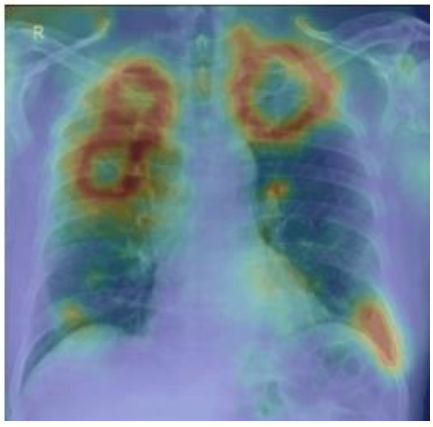
RadioIQ – User Manual



AI-Powered Medical Imaging Analysis Platform for Assisting Radiologists in Screening Conditions Using X-ray Images

1. Introduction

1.1 Purpose of this Manual

The purpose of this user manual is to provide clear guidance on the AI Software for abnormalities in the Chest X-Ray project, including its features and functions. It also offers detailed instructions for using AI software to detect AI Software for abnormalities in Chest X-Ray is an AI-powered medical imaging analysis platform designed to assist radiologists in screening abnormalities using chest X-ray images., specifically for radiologists, physicians and pulmonologists

1.2 Product Name & Version

- **Product Brand Name:** Radio–IQ
- **Product Generic Name:** AI Software for abnormalities in Chest X-Ray
- **Version Number:** 1.0.1
- **Link:** www.radioiq.ai

1.3 Intended Use

RadioIQ in Chest X-Ray is an AI-powered medical imaging analysis platform designed to assist radiologists in screening conditions using chest X-ray images. The system leverages AI-driven analysis to detect, annotate, and categorize abnormalities, helping radiologists quickly analyze images, identify potential issues, and generate reports with greater accuracy and efficiency. The platform is tailored to address the high workload and time constraints faced by radiologists by offering intuitive tools, customizable workflows, and AI-generated insights to streamline the screening process. AI Software for abnormalities in Chest X-Ray assist radiologists in the review of chest radiographic images.

AI Software for abnormalities in Chest X-Ray is not a standalone software - it functions as a supplementary decision-support tool, designed to aid, not replace, professional medical judgment.

1.4 Intended Users

AI Software for abnormalities in Chest X-Ray is developed to assist and be operated by the following categories of users:

- Radiologists

- Emergency room physician
- Pulmonologist who regularly reviews chest X-ray

2. Project Overview

RadioIQ is an AI-powered healthcare web application designed to assist in radiological diagnostics by automating the analysis of chest X-ray images. It enhances diagnostic workflows by providing real-time assistance in detecting and interpreting radiological abnormalities.

2.1 Key Features and Capabilities

1. **AI-Powered Screening:**
   - Utilizes advanced deep learning models to detect and analyze abnormalities in chest X- rays with precision.
   - Capable of identifying abnormalities in chest X-rays such as
     - Pneumothorax
     - Nodules
     - Pleural effusion
     - Cardiomegaly
     - Consolidation
     - Opacity
     - Rib Fracture.
2. **Automated Image Annotation:**
   - Highlights and segments abnormalities automatically, aiding in faster clinical decisions.
   - Offers visual overlays such as bounding boxes and segmentation masks for clear identification of issues.
3. **Time-Based Comparisons:**
   - Enables tracking disease progression by comparing historical chest X-rays of the same patient.
4. **Comprehensive Reporting:**
   - Creates detailed screening reports that include detected abnormalities and analytics.
   - Provides three formats – Standard, Detailed and Full Screening supporting both patient- friendly and clinical report formats.
5. **Interactive Radiologist Tools:**
   - Includes tools for manual annotation adjustments and feedback, which can enhance model learning over time.

2.2 Indication of Use

RadioIQ is an AI-powered chest X-ray analysis platform that assists radiologists in identifying and classifying abnormalities in chest X-rays. It enhances diagnostic accuracy, speeds up image review, and supports clinical decision-making through AI-generated annotations and insights. RadioIQ also generates a Tuberculosis (TB) Probability, which categorizes findings into:

- Low TB Probability
- Medium TB Probability
- High TB Probability

The platform is applicable across multiple domains of healthcare:

- **Primary & Secondary Care** – Supports general practitioners and specialists in timely, accurate screenings and evaluations.
- **Emergency Services** – Enables rapid triage of critical cases through fast AI-based analysis.
- **Telemedicine** – Facilitates remote image interpretation, expanding access to expert radiology.
- **Research & Academia** – Assists in large dataset analysis and serves as a teaching aid for
  medical education.
- **Quality Assurance** – Provides a second layer of review to reduce diagnostic errors and improve consistency.

2.3 Contraindications and Limitations

- **Image Quality Dependency** – Low-quality images or corrupted DICOM files may result in inaccurate AI-driven analysis and misinterpretations.
- **Server Load Management** – Extremely high user load may impact server performance, potentially causing downtime or slower processing speeds.
- **Device Compatibility** – The application is currently optimized for use on laptops and PCs, with no support for mobile devices in this version.
- **Detection Limitations (Version 1)** – The first version of RadioIQ is capable of detecting Pneumothorax, Nodules, Pleural effusion, Cardiomegaly, Consolidation, Opacity and Rib Fracture.
- **Decision Support Only**: This is an AI-driven tool designed to assist medical professionals, but the final diagnosis and decisions must be made by experts.
- **OTP Delivery Delay:** If you are using an organization email account with advanced security filters, there may be a delay in receiving the OTP during login or registration. Please check your spam/junk folder and allow time for your organization's mail system to release the email.

