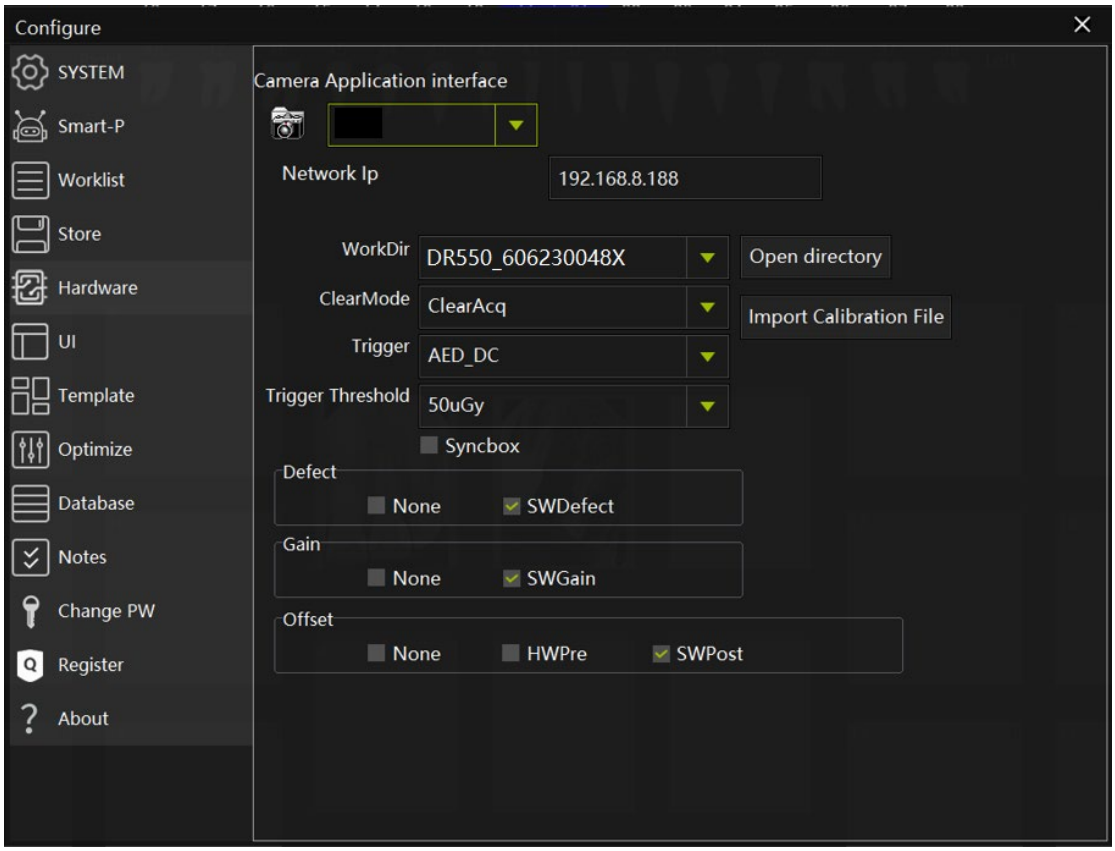


Figure 7.4.1

- **Camera application interface:** the default is test, which is actually used according to the application scenario;
- **WorkDir:** detector name, which will be refreshed automatically after connecting the detector;
- **ClearMode:** provides two options: clear and clearacq;
- **Trigger:** detector trigger mode;
- **Trigger threshold:** trigger threshold of detector;
- **Syncbox:** connect the synchronization box; If it is not checked by default, the synchronization box will not be used;
- **Defect:** defect correction template, which defaults to none and is not loaded;
- **Gain:** gain correction template, which defaults to none and is not loaded;
- **Offset:** the offset correction template, which defaults to none and is not loaded;

