Dental AI Analysis Module User Guide

1. Installation of AI Analysis Module

No need for extra installation. XVDental software version 2.2.9.14 and above integrates the AI analysis module.

2. Run the AI Analysis Module

Step 1: In the main software interface, click the “Image Viewer” window button via the menu or the “eye” icon on the preview image.

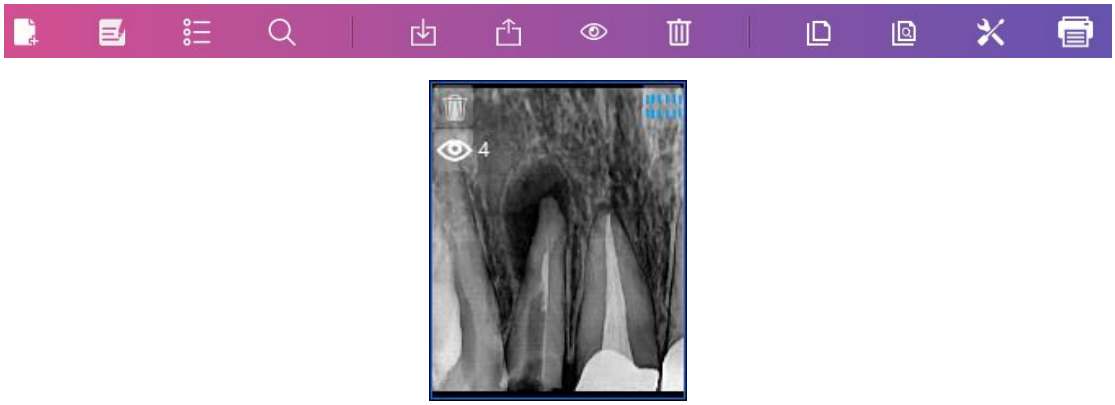


Figure 1: Image Viewer Entrance Button

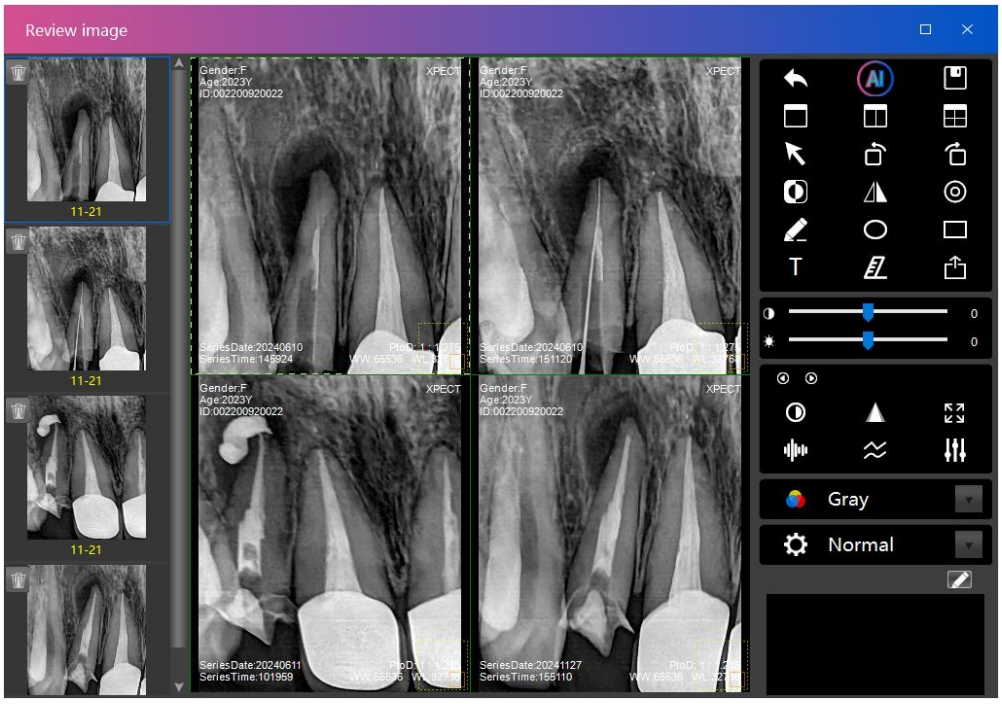


Figure 2: Image Viewer and AI Module Launch Button

Step 2: In the “Image Viewer” interface, select the image to analyze and click the button  to enter the AI Analysis Module interface.

