TEST PLAN FOR

CHEST X-RAY REPORT GENERATOR

ChangeLog

Version	Change Date	By	Description
version number	Date of Change	Name of person who made changes	Description of the changes made
001	06/11/2023	Sujal Gupta	Initial Draft

1 Introduction

In the medical fiield there is a term called Medical Imaging, it is the process of creating visual representations of the interior of the body for clinical analysis as well as visual representation of the function of organs or tissues. It is one of most significant and widely used methods for diagnosis and treatment. Some of the significant examples of medical imaging are X- Ray, MRI (Magnetic Resonance Imaging) etc. During the pandemic times (Covid-19) we saw that there was surge in the demands of medical imaging and Nowadays after the post pandemic (Covid-19) we have seen that people have become more conscious towards the diseases ,especially chest related diseases.

The detailed information generated from medical images is necessary for diagnosing illnesses or tracking patients' progress. However, every image requires a radiologist to carefully examine and write a full-text report to describe the findings. Diagnosing medical images requires an appropriate amount of experience from the radiologists to develop more confident and accurate reports. Furthermore, a more glaring issue is the amount of time it takes the radiologist to write a full-text report. It would take on average 10 min or more based on the radiologist's degree of experience, so this would prove very time-consuming when considering the number of cases a radiologist should investigate per day, and in crowded hospitals, regions, and cities, this would be problematic.

Also, for less-experienced radiologists and pathologists, especially those working in the rural area where the quality of healthcare is relatively low, writing medical-imaging reports is demanding. For instance, to correctly read a chest x-ray image, the following skills are needed like thorough knowledge of the normal anatomy of the thorax, the basic physiology of chest diseases; skills of analyzing the radiograph through a fixed pattern probability of evaluating the evolution over time knowledge of clinical presentation and history knowledge of the correlation with other diagnostic results (laboratory results, electrocardiogram, and respiratory function tests).

In sum, for both unexperienced and experienced medical professionals, writing imaging reports is unpleasant. So, our project, "Chest X- Ray Image Report App," is a pioneering initiative android based project aimed at providing the way to automatically generate the chest X-Ray report by giving the X-Ray image as input. It uses image captioning method using deep learning for extracting the features of the input image and providing appropriate text report as output for that image

1.1 Scope

1.1.1 In Scope

1. **User authentication for privacy of medical data**
    - The system must authenticate and validate the user Id and password to identify appropriate users.
    - The system should ask for permission to access the medical data.
    - No data of the user should be saved .
2. **X-Ray image picker**
    - The system should be able to pick two images at a time for single report
    - It should be pick clear images and asking user to adheres to the guidelines for picking X-Ray image.
    - The system should allow users to cancel or delete the picked image
3. **Accurate report generation**
    - The system must be capable of generating medical reports accurately ,subjective to its scope.
    - It should specify clearly whether disease is present or not.
    - The text report must be brief description based on the quality of image.

1.1.2 Out of Scope

1. Usability
- The user interface should be intuitive and easy to navigate.
- Response times for translations should be fast, ensuring a seamless user experience.
- The application must comply with accessibility standards to cater to users with various disabilities.

2. Security
- The project must ensure the security of user data, especially when processing sensitive information.
- Data transmission and storage should be encrypted to protect user information.
- The application must comply with relevant privacy regulations and guidelines.

3. Scalability and Performance
- The system should be scalable to accommodate a growing user base and increased usage.
- It must operate efficiently on various Android devices, including smartphones and tablets

1.2 Quality Objective

- Ensuring the Application Under Test conforms to functional and non-functional requirements
- Ensuring the AUT meets the quality specifications defined by the client
- Bugs/issues are identified and fixed before going live

1.3 Roles and Responsibilities

Detail description of the Roles and responsibilities of different team members like

- **QA Analyst** : Sujal Gupta
  The Quality Assurance (QA) Analyst conducted testing on software, websites, and other technical products to identify and resolve bugs, defects, and other potential issue.
- **Test Manager :** Ms. Shreela Pareek
  Managed all test processes, including test plans, resources, costs, timescales, test deliverables and traceability.
- **Configuration Manager :** Ms. Neha Shukla
- **Developers :** Sujal Gupta , Anmol Ratan , Vikas Yadav
  Developed the model and trained it.
- **Installation Team :** Vikas Yadav , Anmol Ratan , Sujal Gupta , Shreela Pareek, Neha Shukla
  Responsible for smooth execution of the program

2 Test Methodology

2.1 Overview

The decision to adopt a Waterfall methodology for a project is typically based on specific project requirements, constraints, and organizational factors. Here are some common reasons for choosing the Waterfall methodology:

- Well-Defined Requirements: When the project has clearly defined and stable requirements that are unlikely to change significantly throughout the project's lifecycle. Waterfall is suitable when you can gather and document all the requirements up front.