7.5 UI

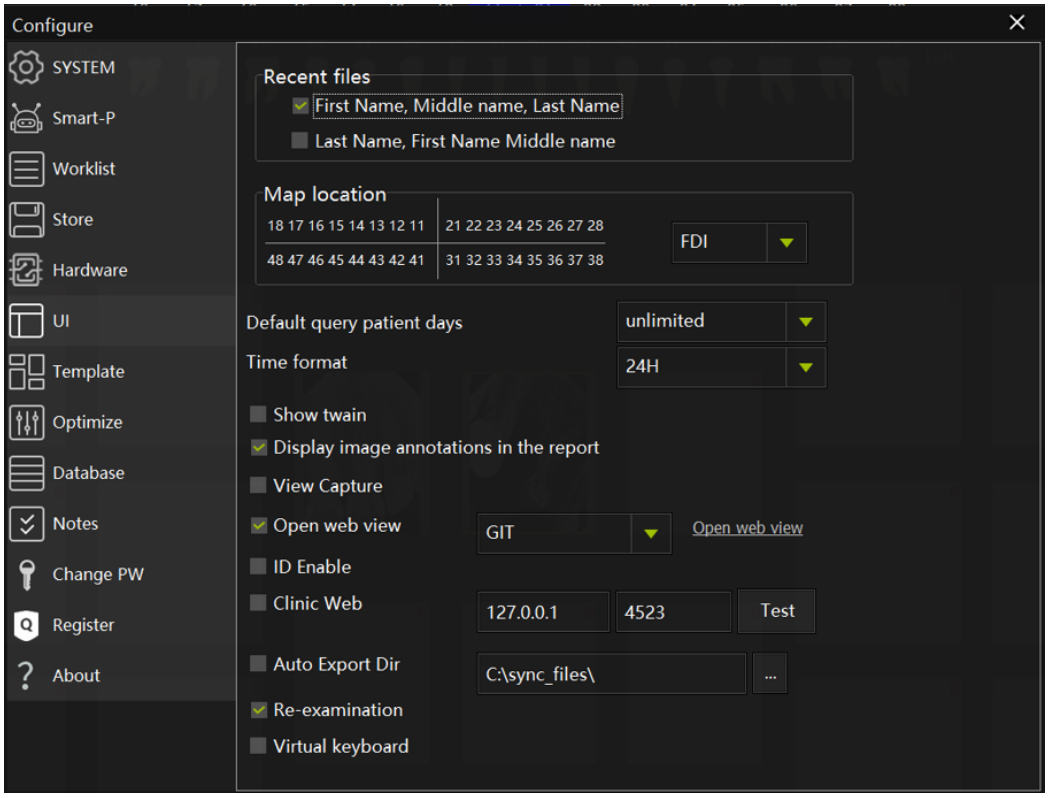


Figure 7.5.1

- **Recent Files:** list of registration and recent files, showing last name / first name and first name / last name;
- **Map location:** tooth position selection, providing three schemes of FDI, CH and us;
- **Default query patient days:** the inspection data displayed in the query interface and the latest file. The default is inspection within one month;
- **Time format:** AMPM: 

  Default: 

- **Show twain:** not displayed by default. If checked, it will be displayed in the interface, as shown in the figure:

Figure 7.5.2

- **Display marked image on report:** After checking, click "print the selected content", and the report displays the marked image, as shown in the figure:
- **View capture:** Only view capture pictures (Conflicts with **RE-examination**, only one display method can be selected)

Figure 7.5.3

- **RE-examination:** When you viewing pictures, you can compare 2 pictures (Conflicts with View capture, only one display method can be selected)

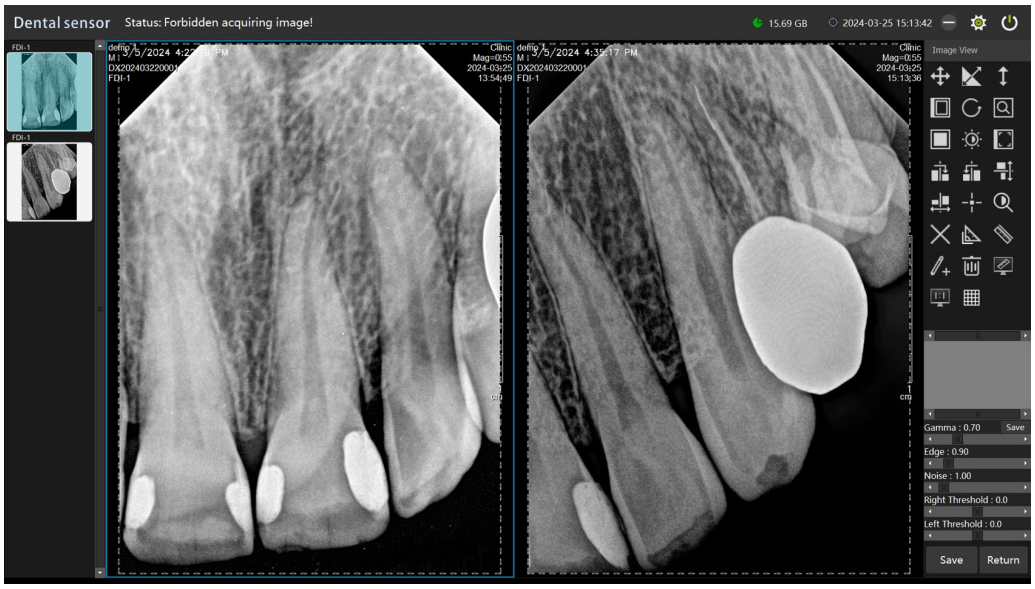


Figure 7.5.4

- **Open web view:** Enable viewing images in a web browser.

