

7 Testing and Evaluation

7.1 Unit Testing

Unit Testing 1: Verify creation of user type

Testing Objective: To ensure that correct user type is created

Test Case Id: TC_001

Table 78 Test Case Id: TC_001

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	Verify that the user type is created successfully.	User type = "Shop Owner"	User type "Shop Owner" is created successfully	User type "Shop Owner" is created successfully	Pass
2	Verify that the user type is created successfully.	User type = "Employee"	User type "Employee" is created successfully	User type "Employee" is created successfully	Pass

Unit Testing 2: User account creation

Testing Objective: To ensure that correct user account is created.

Test Case Id: TC_002

Table 79 Test Case Id: TC_002

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	Verify that a user account is created successfully.	Full Name = "Muhammad Azfar", Email = " azfar1@gmail.com ", User Type = "Employee", Password = "abc123"	User account for John Doe is created successfully.	User account for John Doe is created successfully.	Pass
2	Verify that an invalid email address is not accepted.	Full Name = "Syed Danish", Email = " Danish ", User Type = "Shop Owner", Password = "abc123"	Error message is displayed indicating an invalid email address.	Error message is displayed indicating an invalid email address.	Pass

Unit Testing 3: View User Account

Testing Objective: To ensure that correct user account information is displayed.

Test Case Id: TC_003

Table 80 Test Case Id: TC_003

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	Verify that the user accounts are displayed correctly.	User Account Data (Full Name, Email, User Type) = [Muhammad Azfar, azfar1@gmail.com , Employee], [Syed Danish, danish@gmail.com , Shop Owner]	User accounts for Muhammad Azfar and Syed Danish are displayed correctly.	User accounts for Muhammad Azfar and Syed Danish are displayed.	Pass

Unit Testing 4: Edit User Account

Testing Objective: To ensure that edited data is properly saved and executed.

Test Case Id: TC_004

Table 81 Test Case Id: TC_004

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	Verify that the user account details are pre-filled correctly.	(Full Name, Email, User Type, Password) = [Muhammad Azfar, azfar1@gmail.com, Employee, abc123]	The Full Name, Email, User Type, and password fields are pre-filled with the corresponding user account details.	The Full Name, Email, User Type, and password fields are pre-filled with the corresponding user account details.	Pass
2	Verify that the user account is updated successfully.	(Full Name, Email, User Type, Password) = [Muhammad Danish, danish@gmail.com, ShopOwner, abc123]	User account details for Syed Danish are updated to Muhammad Danish successfully	User account details for Syed Danish are updated to Muhammad Danish successfully	Pass

Unit Testing 5: Delete User Account

Testing Objective: To ensure that admin deletion of user account feature works and is executed properly

Test Case Id: TC_005

Table 82 Test Case Id: TC_005

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The Admin logs into the dashboard	(Email, Password) = [azfar1@gmail.com, abc123]	Admin successfully logged in.	Admin successfully logged in.	Pass
2	The Admin clicks View User Account.	Single Click	User account screen displayed	User account screen displayed	Pass
3	The Admin clicks on the delete icon for the desired user account required to be deleted.	Single Click	User account deleted successfully	User account deleted successfully	Pass

Unit Testing 6: Edit Admin Account

Testing Objective: To ensure that admin successfully updates their account.

Test Case Id: TC_006

Table 83 Test Case Id: TC_006

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The Admin logs into the dashboard	(Email, Password) = [azfar1@gmail.com, abc123]	Admin successfully logged in.	Admin successfully logged in.	Pass
2	The Admin clicks on settings icon.	Single Click	Admin edit screen is displayed	Admin edit screen is displayed	Pass
3	The Admin clicks on update password button.	Single Click	Password fields enabled	Password fields enabled	Pass
4	The Admin edits their password	Password: abc123	Password Written	Password Written	Pass
5	The Admin again writes password in confirm password field	Password: abc123	Confirm Password Field Password Written	Confirm Password Field Password Written	Pass
6	The Admin clicks on Update Profile button	Single Click	Admin details updated successfully	Admin details updated successfully	Pass

Unit Testing 7: Face Detection

Testing Objective: To ensure that employee face detection works and is executed properly.

Test Case Id: TC_007

Table 84 Test Case Id: TC_007

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User clicks on mark attendance	Single Click	The system navigates the user to the attendance screen	The system navigates the user to the attendance screen	Pass
2	The User brings face in front of screen	Detect Face	System has the face image correctly placed	System has the face image correctly placed	Pass
3	The User remains still for face detection	Detect Face	System detects employee face	System detects employee face	Pass
4	The User waits for face detection	Detect Face	System makes a box shape around the detected employee face	System makes a box shape around the detected employee face	Pass
5	The User checks attendance status	Check Attendance	System displays Attendance Marked Successfully	System displays Attendance Marked Successfully	Pass
6	The User views attendance	View Attendance	System displays total attendance and year of marked employee	System displays total attendance and year of marked employee	Pass

Unit Testing 8: Face Detection already marked

Testing Objective: To ensure that no multiple detection take place for an employee at the same time.