3. System Requirements

The system requirements for RadioIQ:

Requirement	Specification
Operating System	Windows 11 or higher, macOS Sequoia 15.0+, Ubuntu 22.04+
Browser	Google Chrome (version 120 and above), Mozilla Firefox (version 115 and above), Brave (version 1.77 and above), Microsoft Edge (version 119 and above), Safari (18.4 and above)
Internet Connection	Stable 30 Mbps+ for smooth image loading & AI analysis
Screen Resolution	Minimum 1280x720 (16:9), recommended 1920x1080 (16:9)
Cookies & JavaScript	Must be enabled for authentication and AI analysis features
Device Support	Supports PCs and laptops; mobile devices are not supported
User Eligibility	Intended for licensed healthcare professionals (radiologists, physicians, etc.)
X-ray analysis Age Group	For all age group

4. Installation & Setup

4.1 Accessing RadioIQ

No Installation Required: RadioIQ is a web-based application and does not require any local installation. Users can securely access the platform through any compatible browser.

4.2 Cloud-Based Access

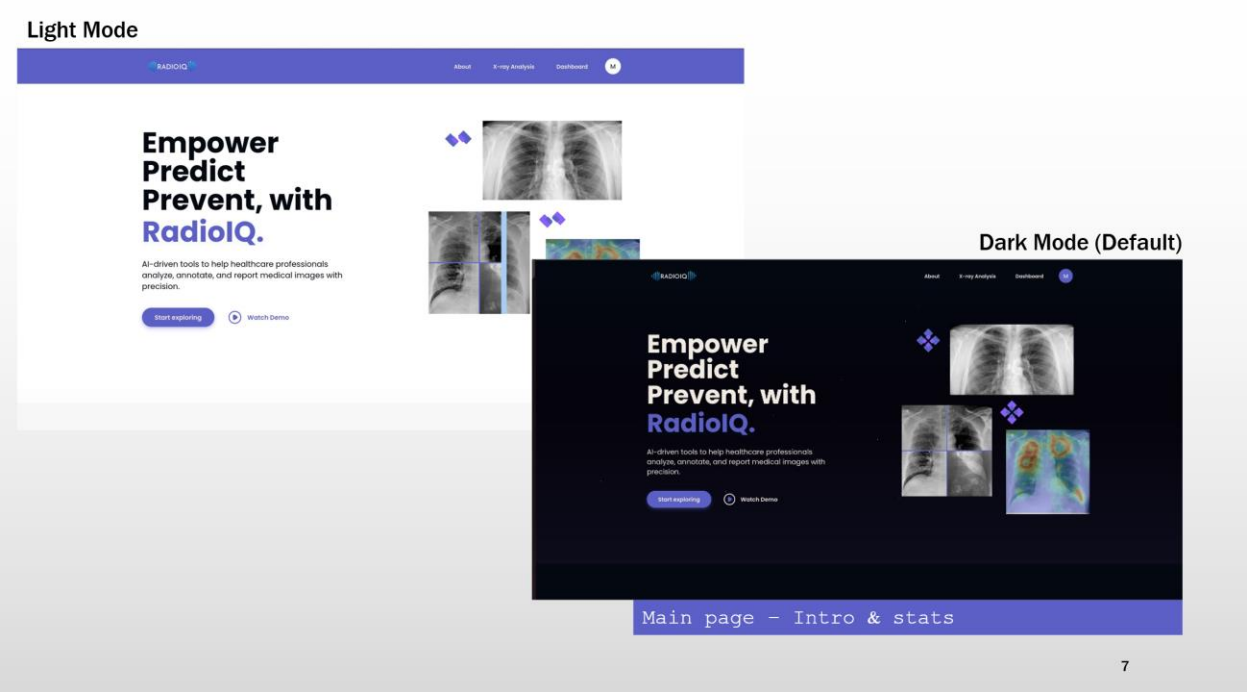
- **Access anytime, anywhere:** As a cloud-based platform, users can log in from devices such as laptops and PCs, with a supported web browser.
- **Visit the Platform:** Go to the login page at **www.radioiq.ai**
- **Navigating to the platform:** Open your browser and go to RadioIQ platform and navigate to login page.
- **Logging in:** Enter your credentials to access the dashboard and start using the platform.
- **Ensure Browser Compatibility:** Keep JavaScript and cookies enabled for

uninterrupted access and AI analysis functionality.

5. Application Guide

5.1 Home Page

The **Home Page** serves as the entry point for both new and returning users of the RadioIQ platform. It introduces the application's core features, highlights its AI-powered capabilities, and offers quick navigation to essential sections, such as sign-in, sign-up, and the dashboard.



5.5.1 Header

The top navigation bar allows easy access to different sections of the platform:

- **About:** Offers information about the platform and its use cases.
- **X-ray Analysis:** Opens the page to upload and analyze X-ray images.
- **Dashboard:** Directs logged-in users to patient analytics and tools.
- **Login:** For existing users to sign in.

