COMSATS University Islamabad (CUI)

Software Requirement Specification
(SRS DOCUMENT)

for

EMPLOYEE IDENTIFICATION AND TRACKING
Version 1.0

By

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Revision History

Name	Date	Reason for Changes	Version

Application Evaluation History

Comments (by committee) ***include the ones given at scope time both in doc and presentation**	**Action Taken**

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Signature_____

Table of Contents

List of Figures

List of Tables

1. Introduction

This document aims at providing the complete insight of the given application. The first section provides the purpose with a brief introduction of the scope and what this app aims to achieve.The Second portion will accommodate the overall description of our website and the products context and origin. It explains in great detail how and what our product is and its perspective and its operating environment. It also holds the key to our product's implementation and design constraints.The Third portion entails the requirements identification techniques. The processes and resources that the product uses and the brief introduction to the data gathering strategy. This section also contains our use case diagram.

1.1 Purpose

According to Forbes, during a survey where 89% of respondents said they wasted time every day, which was with an increase of 20% from the previous year. The manual process of employee tracking and identification is very time consuming and still not efficient.

Our efforts aim to produce a product that can help the managers automate the process of employee tracking and identification. This application enables the managers to keep search for a particular person in the real time security footage and generate a report.

1.2 Scope

Our system is focused on offices that want to monitor their employee using an automated system. Once the user is registered on the system, he can create his organization and add users to the organization with different roles created by the user. Once it is done, the user can add cameras and RFID sensors, and label them with their positions. Now the system is ready for use, and the user with appropriate permissions defined in the roles can add an employee with their images to train the system. As soon as the employee is registered, the system will be trained with the employees face and issued with an RFID card. As the employees are registered, the employees will be clocked in based on the camera at the entrance and clocked out. An overall report of employees can also be reviewed at any time. Moreover, warning and challans can also be generated and sent to the employees. The system also allows the user with appropriate permissions to search a user with an image or name to search for the location. The same system will be used to monitor the visitors in the office.

2. Overall Description

This section presents the overall description of the targeted project.

2.1 Product Perspective

In this project we will be developing a web application and a mobile application. This system will allow the office management to automate the process of employee identification and tracking. This system offers a unique solution that used RFID sensors and security cameras to improve the efficiency and reduce the total cost to track the employees.

2.2 Operating Environment

OE-1: The web application for this system shall be deployed on Windows IIS Server 2014.
OE-2: The database for this server will be SQL Server 2014.
OS-3: The mobile application shall run on android 10.

2.3 Design and Implementation Constraints

CO-1: The system shall use the SQL Server 2014.
CO-2: The system shall use ASP.NET Core For the development of backend API's
CO-3: The system shall use Angular 7 for the development of Frontend.
CO-4: The system shall use Android SKD 29 for the Development of Mobile Application.
CO-5: The system shall use Python 3.8 to develop the machine learning code.
CO-6: The system shall use IronPython to integrate Python with C# code.
CO-7: The user needs to have a knowledge of basic computer skills to use the application.

3. Requirement Identifying Technique

This section describes the requirements identifying technique(s) which further help to derive

3.1 Event Response Table

Table 1: Event Response Table.

Event	Trigger	Source	Use Case	Response	Destination
Employee is checked in to the system	Camera on the enterance detecting face	User	Check in the employee	Store the check in time in the database	System
Employee is checked out from the system	Camera on the exit detecting the face	User	Check out the employee	Store the check out time in the database	System
Update Location in the database	RFID sensor detecting RFID card and Camera detecting face	User	Update location	Store the latest location of the user in the database	System
Geofencing Alert	RFID sensor detecting RFID card and Camera detecting face	User	Check for Access Control	Check the person in the database and his access control else report to the Manager and store in the database	Manager, System
Conflict Resolution requet	RFID sensor and Camera detecting in different places	User	RFID sensor and Camera conflict	Report to the manager and send the email as well as log in the system	Manager, Employee, System
Unknown Person identification	Camera detecting faces	User	Unknown person identification	Report to the Manager and send a notification	Manager, System
Monthly Report Generation	End of the month		Monthly Report Generation	Annual Activity Report	Manager

3.2 Use Case Diagram

The use case diagrams of our web application is give below.