Test Case Id: TC_008

Table 85 Test Case Id: TC_008

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User clicks on mark attendance	Single Click	The system navigates the user to the attendance screen	The system navigates the user to the attendance screen	Pass
2	The User brings face in front of screen	Detect Face	System has the face image correctly placed	System has the face image correctly placed	Pass
3	The User remains still for face detection	Detect Face	System detects employee face	System detects employee face	Pass
4	The User waits for face detection	Detect Face	System makes a box shape around the detected employee face	System makes a box shape around the detected employee face	Pass
5	The User checks attendance status	Check Attendance	System displays Attendance Marked Successfully	System displays Attendance Marked Successfully	Pass
6	The User remains still looking in the camera	Check Attendance Status	System displays Attendance Already Marked	System displays Attendance Already Marked	Pass
7	The User views attendance	View Attendance	System displays total attendance and year of marked employee	System displays total attendance and year of marked employee	Pass

Unit Testing 9: View Attendance

Testing Objective: To ensure that both Employee and Shop Owner can properly view their attendance.

Test Case Id: TC_009

Table 86 Test Case Id: TC_009

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User enters username	Username: azfariqbal01@gmail.com	The system identifies as a registered and valid email	The system identifies as a registered and valid email	Pass
2	The User enters password and press the login button	Password: abc123 Single Click	User is logged in the application and dashboard is displayed	User is logged in the application and dashboard is displayed	Pass
3	The User clicks on View Attendance	Single Click	User Attendance is displayed	User Attendance is displayed	Pass

Unit Testing 10: Edit Profile

Testing Objective: To ensure that both shop owner and employee are able to successfully edit their profile.

Test Case Id: TC_010

Table 87 Test Case Id: TC_010

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User logs into the application	Username: azfariqbal01@gmail.com Password: abc123	Login is successful	Login is successful	Pass
2	The User clicks on edit profile	Single click	System navigates the user to the edit profile screen	System navigates the user to the edit profile screen	Pass
3	The User enters new password and again enters in confirm password	Password: abcd123	System updates password field	System updates password field	Pass
4	The User clicks on Reset Password	Single Click	A pop-up appears asking to confirm password reset	A pop-up appears asking to confirm password reset	Pass
5	The User clicks OK	Single Click	System displays Password reset successfully	System displays Password reset successfully	Pass

Unit Testing 11: Help & Support

Testing Objective: To ensure that both shop owner and employee are able to successfully contact help & Support.

Test Case Id: TC_011

Table 88 Test Case Id: TC_011

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User logs into the application	Username: azfariqbal01@gmail.com Password: abc123	Login is successful	Login is successful	Pass
2	The User clicks on settings	Single click	System navigates the user to the settings screen	System navigates the user to the settings screen	Pass
3	The User clicks on Help & Support	Single Click	Support screen is displayed	Support screen is displayed	Pass
4	The User clicks on the help contact number	Button Click	System prompts the user to make call	System prompts the user to make call	Pass
5	The User clicks OK	Single Click	System redirects the user to the built-in phone dialer	System redirects the user to the built-in phone dialer	Pass
6	The User clicks on the call icon	Button Click	A call is sent to the help phone number by the user	A call is sent to the help phone number by the user	Pass

Unit Testing 12: Forgot Password

Testing Objective: To ensure that user can change password if forgotten.

Test Case Id: TC_012

Table 89 Test Case Id: TC_012

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User clicks on forgot password	Single Click	System directs the user to the Forgot Password page	System directs the user to the Forgot Password page	Pass
2	The User writes his email	Email: azfariqbal01@gmail.com	The system updates email field	The system updates email field	Pass
3	The User writes the OTP	OTP: 123456	The system validates the OTP and navigates user to home page	The system validates the OTP and navigates user to home page	Pass

Unit Testing 13: Notifications

Testing Objective: To ensure that the system notifies the user about activities.

Test Case Id: TC_013

Table 90 Test Case Id: TC_013

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User clicks on notification button	Single Click	The System prompts a notifications bar	The System prompts a notifications bar	Pass
2	The User clicks on notification	Single Click	The system navigates the user to notifications page	The system navigates the user to notifications page	Pass
3	The User clicks on delete button to remove the notification from notification page	Single Click	The system deletes the notifications from the notification page	The system deletes the notifications from the notification page	Pass

Unit Testing 14: Live Surveillance

Testing Objective: To ensure that the shop owner is able to view live surveillance successfully.