5.5.2 Stats Section

Displays key statistics, including-

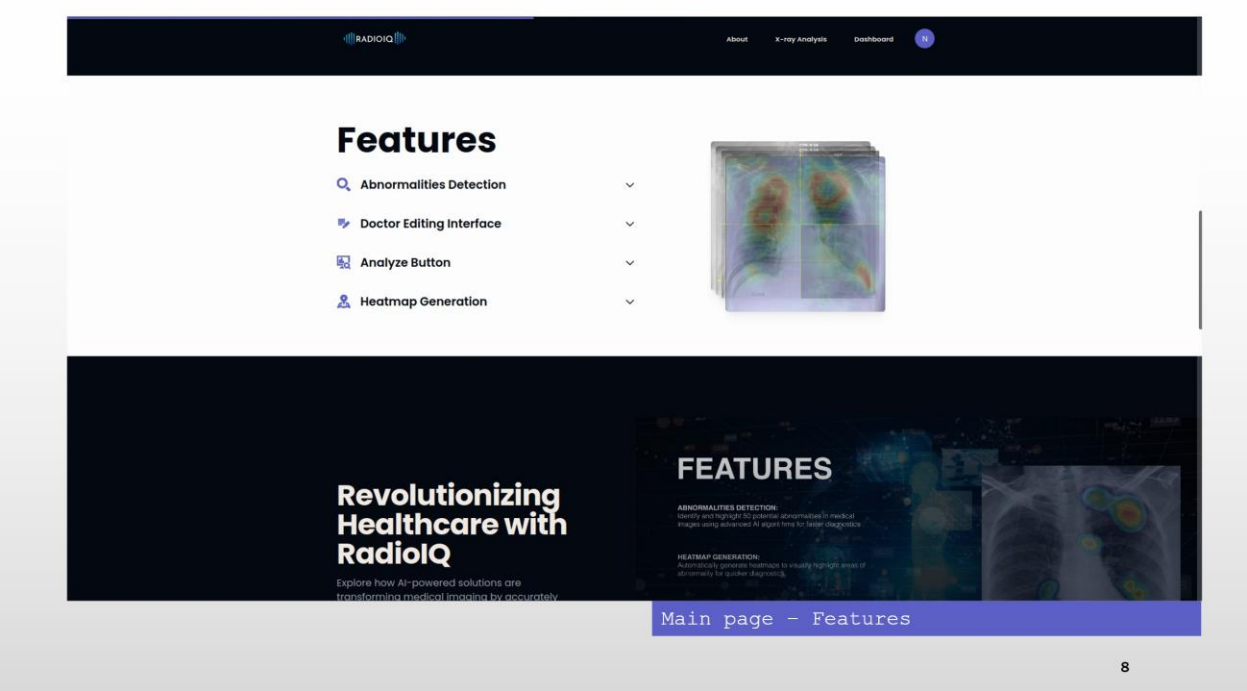
- **Sensitivity:** Percentage of actual positives correctly identified by the AI.

- **Specificity:** Percentage of actual negatives correctly identified.
- **Dataset Size:** Number of X-ray images used for training and evaluation.

5.5.3 Features Section

Highlights major functionalities

- **Abnormality Detection:** Automatically identifies and highlights critical findings.
- **Doctor Editing Interface:** Allows radiologists to manually review and refine AI suggestions.
- **Analyze Button:** Initiates the AI-powered X-ray analysis.
- **Heatmap Generation:** Visualizes AI focus areas to support explainability.



5.5.4 Demo Section & Playground

This section provides an interactive demo experience**:**

- Enables new users to try out RadioIQ features using demo video.
- Offers an intuitive "Playground" to experiment with annotations and tools in a safe environment.

5.2 Getting Started

This section guides new users through the essential steps to begin using the RadioIQ platform, including account creation, login, and password recovery.

5.2.1 Account Creation

To create a new RadioIQ account:

- Visit the official website: **www.radioiq.ai**
- Click on the **Sign-Up** button.
- Enter the required details (Name, Phone Number, Email, Password) and submit.
- Check your email inbox for the confirmation **OTP (One-Time Password)** and enter it on the website.
- Once verified, your account will be successfully created.

Note: If you're using an organization email address with strict security filters, the OTP email may be delayed. Please wait a few minutes and check your spam/junk folder as well.

5.2.2 Logging In

To access your account:

- Click the **Sign In** button on the homepage.
- Enter your registered email and password.
- Click **Login** to enter the dashboard and access platform features.

5.2.3 Forgot Password

If you forget your password:

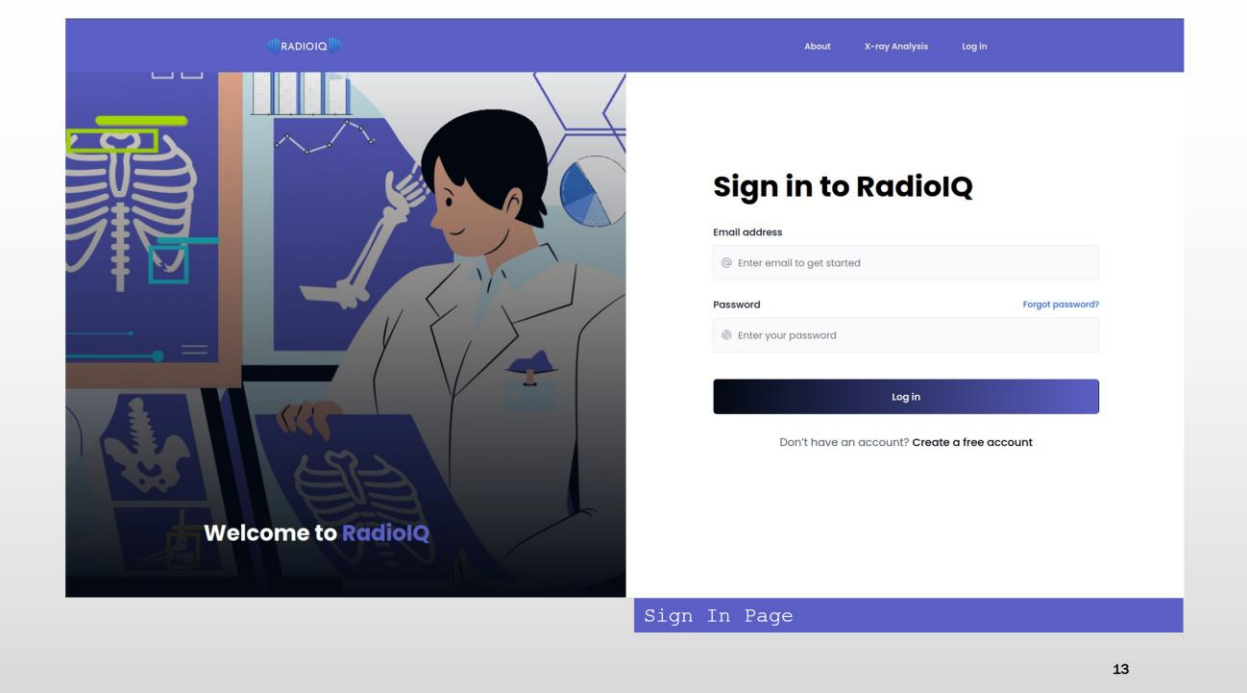
- Click the **Forgot Password** link on the login page.
- Enter your registered email and submit the request.
- Check your inbox for an OTP.
- Enter the OTP and create a new password.
- Log in using your updated credentials.