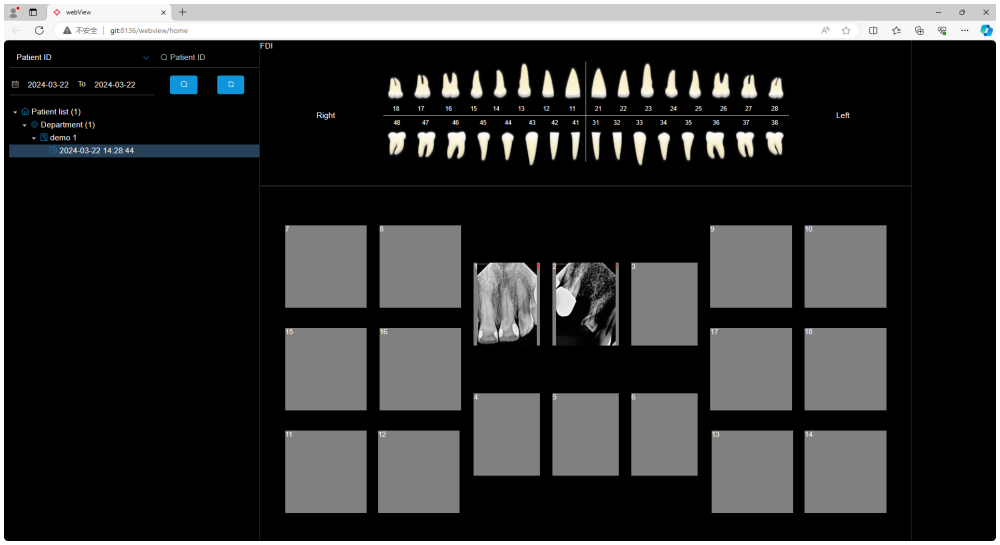


Figure 7.5.5

- **Clinic web:** This computer's server IP address and port
- **Auto Export Dir:** Set the directory for automatic export
- **Display marked image on report:** After checking, click "print the selected content", and the report displays the marked image, as shown in the figure:

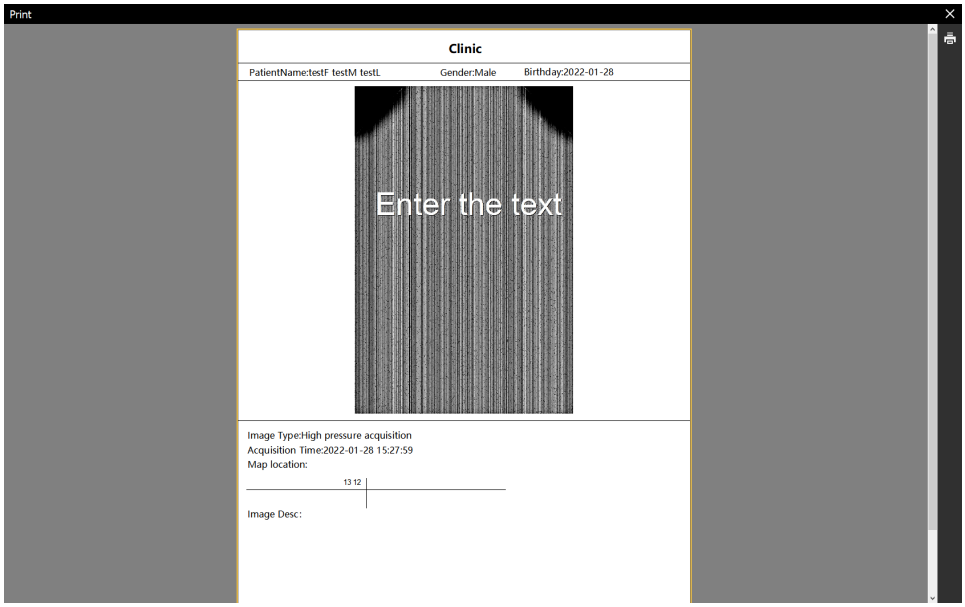


Figure 7.5.6

- **Virtual keyboard:** Turn on virtual keyboard

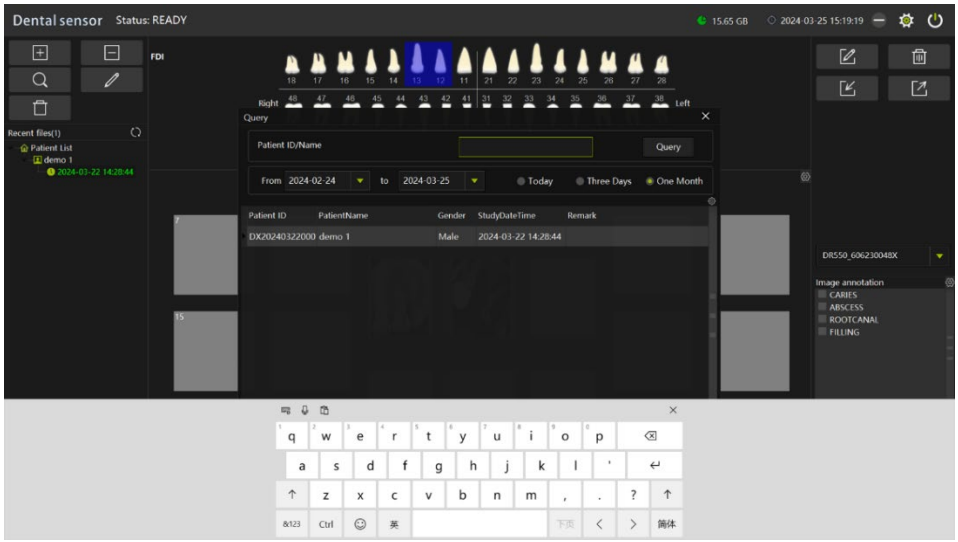


Figure 7.5.7

7.6 Template

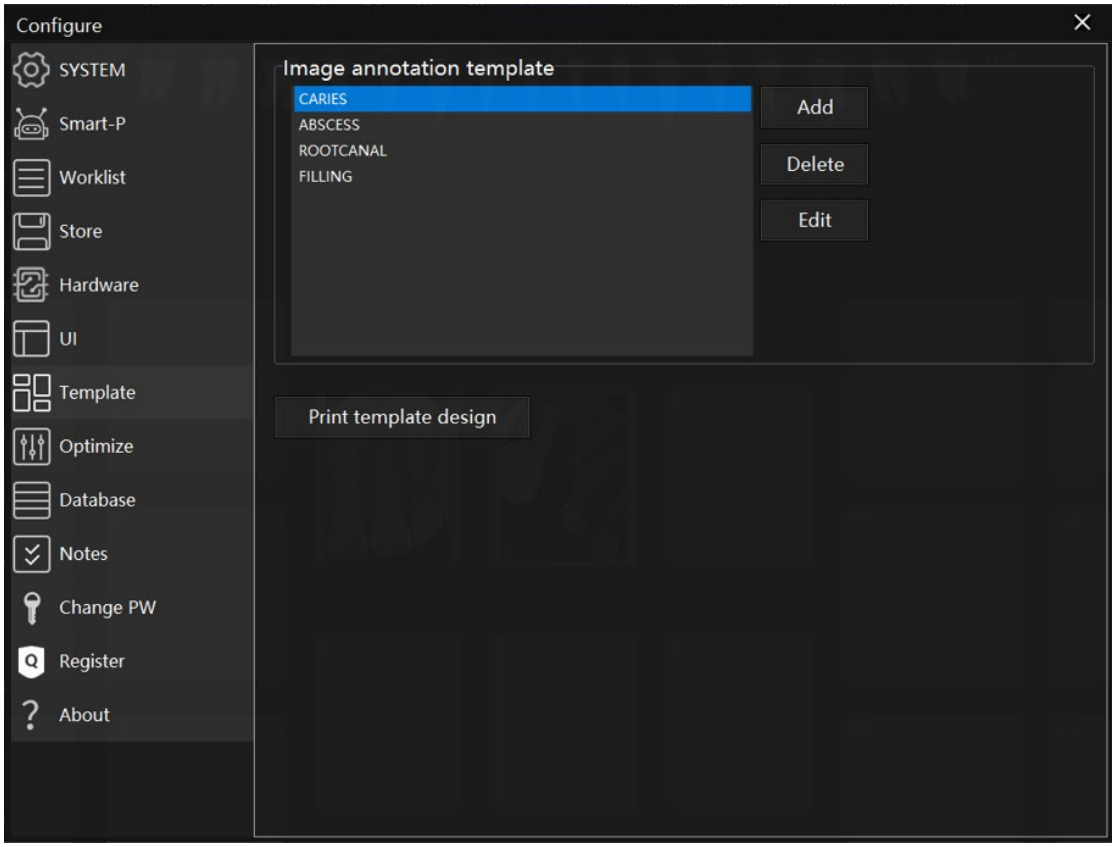


Figure 7.6.1

Image annotation template: caries, abscess, root canal and filling are displayed by default, and can be added, deleted and edited.