Test Case Id: TC_014

Table 91 Test Case Id: TC_014

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User logs into the application	Username: azfariqball@gmail.com Password: abc123	System displays user dashboard	System displays user dashboard	Pass
2	The User clicks on live surveillance	Single Click	The system navigates the user live surveillance screen	The system navigates the user live surveillance screen	Pass
3	The User clicks on full screen icon	Single Click	The system displays live surveillance to the shop owner from device	The system displays live surveillance to the shop owner from device	Pass

Unit Testing 15: Recorded Tapes

Testing Objective: To ensure that the shop owner is able to view recorded tapes of live surveillance successfully.

Test Case Id: TC_015

Table 92 Test Case Id: TC_015

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User logs into the application.	Username: azfariqbal1@gmail.com Password: abc123	System displays user dashboard	System displays user dashboard	Pass
2	The User clicks on Recorded Tapes.	Single Click	The system navigates the user recorded tapes screen	The system navigates the user recorded tapes screen	Pass
3	The User clicks on Tap to View Button.	Button Click	The system redirects the user to clouldinary login page	The system redirects the user to clouldinary login page	Pass
4	The User clicks on desired recording tape from the available ones.	Single Click	The system starts to play the desired selected recording tape	The system starts to play the desired selected recording tape	Pass

Unit Testing 16: Display Employees

Testing Objective: To ensure that the shop owner is able to view live surveillance successfully.

Test Case Id: TC_016

Table 93 Test Case Id: TC_016

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User logs into the application	Username: azfariqbal1@gmail.com Password: abc123	System displays user dashboard	System displays user dashboard	Pass
2	The User clicks on All Employees	Single Click	The system navigates the user to Employee List	The system navigates the user to Employee List	Pass

Unit Testing 17: View Employee Attendance

Testing Objective: To ensure that the shop owner is able to view Employee Attendance successfully.

Test Case Id: TC_017

Table 94 Test Case Id: TC_017

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User logs into the application	Username: azfariqbal1@gmail.com Password: abc123	System displays user dashboard	System displays user dashboard	Pass
2	The User clicks on All Employees	Single Click	The system navigates the user to Employee List	The system navigates the user to Employee List	Pass
3	The User clicks on Click to View Button for the desired employee	Single Click	The system display attendance of the specific employee	The system display attendance of the employee	Pass

Unit Testing 18: Detect Pistol

Testing Objective: To ensure that the System is able to detect pistol of intruder successfully.

Test Case Id: TC_018

Table 95 Test Case Id: TC_018

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqbal1@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User places a pistol in front of the screen	Pistol	The system detects the object as a pistol and marks a box around it with the pistol label	The system detects the object and marks a box around it with the pistol label	Pass

Unit Testing 19: Detect Trespasser

Testing Objective: To ensure that the System is able to detect trespassing intruder successfully.

Test Case Id: TC_019

Table 96 Test Case Id: TC_019

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User selects Region of Interest (ROI)	Selected Region	System recognizes ROI and proceeds to detect trespasser in that region	System recognizes ROI and proceeds to detect trespasser in that region	Pass
3	The User stays visible by the camera	Trespasser/Person	The system detects the human as a person and marks a box around them with person label	The system detects the human as a person and marks a box around them with person label	Pass

Unit Testing 20: Detect Trespasser with incorrect ROI

Testing Objective: To ensure that the only detects trespassing intruder in the ROI.

Test Case Id: TC_020

Table 97 Test Case Id: TC_020

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqbal1@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User selects Region of Interest (ROI) outside of the intruder's present region.	Selected Region	System recognizes ROI and proceeds to detect trespasser in that region	System recognizes ROI and proceeds to detect trespasser in that region	Pass
3	The User stays visible by the camera	Trespasser/Person	The system is unable to detect the person as he is standing outside the ROI	The system is unable to detect the person as he is standing outside the ROI	Pass

Unit Testing 21: Record Weapon Detection Video

Testing Objective: To ensure that the System is able to record video of weapon detection successfully.

Test Case Id: TC_021

Table 98 Test Case Id: TC_021

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on weapon detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User places a pistol in front of the screen	Pistol	The system detects the object as a pistol and marks a box around it with the pistol label	The system detects the object as a pistol and marks a box around it with the pistol label	Pass

Unit Testing 22: Save Weapon Detection Video

Testing Objective: To ensure that the System is able to save video of weapon detection successfully.