5.2.4 Payment & Subscription

To access advanced features and analysis capabilities, a valid subscription may be required:

- After logging in, navigate to the Subscription section in your account dashboard.
- Choose the appropriate plan based on your usage.
- Select your preferred payment method (Credit/Debit Card, Net Banking, UPI, etc.).

- Complete the payment process securely through the integrated payment gateway.
- Once payment is confirmed, your subscription will be activated immediately.



5.3 Analyzing X-Ray Images

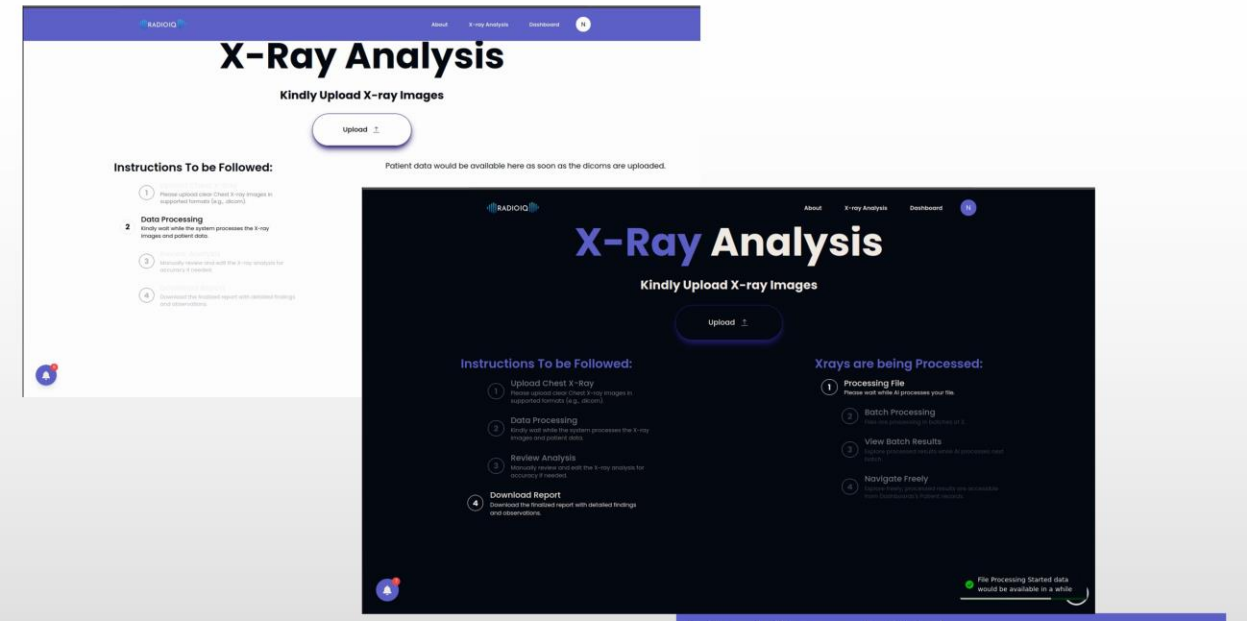
RadioIQ provides an intuitive workflow for uploading, analyzing, and interpreting chest X-ray images using advanced AI-powered tools. This section outlines each step.

5.3.1 DICOM File Upload

To begin analysis:

- Navigate to the **Upload** page.
- Click **Upload** and select a valid image file (.dcm, .dic, .dicom, or .png).
- The platform will process the image and display available patient details.
- If any required fields are missing (e.g., Name, Age, Gender, Location), fill them manually.
- Click **Analyze** to initiate AI-powered abnormality detection.

Note: Ensure that the uploaded file is a **valid chest X-ray image**, not corrupted, and of sufficient quality (e.g., not blurry, low-resolution, or improperly exposed). Poor-quality or non-chest images may lead to inaccurate or failed analysis.