3. Functions of AI Analysis Module

The main interface of the AI module has:

- **Green box**: Info display area (read-only)
- **Red box**: Functional area (interactive)

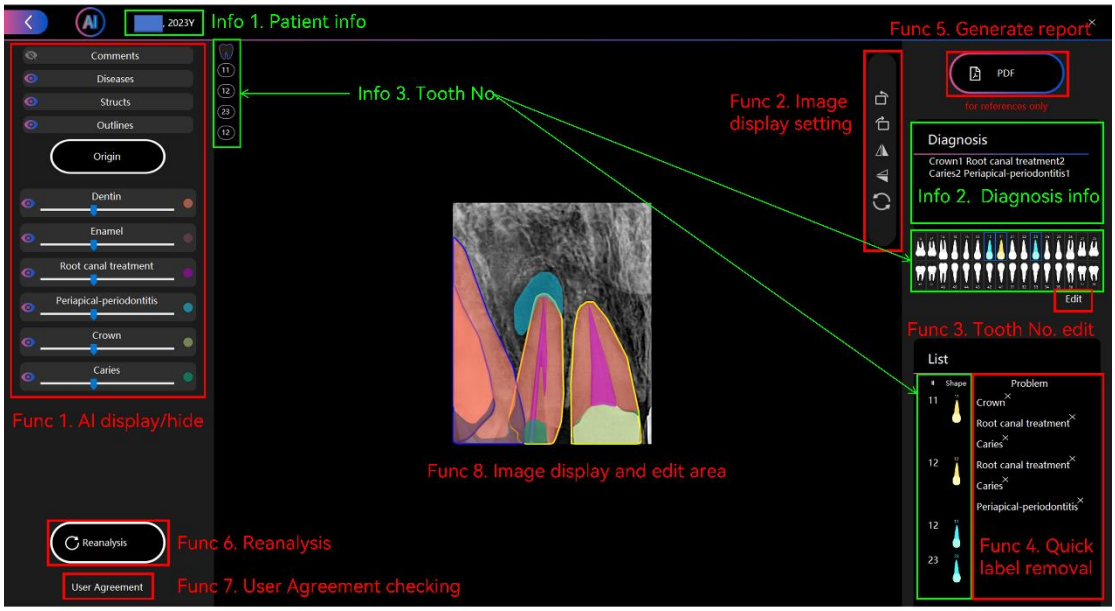


Figure 3: AI Module Main Interface

3.1 Viewing AI Elements

3.1.1 Overview

The AI module allows:

- Display/hide AI elements
- Group display of AI elements
- Adjust the transparency of AI overlays