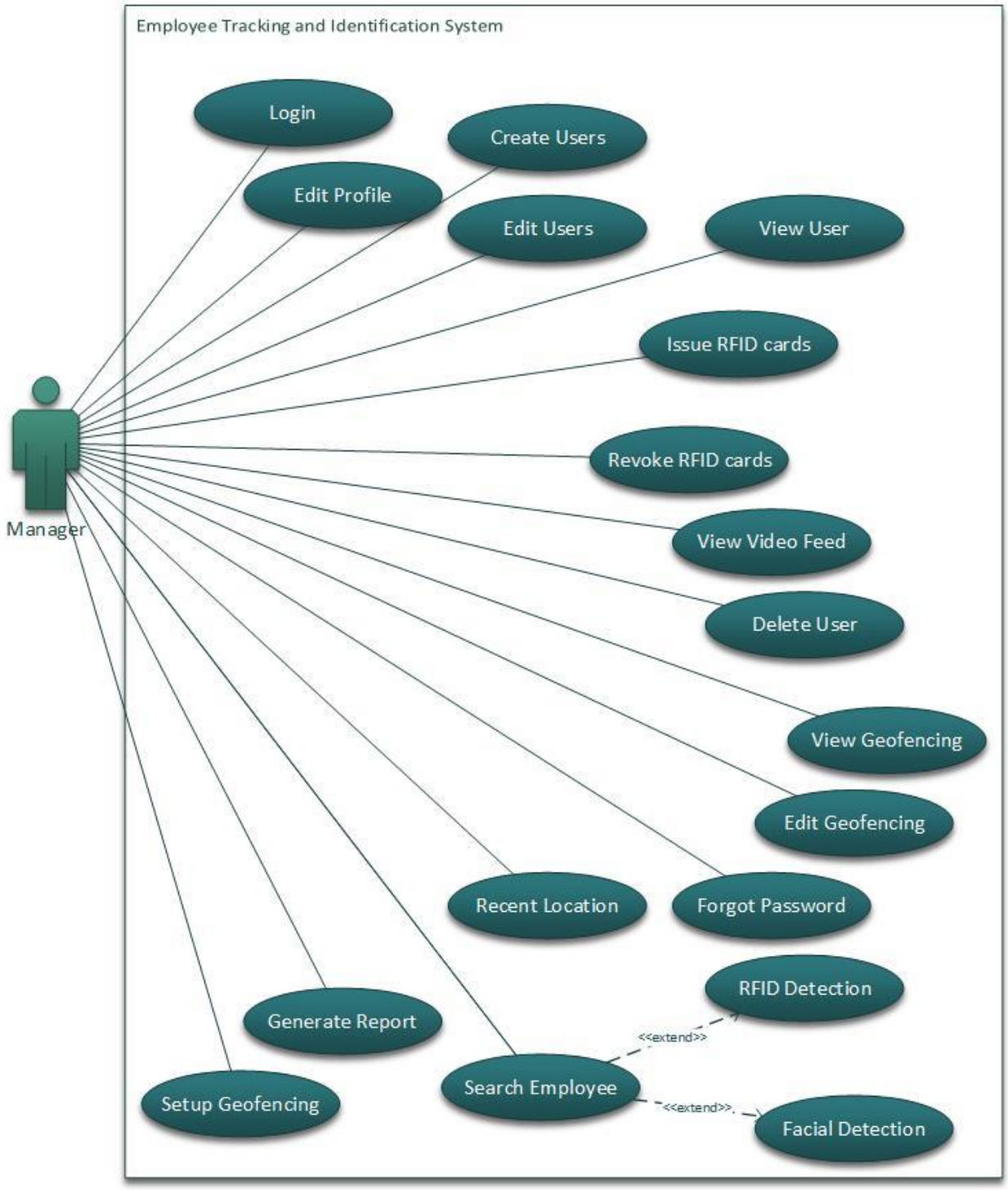


Figure 1: Use Case Diagram of Manager.

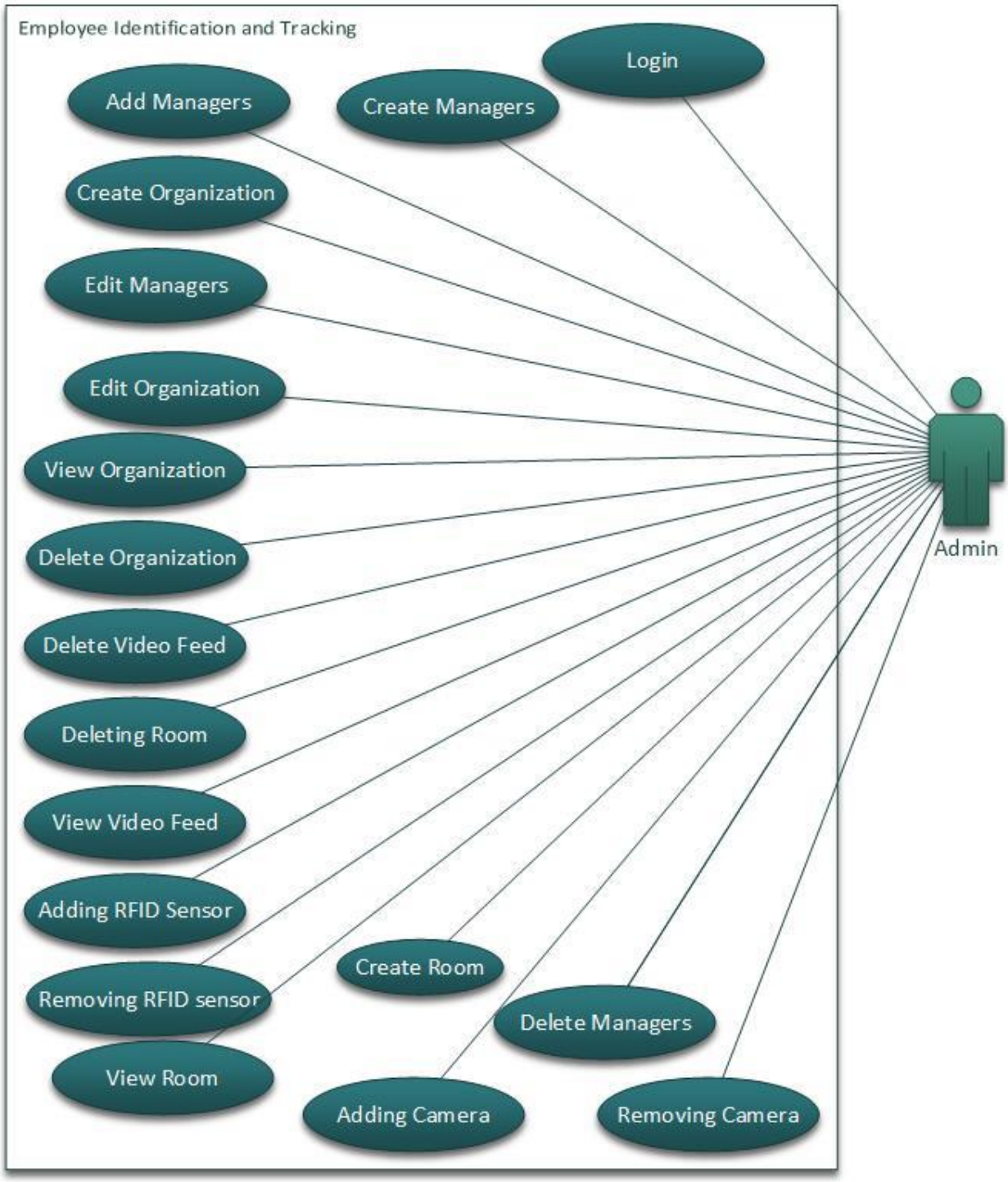


Figure 2: Usecase Diagram of Admin.