Upload Page - Initial

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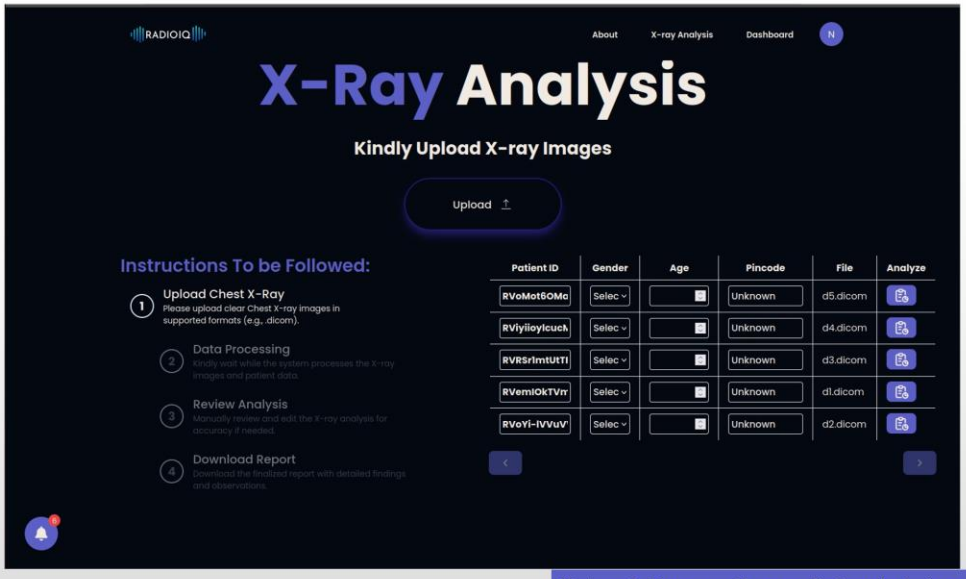

Upload Page – X-ray Uploaded & processed

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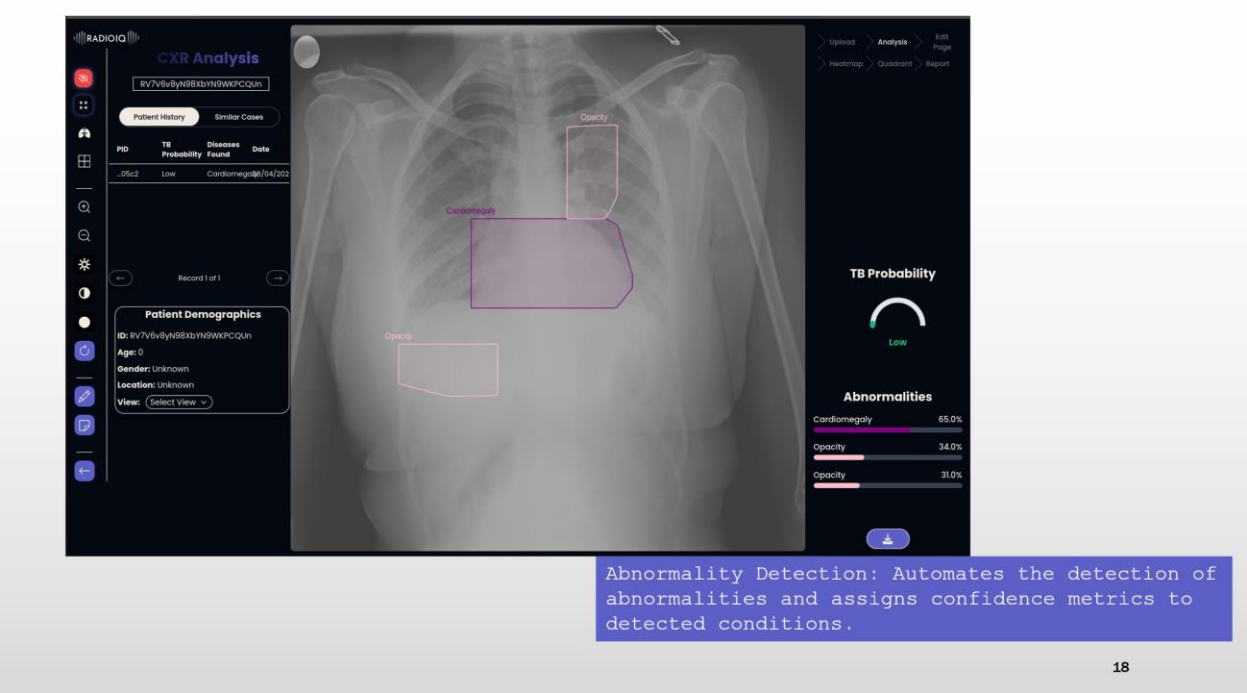
5.3.2 AI-Powered X-Ray Analysis

Once uploaded, the AI automatically:

- Analyzes the chest X-ray and highlights detected abnormalities.
- Displays results in the **Abnormalities Panel** (right side), including condition names and severity.
- Offers tools in the **Image Toolbar** (left side) to adjust brightness, contrast, zoom, and

pan.

- Allows viewing of **historical records** for comparative tracking of the same patient over time.
- Provides image enhancement options such as filters for improved readability.



5.3.3 Interpretation of AI Results

The AI analysis provides a probability score indicating the likelihood of abnormalities detected in the X-ray. Below is the interpretation of the AI output and the recommended actions for the radiologist:

AI Output	Meaning	Recommended Action
High (75–100%)	High confidence in abnormality detected	Verify and consider for diagnostic decisions
Medium (50–75%)	Possible abnormality	Review thoroughly; consider additional input
Low (0–50%)	Unlikely to be abnormal	Use clinical judgment; no action may be needed

Disclaimer: AI results are intended to assist in screening and should not be used as a replacement for professional medical judgment.

