ÇANKAYA UNIVERSITY
FACULTY OF ENGINEERING
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Test Plan, Test Design Specifications and Test Cases

Version 1

CENG 408

Innovative System Design and Development II

SUMMER TRAINING INFORMATION SYSTEM

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INTRODUCTION

1.1 Version Control

Version No	Description of Changes	Date
1.0	First Version	March 27, 2025

1.2 Overview

This test plan aims to verify the functionalities of the "Skinalyzer" desktop application, which detects skin cancer by analyzing lesion images using federated and incremental learning techniques. The primary focus will be on validating the system's image upload process, result display, authentication mechanism, and federated training flow between clients and server.

1.3 Scope

This document defines the overall testing strategy and includes the features to be tested, test design specifications, test scenarios, and criteria for evaluating the success of tests. The testing will cover the User UI (image upload and analysis)

1.4 Terminology

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Term	Definition
Federated Learning	**A machine learning technique where multiple clients collaboratively train a model without sharing raw data.**
Incremental Learning	**A learning method where the model continuously updates itself with new data without retraining from scratch.**
Client	**A device or node that trains the machine learning model locally and communicates updates to the server.**
Server	**The central component responsible for aggregating updates from clients and distributing the global model.**
Global Model	**The centralized machine learning model formed by aggregating updates from clients.**
Base Model	**The initial version of the model sent to clients before training begins.**
Model Aggregation	**The process of combining multiple client model updates into a global model.**
HAM10000	**A medical dataset containing dermatoscopic images of skin lesions used for training and evaluating ML models.**
ISIC2019	**A large benchmark dataset for skin lesion analysis containing labeled dermatoscopic images.**
Accuracy	**A performance metric indicating the proportion of correct predictions.**
F1-Score	**A metric combining precision and recall, especially useful for imbalanced datasets.**
PyQt5	**A Python library used to create GUI (Graphical User Interface) applications.**
Kafka	**A distributed event streaming platform used for real-time data exchange between systems.**
MLFlow	**An open-source platform for managing the ML lifecycle, including experiment tracking and model versioning.**
Client UI	**The graphical interface that allows clients to manage local training and view logs.**
Server UI	**The administrative interface used to control the training rounds and monitor model updates.**
User UI	**The part of the desktop application where end users upload lesion images and view diagnostic results.**

38.

2. FEATURES TO BE TESTED

This section lists and gives a brief description of all the major features to be tested. For each major feature there will be a Test Design Specification added at the end of this document.

2.1 Login (LG)

The login feature allows users to securely access their accounts by entering their registered email or phone number along with a password. It verifies the provided credentials against the database and grants access if they match. In case of incorrect credentials, appropriate error messages are displayed, ensuring security and user guidance.

2.2 Add User (AU)

The add user feature enables new users to create an account by providing necessary information such as full name, username, email, password (and confirmation), and skin color. The system validates inputs, checks for existing accounts with the same email, and securely hashes the password before saving the user data to the database. In case of invalid inputs or duplicate emails, appropriate error messages are shown to guide the user.

3. FEATURES NOT TO BE TESTED

Feature	Reason for Exclusion
User Interface Theme Customization	The visual theme of the interface (e.g., color scheme) does not affect system functionality and will not be tested in this cycle.
Multilingual Support	The application is only being developed and tested in English for this release.
Database Backup and Restore	Backup functionalities are handled manually and are not part of the current release scope.

4. ITEM PASS/FAIL CRITERIA

A test case is considered **PASS** if the actual result matches the expected result without any errors, and all steps complete successfully.
A test case is considered **FAIL** if the actual result deviates from the expected result, produces an error, or if any step cannot be completed.