Test Case Id: TC_022

Table 99 Test Case Id: TC_022

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User places a pistol in front of the screen	Pistol	The system detects the object as a pistol and marks a box around it with the pistol label	The system detects the object as a pistol and marks a box around it with the pistol label	Pass
3	The User closes the application	Single Click	The system saves the recorded video inside the directory chosen by the user	The system saves the recorded video inside the directory chosen by the user	Pass

Unit Testing 23: Upload Weapon Detection Video

Testing Objective: To ensure that the System is able to upload video of weapon detection on cloudinary server successfully.

Test Case Id: TC_023

Table 100 Test Case Id: TC_023

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqbal1@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on weapon detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User places a pistol in front of the screen	Pistol	The system detects the object as a pistol and marks a box around it	The system detects the object as a pistol and marks a box around it	Pass
4	The User closes the application	Single Click	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	Pass

Unit Testing 24: Record Trespasser Detection Video

Testing Objective: To ensure that the System is able to record video of trespassing detection successfully.

Test Case Id: TC_024

Table 101 Test Case Id: TC_024

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on trespassing detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User selects Region of Interest (ROI)	Selected Region	System recognizes ROI and proceeds to detect trespasser in that area	System recognizes ROI and proceeds to detect trespasser in that area	Pass
4	The User stays visible by the camera	Detect Trespasser	The system detects the human as a person and marks a box around them with the person label	The system detects the human as a person and marks a box around them with the person label	Pass

Unit Testing 25: Save Trespasser Detection Video

Testing Objective: To ensure that the System is able to save video of trespassing detection successfully.

Test Case Id: TC_025

Table 102 Test Case Id: TC_025

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User selects Region of Interest (ROI)	Selected Region	System recognizes ROI and proceeds to detect trespasser in that region	System recognizes ROI and proceeds to detect trespasser in that region	Pass
3	The User closes the application	Single Click	The system saves the recorded video inside the directory chosen by the user	The system saves the recorded video inside the directory chosen by the user	Pass

Unit Testing 26: Upload Trespasser Detection Video

Testing Objective: To ensure that the System is able to upload video of trespassing detection on cloudinary server successfully.

Test Case Id: TC_026

Table 103 Test Case Id: TC_026

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on trespassing detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User selects Region of Interest (ROI)	Selected Region	System recognizes ROI and proceeds to detect trespasser in that region	System recognizes ROI and proceeds to detect trespasser in that region	Pass
4	The User stays visible by the camera	Detect Trespasser	The system detects the human as a person and marks a box around them	The system detects the human as a person and marks a box around them	Pass
5	The User closes the application	Single Click	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	Pass

7.2 Functional Testing

Functional test cases are given below:

Functional Testing 1: Check deletion and editing of user type

Objective: To ensure that the deletion and editing user type functionality works

Test Case Id: TC_001

Table 104 Functional Test Case Id: TC_001

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that a user type can be deleted.	User type = "Shop Owner"	User type "Shop Owner" is deleted successfully.	User type "Shop Owner" is deleted successfully.	Pass
2.	Verify that a user type can be edited.	User type = "Employee"	User type "Employee" is updated successfully.	User type "Employee" is updated successfully.	Pass
3.	Verify that an invalid user type cannot be created.	User type = "Invalid User Type"	Error message is displayed indicating invalid user type.	Error message is displayed indicating invalid user type.	Pass
4.	Verify that deleting a user type removes associated user records.	User type = "Shop Owner"	All user records associated with the "Shop Owner" user type are deleted.	All user records associated with the "Shop Owner" user type are deleted.	Pass

Functional Testing 2: Verify successful account creation.**Objective:** To ensure that the deletion and editing user type functionality works**Test Case Id:** TC_002**Table 105 Functional Test Case Id: TC_002**

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that the "Create User Account" button is disabled until all required fields are filled.	Full Name = "", Email = " azfar1@gmail.com ", User Type = "Employee", Password = "abc123"	The "Create User Account" button remains disabled until a Full name is entered.	The "Create User Account" button remains disabled until a Full name is entered.	Pass
2.	Verify that the user account creation is successful with all valid input data.	Full Name = "Muhammad Azfar", Email = " azfar1@gmail.com ", User Type = "Employee", Password = "abc123"	User account for Muhammad Azfar is created successfully.	User account for Muhammad Azfar is created successfully.	Pass
3.	Verify that the password meets the required complexity criteria.	Full Name = "Muhammad Azfar", Email = " azfar1@gmail.com ", User Type = "Employee", Password = "aaaaaa"	Error message is displayed indicating that the password does not meet the complexity requirements	Error message is displayed indicating that the password does not meet the complexity requirements	Pass

Functional Testing 3: Verify delete and edit user account functions.