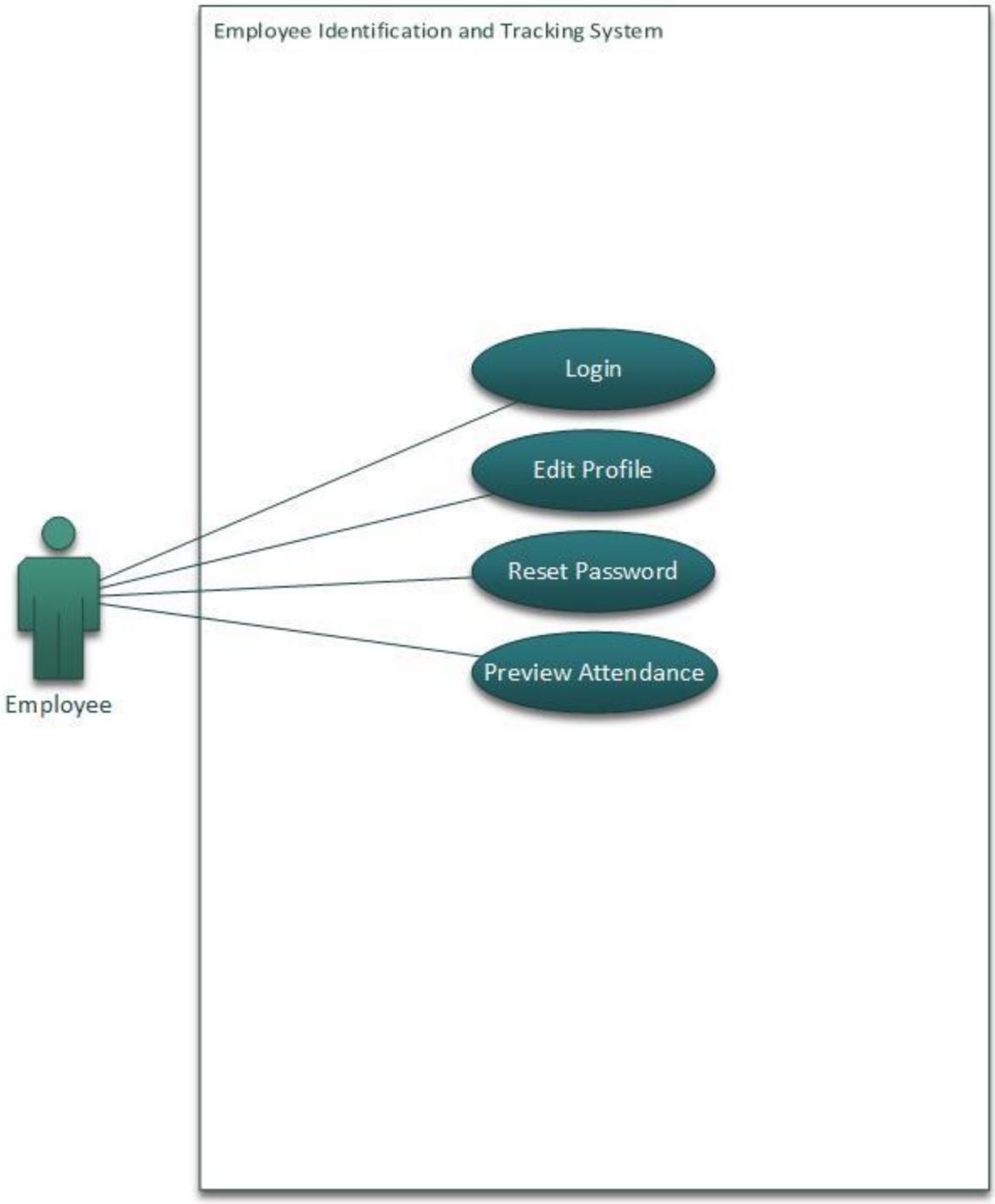


Figure 3: Usecase diagram of Employee.

3.3 Use Case Description

Table 2: UC 1 - Textual Description of Login.

Use Case ID:	UC-1
Use Case Name:	Login
Actors:	Primary Actor: User
Description:	This will allow the user to login to the system.
Trigger:	When the user presses "Login" button.
Preconditions:	PRE-1. The user open the application. PRE-2. The user enters the email address. PRE-3. The user enters the password.
Postconditions:	POST-1 The user is taken to the dashboard.
Normal Flow:	1. User opens the application. 2. User enters the email address and the password. 3. User presses the login button. 4. If the credentials are correct the user is taken to the dashboard.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. Email is not correct. E2. Password is not correct. E3. The API backend is down.
Business Rules	None
Assumptions:	1. User know how to user a browser. 2. User enter the correct password. 3. User has an active internet connection.

Table 3: UC 2 - Textual Description of Create User.

Use Case ID:	UC-2
Use Case Name:	Create User
Actors:	Primary Actor: Manager
Description:	This will allow the manager to add users to the organization.
Trigger:	When the user presses “Create” button.
Preconditions:	PRE-1. The manager fill in all the input fields. PRE-2. The manager uploads the picture.
Postconditions:	POST-1 The user is registered in the system.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the create new user page. 3. Manager fill in the input field. 4. The manager presses the Save button. 5. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. Email already exists.. E2. The API backend is down.
Business Rules	An email address can only be associated with a single user.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 4: UC 3 - Textual Description of Edit User.

Use Case ID:	UC-3
Use Case Name:	Edit User
Actors:	Primary Actor: Manager
Description:	This will allow the manager to edit user.
Trigger:	When the user presses "Update" button.
Preconditions:	PRE-1. The manager updates the input fields.
Postconditions:	POST-1 The user data is updated in the system.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of users. 3. Manager select the user to be updated. 4. Manager fills in the input field. 5. The manager presses the Save button. 6. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. Email already exists.. E2. The API backend is down.
Business Rules	An email address can only be associated with a single user.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 5: UC 4 - Textual Description of View User.

Use Case ID:	UC-4
Use Case Name:	View User
Actors:	Primary Actor: Manager
Description:	This will allow the manager to view user's details.
Trigger:	When the user presses "Details" button.
Preconditions:	PRE-1. The manager is logged in. PRE-2. The manager select the user.
Postconditions:	POST-1 The user details are displayed
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of users page. 3. Manager selects a particular user. 4. The manager presses the Details button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	1. Manager logs in to the application. 2. Manager click the details from the attendance table on the dashboard.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 6: UC 5 - Textual Description of Edit Profile.

Use Case ID:	UC-5
Use Case Name:	Edit Profile
Actors:	Primary Actor: User
Description:	This will allow the user to edit his profile.
Trigger:	When the user presses “Save” button.
Preconditions:	PRE-1. The user fill in all the input fields. PRE-2. The user uploads the picture.
Postconditions:	POST-1 The users profile is updated in the system.
Normal Flow:	1. User logs in to the application. 2. User open the edit profile. 3. User updates the input field. 4. The user presses the Save button. 5. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. User is logged in to the system 2. User has an active internet connection.

Table 7: UC 6 - Textual Description of Issue RFID.