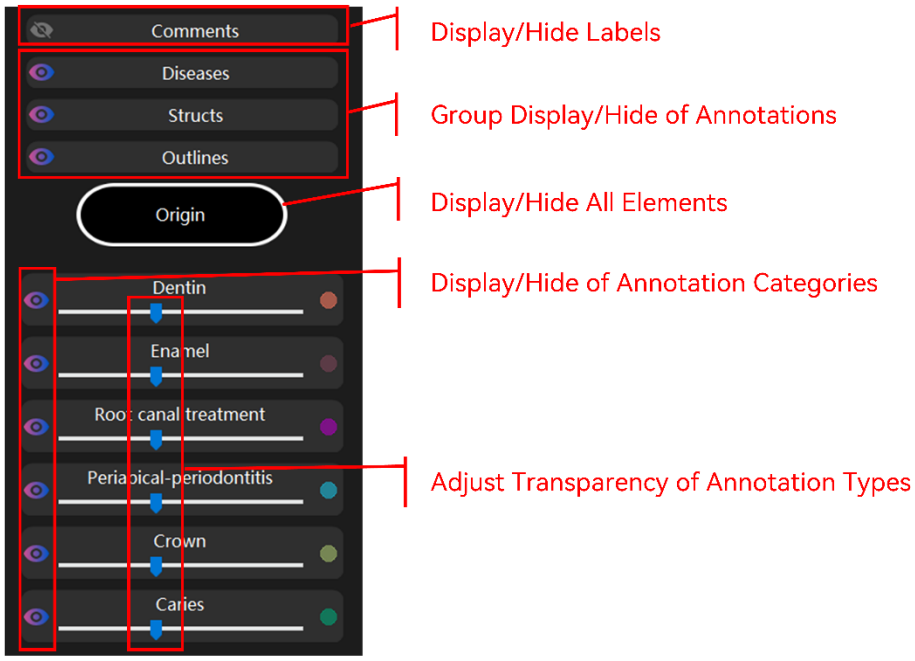


Figure 4: AI Element Viewing Overview

3.1.2 Display/Hide Labels

"Labels" refer to the AI-detected element categories. "Annotations" refer to the marked regions.

Click the "Show Labels" button or the  button to toggle label visibility (icon switches accordingly).

Note: Labels are hidden by default when loading AI results.

3.1.3 Group Display/Hide of Annotations

Teeth elements are grouped into:

- **Diseases**: Root canal treatment, periapical inflammation, crown, caries, filling
- **Structures**: Dentin, enamel
- **Contours**: Tooth contours

Each group can be shown or hidden via its toggle button.

3.1.4 Display/Hide All Elements

Each time the “View Original” button is clicked, the currently displayed AI elements (labels and annotations) on the image will toggle between “Displayed” and “hidden” states.

3.1.5 Display/Hide of Annotation Categories

Click the  button for each type of AI element; the button icon will toggle between **Display/Hide** states. The visibility of the corresponding AI elements on the image will change accordingly.

3.1.6 Adjust Transparency of Annotation Types

Drag the slider to set annotation transparency:

- Far left = fully transparent
- Far right = fully opaque

Note: Transparency changes affect all subsequent analyses until the software restarts.

3.2 Image Viewing

3.2.1 Overview

The AI module offers flexible image viewing options.

