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Camera Motion Sensor

J-Component Final Report

SOFTWARE ENGINEERING

SLOT: L11+L12

CODE:CSE3001

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I) Abstract

Objective

This camera motion sensor system can detect motion (even the slightest ones) and trigger an alert where it will mail the respective. It uses a motion detector algorithm for detecting movements. The camera continually monitors the surrounding environment, records images of any movements in real-time, and sets triggers for unusual activities in the vicinity

Scope

This project's scope or target audience is almost everyone who needs surveillance and vigilance solutions, like shops, jewelry shops, prisons, car garage, bank, places near money and data

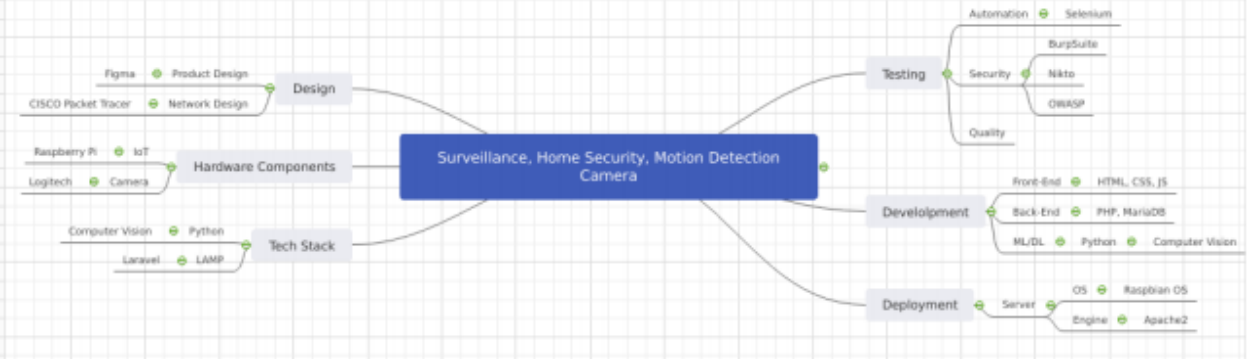
1. Security Surveillance and vigilance camera
2. Easy to configure and view
3. Easy to access and monitor from anywhere in the world
4. Providing Security to user data by storing only the hashes of the user's data in database
5. Detects motions and send alerts to the registered email id about the intrusion (if possible, with a snapshot)

II) System Analysis

Overview

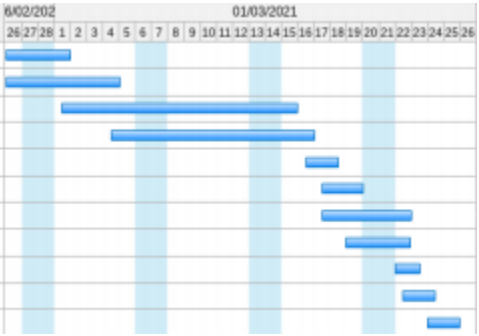
The principal points of Advance Intelligent video surveillance system (AIVSS) are to build up an observation system which can function as an indoor/open-air observation system. As Advance Intelligent Video Surveillance System has a more extensive degree to take a shot at. As nowadays security and protection assume an essential part of the survival of the individual. The perfect observation engineering will have the accompanying attributes: elite, adaptability, simple upgradability, low advancement cost, and a movement way to bring down cost as the application develops and volume inclines. Also, the step by step expanding innovations restricted the working of the Surveillance system, therefore the level of security must be expanded with a specific end goal to stop the obstruction of interlopers. At present, the video surveillance industry utilizes simple CCTV cameras and interfaces as the premise of observation systems. These system parts are not effortlessly expandable and have low video determination with practically zero flag preparing. Nonetheless, the up-and-coming age of video surveillance systems will supplant these segments with more current computerized LAN cameras, complex picture handling, and video-over-IP steering. They will never again be essentially surveillance camera systems yet in addition video correspondence systems.

Mind Map:



Gantt Chart:

ID	Task Name	Start	Finish	Duration	Complete
1	Planning	25/02/2021	01/03/2021	3.0 d.	0%
2	Designing	26/02/2021	04/03/2021	5.0 d.	0%
3	Development	01/03/2021	15/03/2021	10.5 d.	0%
4	Initial Testing & Debugging	04/03/2021	16/03/2021	8.5 d.	0%
5	Alpha Product Deployment	16/03/2021	18/03/2021	2.0 d.	0%
6	AlphaTesting	17/03/2021	19/03/2021	2.5 d.	0%
7	Maintainance & Updates	17/03/2021	22/03/2021	3.5 d.	0%
8	Beta Product Deployment	19/03/2021	22/03/2021	2.0 d.	0%
9	Updates & Bug Fixes	22/03/2021	23/03/2021	1.5 d.	0%
10	Final Review	22/03/2021	24/03/2021	2.0 d.	0%
11	Final Product Deployment	24/03/2021	25/03/2021	2.0 d.	0%



Product Functions

This is a camera motion detection sensor which detects motion and triggers an alert and gives the notification to the respective owner. One who want to use this must register and login using their respective user id. They need to update their contact info to which alert will be triggered if the camera detects any unusual activities. This is safe and secure so that one without user id can't get into the website and registered users can view only their camera

User Characteristics

- Webcam

- Internet access
- Supports both x86 and ARM architecture
- Supports all OS
- Requires Java script enabled browser

Assumptions

Server Type: We have a raspberry pi running on apache-2 based server, which provides superior performance and features.