Use Case ID:	UC-6
Use Case Name:	Issue RFID
Actors:	Primary Actor: Manager
Description:	This will allow the manager to assign RFID cards to the users.
Trigger:	When the manager presses “Save” button.
Preconditions:	PRE-1. The manager fills in the RFID unique id. PRE-2. The manager uploads the picture.
Postconditions:	POST-1 The user is registered in the system.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the create new user page. 3. Manager fill in the input field. 4. The manager presses the Save button. 5. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. RFID already exists.. E2. The API backend is down.
Business Rules	An email address can only be associated with a single user.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 8: UC 7 - Textual Description of Revoke RFID.

Use Case ID:	UC-7
Use Case Name:	Revoke RFID
Actors:	Primary Actor: Manager
Description:	This will allow the manager to revoke RFID card for a particular users.
Trigger:	When the manager presses "Revoke" button.
Preconditions:	PRE-1. The manager selects the employee. PRE-2. The manager presses the button "Revoke RFID"
Postconditions:	POST-1 The user's RFID cards access will be revokes in the system.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the create new user page. 3. Manager fill in the input field. 4. The manager presses the Save button. 5. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	1. Manager opens the List of RFID cards. 2. Manager Searches for the RFID unique ID. 3. Manager presses "Revoke access" button.
Exceptions:	E1. The user enters the wrong RFID unique id. E2. The API backend is down.
Business Rules	A manager shall revoke the access of the RFID card when the employee is fired or resigns from the position.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 9: UC 8 - Textual Description of View Video feed.

Use Case ID:	UC-8
Use Case Name:	View Video Feed
Actors:	Primary Actor: Manager
Description:	This will allow the manager to view the video footage of each camera.
Trigger:	When the manager presses “View Video” button.
Preconditions:	PRE-1. The manager is logged in. PRE-2. The manager selects the room. PRE-3. The manager selects the camera.
Postconditions:	POST-1 The manager can start viewing the video stream. POST-2 The manager can rewind the video.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the camera feed page. 3. Manager select the room. 4. Manager selects the camera. 5. Manager presses the “View Video” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The cloud hosting storage is full. E2. The API backend is down.
Business Rules	A manager shall be able to review the video feed.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 10: UC 9 - Textual Description of Delete User.

Use Case ID:	UC-9
Use Case Name:	Delete User
Actors:	Primary Actor: Manager
Description:	This will allow the manager to delete a user from the organization.
Trigger:	When the manager presses "Delete" button.
Preconditions:	PRE-1. The manager is logged in to the system. PRE-2. The manager selects the user from the list.
Postconditions:	POST-1 The user is deleted from the system.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of users. 3. Manager selects the user. 4. Manager presses "delete" button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	The user can be deleted by the manager anytime.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 11: UC 10 - Textual Description of Setup Geofencing.

Use Case ID:	UC-10
Use Case Name:	Setup geofencing
Actors:	Primary Actor: Manager
Description:	This will allow the manager to setup geofencing for the rooms.
Trigger:	When the manager presses “Save” button.
Preconditions:	PRE-1. The manager is logged in to the system. PRE-2. The rooms are created by the admin. PRE-3. The manger selects the roles allowed for a room.
Postconditions:	POST-1 The roles are allowed for a particular room.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of rooms. 3. Manager enables the geofencing. 4. Manager add the appropriate roles. 5. Manager presses “save” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down. E2. No rooms have been created. E3. No roles have been created. E5. The camera in the room in not working. E6. The RFID in the room in not working.
Business Rules	The manager shall be able to setup the geofencing for the room.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection. 3. Camera is installed in the room. 4. RFID is installed in the room.

Table 12: UC 11 - Textual Description of Edit Geofencing.

Use Case ID:	UC-11
Use Case Name:	Edit geofencing
Actors:	Primary Actor: Manager
Description:	This will allow the manager to edit the geofencing.
Trigger:	When the manager presses "Update" button.
Preconditions:	PRE-1. The manager is logged in to the system. PRE-2. The manager selects the room from the list.
Postconditions:	POST-1 The geofencing settings for the room are updated.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of rooms. 3. Manager selects the room. 4. Manager updates the fields 5. Manager presses "update" button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	The manager shall be able to edit the geofencing.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 13: UC 12 - Textual Description of Delete User.

Use Case ID:	UC-12
Use Case Name:	View Geofencing
Actors:	Primary Actor: Manager
Description:	This will allow the manager to view the geofencing.
Trigger:	When the manager presses “View” button.
Preconditions:	PRE-1. The manager is logged in to the system. PRE-2. The manager selects the room from the list.
Postconditions:	POST-1 The manager can view the details of the room.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of room. 3. Manager selects the room. 4. Manager presses “view” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 14: UC 13 - Textual Description of Forgot Password.

Use Case ID:	UC-13
Use Case Name:	Forgot Password
Actors:	Primary Actor: User
Description:	This will allow the user to reset his password.
Trigger:	When the user presses "Reset" button.
Preconditions:	PRE-1. The user enters the email adddress. PRE-2. The user enter the valid OTP.
Postconditions:	POST-1 The user can enter new password.
Normal Flow:	1. User opens the password reset page. 2. User enters the valid email address. 3. User enter the OTP sent to the email address. 4. System validates the OTP. 5. User enters the new password. 6. User presses "save" button.
Alternative Flows: **[Alternative Flow 1 – Not in Network]**	1. User emails the admin with registered email. 2. Admin verifies the user. 3. Admin resets the password. 4. Admin send the new login link.
Exceptions:	E1. The API backend is down. E2. The email is not confirmed.
Business Rules	None
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 15: UC 14 - Textual Description of Search Employee.

Use Case ID:	UC-14
Use Case Name:	Search Employee
Actors:	Primary Actor: Manager
Description:	This will allow the manager to search the employees real-time location.
Trigger:	When the manager presses "Search" button.
Preconditions:	PRE-1. The manager is logged in to the system. PRE-2. The manager selects the user from the list.
Postconditions:	POST-1 The manager can view the locations of the employee
Normal Flow:	1. Manager logs in to the application. 2. Manager open the search form. 3. Manager enters the employee related information. 4. Manager presses "Search" button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	1. Manager logs in to the application. 2. Manager opens the search form. 3. Manager selects the image file. 4. Manager presses "Search" button.
Exceptions:	E1. The employee is not present today. E2. The API backend is not running. E3. Irrelevant information was used to search the employee.
Business Rules	The system shall enable the manager to search the user within the facility.
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 16: UC 15 - Textual Description of Recent location.