4.1 Exit Criteria

Testing will be considered successful and complete when the following conditions are met:

- 100% of the planned test cases have been executed
- At least 95% of all test cases have passed
- All high and medium-priority test cases have passed
- No critical bugs remain unresolved
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5. REFERENCES

[1] IS502_Group1_SRS_V2.0, December 12, 2009 *<< Give reference to your SRS / SDD documents*

6. TEST DESIGN SPECIFICATIONS

6.1 Login (LG)

6.1.1 Subfeatures to be tested

6.1.1.1 Login Button (LG.LOG_B)

The user can log in to the system by entering their registered credentials (email and password) in the login screen. After clicking the "Login" button, the system verifies the credentials and grants access to the main page section.

1. #### 6.1.1.2 Sign Up for Register Button (LG.SR_B)

The user can navigate to the registration page by selecting the "Sign Up" button. On this page, the user will provide the necessary details (name, surname, email, skin tone, password) to create an account.

2. #### 6.1.1.3 Forgot My Password (LG.FP_B)

The user can recover their password by clicking the "Forgot My Password" button on the login screen. The system prompts the user to enter the registered email address to send a password reset link

6.1.2 Test Cases

Here list all the related test cases for this feature

3. #### Login Button(LOG_B)

TC ID	Requirements	Priority	Scenario Description
LG.LOG_B.01	3.1.1	H	Enter a valid admin user id and password
LG.LOG_B.02	3.1.2	H	Enter a valid email and blank password
LG.LOG_B.03	3.1.3	H	Enter a invalid email and valid password
LG.LOG_B.03	3.1.4	H	Enter a invalid email and invalid password

4. Sign Up for Register Button (LG.SR_B)

TC ID	Requirements	Priority	Scenario Description
	3.2.1	H	Click on the “Register” button to register and after clicking go to the register page.

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8. **Forgot My Password (LG.FP_B)**

TC ID	Requirements	Priority	Scenario Description
	3.3.1	H	By clicking the "Forgot Password" button, a link will be sent to your registered email address. You can use this link to securely reset your password.

6.2 Register (REG)

2. **6.2.1 Subfeatures to be tested**

1. **6.2.1.1 Minimum Password Length (REG.PW.MIN)**

This subfeature verifies that the password entered by the user is at least 4 characters long to ensure security and validation.

2. 6.2.1.2 Password Confirmation Match (REG.PW.CFM)

This subfeature checks whether the password and confirm password fields match to prevent mistyped passwords during registration.

3. 6.2.1.3 Email Validation (REG.EM)

This subfeature verifies that the email address entered by the user is in a valid email format (e.g., includes @ and domain).

4. 6.2.1.4 Name Validation (REG.NM)

The system will validate the input to ensure it meets a minimum length requirement of at least 3 characters. If the input does not meet this criterion, an error message will prompt the user to enter a valid input with the correct length.

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TC ID	Requirements	Priority	Scenario Description
REG.PW.01		H	Enter a password shorter than 4 characters. System should reject the input.
REG.PW.02		H	Enter a mismatching password and confirm the password. System should show error.
REG.PW.03		H	Enter matching passwords with 4+ characters. System should accept the input.
REG.EM.01		H	Enter invalid email (e.g., without '@'). System should show validation error.
REG.EM.02		H	Enter valid email (e.g., user@example.com). System should accept it.

~~10.~~5. Name Validation (REG.NM)

TC ID	Requirements	Priority	Scenario Description
REG.NM.01	3.3.1	M	Enter a input smaller than 3 character
REG.NM.02	3.3.2	M	Enter a input equal to 3 character
REG.NM.03	3.3.3	M	Enter a input longer than 3 character

6.3 HOMEPAGE

~~2.~~3. 6.3.1 Subfeatures to be tested

1. **6.3.1.1 Upload Photo Button (HM.UP_B)**

   When the user clicks on the "UPLOAD PHOTO TO ANALYSE" button, the system should allow the user to select the photo on their device.

2. **6.3.1.2 Show Analysis History (HM.SH_B)**

   When the user clicks the "SHOW" button, he should be able to view the previous analysis history.