5.3.4 X-Ray Annotation and Editing

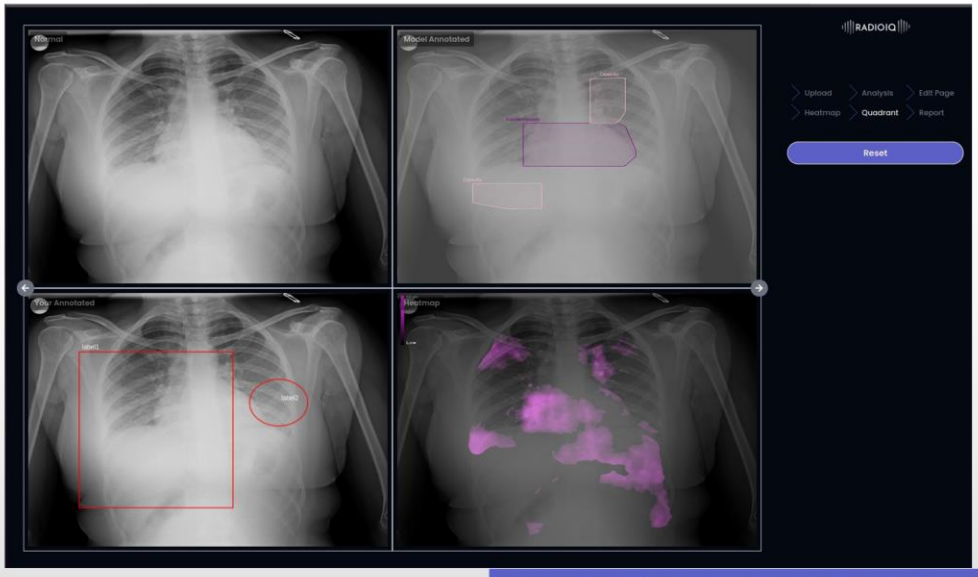
After analysis, users can:

- Use **annotation tools** to draw, label, or highlight regions of interest.
- Add **custom notes** for further clinical insights.
- Use **Undo/Redo** to revise markings easily.
- Click **Clear Annotations** to remove all drawings.
- Annotations are saved for future sessions and comparisons.
- Compare with previous reports to evaluate **progression or recovery**.

5.3.5 Transformed Images

RadioIQ enhances diagnostic review using AI-driven image transformations:

- Access the Quadrant section for enriched views.
- Apply transformations like:
  - Bone Separation
  - CLAHE (Contrast Limited Adaptive Histogram Equalization)
  - Cardiothoracic Ratio (CTR) Calculation
  - Inverted
- View Heatmap Overlays that highlight AI attention zones.
- Use Quadrant-Based View to zoom into specific regions of the scan.
- Enable Sync Zooming to compare multiple filters in parallel.



Diagnostic images - Applies transformations to X-rays, such as bone separation, CLAHE, cardiothoracic ratio, etc. for doctor analysis.

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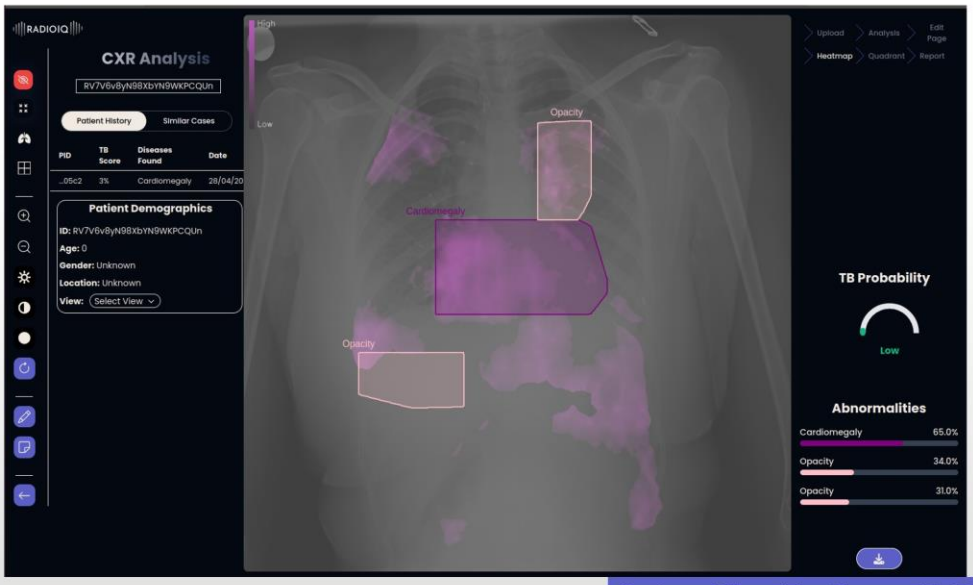

Heatmap Visualizations: Highlights AI focus areas using explainable AI techniques.