User Database and Concurrent Users: We estimated how many users will be accessing and how many may access the server at a time. We configured the server accordingly

Bandwidth: We selected or configured the server, as it is important to ensure a good bandwidth to help users access eLearning courses seamlessly.

Other Server Configurations: We ensured to have items with good configurations such as core processors for the fast processing of requests, RAM for quick response time, and a hard-disc with enough space to upload eLearning courses and store training information in the database.

PC minimum hardware specification:

Operating system: We used windows operating systems for our project.

Database: MySQL is being used for saving properties and its related user information.

Eclipse/visual studio: For creating a front-end where users will interact with our product and can support any type of browser.

Functional Requirements

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Non-Functional Requirements

Performance Requirements:

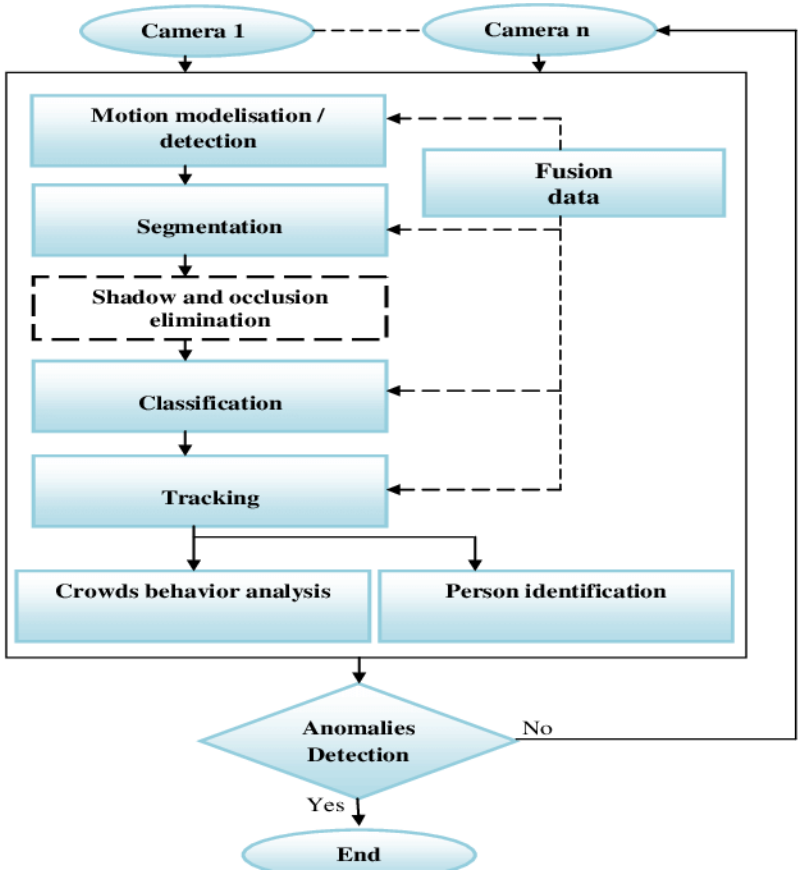
In order to capture live video feed to be used as a trigger, a video camera must be connected to and activated on the computer. Similarly, the Arduino hardware must be connected to the computer so that sensors can be read.

Safety Requirements: This product will involve screen(s) and a hard drive. The screens may be connected to the computer hardware directly, in the form of a laptop or a screen with a built-in hard drive.

Security Requirements: There may be a violation of privacy involved if a video camera is activated in a public location without the knowledge of the people in the area. Security protocols shall be used in communication networking.

Business Rules: Anyone who wants to use this can purchase this and if you want to improve further can carry on with no restrictions

System Architecture:



System Model:

In this section we will discuss about the overall design our camera motion sensor detection.

Signup: Here new users can register themselves

Login: Here existing users can login.

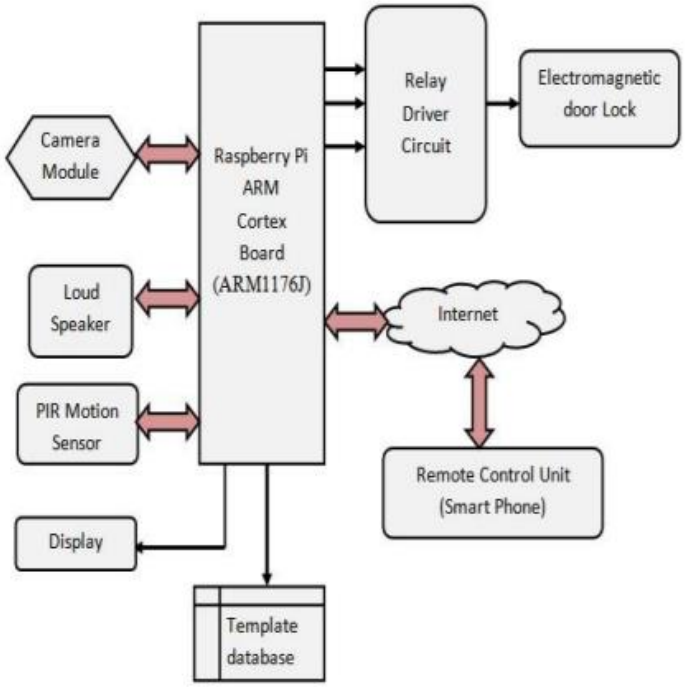
Forgot password: In case users forget their passwords, we have an easy way for users to reset their passwords after verification