- Low Uncertainty: If there is a high level of confidence in the project scope and objectives, and the technology and processes to be used are well-understood, Waterfall can be a good choice. It is less adaptable to uncertainty and change.

- Regulatory Compliance: In cases where the project needs to adhere to strict regulatory or compliance standards, Waterfall provides a structured and documented approach that can help meet these requirements.

- Large-Scale and Complex Projects: Waterfall can be beneficial for large-scale, complex projects where a comprehensive and detailed project plan is essential for successful execution.

2.2 Test Levels

Testing a Web Application Firewall (WAF) typically involves multiple test levels to ensure comprehensive coverage of its security features and effectiveness. These test levels can be organized as follows:

1. **Unit Testing:**
    - **Rule Validation:** Verify that individual security rules within the WAF are correctly configured and accurately detect or block specific types of attacks.
    - **Logging and Alerting:** Test that the WAF generates appropriate logs and alerts for specific rule violations.
2. **Integration Testing:**
    - **Rule Interaction:** Assess how different security rules interact when multiple rules are applied to the same request or response. Ensure they do not conflict or produce unintended outcomes.
    - **Communication with Other Security Components:** Test the WAF's ability to integrate with other security components in your infrastructure, such as intrusion detection systems (IDS) or load balancers.
3. **System Testing:**
    - **Rule Coverage:** Validate that the WAF provides comprehensive coverage for known vulnerabilities and attacks, including SQL injection, cross-site scripting (XSS), cross-site request forgery (CSRF), and other common web application threats.
    - **Custom Rule Testing**: Ensure that any custom rules configured to protect application-specific vulnerabilities are working as intended.

2.3 Test Completeness

Few criteria to check Test Completeness are:

- 100% test coverage
- All open bugs are fixed or will be fixed in next release

3 Test Deliverables

Here mention all the Test Artifacts that will be delivered during different phases of the testing lifecycle.

Here are the sample deliverables

- Test Cases :

1. Wecome page of the app

Test Case ID	Description	Test Steps	Expected Outcome	Actual Outcome	Remark
WELCOME-001	App launch verification	Open the app	Welcome page is displayed	Welcome page displayed	Pass
WELCOME-002	Navigation to Login	Click on the login button	Redirected to the Login page	Redirected to the Login page	Pass
WELCOME-003	Navigation to Sign In	Click on the sign-in button	Redirected to the Sign In page	Redirected to the Sign In page	Pass

2. Authentication: Log-in

Test Case ID	Description	Test Steps	Expected Outcome	Actual Outcome	Remark
LOGIN-001	Successful Login	Enter valid credentials and click login	Redirected to Image Picker page	Redirected to Image Picker page	Pass
LOGIN-002	Unsuccessful Login	Enter invalid credentials and click login	Error message displayed	Error message displayed	Pass
LOGIN-003	Navigation to Sign In	Click on the sign-in link	Redirected to Sign In page	Redirected to Sign In page	Pass

4.Image Picker Page:

Test Case ID	Description	Test Steps	Expected Outcome	Actual Outcome	Remark
IMAGEPICKER-001	Select Images	Pick two X-ray images	Images are displayed for report generation	Images are displayed for report generation	Pass
IMAGEPICKER-002	Limit Check	Attempt to pick more than two images	Error message displayed	Error message displayed	Pass

5) Report generation page:

Test Case ID	Description	Test Steps	Expected Outcome	Actual Outcome	Remark
REPORT-001	Generate Report	Select images and click generate	A generated X-ray report is displayed	A generated X-ray report is displayed	Pass
REPORT-002	Image Validation	Select non-image files	Error message displayed	Error message displayed	Pass