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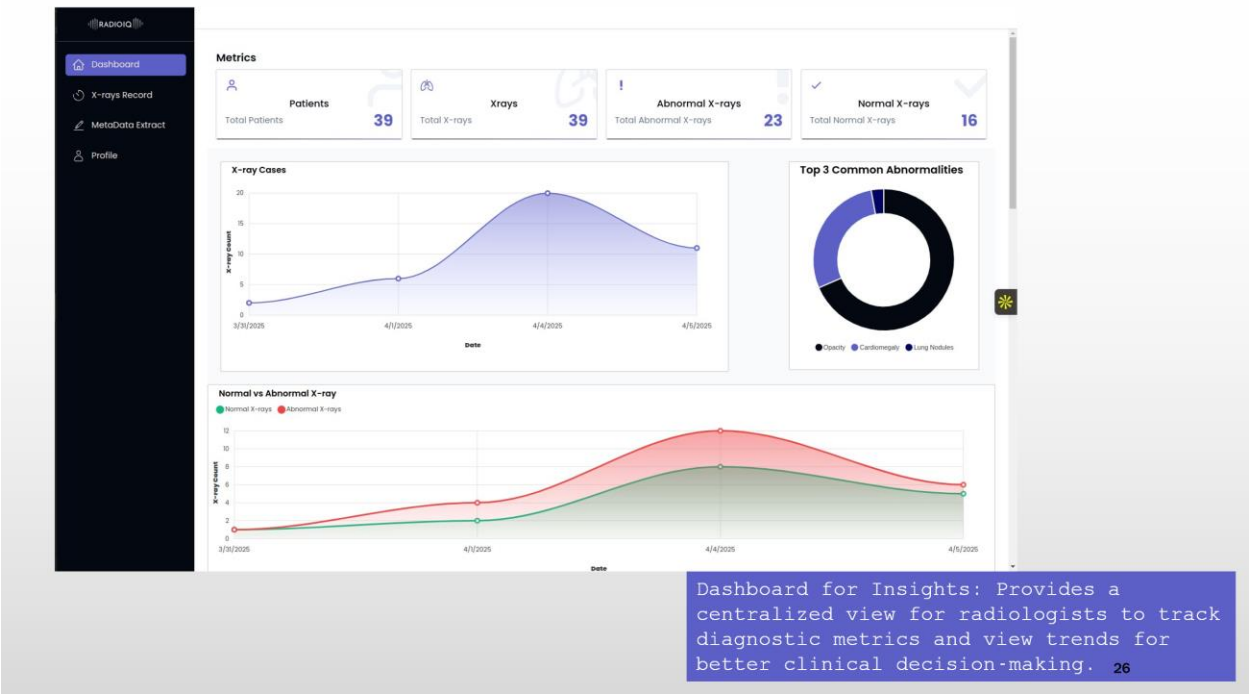
5.4 Downloading Reports

Once the AI analysis and annotations are complete, users can download reports in multiple formats to suit clinical or communication needs.

- Click the Download Report button on the analysis results page.
- Select the desired format:

- **Standard PDF Report**: Includes patient details, X-ray metadata, digital signature, and report date.
- **Detailed Report Format**: A structured format with AI findings, patient information, doctor's comments (editable), and prediction scores.
- **Full Screening Report**: A comprehensive clinical report including patient demographics, AI insights, doctor inputs, suggested next steps, and risk indicators.



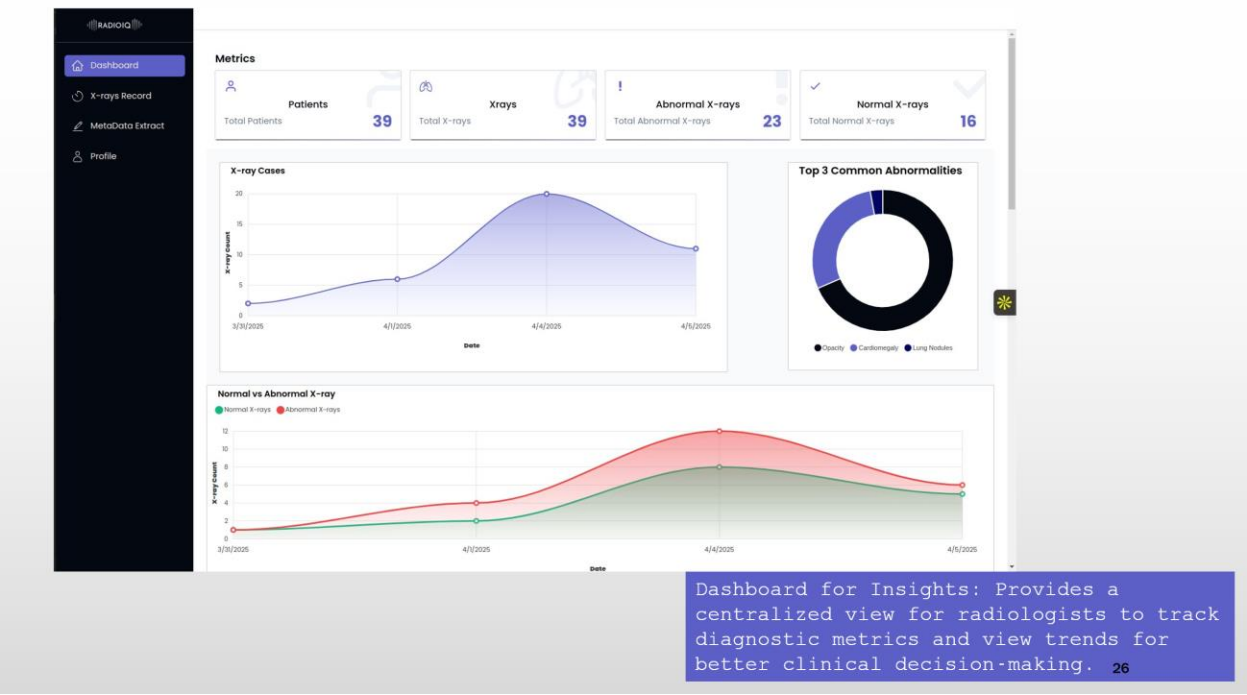
Note: All reports should be reviewed by a licensed radiologist before being used for diagnostic or clinical decision-making.