6.3.1.3 Analyse Photo Button (HM.AN_B)

When the user clicks the "ANALYZE" button after uploading a valid photo, the system should analyze the photo and show the results.

3. **6.3.1.4 Profile Button (HM.EP_B)**

When the user clicks on the "Edit Profile" button to update their profile information, they should be able to change and save their information.

6.3.1.5 About Us Page Navigation (HM.AU_B)

When the user clicks on the "about us" tab, they should be able to view information about us.

6.3.1.6 Contact Us Form (HM.CU_B)

The user can fill out the contact form and submit it by clicking on the "Contact" tab.

6.3.1.7 Logout Button (HM.LGOUT.B)

The user must end the session when he clicks the "Logout" button.

6.3.1.2 Test Cases

4. **6.3.1.2.1 Upload Photo Button (HM.UP_B)**

TC ID	Requirements	Priority	Scenario Description
HM.UP.0		H	Upload a valid photo and proceed to analyze
HM.UP.1		H	Upload photo and cancel before analyzing
HM.UP.2		M	Attempt to upload an unsupported file format
HM.UP.3		L	Try to upload photo with file size exceeding limit

6.3.1.2.2 Show Analysis History (HM.SH_B)

TC ID	Requirements	Priority	Scenario Description
HM.SH.0		H	Show valid analysis history for logged-in user
HM.SH.1		M	Show empty state if no history available
HM.SH.2		L	Handle server error gracefully when fetching

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6.3.1.2.3 Analyse Photo Button (HM.AN_B)

TC ID	Requirements	Priority	Scenario Description
HM.AN_B.0		H	Upload a valid image and analyze successfully
HM.AN_B.1		H	Attempt to analyze without uploading an image
HM.AN_B.2		H	Upload an unsupported file format and analyze
HM.AN_B.3		H	Upload a large file (>5MB) and analyze
HM.AN_B.4		M	Simulate network error during analysis
HM.AN_B.5		H	Analyze image and show result correctly
HM.AN_B.6		L	Verify timeout error if analysis takes too long

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1. 6.3.1.2.4 Show Analysis History (HM.SH_B)

TC ID	Requirements	Priority	Scenario Description
HM.SH.0		H	Show valid analysis history for logged-in user
HM.SH.1		M	Show empty state if no history available

6.3.1.2.5 Profile Button (HM.EP_B)

TC ID	Requirements	Priority	Scenario Description
HM.EP.0		H	Verify error messages when fields are left empty
HM.EP.1		M	Update user profile information successfully
HM.EP.2		L	Attempt to update with invalid data

7. Detailed Test Cases

4. 7.1 LG.LOG_B.01

TC_ID	LG.LOG.01
Purpose	To verify that the login button functions correctly and allows users to access their accounts with valid credentials.
Requirements	6.1.1.1
Priority	High.
Estimated Time Needed	1 Minutes
Dependency	Login form should be accessible
Setup	Open the application and navigate to the login form

Procedure	[A01] Enter a valid email or phone number.
	[A02] Enter a valid password.
	[A03] Click the "Login" button.
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Cleanup	Clear all input fields

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1. LG.SR_B

TC_ID	LG.SR_B.01
Purpose	To verify that the "Sign Up" button redirects users to the registration page..
Requirements	6.1.1.2
Priority	High.
Estimated Time Needed	1 Minutes
Dependency	Login page should be accessible.
Setup	Open the application and navigate to the login page
Procedure	[A01] Click the "Sign Up" or "Register" button.
	The user should be redirected to the registration page
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Cleanup	No specific cleanup required.

2. LG.FP_B

TC_ID	LG.FP_B.01
Purpose	To verify that the "Forgot Password" button redirects users to the password recovery page.
Requirements	6.1.1.3
Priority	High.
Estimated Time Needed	2 Minutes
Dependency	Login page should be accessible.
Setup	Open the application and navigate to the login page
Procedure	[A01] Click the "Forgot Password" button.
	The user should be redirected to the password recovery page.
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Cleanup	No specific cleanup required.