6) FAQ(page)

Test Case ID	Description	Test Steps	Expected Outcome	Actual Outcome	Remark
SETTINGS-001	Open FAQ	Navigate to FAQ from Settings	FAQ page is displayed	FAQ page is displayed	Pass
SETTINGS-002	FAQ Content	Verify FAQ content	Correct FAQ questions and answers are displayed	Correct FAQ questions and answers are displayed	Pass
SETTINGS-003	FAQ Navigation	Click on FAQ links	Navigate to the respective FAQ sections	Navigates to the respective FAQ sections	Pass

- Requirement tracability matrix (RTM)
- Test Metrices

Requirement ID	Test Case ID(s)	Requirement Description	Test Steps	Actual Outcome	Test Status
REQ-001	WELCOME-001	App should have a welcome page	1. Open the app	Welcome page displayed	Pass
REQ-002	LOGIN-001	App should have a login page	1. Open the app	Login page displayed	Pass
REQ-003	LOGIN-002	App should have a sign-in page	1. Open the app	Sign-in page displayed	Pass
REQ-004	LOGIN-003	App should allow successful login	1. Enter valid credentials	Logged in successfully	Pass
			2. Click the 'Login' button		
REQ-005	LOGIN-004	App should handle unsuccessful login	1. Enter invalid credentials	Error message displayed	Pass
			2. Click the 'Login' button		
REQ-006	IMAGEPICKER-001	App should have an image picker page	1. Navigate to the image picker page	Image picker page displayed	Pass
REQ-007	IMAGEPICKER-002	App should allow image selection	1. Select one or more valid images	Images are selected	Pass
REQ-008	IMAGEPICKER-003	App should limit image selection to 2	1. Select more than 2 images	Only the first 2 images are selected	Pass
REQ-009	REPORT-001	App should generate X-ray reports	1. Select images for report generation	Report is generated with selected images	Pass

			2. Click the 'Generate Report' button		
REQ-010	REPORT-002	App should display selected images	1. View the generated report	Images are displayed within the report	Pass
REQ-011	IMAGEPICKER-004	App should handle non-image file selection	1. Select a non-image file	Error message displayed	Pass
			2. Click the 'Select' button		
REQ-012	SETTINGS-001	App should have a settings page with FAQ	1. Navigate to the settings page	Settings page displayed	Pass
REQ-013	SETTINGS-002	FAQ should be accessible from settings	1. Click on the FAQ section within settings	FAQ section displayed	Pass
REQ-014	SETTINGS-003	FAQ should contain relevant content	1. Access the FAQ section	Relevant FAQ content displayed	Pass
REQ-015	SETTINGS-004	FAQ should allow navigation to sections	1. Click on FAQ subsection	Subsection content displayed	Pass

Decision Table:

Conditions:

File Size (FS): 20 KB, 21 KB to 199 KB, 200 KB
Image Format (IF): PNG

Actions:

Accept Images (True)
Reject Images (False)

Conditions	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
FS: 20 KB	True	False	False	True	False	True	False
FS: 21 KB - 199 KB	False	True	False	False	True	False	True
FS: 200 KB	False	False	True	False	False	False	False
IF: PNG	True	True	True	True	True	False	False

Cases:
Case 1: File Size is 20 KB and Image Format is PNG.
Case 2: File Size is between 21 KB and 199 KB (exclusive) and Image Format is PNG.
Case 3: File Size is 200 KB and Image Format is PNG.
Case 4: File Size is 20 KB and Image Format is not PNG.
Case 5: File Size is between 21 KB and 199 KB (exclusive) and Image Format is not PNG.
Case 6: File Size is 200 KB and Image Format is not PNG.
Case 7: File Size is not 20 KB, between 21 KB and 199 KB (exclusive), or 200 KB, and Image format is not PNG.

4 Resource & Environment Needs

4.1 Testing Tools

No Testing Tool is required. Manual Testing is done.

4.2 Test Environment

It mentions the minimum **hardware** requirements that will be used to test the Application.
The following **software's** are required in addition to client-specific software.

- Android Studio
- Smartphone Device

5 Terms/Acronyms

TERM/ACRONYM	DEFINITION
API	Application Program Interface
AUT	Application Under Test