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### A vedio surveillance system for object detection and tracking

### Version 1.0

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# Description :

This Software Requirements Document Specification provides a list and description of the functional and non-functional specifications for the software components for a video surveillance system for object detection and tracking. We make use of different object detection and object tracking methods to detect moving objects in a video.

* This Software Requirement document provides the following views of the requirements.
* A preliminary component grouping of the requirements.
* A preliminary mapping of the requirements against proposed objects and their responsibilities.

The document is intended to establish the initial scope of the development effort.

## Perspective :

Visual surveillance system is basically used for analysis and explanation of object behaviours. There are different methods to detect a moving object in a video. This document is intended to illustrate the processes and technical items contained by a paper on a study on video surveillance system for object detection and tracking.

# Functional Requirements :

* Open CV
* Object Detection Techniques
* Object Tracking techniques
* Image Processing Algorithms
* Microsoft Visual Studio

# Functional Requirements Description :

1. **Image Detection Techniques**

The way of finding semantic objects like humans, animals, carriage in video scenes is called object detection. Any video scene contains objects that can be determined by object detection technique. Object detection algorithms mainly used to extract features to recognize instances of an object. The various applications of object detection is retrieval of images from many sources, security and vehicle parking systems.

1. **Image Processing Algorithms**

Image Processing is processing of images using mathematical operations by using any form of [signal processing](https://en.wikipedia.org/wiki/Signal_processing) for which the input is an image, a series of images, or a video, such as a [photograph](https://en.wikipedia.org/wiki/Photograph) or [video frame](https://en.wikipedia.org/wiki/Video_frame); the output of image processing may be either an image or a set of characteristics or [parameters](https://en.wikipedia.org/wiki/Parameter) related to the image.

1. **OpenCV**

OpenCV is released under a BSD license and hence it’s free for both academic and commercial use. It has C++, C, Python and Java interfaces and supports Windows, Linux, Mac OS, iOS and Android. OpenCV was designed for computational efficiency and with a strong focus on real-time applications. Written in optimized C/C++, the library can take advantage of multi-core processing. Enabled with OpenCL, it can take advantage of the hardware acceleration of the underlying heterogeneous compute platform.

1. **Object tracking Algorithm**

Tracking plays an important role of moving object in human motion analysis. With the help of different feature of an object tracking is used to detect foreground objects between a series of frames like velocity, color and texture. Tracking is the process by locating positions of objects from frame to frame in video scene.

1. **Microsoft Visual Studio**

Microsoft Visual Studio is an [integrated development environment](https://en.wikipedia.org/wiki/Integrated_development_environment) (IDE) from [Microsoft](https://en.wikipedia.org/wiki/Microsoft). It is used to develop [computer programs](https://en.wikipedia.org/wiki/Computer_program) for [Microsoft Windows](https://en.wikipedia.org/wiki/Microsoft_Windows), as well as [web sites](https://en.wikipedia.org/wiki/Web_site), [web applications](https://en.wikipedia.org/wiki/Web_application) and [web services](https://en.wikipedia.org/wiki/Web_service). Visual Studio uses Microsoft software development platforms such as [Windows API](https://en.wikipedia.org/wiki/Windows_API), [Windows Forms](https://en.wikipedia.org/wiki/Windows_Forms), [Windows Presentation Foundation](https://en.wikipedia.org/wiki/Windows_Presentation_Foundation), [Windows Store](https://en.wikipedia.org/wiki/Windows_Store) and [Microsoft Silverlight](https://en.wikipedia.org/wiki/Microsoft_Silverlight). It can produce both [native code](https://en.wikipedia.org/wiki/Native_code) and [managed code](https://en.wikipedia.org/wiki/Managed_code).

**Hardware Requirements :**

1. **Camera**

To capture a video.

1. **Monitor**

To display the results.

**Use Cases :**

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| --- |
| Use Case Name: Capture Video |
| Requirement(s) Explored: #1 |
| Actor - Context (Role): Administrator |
| Preconditions: The system has to be turned on and camera should be set up |
| Trigger(s): Start the recording |
| Main Course of Action:   1. Switch the camera on. 2. Record the video. 3. Store it. |
|  |

|  |
| --- |
| Use Case Name: Object Detection and tracking |
| Requirement(s) Explored: #2 #3 |
| Actor - Context (Role): Administrator |
| Preconditions: Video recording should have started |
| Trigger(s): Start the recording |
| Main Course of Action:   1. Video recording must be initiated. 2. Object detection techniques to detect objects. 3. Detect dynamic objects. 4. Object Tracking algorithms. 5. Track the movement of objects. 6. Create alert. |
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