Stream page: Here users can stream their video

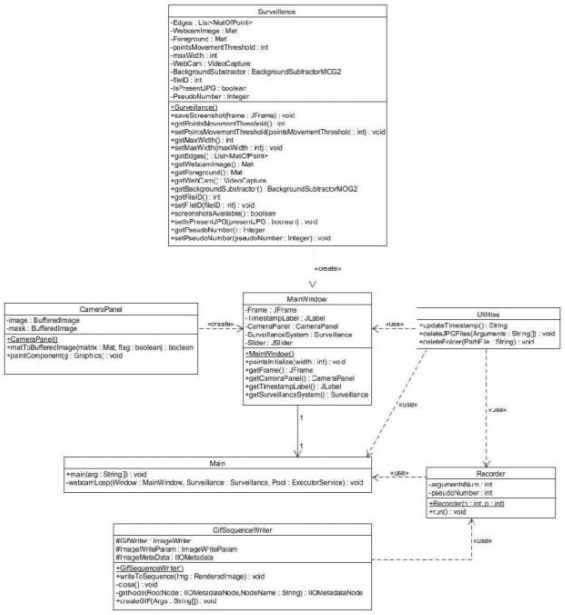
Profile: Here users can view and update their personal information's

III) System Design

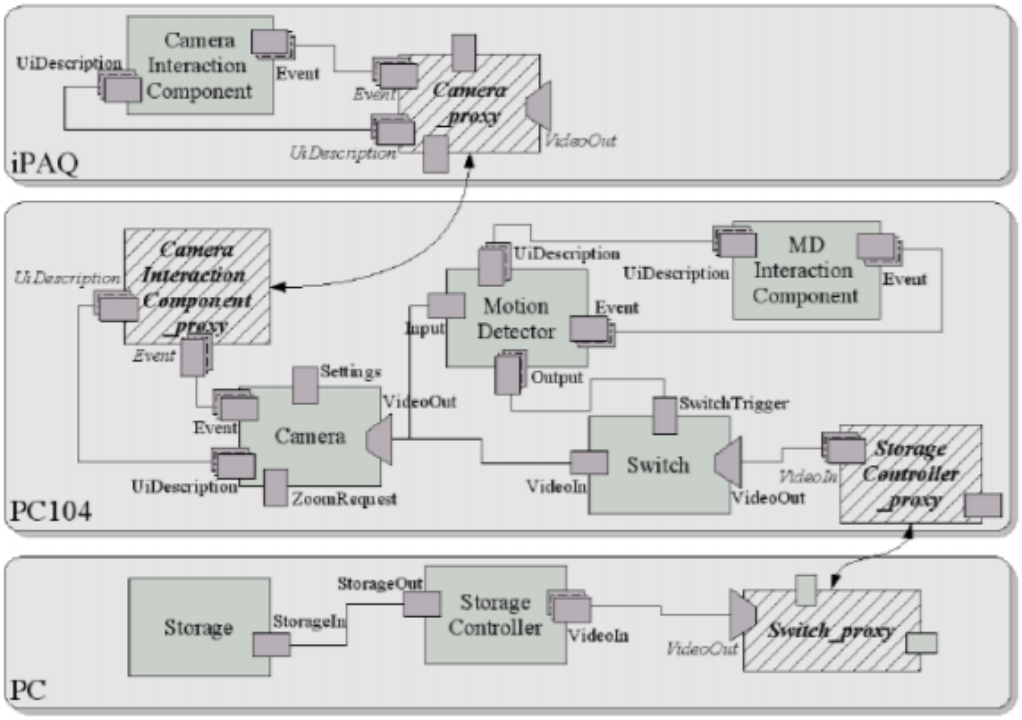
Block Diagram:



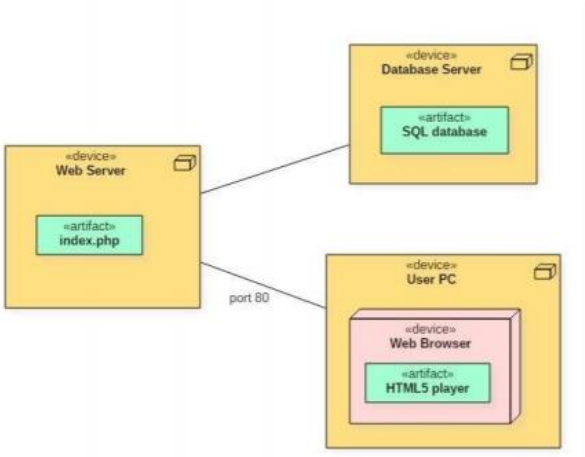
Class Diagram:



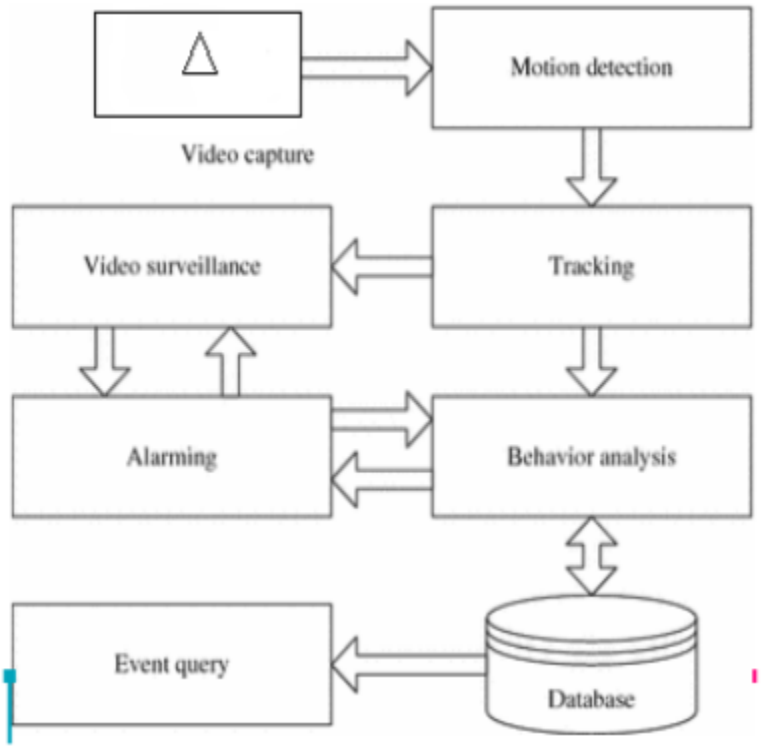
Component Diagram:



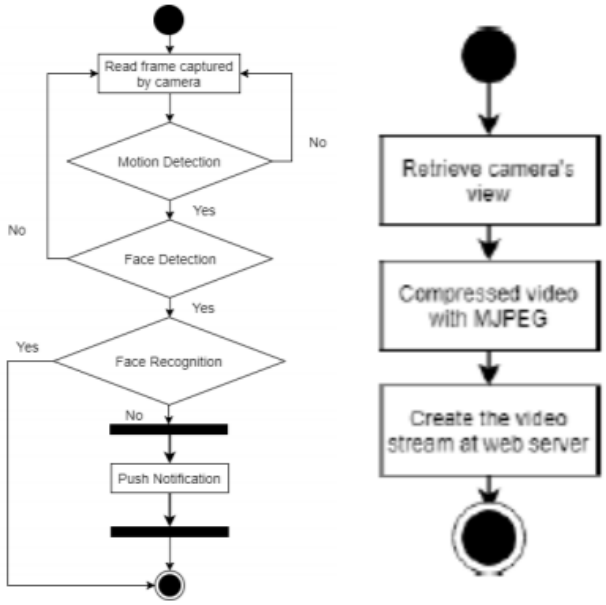
Deployment Diagram:



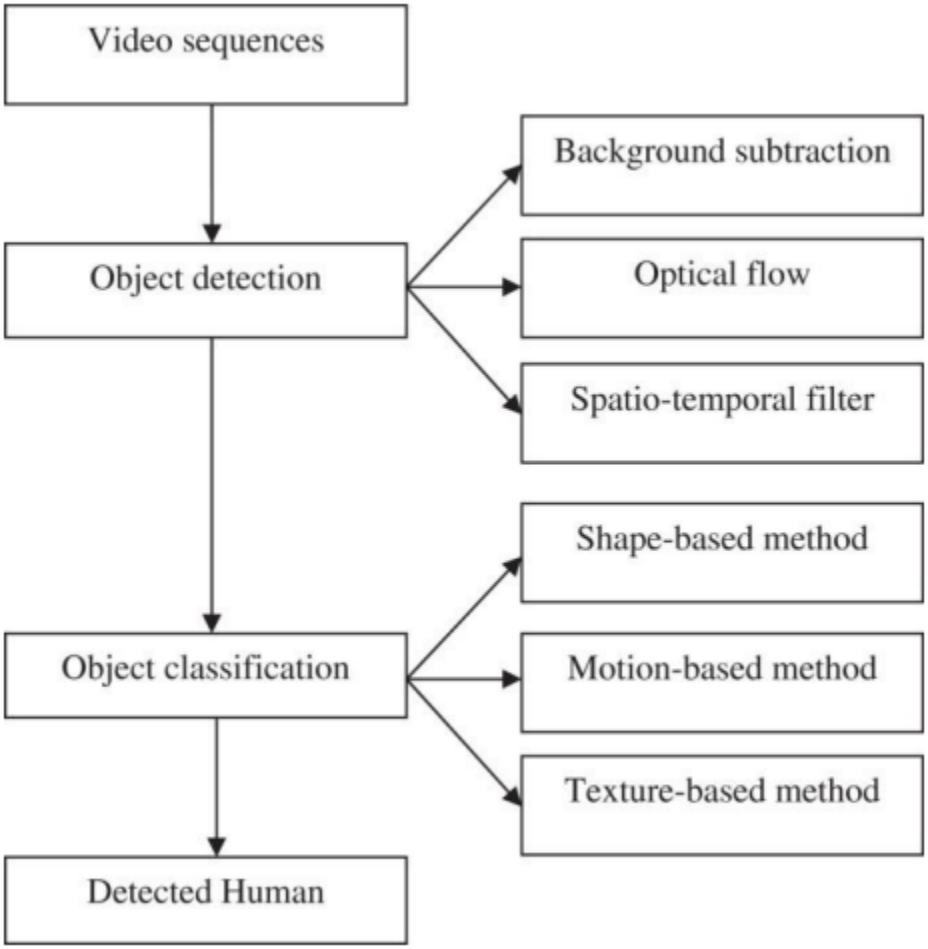
Package Diagram:



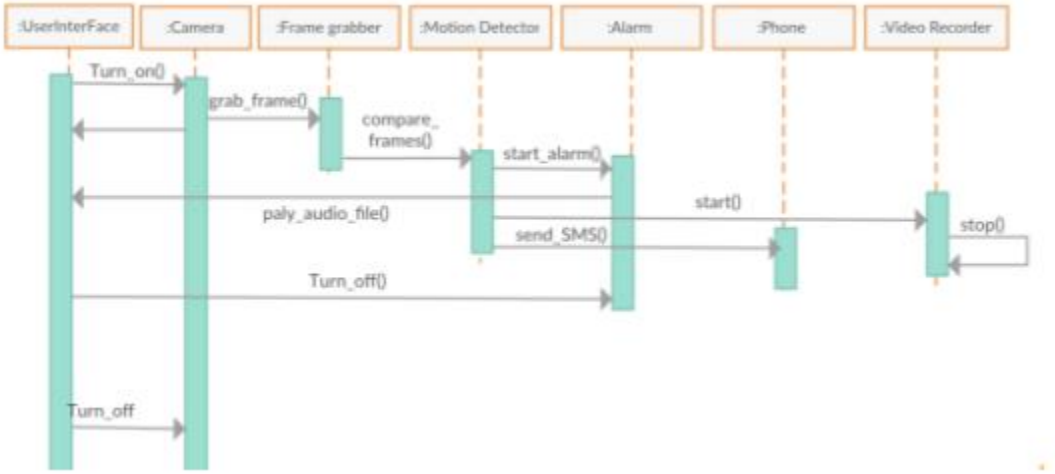
Activity Diagram:



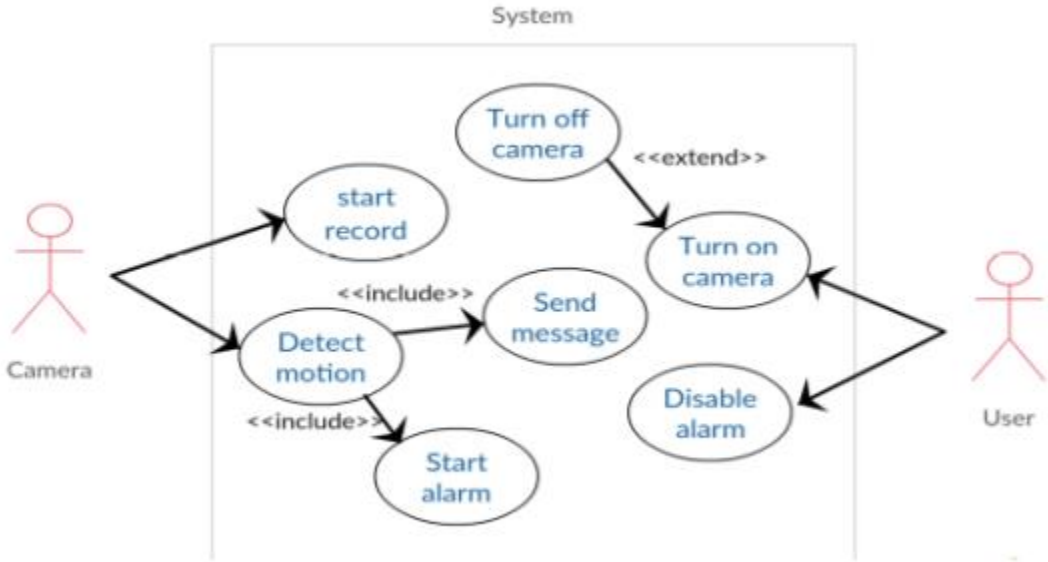
Interaction Diagram:



Sequence Diagram:



Use Case Diagram:



IV) Software Process Specification

As source code is too long it cant be added to the word file.

You can find the source code in the given github link:

https://github.com/Tesla369/StreamIt

V) Software Test Plan

Test Case Specification Identifier –

Test1001: Input validation
Test1002: Performance testing
Test1003: Motion Detection testing

Test Items –

1. Login
2. Sign up
3. Feedback
4. Local Stream
5. Server View

Input Specifications –

Data Names:

A. Username
B. Password
C. First name
D. Last name
E. Mail id
F. Recovery id

Values: (with tolerances or generation procedures)

A. User_1
B. Secret@123
C. Test
D. User
E. test_user@gmail.com
F. test_recuser@gmail.com

States:

Initial

Correct data of a user profile is stored in database for verifying the credentials and authentication

Final

As the email id is unique, user's data are successfully stored in the database and can be used for later purpose

Output Specifications –

Data Names:

A. Username
B. First name
C. Last name
D. Mail id
E. Recovery id
F. Motion detector URL

Values: (with tolerances or generation procedures)

A. User_1
B. Test
C. User
D. test_user@gmail.com
E. test_recuser@gmail.com
F. zaptech.zapto.org:8081

States:

Initial

The user profile details can be viewed in My Profile and stream can be accessed in the designated URL

Final

An alert is triggered when a motion is detected and user is notified through his registered mail id

Environmental Needs

Hardware

This software is supported by ARM based hardware 64-bit architecture and Debian based Linux distributions (Raspberry pi OS). The user also needs to connect a webcam and it works in internet

Software

The project will be designed to run on Debian based Linux distributions (Raspberry pi OS). PHP, Bash, Python3 will be used as the programming language and scripting language. Motion is used to detect the motion of an intruder. This software is independent of browser