Objective: To ensure that the delete and edit functions are valid.

Test Case Id: TC_003

Table 106 Functional Test Case Id: TC_003

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that a user account can be deleted	User Account Data = [Muhammad Azfar, azfar1@gmail.com , Employee]	User account for Muhammad Azfar is deleted successfully	User account for Muhammad Azfar is deleted successfully	Pass
2.	Verify that a user account can be edited.	User Account Data = [Syed Danish, danish@gmail.com , Shop Owner]	User account details for Syed Danish is updated successfully.	User account details for Syed Danish is updated successfully.	Pass
3.	Verify that deleting a user account prompts for confirmation.	User Account Data = [Muhammad Azfar, azfar1@gmail.com , Employee]	Confirmation dialog is displayed before deleting the user account	Confirmation dialog is displayed before deleting the user account	Pass
4.	Verify that editing a user account redirects to the "Edit User Account" screen.	User Account Data = [Syed Danish, danish@gmail.com , Shop Owner]	Clicking on the "Edit" action for Syed Danish's user account opens the "Edit User Account" screen with pre-filled data.	Clicking on the "Edit" action for Syed Danish's user account opens the "Edit User Account" screen with pre-filled data.	Pass

Functional Testing 4: Verify edit account details.**Objective:** To ensure that the account is edited successfully.**Test Case Id:** TC_004**Table 107 Functional Test Case Id: TC_004**

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that the user account can be updated with a new password.	(Full Name, Email, User Type, Password) = [Muhammad Azfar, azfar1@gmail.com, Employee, xyz123]	User account details for Muhammad Azfar, including the password, are updated successfully.	User account details for Muhammad Azfar, including the password, are updated successfully.	Pass
2.	Verify that an error message is displayed when attempting to update the user account with incomplete or invalid data.	(Full Name, Email, User Type, Password) = [Syed Danish, “ ”, ShopOwner, abc123]	Error message is displayed indicating that a required field (Email) is missing or invalid, preventing the update of the user account.	Error message is displayed indicating that a required field (Email) is missing or invalid, preventing the update of the user account.	Pass
3.	Verify that the "Update" button is enabled and functional when all required fields are filled with valid data.	(Full Name, Email, User Type, Password) = [Syed Danish, “danish11@gmail.com”, ShopOwner, abc123]	The "Update" button is enabled and clicking it successfully updates the user account with the modified details.	The "Update" button is enabled and clicking it successfully updates the user account with the modified details.	Pass

Functional Testing 5: Sign-Up as Admin with valid/invalid credentials

Testing Objective: To ensure that the Sign-Up form is working correctly with valid and invalid credentials.

Test Case Id: TC_05

Table 108 Test Case Id: TC_05

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	System allows user to register if they are not registered already.	Register link on the login page.	Register link displayed on login page	Register link displayed on login page	Pass
2	If the user is not registered already then by clicking on the register link, user redirects to the sign-up page.	Click: Register link on the login page	User redirects to the signup form page.	User redirects to the signup form page.	Pass
3	To check if the user fills the form, user shall be able to submit his form.	Name: Muhammad Azfar Email: Azfariqbal01@gmail.com Password: azfar054 Confirm Password: azfar054 Click Signup button	User redirects to the login page.	User redirects to the login page.	Pass
4	To check when the system accepts user submission, system shall allow Admin to login	Enter Login details. Email: Password:	Login page displayed	Login page displayed	Pass
5	To check if the user missed information in any field and clicks on register	Email: azfariqbal01@gmail.com Password: Confirm Password:	Message: "Missing Credentials"	Message: "Missing Credentials"	Pass

	button.				
6	Checking the validation of email field of sign-up that if it displays an alert of wrong email format or not.	Email: aknd@andkagmail.com	“Invalid Credentials”.	“Invalid Credentials”.	Pass
7	To check if the user enters duplicated information, system prompt an error message or not.	Email: azfariqbal01@gmail.com	Alert generated: Email already exists.	Alert generated: Email already exists.	Pass
8	Verify the email field of sign-up to validate that it takes @ in email	Email: azfariqbal1@gmail.com	“Invalid Credentials”.	“Invalid Credentials”.	Pass
9	Check If the system redirects the user to the login page after submission or not	Click: Register button	User redirects to the login page.	User redirects to the login page.	Pass

Functional Testing 6: Login as Admin

Objective: To ensure that the correct page is loaded.