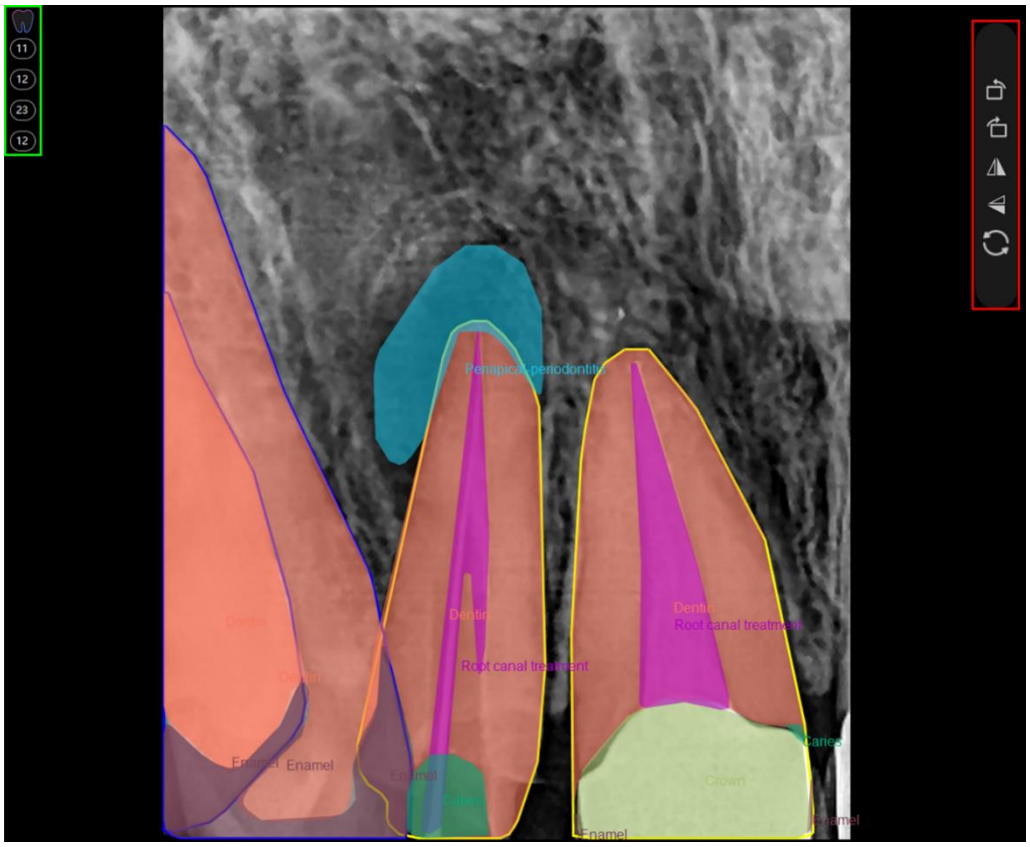


Figure 5: Image Viewing and Operation Area Overview

3.2.2 Display Tooth Position Information

As shown in Figure 5, the upper-left area (highlighted in a green box) displays the tooth position information of the currently viewed image.

3.2.3 Rotate/Flip Images

As shown in Figure 5, image display operation functions are provided, including:

①  Rotate the image 90° counterclockwise

②  Rotate the image 90° clockwise

③  Flip the image horizontally (mirror image)

④  Flip the image vertically (mirror image)

3.2.4 Reload Image

Clicking the reload button  allows the AI analysis results to be reloaded

(without reconnecting to the server), with all AI element annotations displayed by default, but labels hidden.

3.2.5 Adjust Window Width/Level

Two methods are provided to adjust the image window width and window level:
① **Right-click and drag**: Dragging left or right adjusts the window level; dragging up or down adjusts the window width.
② **Using the histogram component**: Right-click the image display area to show or hide the histogram component. Use it to adjust the mapping curve by dragging the corresponding regions to modify the window width and level.

3.2.6 Zooming Images

- **Scroll wheel**: Zoom in/out centered on the cursor.
- **Double-click**: Toggle between original size and fit-to-window.

3.2.7 Mouse Hover to Display AI Labels

When the mouse hovers over an area containing AI elements, the label of the "topmost" element will appear in the upper-left of the cursor position. The display follows a hierarchical order from "bottom" to "top" as follows:
Tooth → Dentin → Enamel → Pulp → Crown → Filling → Root Canal Treatment → Caries → Implant → Periapical Inflammation → Calculus.

3.3 Generate Report

The AI analysis module provides a report generation feature. By clicking the button, a PDF report named **"Dental Analysis report_XXXXXXX.pdf"** will be generated on the desktop, containing the results of the current image analysis.
Note: If the AI analysis results have been edited, the report will include the edited information.

3.4 Information Editing

Allows editing of AI results for diagnostic reporting.

3.4.1 Quick Edit Tooth Position

Figure 6: Tooth Position Display and Quick Edit

As shown in Figure 6, the teeth marked in color in the tooth position display area represent the tooth positions identified by the AI. Clicking the “Edit” button will open the quick edit dialog box as shown.