Other

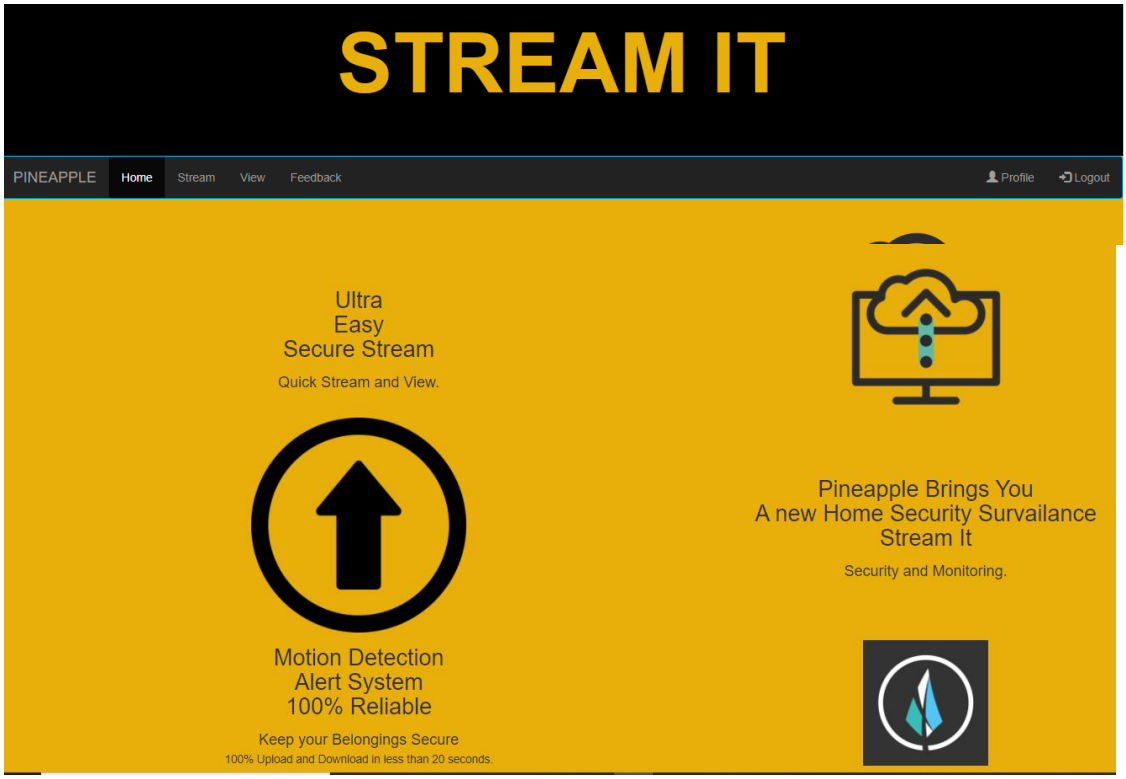
Performance:

The performance of our project will be measured by the time it takes for the detection software to successfully detect any motion of the intruder and issue a warning to the designated user. The software will be aimed to detect the intrusion within a time period of 2–3 seconds. It will also alert the user by sending an email. The project will use small amounts of CPU and RAM resources.

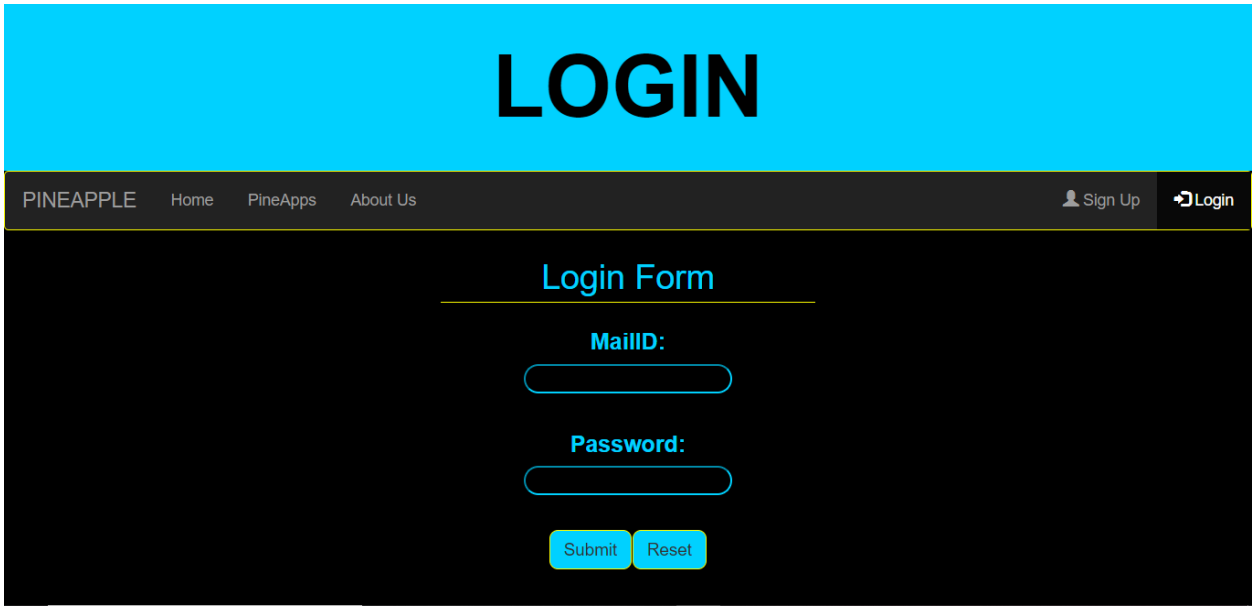
Special Procedural Requirements

The special procedural requirements include the setup of Raspberry pi in local area network, port forwarding to access via the internet, connecting the desire webcam to the mini-computer. The user must allow the permission for camera through the browser.