6. 7.2 REG.VAL.01

TC_ID	REG.VAL.01
Purpose	To verify that the system enforces minimum password length of 4 characters
Requirements	6.2.1.1
Priority	High.
Estimated Time Needed	3 Minutes
Dependency	Registration form should be accessible
Setup	Open the application and navigate to the registration form
Procedure	[A01] Enter a valid full name, username, and email
	[A02] Enter a password with only 3 characters
	[A03] Confirm the password with the same 3 characters
	[A04] Click the "Register" button
	-
Cleanup	Clear all input fields

7. 7.2 REG.VAL.02

TC_ID	**REG.VAL.02**
Purpose	**To verify that mismatching passwords are not accepted**
Requirements	6.2.1.2
Priority	High.
Estimated Time Needed	3 Minutes
Dependency	**Registration form should be accessible**
Setup	**Open the application and navigate to the registration form**
Procedure	[A01] Enter a valid full name, username, and email
	[A02] Enter password: abcde123
	[A03] Enter confirm password: abc123
	[A04] Click the "Register" button
Cleanup	Clear all input fields

7.2 REG.VAL.03

TC_ID	REG.VAL.03
Purpose	To ensure that invalid email format is not accepted
Requirements	6.2.1.3
Priority	High.
Estimated Time Needed	2 Minutes
Dependency	Registration form should be accessible
Setup	Open the application and navigate to the registration form
Procedure	[A01] Enter a valid full name, username, and password
	[A02] Enter email: useremail.com
	[A03] Confirm password properly
	[A04] Click the "Register" button
Cleanup	Clear all input fields

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1. **7.2 REG.NM.VAL.04**

TC_ID	REG.NM.03
Purpose	To ensure that invalid name is not accepted
Requirements	6.2.1.4
Priority	M.
Estimated Time Needed	2 Minutes
Dependency	Registration form should be accessible
Setup	Open the application and navigate to the registration form
Procedure	[A01] Enter a valid full name(at least 3 words), and password
	[A02] Enter a valid email
	[A03] Confirm password properly
	[A04] Click the "Register" button
Cleanup	Clear all input fields

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Biçimlendirilmiş: Normal, Girinti: İlk satır: 0 cm, Sekme durakları: 2 cm, Sola

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7.3 HM.UP.0

TC_ID	HM.UP.0
Purpose	To verify that the system allows users to upload a valid photo and prepares it for analysis.
Requirements	6.3.1.1
Priority	High.
Estimated Time Needed	2 Minutes
Dependency	User must be logged in and on the main page.
Setup	Open the application and navigate to the home page
Procedure	[A01] Click the "Upload Photo to Analyse" button
	[A02] Select a valid image file (e.g., JPG or PNG under 5MB)
	[A03] Confirm that the image appears in the preview section
Cleanup	Remove uploaded photo from temporary storage if necessary.

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7.4 HM.AN_B.0 – Analyze Uploaded Photo

TC_ID	HM.AN_B.0
Purpose	To verify that the system successfully analyzes a valid uploaded image and displays the result.
Requirements	6.3.1.3

Priority	High.
Estimated Time Needed	3 Minutes
Dependency	Valid photo must be uploaded
Setup	Open the homepage and upload a valid photo.
Procedure	[A01] Click the "Analyze" button
	[A02] Wait for the analysis to complete
	[A03] View the analysis results shown on screen
Cleanup	Clear displayed results.

7.6 HM.SH.0 – Show Analysis History

TC_ID	HM.SH.0
Purpose	To verify that analysis history is retrieved and displayed correctly.
Requirements	6.3.1.2
Priority	High.
Estimated Time Needed	2 Minutes
Dependency	At least one past analysis must exist in the database
Setup	Login with a user that has performed analysis before
Procedure	[A01] Click the "SHOW" button
	[A02] View the list of previous analysis results
Cleanup	None.