7.7 Optimize

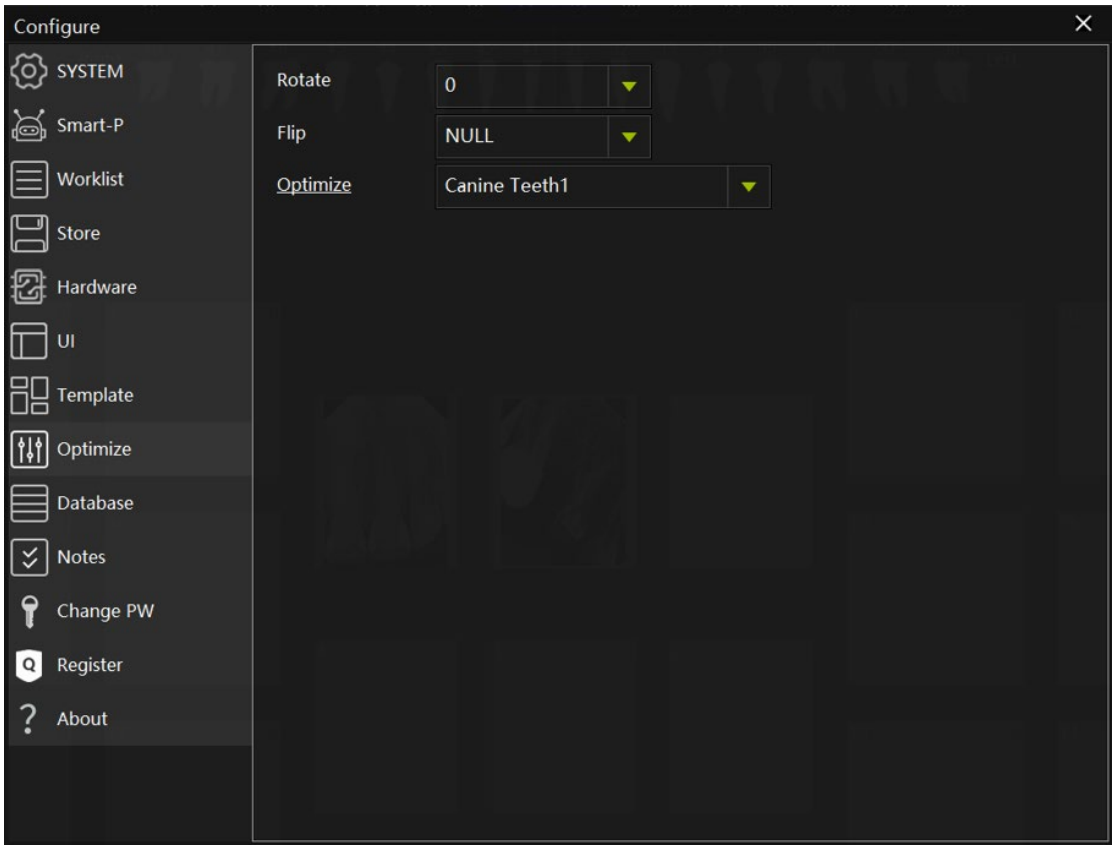


Figure 7.7.1

You need to enter the correct password to enter the optimization mode;

- **Rotate:** when the image is uploaded to the software, the rotation angle will be automatically. The default is 0 degrees. After the image is uploaded, it will not rotate;
- **Flip:** when the image is uploaded to the software, the image will be automatically flipped. The default is none. After the image is uploaded, it will not be flipped;
- **Optimize:** optimization mode selection.