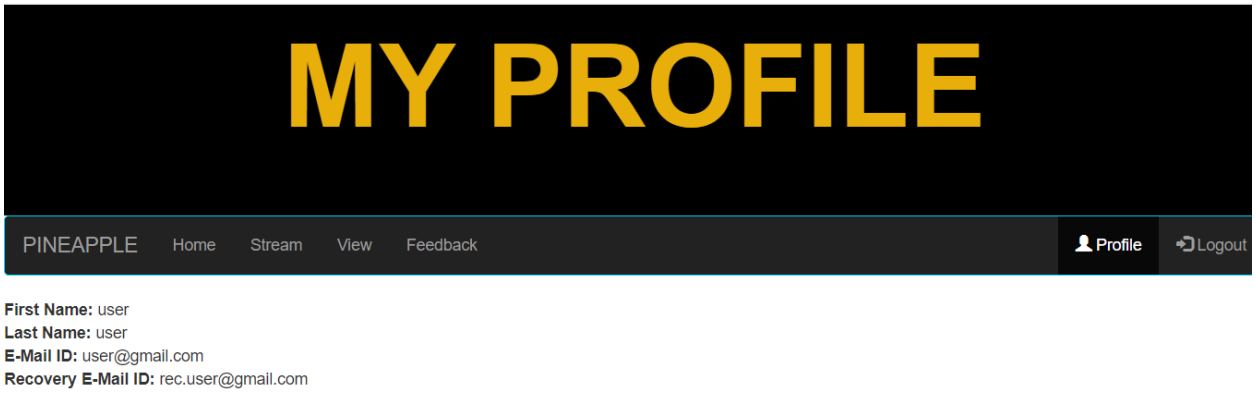
VI) Result Analysis and Discussion



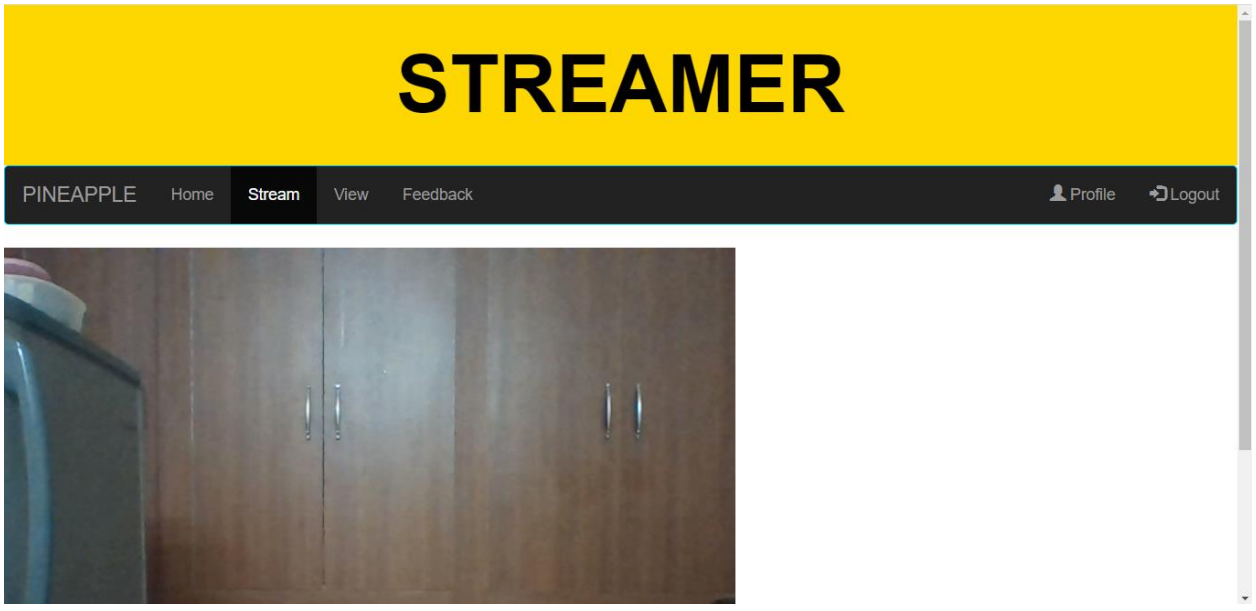
Enter your Credentials to login



Click on my profile to view your details



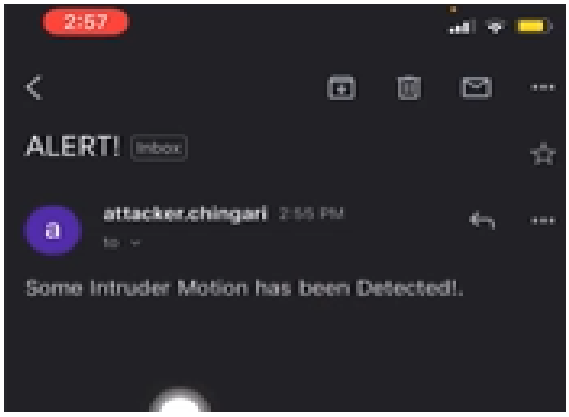
By stream option you can stream your webcam