Use Case ID:	UC-15
Use Case Name:	Recent Location
Actors:	Primary Actor: Manager
Description:	This will allow the manager to view the recent location of every user stored in the database.
Trigger:	When the manager presses “View” button.
Preconditions:	PRE-1. The manager is logged in to the system. PRE-2. The manager selects the user from the list.
Postconditions:	POST-1 The manager can view the location of the user.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of users. 3. Manager selects the user. 4. Manager presses “view” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 17: UC 16 - Textual Description of Generate Report.

Use Case ID:	UC-16
Use Case Name:	Generate Report
Actors:	Primary Actor: Manager
Description:	This will allow the manager generate reports by applying various filters.
Trigger:	When the manager presses “Generate” button.
Preconditions:	PRE-1. The manager is logged in. PRE-2. The manager applies the filters.
Postconditions:	POST-1 The manager can view the generated report.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the report generation. 3. Manager applies the filters.. 4. Manager presses “Generate” button. 5.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Manager is logged in to the system 2. Manager has an active internet connection.

Table 18: UC 17 - Textual Description of Create Managers.

Use Case ID:	UC-17
Use Case Name:	Create Managers
Actors:	Primary Actor: Admin
Description:	This will allow the admin to create managers.
Trigger:	When the manager presses “Create” button.
Preconditions:	PRE-1. The admin is logged in to the system. PRE-2. The admin fill in the valid input fields.
Postconditions:	POST-1 The admin has added a new managers.
Normal Flow:	1. Admin open the form. 2. Admin fill the input fields with valid information. 3. Admin presses “Create” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down. E2. The email already exists.
Business Rules	None
Assumptions:	1. Admin is logged in to the system 2. Admin has an active internet connection.

Table 19: UC 18 - Textual Description of Add Managers.

Use Case ID:	UC-18
Use Case Name:	Add Managers
Actors:	Primary Actor: Admin
Description:	This will allow the admin to assign managers to the organization.
Trigger:	When the admin presses “Assign” button.
Preconditions:	PRE-1. The manager selects the manager PRE-2. The manager selects the organization
Postconditions:	POST-1 The manager can view the location of the user.
Normal Flow:	1. Manager logs in to the application. 2. Manager open the list of managers. 3. Manager selects the manager. 4. Manager assigns the organization 5. Manager presses “Assign” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Manager is registered in the system 2. Admin has an active internet connection.

Table 20: UC 19 - Textual Description of Create Organization.

Use Case ID:	UC-19
Use Case Name:	Create Organization
Actors:	Primary Actor: Admin
Description:	This will allow the admin to create organization.
Trigger:	When the admin presses “Create” button.
Preconditions:	PRE-1. The admin fill in the valid input fields.
Postconditions:	POST-1 The admin has added a new organization.
Normal Flow:	4. Admin open the form. 5. Admin fill the input fields with valid information. 6. Admin presses “Create” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down. E2. The organization already exists.
Business Rules	None
Assumptions:	3. Admin is logged in to the system 4. Admin has an active internet connection.

Table 21: UC 20 - Textual Description of Edit Manager.

Use Case ID:	UC-20
Use Case Name:	Edit Manager
Actors:	Primary Actor: Admin
Description:	This will allow the admin to edit manager.
Trigger:	When the admin presses "Update" button.
Preconditions:	PRE-1. The admin updates the input fields.
Postconditions:	POST-1 The manager data is updated in the system.
Normal Flow:	1. Admin logs in to the application. 2. Admin open the list of manager. 3. Admin select the manager to be updated. 4. Admin fills in the input field. 5. The admin presses the Save button. 6. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. Email already exists.. E2. The API backend is down.
Business Rules	An email address can only be associated with a single user.
Assumptions:	1, Admin is logged in to the system 2, Admin has an active internet connection.

Table 22: UC 21 - Textual Description of Edit Organization.

Use Case ID:	UC-21
Use Case Name:	Edit Organization
Actors:	Primary Actor: Admin
Description:	This will allow the manager to edit organization.
Trigger:	When the user presses “Update” button.
Preconditions:	PRE-1. The admin updates the input fields.
Postconditions:	POST-1 The organization data is updated in the system.
Normal Flow:	1. Admin logs in to the application. 2. Admin open the list of orgnaization. 3. Admin select the orgnaization to be updated. 4. Amdin fills in the input field. 5. The admin presses the Save button. 6. The input fields are validated.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. Organization already exists.. E2. The API backend is down.
Business Rules	None
Assumptions:	1. Admin is logged in to the system 2. Admin has an active internet connection.

Table 23: UC 22 - Textual Description of View Organization.

Use Case ID:	UC-22
Use Case Name:	View Organization
Actors:	Primary Actor: Admin
Description:	This will allow the admin to view organization's details.
Trigger:	When the admin presses "Details" button.
Preconditions:	PRE-1. The admin select the organization.
Postconditions:	POST-1 The organization details are displayed
Normal Flow:	1. Admin logs in to the application. 2. Admin open the list of organization page. 3. Admin selects a particular organization. 4. The admin presses the Details button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Admin is logged in to the system 2. Admin has an active internet connection.

Table 24: UC 23 - Textual Description of Delete Organization.

Use Case ID:	UC-23
Use Case Name:	Delete Organization
Actors:	Primary Actor: Admin
Description:	This will allow the admin to delete an organization.
Trigger:	When the admin presses "Delete" button.
Preconditions:	PRE-1. The admin selects the organization from the list.
Postconditions:	POST-1 The organization is deleted from the system.
Normal Flow:	1. Admin logs in to the application. 2. Admin open the list of organization. 3. Admin selects the oranization. 4. Admin presses "delete" button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	The organization can be deleted by the manager anytime.
Assumptions:	1. Admin is logged in to the system 2. Admin has an active internet connection.

Table 25: UC 24 - Textual Description of Delete Video Feed.

Use Case ID:	UC-24
Use Case Name:	Delete Video Feed
Actors:	Primary Actor: Admin
Description:	This will allow the admin to delete a video feed from the cloud.
Trigger:	When the admin presses “Delete” button.
Preconditions:	PRE-1. The admin selects the video from the list.
Postconditions:	POST-1 The video is deleted from the cloud.
Normal Flow:	1. Admin logs in to the application. 2. Admin open the list of videos. 3. Admin selects the video. 4. Admin presses “delete” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Admin is logged in to the system 2. Admin has an active internet connection.