7.8 Database

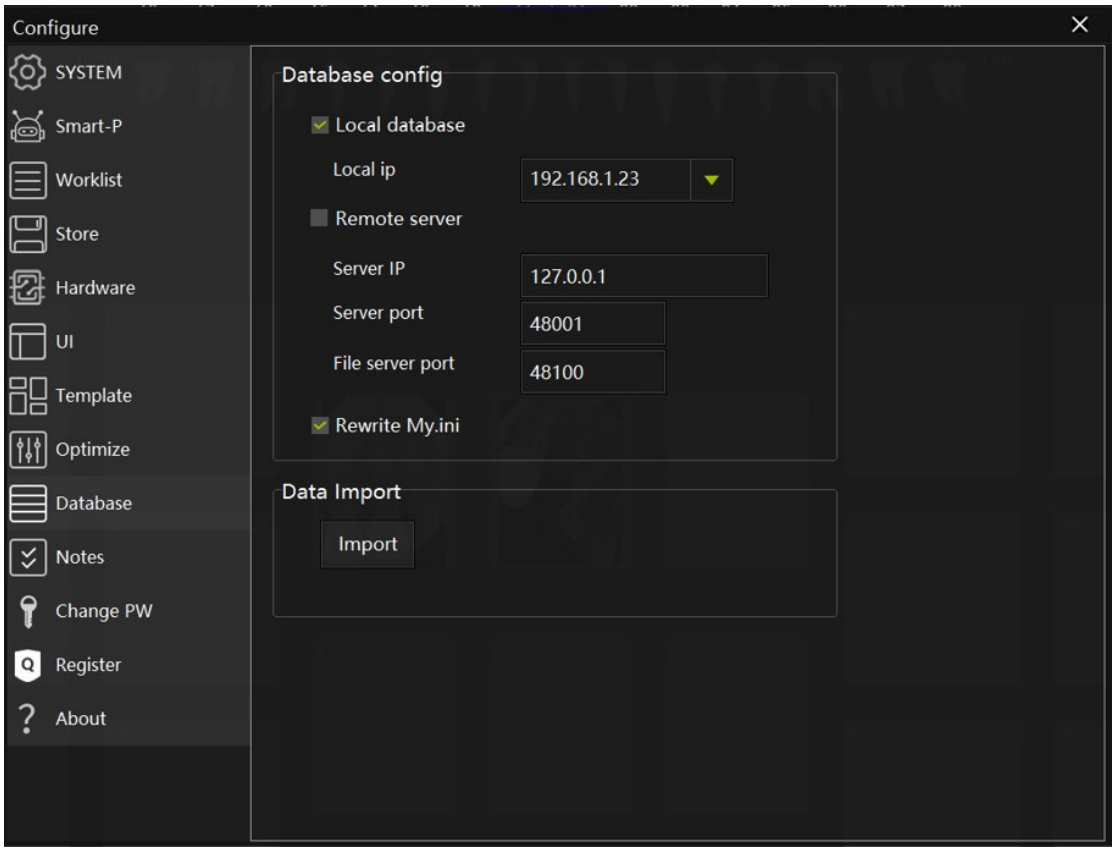


Figure 7.8.1

- **Function Description:** this function is multi-client film reading. After checking the remote server, you can view the data in another PC from the currently used PC.
- **Local database:** fill in the local IP;
- **Remote server:** server IP, server port and file service port. Note: the default port number of MySQL database is 48001;
- **Data Import:** Import old data

7.9 Notes

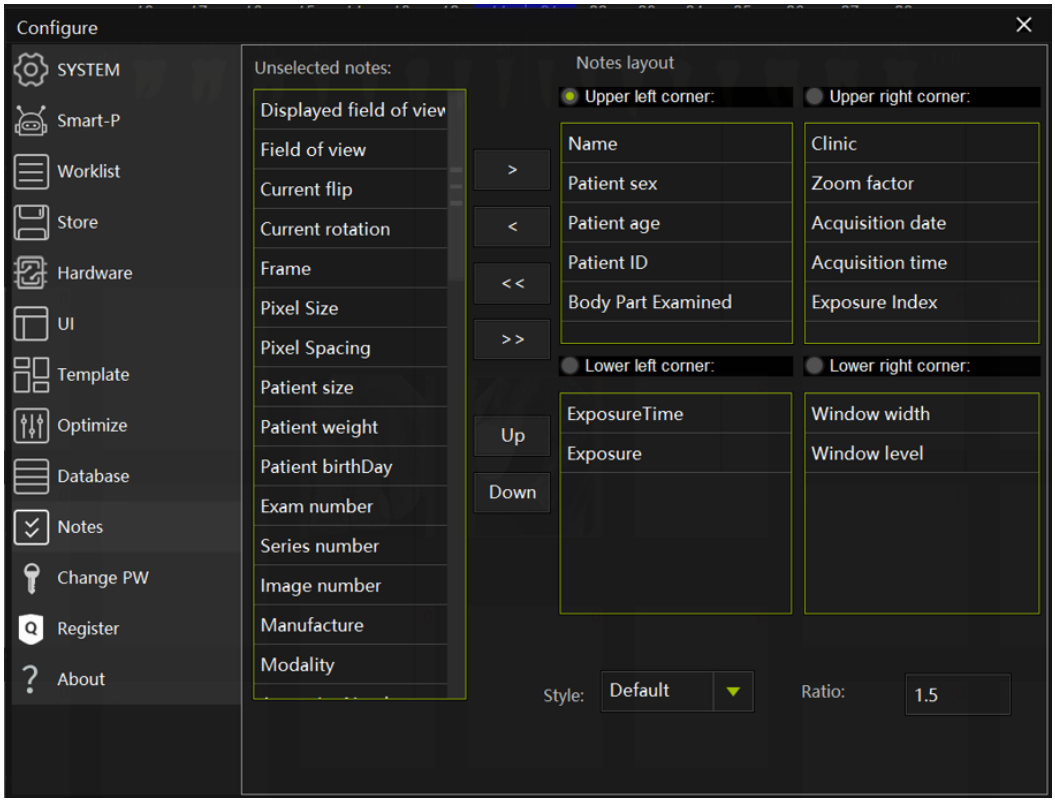


Figure 7.9.1

Annotation information is to configure the overlay information related to the display of the four corners during image display.

Select a corner, such as the upper left corner, then select the information to be displayed from the unconfigured notes, click the Add button to add to the corner, or select the configured information from the corner and click the remove button to remove.