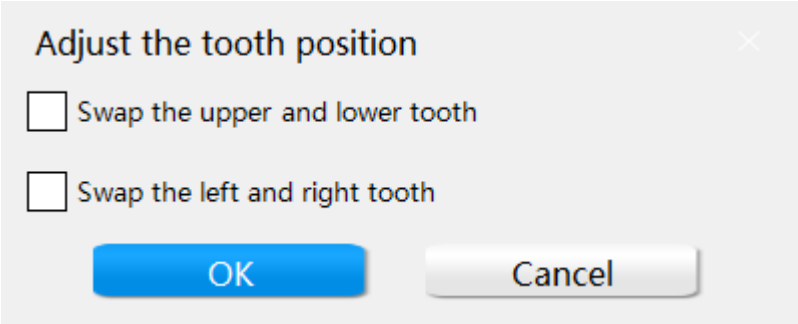


Figure 7: Tooth Position Quick Edit Dialog

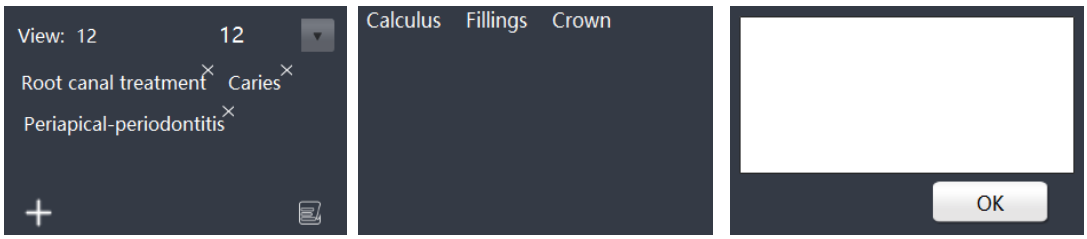
Select the desired operations and click the “Confirm” button to complete the tooth position editing. The “Info 3. Tooth No.” section in Figure 3 will be updated accordingly. Clicking the “Cancel” button will discard the changes.

3.4.2 Tooth Information Editing

Clicking the left mouse button within the area of a tooth on the image will bring up the tooth information editing window, as shown below. This window displays the tooth’s position and the diseases identified on that tooth. It also allows you to modify the tooth position, add labels, add annotations, and delete labels or annotations.

Note: The tooth information editing window will only appear when the left

mouse button is clicked within the boundary of a tooth.



①Primary Information Display Window

②Secondary Window for Adding Labels

③Secondary Window for Editing Annotations

Figure 8: Tooth Information Editing Window

To edit:

- **Modify tooth position**: Click the  button to open a dropdown menu where you can select a new tooth position, which will take effect immediately. The "Info 3. Tooth Position Information" section will update accordingly. Clicking outside the menu will close the primary window.

- **Add label**: Click the  button to open the secondary window②. In this window, click an AI-detected disease label to add it to the current tooth. The information in window① and the "Tooth Issue List" in the lower right of the main interface (Func 4. Quick Label Removal) will update accordingly. Clicking on the primary window area will close the secondary window; clicking elsewhere will close both windows.

- **Add annotation**: Click the  button to open the secondary window③, enter the annotation text, and click the "Confirm" button to apply the annotation to the current tooth. The information in window① will update accordingly. Clicking on the primary window area will close the secondary window; clicking elsewhere will close both windows.

- **Delete Labels and Annotations**: In the primary information window, click the "x" at the top right corner of a label or annotation to delete it. The "Tooth Issue List" (Func 4. Quick Label Removal) will update accordingly. If a deleted item is an AI-detected label, it will reappear in the label list shown in Figure 8.②.

Note:

- Annotations are not diseases and won't show in the "Tooth Issue List."
- Each tooth can have only one AI-identified instance per disease.

3.5 Reanalysis Function

Since the AI analysis function is powered by a cloud service, network communication issues may occasionally cause the analysis request to fail. To address this, the AI analysis module provides a reanalysis function for the same image data.

By clicking the "Reanalysis" button in the lower-left corner of the main interface, the module will reconnect to the cloud server and reprocess the data. Once the new analysis results are received, they will be displayed according to the default display settings.

3.6 User Agreement Viewer

Click the "User Agreement" button in the lower-left to view the service agreement.

Note: This notice appears by default on first use. Users can check "Don't show again" to disable it, but it can always be reopened.

4. Historical Image Processing

For historical data collected using our company's products, you can use the "Restore Data" function to add the data to the software database. After that, the AI analysis function can be used to assist in diagnosis.

Note: Only data imported via the "**Restore Data**" function supports AI analysis. Images imported via **"Import Image**" **DO NOT** support AI analysis.

5. Troubleshooting

If the cloud AI service encounters issues, the software provides error codes:

Error Code	Description	Solution
—	Network error	Check the internet connection
1002	Parameter error	Update to the latest software version
1003	AI prediction error	Report the issue to backend support
1008	AI task not found	Retry AI analysis
1009	AI queue failure	Retry AI analysis
1010	AI service limit reached	Daily usage cap reached