Table 26: UC 25 - Textual Description of Delete Room.

Use Case ID:	UC-25
Use Case Name:	Delete Room
Actors:	Primary Actor: Admin
Description:	This will allow the admin to delete a room from the organization.
Trigger:	When the admin presses “Delete” button.
Preconditions:	PRE-1. The admin selects the room from the list.
Postconditions:	POST-1 The room is deleted from the system.
Normal Flow:	1. admin logs in to the application. 2. admin open the list of rooms. 3. admin selects the room. 4. admin presses “delete” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	5. Admin is logged in to the system 6. Admin has an active internet connection.

Table 27: UC 26 - Textual Description of Delete Manager.

Use Case ID:	UC-26
Use Case Name:	Delete Manager
Actors:	Primary Actor: Admin
Description:	This will allow the admin to delete a manager from the organization.
Trigger:	When the admin presses “Delete” button.
Preconditions:	PRE-1. The admin selects the manager from the list.
Postconditions:	POST-1 The manager is deleted from the system.
Normal Flow:	1. Admin logs in to the application. 3. Admin open the list of manager. 4. Admin selects the manager. 5. Admin presses “delete” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Admin is logged in to the system 2. Admin has an active internet connection.

Table 28: UC 27 - Textual Description of Remove Camera.

Use Case ID:	UC-27
Use Case Name:	Remove Camera
Actors:	Primary Actor: Admin
Description:	This will allow the admin to delete a camera from the room.
Trigger:	When the admin presses “Delete” button.
Preconditions:	PRE-1. The admin selects the camera from the list in the room.
Postconditions:	POST-1 The camera is deleted from the system.
Normal Flow:	2. Admin logs in to the application. 6. Admin open the list of camera. 7. Admin selects the camera. 8. Admin presses “delete” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	3. Admin is logged in to the system 4. Admin has an active internet connection.

Table 29: UC 28 - Textual Description of Adding RFID Sensor.

Use Case ID:	UC-28
Use Case Name:	Adding RFID Sensor
Actors:	Primary Actor: Admin
Description:	This will allow the admin to add a RFID sensor to the room.
Trigger:	When the admin presses “Add” button.
Preconditions:	PRE-1. The admin configures the RFID
Postconditions:	POST-1 The RFID sensor is added to the room.
Normal Flow:	1. Admin logs in to the application. 2. Admin opens the RFID add form. 3. Admin configures the RFID sensor. 4. Admin presses “Create” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	5. Admin is logged in to the system 6. Admin has an active internet connection.

Table 30: UC 29 - Textual Description of Remove RFID.

Use Case ID:	UC-29
Use Case Name:	Remove RFID
Actors:	Primary Actor: Admin
Description:	This will allow the admin to delete a RFID from the room.
Trigger:	When the admin presses “Delete” button.
Preconditions:	PRE-1. The admin selects the RFID from the list in the room.
Postconditions:	POST-1 The RFID sensor is deleted from the system.
Normal Flow:	3. Admin logs in to the application. 7. Admin open the list of RFID sensors. 8. Admin selects the RFID sensor. 9. Admin presses “delete” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	10. Admin is logged in to the system 11. Admin has an active internet connection.

Table 31: UC 30 - Textual Description of Adding Camera.

Use Case ID:	UC-30
Use Case Name:	Adding Camera
Actors:	Primary Actor: Admin
Description:	This will allow the admin to add a Camera to the room.
Trigger:	When the admin presses “Add” button.
Preconditions:	PRE-1. The admin configures the Camera
Postconditions:	POST-1 The Camera is added to the room.
Normal Flow:	1. Admin logs in to the application. 2. Admin opens the Camera add form. 3. Admin configures the Camera feed. 4. Admin presses “Create” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	5. Admin is logged in to the system 6. Admin has an active internet connection.

Table 32: UC 31 - Textual Description of Creating Room.

Use Case ID:	UC-31
Use Case Name:	Creating Room
Actors:	Primary Actor: Admin
Description:	This will allow the admin to add a room to the organization
Trigger:	When the admin presses “Add” button.
Preconditions:	PRE-1. The admin configures the Room
Postconditions:	POST-1 The room is added to the organization.
Normal Flow:	1. Admin logs in to the application. 2. Admin opens the add room form. 3. Admin fills the input fields. 4. Admin presses “Create” button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	5. Admin is logged in to the system 6. Admin has an active internet connection.

Table 33: UC 32 - Textual Description of View Room.

Use Case ID:	UC-32
Use Case Name:	View Room
Actors:	Primary Actor: Admin
Description:	This will allow the admin to view the room and its components
Trigger:	When the admin presses "View" button.
Preconditions:	PRE-1. The admin opens the room page
Postconditions:	POST-1 The admin can view the room details.
Normal Flow:	1. Admin logs in to the application. 2. Admin opens the room list page. 3. Admin select the room. 4. Admin presses "View" button.
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	5. Admin is logged in to the system 6. Admin has an active internet connection.

Table 34: UC 33 - Textual Description of Preview Attendance.

Use Case ID:	UC-33
Use Case Name:	Preview Attendance
Actors:	Primary Actor: Employee
Description:	This will allow the employee to preview his attendance.
Trigger:	When the employee enter the attendance tab.
Preconditions:	PRE-1. The employee is allowed to access the portal.
Postconditions:	POST-1 The employee can see the attendance report.
Normal Flow:	1. Employee logs in to the application. 2. Employee opens the dashboard. 3. Employee opens the report
Alternative Flows: [Alternative Flow 1 – Not in Network]	None.
Exceptions:	E1. The API backend is down.
Business Rules	None
Assumptions:	1. Employee is logged in to the system 2. Employee has an active internet connection.

4. Functional Requirements

Following are the functional requirements for our proposed solution.

4.1 Functional Requirement 1

Table 35: Description of FR-1: Check in.

Identifier	FR-1
Title	Check in
Requirement	The system shall allow the user to automatically check in to the system when they enter the facility.
Source	Supervisor
Rationale	To maintain the record of employee attendance.
Business Rule (if required)	None
Dependencies	
Priority	High

4.2 Functional Requirement 2

Table 36: Description of FR-2: Check out.

Identifier	FR-2
Title	Check out
Requirement	The system shall allow the user to automatically check out from the system when they enter the facility.
Source	Supervisor
Rationale	To maintain the record of employee attendance.
Business Rule (if required)	None
Dependencies	FR-1
Priority	High

4.3 Functional Requirement 3

Table 37: Description of FR-3: Modify Attendance.