At the same time, the position can be moved up and down according to the information of each corner. The configurable information displayed is:

- Hospital name:
- Patient name:
- Patient ID:
- Patient age:
- Body Part Examined:
- Study date:
- Study time:
- Series date:
- Series time:

- Patient sex:
- Patient size:
- Patient weight:
- Patient birthday:
- Exam number:
- Series number:
- Image number:
- Manufacturer:
- Modality:
- Accession Number:
- Study Instance UID:
- Series Instance UID:
- SOP Instance UID:
- Acquisition date:
- Acquisition time:
- Diagnoses Description:
- Study Description:
- Series Description:
- Referring's Physicians Name:
- Performing Physicians Name:
- Read Study Physicians Name:

7.10 Change Password

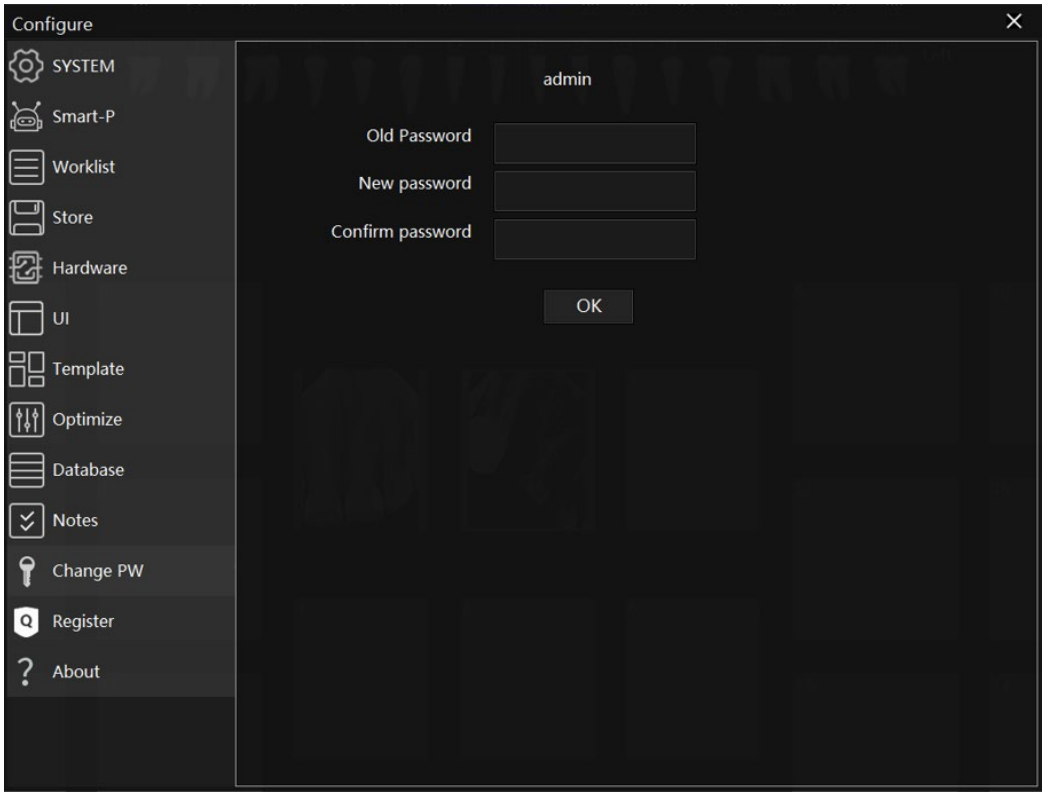


Figure 7.10.1

- **admin:** the currently logged in user name, which cannot be modified;
- **Old password:** the original password of admin account;
- **New password:** you need to enter the modified password;
- **Confirm password:** confirm the new password, which must be consistent with the new password.

7.11 Register

Products starting in April 2024 do not need to be manually activated.

Before registering, the computer must first plug in the detector.

1) Enter the main interface of the software in the port and click the registration function in the button menu in the upper right corner.

2) Different detector activation operations can be switched in the drop-down box. If the detector is activated, it will be prompted in the upper left corner