Test Case Id: TC_006

Table 109 Functional Test Case Id: TC_006

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Login as an Admin member	Username: Muhammad Azfar Password: abc123	Main page for the Admin is loaded with the Admin navigation bar	Main page for the Admin is loaded with the Admin navigation bar	Pass

Functional Testing 7: Logout as Admin

Objective: To ensure that the Admin is logged out from their respective accounts.

Test Case Id: TC_007

Table 110 Functional Test Case Id: TC_007

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Admin tries to logout and is redirected to login page	Single Click	Login Page displayed	Login Page displayed	Pass

Functional Testing 8: Login as Shop Owner & Employee

Objective: To ensure that the correct page is loaded.

Test Case Id: TC_008

Table 111 Functional Test Case Id: TC_008

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Login as a Shop Owner member	Username: Danish Password: abc123	Main page for the Shop Owner is loaded with the Shop Owner navigation bar	Main page for the Shop Owner is loaded with the Shop Owner navigation bar	Pass
2.	Login as an Employee member	Username: Talha Password: abc123	Main page for the Employee is loaded with the Employee navigation bar	Main page for the Employee is loaded with the Employee navigation bar	Pass

Functional Testing 9: Logout as Employee & Shop Owner

Objective: To ensure that the Employee & Shop Owner are logged out from their respective accounts.

Test Case Id: TC_009

Table 112 Functional Test Case Id: TC_009

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Employee tries to logout and is redirected to login page	Single Click	Login Page displayed	Login Page displayed	Pass
2.	Shop Owner tries to logout and is redirected to login page	Single Click	Login Page displayed	Login Page displayed	Pass

Functional Testing 10: Employee View Profile

Objective: To ensure that the User can view their respective profile information.

Test Case Id: TC_010

Table 113 Functional Test Case Id: TC_010

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that the system redirects user to employee detail page when user clicks on my profile option.	Single Click	Successfully redirects to the Employee profile page	Successfully redirects to the Employee profile page	Pass

Functional Testing 11: Shop Owner View Profile

Objective: To ensure that the User can view their respective profile information.

Test Case Id: TC_011

Table 114 Functional Test Case Id: TC_011

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that the system redirects user to Shop Owner detail page when user clicks on my profile option.	Single Click	Successfully redirects to the Shop Owner profile page	Successfully redirects to the Shop Owner profile page	Pass

Functional Testing 12: View Registered Users

Objective: To ensure that all the registered users are displayed with correct usernames.

Test Case Id: TC_012

Table 115 Functional Test Case Id: TC_012

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Verify that correct users are displayed with correct usernames upon clicking on view users	Single Click	All the registered users are displayed with their correct usernames.	All the registered users are displayed with their correct usernames.	Pass

Functional Testing 13: Display Attendance Chart for Employee

Objective: To ensure that all correct pie chart is displayed for Employee Attendance.

Test Case Id: TC_013

Table 116 Functional Test Case Id: TC_013

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	User clicks on My Attendance Option	Single Click	Employee Attendance displayed in form of pie chart	Employee Attendance displayed in form of pie chart	Pass

Functional Testing 14: Display Attendance Chart for Shop Owner Account

Objective: To ensure that all correct pie chart is displayed for Employee Attendance.

Test Case Id: TC_014

Table 117 Functional Test Case Id: TC_014

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	User clicks on Employee Attendance Option	Single Click	List of Employees displayed	List of Employees displayed	Pass
2.	User clicks on desired employee name from list	Single Click	Employee attendance displayed	Employee Attendance displayed	Pass

Functional Testing 15: Mark attendance of multiple employees.

Objective: To ensure that all attendance is marked for the correct employee.

Test Case Id: TC_015

Table 118 Functional Test Case Id: TC_015

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	User starts employee attendance application	Single Click	Application started and webcam is opened	Application started and webcam is opened	Pass
2.	User stays visible in camera	Human/Person (Muhammad Azfar)	Attendance Marked present for Muhammad Azfar	Attendance Marked present for Muhammad Azfar	Pass
3.	Another user appears in front of camera	Human/Person (Umair)	Attendance Marked present for Umair	Attendance Marked present for Umair	Pass

7.3 Business Rules Testing

Business Rules Testing 1: Choose Email for account registration

Testing Objective: To ensure that correct email chosen is valid.

Conditions:

- Email should follow the given pattern
- No two users can have the same email

Test Case Id: TC_001

Table 119 Business Rules Test Case Id: TC_001

Conditions	Rule 1	Rule 2	Rule 3	Rule 4
Email to follow pattern	Y	Y	N	N
No two users have same emails	Y	N	Y	N
Actions/Outcomes				
Email is selected	Y	N	N	N

Business Rules Testing 2: Choose Password for account registration

Testing Objective: To ensure that Password chosen is valid.

