

Table 1: Revision History

Date	Developer(s)	Change
Date1	Name(s)	Description of changes
Date2	Name(s)	Description of changes
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Hazard Analysis

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1 Introduction

2 Component Overview

The project can be divided into five different main components. Those components are listed in the paragraphs below.

2.1 Movement of Camera

2.2 Human Body Detection

A good detection method should be used so that the human body can be detected by the program in the images provided by the camera. The movement of the human body should also need to be detected to help the camera to judge its angular position.

2.3 User Interface

This component provides a communication layer between the system and the user through a computer app.

2.4 Database

A fast and accurate data flow is the cornerstone for a system to be able to work properly and meet requirements. The design and implementation of database is playing a major role in the whole system design.

2.5 Objection Detection

This system is responsible for detecting any moving object in the area and identifying each object with unique set of characteristics. This is the main logical system for smartVault to help locate a “lost” item.

3 Safety Considerations and Connection with Requirements

3.1 Movement of Camera

3.2 Human Body Detection

3.2.1 Human Body not Detected

When a human presents in the room and the images have been shown in the computer, the program fails to detect the human body in the screen.

Related Requirements: IPR1

3.2.2 Wrong Human Body Detected

When the software component of the oobject detects a human body shown in the camera, the body shown on the screen is not actually a body of a person.

Related Requirements: IPR1

3.2.3 Body Movement not Detected

When people moves in the room and thhe images has been sent to the computer, the program cannot detect the movement of the body.

Related Requirements: IPR4

3.2.4 Wrong Body Movement Detected

When the program detects the movements of human body, only part of movement or wrong movement is identified by the program.

Related Requirements: IPR4

3.3 User Interface

3.3.1 General

App closes unexpectedly, it could lead to the loss of current progress.

3.3.2 Login In Issue

User cannot log in to the app successfully, such that he/she do not have the ability to interface with the system.

3.3.3 Authentication

An unauthorized user logs in as a privileged user with high-level access.

3.4 Database

3.4.1 Overflow

As video are divided into frames to analyze, the files may occupy unexpected large spaces without restriction and further crash the program.

Related Requirements: IPR6

3.4.2 Mismatch

The object information are not collected completely and create wrong identification.

Related Requirements: IPR5

3.4.3 Miss time requirement

As the system is designed to be real-time, timing issue might occur when dealing with large data stream. The algorithm takes time longer than expectation and can not proceed next task.

3.5 Object Detection

SmartVault will return error message when connection between camera and the object detection system is lost. When connection is lost, object detection system will not be able to monitor moving objects.

4 FMEA Worksheet

Table 1: The FMEA Table			
Components	Failures	Cause of Failure	Recommended Action
Movement of Camera	N	N	N
Human Body Detection	Human Body not Detected	a. Detection method failure b. Wrong posture of human	a. Restart the program b. request help from development team
	Wrong Human Body Detected	a. Detection method failure	a. Restart the program b. Request help from development team
	Body Movement not Detected	a. Detection method failure b. Human body moves too fast	a. Restart the program b. Request help from Development team
	Wrong Body Movement Detected	a. Detection method failure	a. Restart the program b. Request help from development team
General	App closes unexpectedly	a. Host device loses power b. Crash due to instabilty	a. Store unsaved data locally on user's device
Login In Issue	User cannot log in to the app successfully	a. User's credentials are unmatched	a. Reset user's credentials
Authenti-cation	An unauthorized user logs in as a privileged one with high-level access	Authentica-tion issue	a. Fix the account permission and undo changes made by unauthorized user
Database	N	N	N
Object Detection	N	N	N

Failure Mode and Effects Analysis							
Components	Failure Modes	Causes of Failure	Effects of Failure	Severity	Recommended Actions	SR	Ref
Movement of Camera	NA	a. NA	a. NA	a. NA	a. NA	NA	H3-1
	NA	b. NA	b. NA	b. NA	b. NA	NA	H3-2
Human Body Detection	NA	a. NA	a. NA	a. NA	a. NA	NA	H3-1
	NA	b. NA	b. NA	b. NA	b. NA	NA	H3-2
User Interface	App closes unexpectedly	Host device loses power, or Crash due to instability	Current progress is lost	High	a. Store unsaved data locally on user's device	NA	NA
	User cannot log in to the app successfully	User's credential is unmatched	User is unable to use the system	High	a. Reset user's credentials	NA	NA
	An unauthorized user logs in as a privileged one with high-level access	Authentication issue	User could view or modify data even he/ she is not allowed	Strongly high	a. Fix the account permission and undo changes made by unauthorized user	NA	NA
Database	Overflow	Files of frames are stored without size restriction	Program crash	High	Set a strict time period for the camera to capture picture for each task	NA	NA
	Mismatch	Object information are not collected completely	Inaccurate behavior done by the system	Medium	First ensure the functionality of camera is in good condition then re-enter information about the object	NA	NA
	Miss time requirement	Too much items in one frame and takes the program longer time to proceed	Long time delay of the system behavior	Medium	Increase search frame and prioritize the assigned area	NA	NA
Object Detection	NA	a. NA	a. NA	a. NA	a. NA	NA	H3-1
	NA	b. NA	b. NA	b. NA	b. NA	NA	H3-2

Table 2: FMEA Table Part 1