3) Copy your authorization code and paste it here

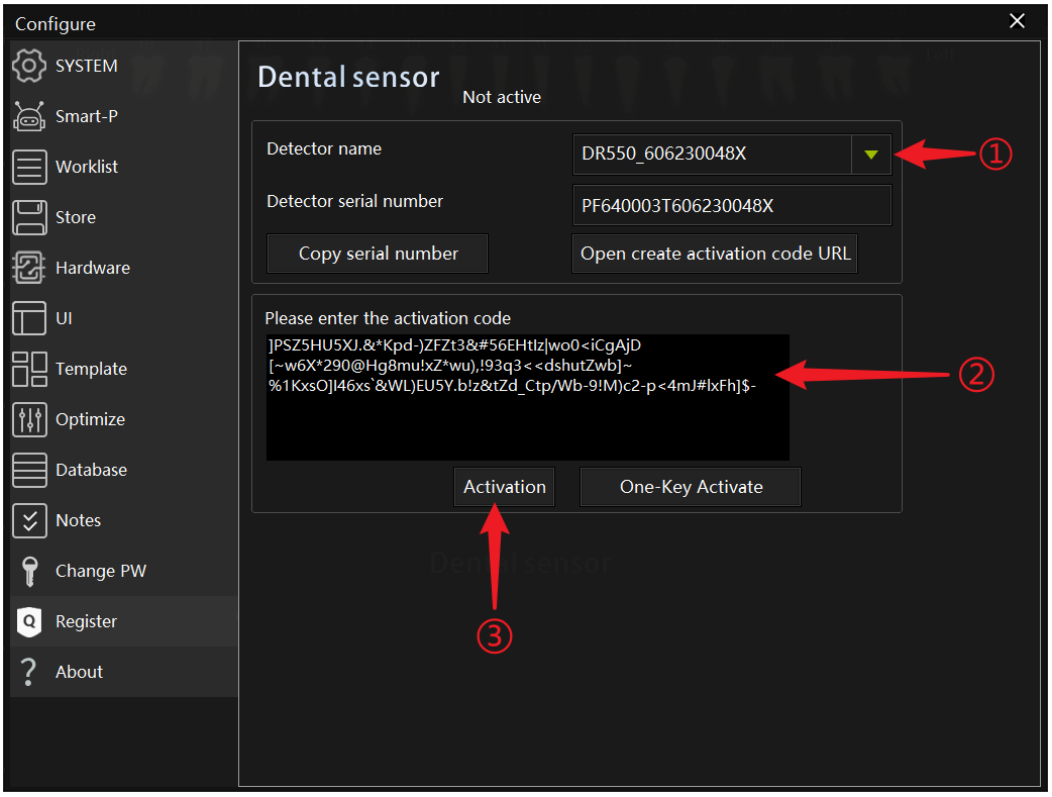


Figure 7.11.1

8. Close

1) In the status bar  【Close】, The following dialog box appears:

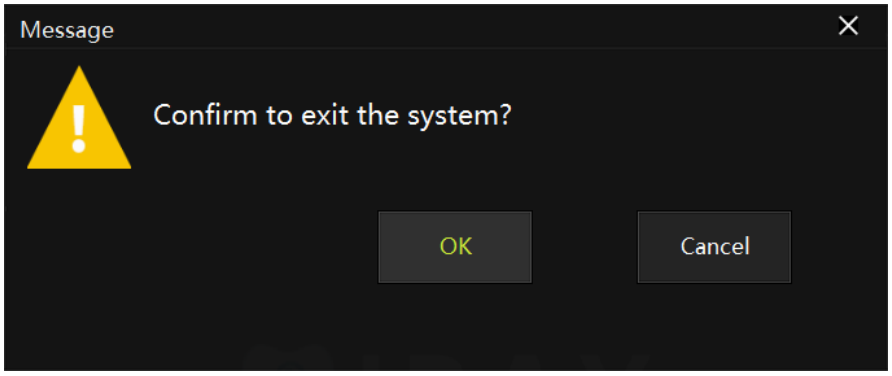
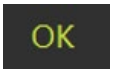


Figure 8.1

2) Click  [OK] to exit the software operation.

9. Trouble shooting

9.1 Sensor not found

Fault	**Solution**
The driver is working	Check the connect interface between controller box and computer.
	Re-plug the sensor or try to use another USB port.
The driver not work	Install the driver
Antivirus and firewalls	Allows all of DTFC services

9.2 Imaging quality

Fault	**Solution**
Too bright / too dark	Reduce / increase exposure time
The image is blurry	Keep the device stable during exposure

9.3 Trigger Threshold

Common dental ray machines mainly have tube voltage 60-70kV and tube current 1-8mA. For different types of dental ray machines, the AED Trigger Threshold is recommended as follows:

kV	mA	SID (mm)	Equivalent filter	Min Entrance Dose Rate(uGy/s)	Trigger Threshold (uGy/s)	Max Entrance Dose Rate(uGy/s)	mA (up to)
60	1	250	2mm Al	256	50	1000	4
			8mm Al	69			
			10mm Al	51			
65	1	250	2mm Al	306	50	1000	3.2
			8mm Al	91			
			10mm Al	69			
70	1	250	2mm Al	358	50	1000	3
			8mm Al	226			
			10mm Al	90			
60	3.2	250			150	3000	8
			8mm Al	251			
			10mm Al	186			
65	3.2	250	2mm Al	1115	150	3000	8
			8mm Al	333			
			10mm Al	253			
70	3.2	250	2mm Al	1311	200	4000	8
			8mm Al	425			