Conditions:

- Password should be alphanumeric
- Password should be minimum 8 characters long

Test Case Id: TC_002

Table 120 Business Rules Test Case Id: TC_002

Conditions	Rule 1	Rule 2	Rule 3	Rule 4
Password Alphanumeric	Y	Y	N	N
Minimum 8 Characters Long	Y	N	Y	N
Actions/Outcomes				
Password is selected	Y	N	N	N

Business Rules Testing 3: Log into the account

Testing Objective: To ensure that login is performed accordingly under certain conditions.

Conditions:

- Password should be valid
- Email should be valid
- Credentials should belong to an existing user

Test Case Id: TC_003

Table 121 Business Rules Test Case Id: TC_003

Conditions	Rule 1	Rule 2	Rule 3	Rule 4	Rule 5	Rule 6	Rule 7	Rule 8
Alphanumeric Password	Y	Y	Y	Y	N	N	N	N
Email is valid	Y	N	Y	N	Y	Y	N	N
Credentials belong to an existing user	Y	N	N	Y	Y	N	Y	N
Actions/Outcomes								
Login and Use Application	Y	N	N	N	N	N	N	N

7.4 Integration Testing

Integration Testing 1: Verification of Sign-up

Testing Objective: To ensure that correct email is sent message for verification upon sign-up.

Test Case Id: TC_001

Table 122 Integration Test Case Id: TC_001

No.	Test case/Test script	Attribute value and	Expected result	Actual result	Result
1.	Signup	Name Email Password	Verification Email is sent to the user.	Verification Email is sent to the user.	Pass
2.	Email Verification	Click on verification link	User verified	User Verified	Pass

Integration Testing 2: Edit User Information

Testing Objective: To ensure the interface of Employee/Shop Owner for updating user information is working correctly.

Test Case Id: TC_002

Table 123 Integration Test Case Id: TC_002

No.	Test case/Test script	Attribute value and	Expected result	Actual result	Result
1.	Fill Information	Name Email User Type Password	All required fields in the form are filled correctly.	Fields filled correctly	Pass
2.	Submit Information	Name Email User Type Password	User information updated successfully	User information updated successfully	Pass
3	Change information in user interface	User (Employee/Shop Owner) Information	User Interface updated successfully and shown in user interface	User Interface updated successfully and shown in user interface	Pass

Integration Testing 3: Verify OTP

Testing Objective: To ensure that correct email is sent message for verification upon signup.

Test Case Id: TC_003

Table 124 Integration Test Case Id: TC_003

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	The user clicks on forgot password	Single Click	The system directs the user to forgot password page	The system directs the user to forgot password page	Pass
2.	The user writes his email	Email: muhammadazfariqbal1@gmail.com	System updates email field	System updates email field	Pass
3.	User writes OTP	OTP: 123456	The system validates the OTP and navigates user to homepage	The system validates the OTP and navigates user to homepage	Pass

Integration Testing 4: Weapon Detection

Testing Objective: To ensure that System detects pistol.

Test Case Id: TC_004

Table 125 Integration Test Case Id: TC_004

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	The user clicks on Weapon Detection Button	Single Click	The system prompts the user a web footage through webcam	The system prompts the user a web footage through webcam	Pass
2.	The user places pistol towards the camera	Pistol	The system detects the object and marks a box around it with the pistol label	The system detects the object and marks a box around it with the pistol label	Pass

Integration Testing 5: Trespasser Detection

Testing Objective: To ensure that System detects trespasser.

Test Case Id: TC_005

Table 126 Integration Test Case Id: TC_005

No .	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	The user clicks on Trespassing Detection Button	Single Click	The system prompts the user a web footage through webcam	The system prompts the user a web footage through webcam	Pass
2.	The user places selects ROI	Select Region	System updates email field	System updates email field	Pass
3.	The User stays visible by the camera	Trespasser/Person	The system detects the human as a person and marks a box around them with the person label	The system detects the human as a person and marks a box around them with the person label	Pass

Integration Testing 6: View User Account

Testing Objective: To ensure the interface of Admin viewing list of users works well.

Test Case Id: TC_006

Table 127 Integration Test Case Id: TC_006

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Registered Users list	User Information	Display registered Users (Employee & Shop Owner) list to the Admin	Display registered Users (Employee & Shop Owner) list to the Admin	Pass

Integration Testing 7: Edit User Account

Testing Objective: To ensure the interface of Admin for updating user information is working correctly.