Identifier	FR-3
Title	Modify Attendance
Requirement	The system shall not allow anyone other than admin to modify the attendance.
Source	Supervisor
Rationale	To maintain the record of employee attendance.
Business Rule (if required)	None
Dependencies	
Priority	High

4.4 Functional Requirement 4

Table 38: Description of FR-4: Check Attendance.

Identifier	FR-4
Title	Check attendance
Requirement	The system shall allow the employee to check his attendance report.
Source	Supervisor
Rationale	To maintain the record of employee attendance.
Business Rule (if required)	None
Dependencies	
Priority	Medium

4.5 Functional Requirement 5

Table 39: Description of FR-5: Report Generation.

Identifier	FR-5
Title	Report Generation
Requirement	The system shall allow the manager to generate report of the attendance.
Source	Supervisor
Rationale	To maintain the record of employee attendance.
Business Rule (if required)	None
Dependencies	
Priority	Medium

4.6 Functional Requirement 6

Table 40: Description of FR-6: Monthly Report.

Identifier	FR-6
Title	Monthly Report
Requirement	The system shall automatically generate an attendance report at the end of month and send it to the manager
Source	Supervisor
Rationale	To maintain the record of employee attendance.
Business Rule (if required)	None
Dependencies	FR-1
Priority	High

4.7 Functional Requirement 7

Table 41: Description of FR-7: Create Organization.

Identifier	FR-7
Title	Create Organization
Requirement	The system shall allow the admin to create organization
Source	Supervisor
Rationale	To have separate tenant.
Business Rule (if required)	None
Dependencies	
Priority	High

4.8 Functional Requirement 8

Table 42: Description of FR-8: Edit Organization.

Identifier	FR-8
Title	Edit Organization
Requirement	The system shall allow the admin to edit organization
Source	Supervisor
Rationale	To have separate tenant.
Business Rule (if required)	None
Dependencies	
Priority	High

4.9 Functional Requirement 9

Table 43: Description of FR-9: View Organization.

Identifier	FR-9
Title	View Organization
Requirement	The system shall allow the admin to view organization
Source	Supervisor
Rationale	To have separate tenant.
Business Rule (if required)	None
Dependencies	
Priority	High

4.10 Functional Requirement 10

Table 44: Description of FR-10: Delete Organization.

Identifier	FR-10
Title	Delete Organization
Requirement	The system shall allow the admin to delete organization
Source	Supervisor
Rationale	To have separate tenant.
Business Rule (if required)	None
Dependencies	
Priority	High

4.11 Functional Requirment 11

Table 45: Description of FR-11: Create Room.

Identifier	FR-11
Title	Create Room
Requirement	The system shall allow the admin to create room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.12 Functional Requirement 12

Table 46: Description of FR-12: Edit Room.

Identifier	FR-11
Title	Edit Room
Requirement	The system shall allow the admin to edit room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.13 Functional Requirement 13

Table 47: Description of FR-13: Create Room

Identifier	FR-13
Title	Create Room
Requirement	The system shall allow the admin to view room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.14 Functional Requirement 14

Table 48: Description of FR-14: Delete Room.

Identifier	FR-14
Title	Delete Room
Requirement	The system shall allow the admin to delete room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.15 Functional Requirement 15

Table 49: Description of FR-15: Add Camera.

Identifier	FR-15
Title	Add Camera
Requirement	The system shall allow the admin add camera to room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.16 Functional Requirement 16

Table 50: Description of FR-16: Remove Camera.

Identifier	FR-16
Title	Remove Camera
Requirement	The system shall allow the admin remove camera from room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.17 Functional Requirement 17

Table 51: Description of FR-17: Add RFID Sensor.

Identifier	FR-17
Title	Add RFID sensor
Requirement	The system shall allow the admin add RFID sensor from room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.18 Functional Requirement 18

Table 52: Description of FR-18: Remove RFID Sensor.

Identifier	FR-18
Title	Remove RFID sensor
Requirement	The system shall allow the admin remove rfid sensor from room
Source	Supervisor
Rationale	To have separate rooms in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.19 Functional Requirement 19

Table 53: Description of FR-19: View Camera Feed.

Identifier	FR-19
Title	View Camera Feed
Requirement	The system shall allow the admin and manager to view the camera feed.
Source	Supervisor
Rationale	To have a record.
Business Rule (if required)	None
Dependencies	
Priority	High

4.20 Functional Requirement 20

Table 54: Description of FR-20: Delete Camera Feed.

Identifier	FR-20
Title	Delete Camera Feed
Requirement	The system shall allow the admin delete the camera feed.
Source	Supervisor
Rationale	To have a space on the storage.
Business Rule (if required)	None
Dependencies	
Priority	High

4.21 Functional Requirement 21

Table 55: Description of FR-21: Login

Identifier	FR-21
Title	Login
Requirement	The user shall be able to login to the system.
Source	Supervisor
Rationale	Authentication
Business Rule (if required)	None
Dependencies	
Priority	High

4.22 Functional Requirement 22

Table 56: Description of FR-22: Edit Profile.

Identifier	FR-22
Title	Edit Profile
Requirement	The system shall allow the user to edit their profile
Source	Supervisor
Rationale	Profile management
Business Rule (if required)	None
Dependencies	
Priority	High

4.23 Functional Requirement 23

Table 57: Description of FR-23: Create Users.

Identifier	FR-18
Title	Create Users
Requirement	The system shall allow the manager to create accounts for employees
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.24 Functional Requirement 24

Table 58: Description of FR-24: Edit Users.

Identifier	FR-18
Title	Edit Users
Requirement	The system shall allow the manager to edit accounts for employees
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.25 Functional Requirement 25

Table 59: Description of FR-23: View Users.

Identifier	FR-25
Title	View Users
Requirement	The system shall allow the manager to view accounts for employees
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.26 Functional Requirement 26

Table 60: Description of FR-26: Delete Users.

Identifier	FR-26
Title	Delete Users
Requirement	The system shall allow the manager to delete accounts for employees
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.27 Functional Requirement 27

Table 61: Description of FR-23: Issue RFID Cards.

Identifier	FR-18
Title	Issue RFID cards
Requirement	The system shall allow the manager to issue a single card to each user.
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.28 Functional Requirement 28

Table 62: Description of FR-28: Revoke RFID Cards.

