Software Requirements Specification

for

Video Surveillance, Background Modelling

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Revision History

Name	Version
First Draft	1.0

● Introduction

○ Purpose

Here we discuss Video Surveillance, Background Modelling, a project which explores video surveillance using advanced techniques like frame differencing and background modelling.
Version - 1.0.0
Scope - The document covers every aspect of the product, from hardware and software requirements to the use cases and future developments.

○ Document Conventions

Headings are emphasised by using a bold font and indexed by a number.

○ Intended Audience and Reading Suggestions

This document is intended to assist the developers in developing the software and testers to verify the functionalities of the software. The marketing staff can read and understand this in order to assist the users in buying and using the software. It is suggested to read this document in the given order to maintain a good flow and understand the software more clearly.

○ Product Scope

Here we hope to explore different and more advanced techniques of video surveillance by using frame differencing. background modelling and morphological operations.

○ References

1. https://docs.opencv.org/master/db/d5c/tutorial_py_bg_subtraction.html#gsc.tab=0
2. Background modelling and background subtraction performance for object detection: https://ieeexplore.ieee.org/abstract/document/5545291
3. Integrated region- and pixel-based approach to background modelling : https://ieeexplore.ieee.org/abstract/document/1182206
4. http://personal.ee.surrey.ac.uk/Personal/R.Bowden/publications/avbs01/avbs01.pdf
5. Mean-shift background image modelling : https://ieeexplore.ieee.org/abstract/document/1421844

● Overall Description

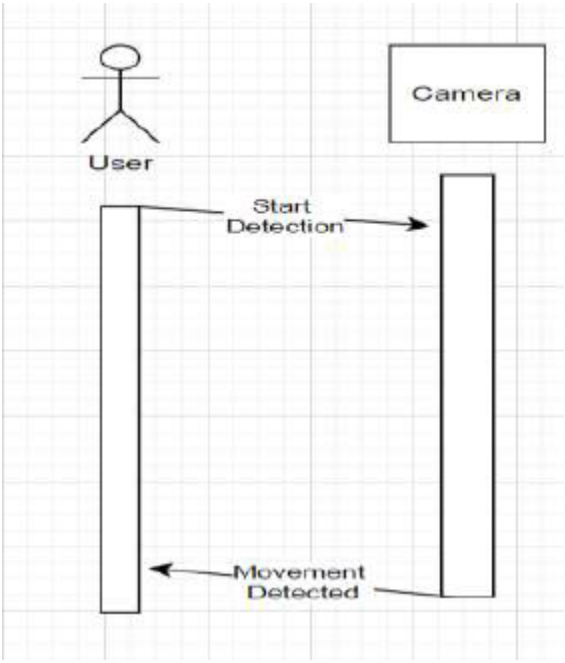
○ Product Perspective

The product is supposed to be open-source, under the GNU General Public License. This is a completely new software product mainly intended for people or military establishments who want to track intruders or foreign objects entering the video feed.

○ Product Functions

○ Track foreign objects using background modelling
○ Detect new objects entering the frame
○ Improvement on naive algorithms to detect objects accurately.

The following diagram gives a better visualization of the product.



○ User Classes and Characteristics

For our project we have two main users :

- Military establishments or Police Stations
- Retail Users for home surveillance systems

○ Operating Environment

The discussed software is made and simultaneously tested on the following hardware platforms, thus making them apt for the product to operate on -

No.	OS	Processor	RAM	Hard Disk
1.	Windows 10	Intel© Core™ i5-1035G1	8 GB	256 SSD
2.	Windows 10	Intel© Core™ i5-2520M	4 GB	512 SSD

○ Design and Implementation Constraints

The software and the input text story are restricted to the English Language in this version. Options for other languages will be provided in future versions.

○ Assumptions and Dependencies

The user should have a decent camera to be able to capture high quality video. This will be required when we wish to analyse the video and perform operations to aid in video surveillance. There are no other assumptions and dependencies as such.