5.5 Dashboard & Patient Management

5.5.1 Dashboard Overview

The RadioIQ dashboard provides a consolidated view of ongoing patient cases, analytical trends, and AI activity:

- It shows the total number of patients, and the number of X-rays processed.
- A breakdown of abnormal and normal X-rays helps doctors assess the proportion of abnormal cases.
- A graphical representation displays the most common abnormalities detected.
- A dedicated section categorizes TB cases based on AI analysis into low, medium, and high-risk categories.
- Interactive charts, map and graphs offer insights into trends over time, aiding in the analysis of patient data.



5.5.2 Viewing Patient Details

- Go to the **Patient Details** page to view a list of patients, including name, age, gender, and X-ray records.
- Click on a patient's name to access their detailed history, past reports, and AI analysis summaries.
- The patient's record includes previous diagnoses, annotations, and consultation history, making it easier to track progress.
- Navigate to the **Patient Details** page from the dashboard sidebar.
- View a list of patients with basic demographics (Name, Age, Gender) and X-ray records.
- Use the **Search Bar** to quickly find specific patients by name or ID.

6. Admin Access

- Managed by the IT department.

7. Performance Characteristics

RadioIQ's performance has been evaluated across several dimensions, including accuracy, clinical validation, response time, and usage guidelines.

7.1 Accuracy Metrics

- **Sensitivity**: 90%
- **Specificity**: 85%

7.2 Clinical Validation

- The AI model has undergone rigorous clinical validation and testing in collaboration with leading medical institutions.

7.3 Response Time

- **Average processing time:** ≥30 seconds per chest X-ray image

7.4 OFF – Label Use Guidance and Usage Limitations

- RadioIQ is intended strictly for use with **chest X-ray images**. The system is not designed or validated for analysing other types of medical images (e.g., abdominal X-rays, CT scans, MRIs). Users must **avoid uploading or interpreting non-chest X-ray images**, as this may result in unreliable or clinically inaccurate outcomes.

- The AI-generated outputs should **not be treated as definitive or ground truth diagnoses**. They serve as **decision-support tools** and must always be reviewed, interpreted, and verified by a qualified medical professional before forming any clinical conclusion.

- To ensure optimal performance:

    - **Avoid uploading low-quality, blurry, or corrupted images**. Poor-quality input may compromise AI analysis and reduce diagnostic accuracy.
    - **Do not use AI-generated results as a baseline for training or initiating**

unrelated experimental procedures, unless validated under a separate research protocol.

7.5 Continuous Updates

- The system is continuously updated with new data and improvements to the AI model to enhance accuracy and performance.

8. Security & Compliance

RadioIQ follows strict data security measures to protect patient data.

- All data is encrypted in transit and at rest.
- Only authorized users can access sensitive medical records.
- Role-based authentication; only authorized users can view or modify clinical data.

9. Troubleshooting

If you experience issues, please try the following steps:

1. Confirm your internet connection is stable (≥ 30 Mbps).
2. Clear your browser cache and refresh the page.
3. Ensure cookies and JavaScript are enabled.
4. Verify that you are using a supported browser version (see System Requirements).
5. If the problem persists, contact our support team: **helpdesk.nuvoai@gmail.com**.

10. End-of-Service Notification

In the event that the AI Software for Abnormalities in Chest X-Ray is permanently withdrawn or decommissioned, the following provisions shall apply:

- **Advance Notification**: Users will be provided with formal notice at least 90 days prior to the discontinuation of the web-based software service.
- **Data Access**: Users will be offered a secure mechanism to export their clinical usage data, if applicable, before the service is terminated.
- **Support During Transition**: Technical support will remain available during the notice period to assist with data export, transition planning, or obtaining compliance documentation.

- **Data Retention and Privacy**: Any retained personal health information will be handled in accordance with applicable privacy regulations (e.g., GDPR, HIPAA). After deactivation, data will either be securely archived or permanently deleted as per the manufacturer's data retention policy.

Contact for Decommissioning Support: For any questions or support related to decommissioning, users may contact: helpdesk.nuvoai@gmail.com

11. Reporting Issues & Adverse Events

Users should report **any software malfunction:**

- Contact Us feature of the webapp
- Email to: helpdesk.nuvoai@gmail.com

12. Manufacturer Information

NUVO AI Private Limited
Address: 135/139, Muktanand Marg, Bilakhia House, Chala, Vapi, Pardi, Valsad-396191, Gujarat, India
Email ID: contact@nuvoai.org
Mob number: 0260-2408000, 0260-3509400
Website: www.nuvoai.org

13. FAQs

Q1: What file formats do RadioIQ support?
A: It supports DICOM (.dcm, .dicom, .dic) and PNG images.

Q2: Can I use RadioIQ on mobile?
A: Currently, RadioIQ is available only on laptops and PCs.

Q3: How accurate is the AI analysis?
A: The AI provides high-accuracy predictions but must always be reviewed by a radiologist.

Q4: Can I edit or annotate X-ray images after AI analysis?
A: Yes, doctors can annotate X-ray images, add custom notes, and adjust image properties such as brightness and contrast.

Q5: How can I download patient reports?

A: Reports can be downloaded in PDF format from the diagnostic report section.

Q6: Is patient data stored securely on RadioIQ?

A: Yes, patient data is encrypted and stored securely, following compliance with medical data protection regulations.

Q7: Is patient personal information stored on RadioIQ?

A: No, patient personal information is not asked (such as Name, Email, Phone Number, etc.). Only required demographic data is taken such as age, gender and location.