Identifier	FR-28
Title	Revoke RFID cards
Requirement	The system shall allow the manager to revoke the RFID cards for employees
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.29 Functional Requirement 29

Table 63: Description of FR-29: Creating Geofencing.

Identifier	FR-29
Title	Creating Geofencing
Requirement	The system shall allow the manager to create geofencing for a single room by assigning a list of roles permissible to enter.
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.30 Functional Requirement 30

Table 64: Description of FR-30: Edit Geofencing.

Identifier	FR-30
Title	Edit Geofencing
Requirement	The system shall allow the manager to edit the geofencing
Source	Supervisor
Rationale	To have separate areas in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.31 Functional Requirement 31

Table 65: Description of FR-31: Delete Geofencing.

Identifier	FR-31
Title	Delete geofencing
Requirement	The system shall allow only the admin to remove the geofencing.
Source	Supervisor
Rationale	To have separate areas in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.32 Functional Requirement 32

Table 66: Description of FR-32: Search Employee.

Identifier	FR-32
Title	Search Employee
Requirement	The system shall allow the manager to search for employee real-time location with their name.
Source	Supervisor
Rationale	To have search the employee.
Business Rule (if required)	None
Dependencies	
Priority	High

4.33 Functional Requirement 33

Table 67: Description of FR-33: Search Employee using Images.

Identifier	FR-33
Title	Search Employee using images
Requirement	The system shall allow the manager to search for employee using their images
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.34 Functional Requirement 34

Table 68: Description of FR-34: Alert Manager.

Identifier	FR-34
Title	Alert Manager
Requirement	The system shall notify the user using push notification about any trespassing of geofencing.
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

4.35 Functional Requirement 35

Table 69: Description of FR-35: Check Attendance.

Identifier	FR-35
Title	Check Attendance
Requirement	The system shall allow the employees to check their attendance.
Source	Supervisor
Rationale	To have separate profiles in an organization
Business Rule (if required)	None
Dependencies	
Priority	High

5. Non-Functional Requirements

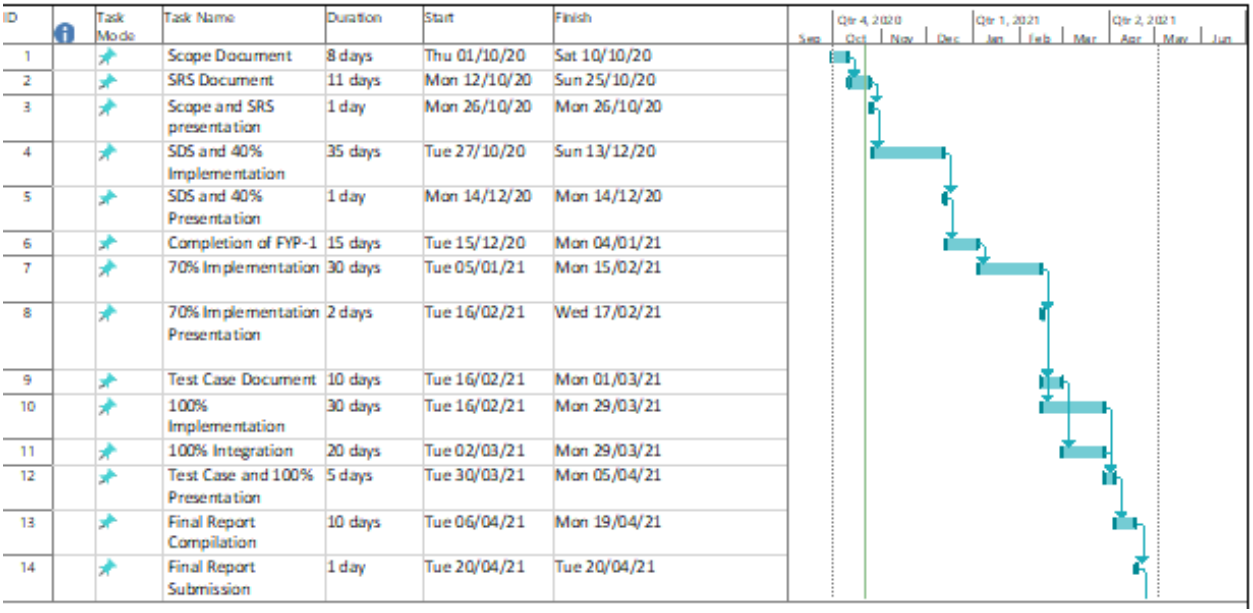
5.1 Usability

USE-1: All the deletions made in the database should be soft deletion.
USE-2: The application should be able to assist atleast 500 people at a time.
USE-3: All the icons used should easily depict what they do.
USE-4: Buttons in the application should be big enough so that user can easily press them. (Erikson, 2012)

5.2 Performance

PER-1: The system shall not take more than 10 seconds to detect a face.
PER-2: The system shall not take more than 10 seconds to detect RFID signal.
PER-3: The system shall not take more than 10 seconds assosicate found person with the database.

6. Project Gantt Chart



ID	Task Mode	Task Name	Duration	Start	Finish
1		Scope Document	8 days	Thu 01/10/20	Sat 10/10/20
2		SRS Document	11 days	Mon 12/10/20	Sun 25/10/20
3		Scope and SRS presentation	1 day	Mon 26/10/20	Mon 26/10/20
4		SDS and 40% Implementation	35 days	Tue 27/10/20	Sun 13/12/20
5		SDS and 40% Presentation	1 day	Mon 14/12/20	Mon 14/12/20
6		Completion of FYP-1	15 days	Tue 15/12/20	Mon 04/01/21
7		70% Implementation	30 days	Tue 05/01/21	Mon 15/02/21
8		70% Implementation Presentation	2 days	Tue 16/02/21	Wed 17/02/21
9		Test Case Document	10 days	Tue 16/02/21	Mon 01/03/21
10		100% Implementation	30 days	Tue 16/02/21	Mon 29/03/21
11		100% Integration	20 days	Tue 02/03/21	Mon 29/03/21
12		Test Case and 100% Presentation	5 days	Tue 30/03/21	Mon 05/04/21
13		Final Report Compilation	10 days	Tue 06/04/21	Mon 19/04/21
14		Final Report Submission	1 day	Tue 20/04/21	Tue 20/04/21

Figure 4: Gantt chart.

7. References

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[5] Meyer, B. *Object-oriented software construction*. London: Prentice-Hall International.

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8. Plagiarism Report