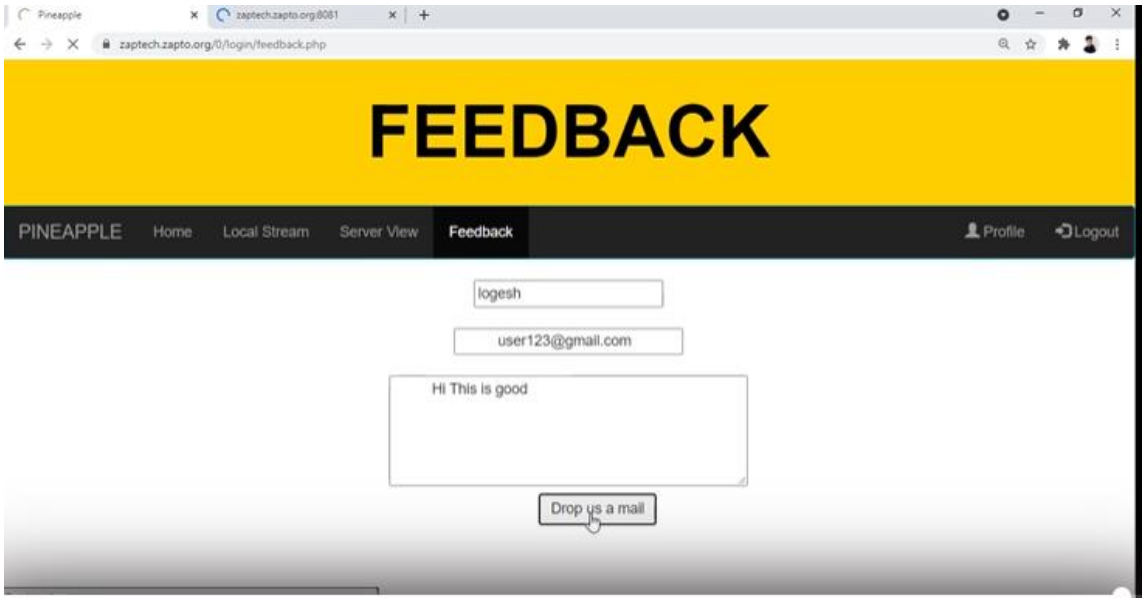
By view option you can stream security camera connected

Rectangular box is shown around moving object or body to detect there is a motion.

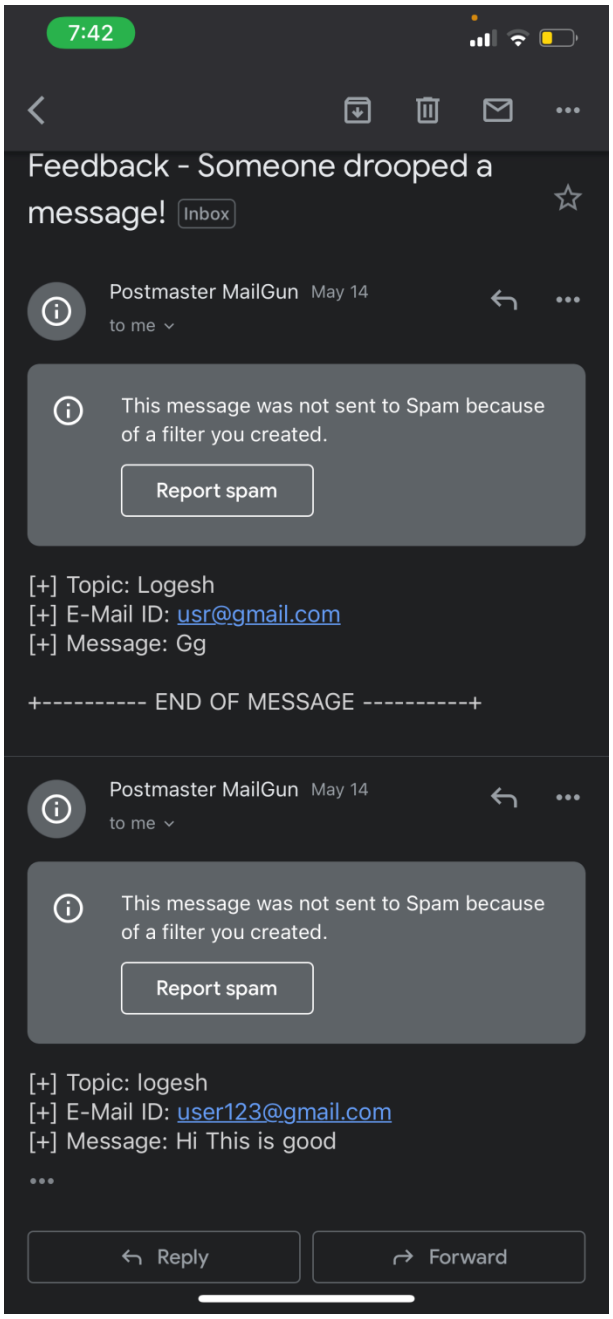
After detecting the motion it alerts and sends the recorded video clip to the registered mail id



Users can give their feedback about the software



Feedback is sent to the developer



VII) Conclusion

In this project, a camera motion sensor software with complete privacy and alert trigger is proposed.

It is so simple for the user to access with their private username and password.

They can view it from anyplace where they get an active internet support. This will help a lot of people out there mainly for safety reasons and also people prefer this as it has a very low Maintenance service and they can highly be depended on it as they watch from their own eyes

VIII) Future Work

In future, this system will be upgraded to mobilize resources to provide the necessary infrastructure, supplies and materials needed to ensure every assessment is achieving the motion analysis potential.

This is important to increase the reliability and effectiveness of this monitoring system. A more detailed concept of motion detection will be more useful in later processing stages. As in image flow algorithm, all the information is need to be incorporated on the direction of motion.

Optimization in realization is very important for a optimize solution from the beginning.

IX)Reference

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