● External Interface Requirements

○ User Interfaces

Video Feed with new movement highlighted in black

○ Hardware Interfaces

Desktop Operation:
Windows Operating System (Windows 8.1 & above)

○ Software Interfaces

The project uses OpenCV 4.0 using the C++ programming language

○ Communications Interfaces

The minimum data transfer rate required is 300kbps for watching the generated video seamlessly without buffering on a video screen

- # System Features

  - ### Inputting Formats

    Here we will use a camera as stated above which is capable capturing high quality video as this will aid us in video surveillance. We will perform various operations like frame differencing, background modelling and morphological operations on this captured video.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Works best on pcs with windows 10 and above with an 17 processor or any equivalent.

5.2 Security Requirements

The user needs to place the cameras in well lit areas and make sure it includes all of the surveillance area.

5.3 Business Rules

The entire software would be under our copyright. Any kind of reproduction as a part or whole is punishable under Copyright Infringement Law.

6. Other Requirements

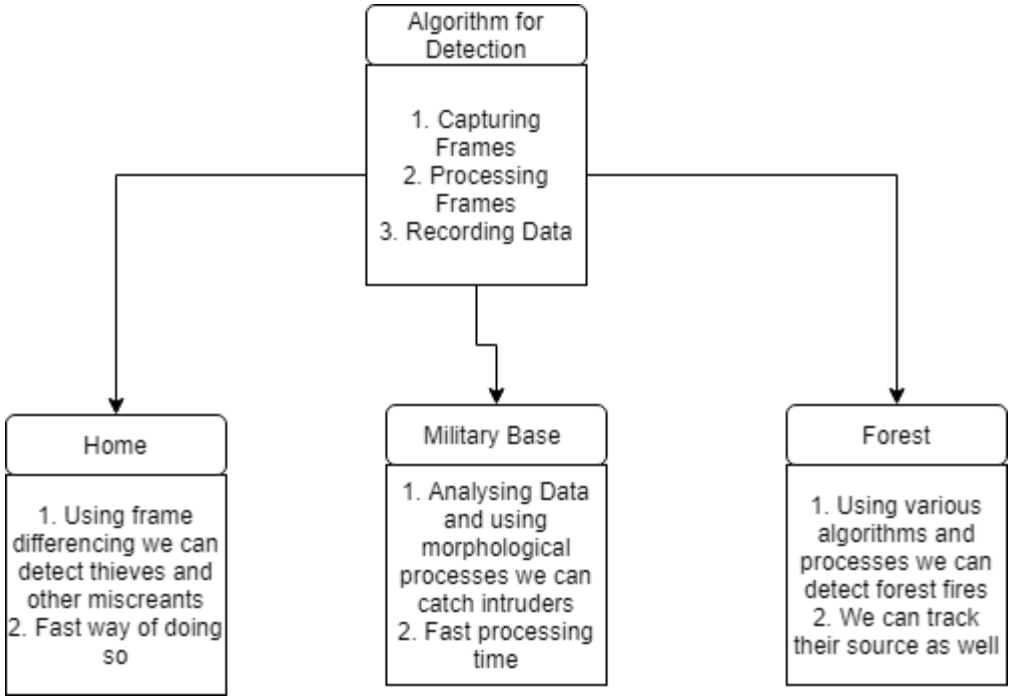
The browsers must allow for storage of certain things in its cache for a smooth user experience. There are no other requirements.

Appendix A: Glossary

CV - Computer Vision

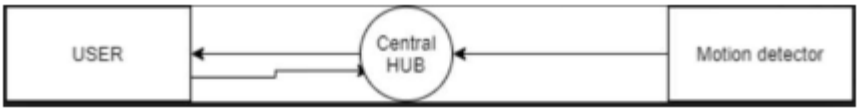
Appendix B: Analysis Models

Class Diagram:

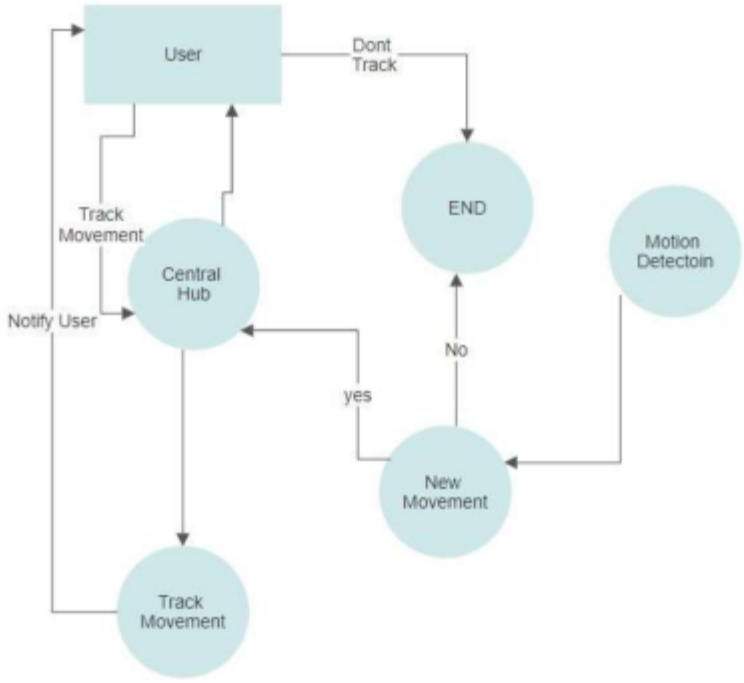


Context Level Diagram:

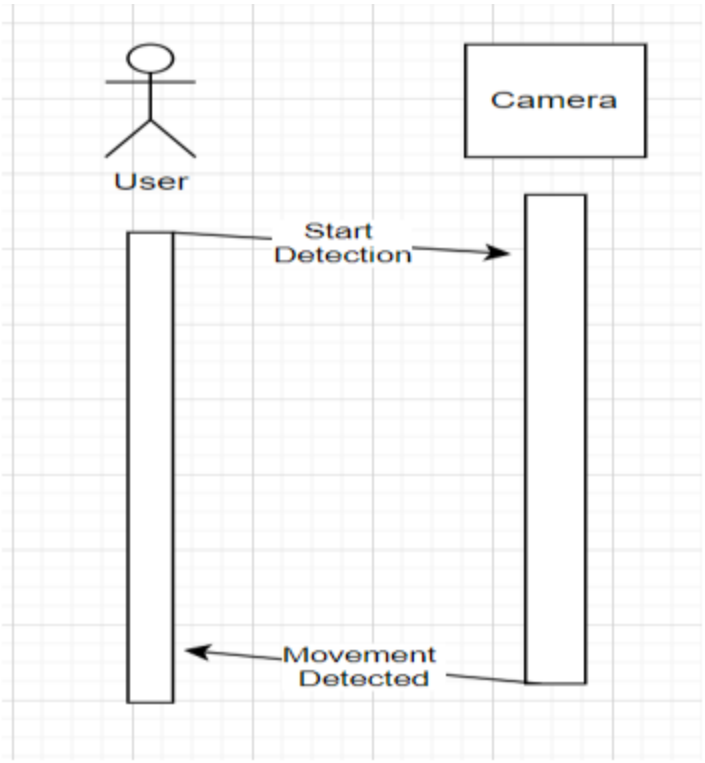
Level 0



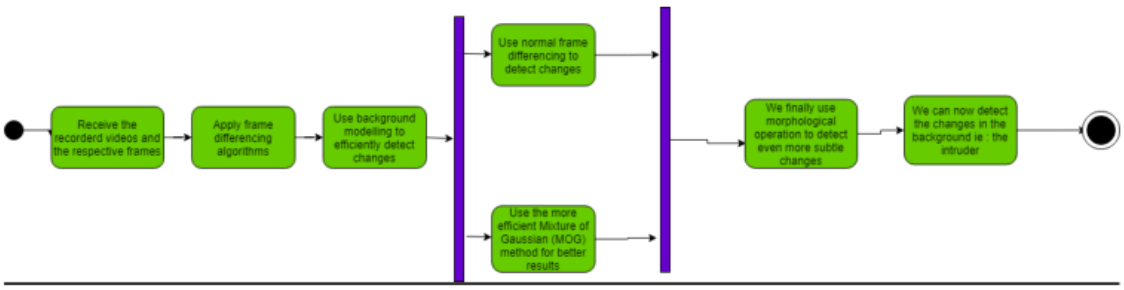
Level 1/2



Sequence Diagram:



Activity Diagram:



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