Test Case Id: TC_007

Table 128 Integration Test Case Id: TC_007

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Fill Information	Personal Information	All required fields in the form are filled correctly.	Fields filled correctly	Pass
2.	Submit Information	Name Email Password	Admin information updated successfully	Admin information updated successfully	Pass

Integration Testing 8: Admin Forgot Password

Testing Objective: To ensure the Admin forgot password functionality works properly.

Test Case Id: TC_008

Table 129 Integration Test Case Id: TC_008

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Admin Clicks on forgot password	Single Click	System redirect Admin to screen for entering username/email	System redirect Admin to screen for entering username/email	Pass
2.	Admin enters his/her username/email	Username: azfariqbal1@gmail.com	An email is sent to the user of the entered email	An email is sent to the user of the entered email	Pass
3.	Admin clicks on change password button	Single Click	System prompts the user to enter password	System prompts the user to enter password	Pass
4.	Admin enters new password	Password: abc123	Password entered successfully	Password entered successfully	Pass
5.	Admin clicks submit button	Single Click	System displays password updated successfully	System displays password updated successfully	Pass

Integration Testing 9: Delete User Account

Testing Objective: To ensure the interface of Admin for deleting user information is working correctly.

Test Case Id: TC_009

Table 130 Integration Test Case Id: TC_009

No.	Test case/Test script	Attribute and value	Expected result	Actual result	Result
1.	Click on delete icon for desired user	Single Click	All required fields in the form are filled correctly.	Fields filled correctly	Pass
2.	Click on delete icon for desired user	Single Click	User information deleted successfully & updated in user interface	User information deleted successfully & updated in user interface	Pass

Integration Testing 10: Email Alert for Weapon Detection.**Testing Objective:** To ensure that Weapon detection email is sent successfully.**Test Case Id:** TC_010**Table 131 Integration Test Case Id: TC_010**

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on weapon detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User places a pistol in front of the screen	Pistol	The system detects the object as a pistol and marks a box around it. System sends email to the Shop Owner	The system detects the object as a pistol and marks a box around it. System sends email to the Shop Owner	Pass
4	The User opens the sent email	Single Click	The system displays weapon detection email sent to the Shop Owner along with picture of intruder.	The system displays weapon detection email sent to the Shop Owner along with picture of intruder.	Pass

Integration Testing 11: Email Alert for Trespassing Detection.

Testing Objective: To ensure that Trespassing detection email is sent successfully.

Test Case Id: TC_011

Table 132 Integration Test Case Id: TC_011

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqball@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on trespassing detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User selects Region of Interest (ROI)	Selected Region	System recognizes ROI and proceeds to detect trespasser in that region	System recognizes ROI and proceeds to detect trespasser in that region	Pass
4	The User stays visible by the camera	Detect Trespasser	The system detects the human as a person and marks a box around them. System sends email to the Shop Owner	The system detects the human as a person and marks a box around them. System sends email to the Shop Owner	Pass
5	The Shop Owner opens the sent email	Single Click	The system displays trespassing detection email sent to the Shop Owner along with picture of intruder.	The system displays trespassing detection email sent to the user along with picture of intruder.	Pass

Integration Testing 12: Record, Save, and Upload Video on Cloudinary Server for Weapon Detection.

Testing Objective: To ensure that video is recorded, saved, and uploaded on Cloudinary server.

Test Case Id: TC_012

Table 133 Integration Test Case Id: TC_012

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqbal1@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on weapon detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User places a pistol in front of the screen	Pistol	The system detects the object as a pistol and marks a box around it	The system detects the object as a pistol and marks a box around it	Pass
4	The User closes the application	Single Click	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	Pass

Integration Testing 13: Record, Save, and Upload Video on Cloudinary Server for Trespassing Detection.

Testing Objective: To ensure that video is recorded, saved, and uploaded on Cloudinary server.

Test Case Id: TC_013

Table 134 Integration Test Case Id: TC_013

No.	Test case/Test script	Attribute and value	Expected result	Actual Result	Result
1	The User launches the application	Username: azfariqbal1@gmail.com Password: abc123	System displays Video Capture	System displays Video Capture	Pass
2	The User clicks on trespassing detection	Single Click	The system starts to record the video capture	The system starts to record the video capture	Pass
3	The User selects Region of Interest (ROI)	Selected Region	System recognizes ROI and proceeds to detect trespasser in that region	System recognizes ROI and proceeds to detect trespasser in that region	Pass
4	The User stays visible by the camera	Detect Trespasser	The system detects the human as a person and marks a box around them	The system detects the human as a person and marks a box around them	Pass
5	The User closes the application	Single Click	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	The system saved the recorded video inside the directory chosen by the user and uploads the same recorded video to cloudinary	Pass