Software Requirements Specification

for

Traffic Monitoring System

Version <1.0>

Prepared by

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Revisions

| Version | Primary Author(s) | Description of Version | Date Completed |
| --- | --- | --- | --- |
| 1.0 | Full Name | Traffic Signal Management System is desktop application which will allow managing the traffic on a four way road. The system will consist of four signals on each road. The system will manage the signal timing according to the size of traffic on a road parallel to it. | 29/05/2022 |

# 

# Introduction

Our intelligent Traffic Expert Solution for road traffic control System offers the ability to acquire real-time traffic information. Traffic Expert enables operators to perform real-time data analysis on the information gathered. Traffic management measures are aimed at improving the safety and flow of traffic utilizing traffic capacity more effectively.

## Document Purpose

Smart traffic management is mainly improvised for looking after the set off data of a region to manage the traffic along the area and implement various useful technologies which are been required by various person like vehicle owners, pedestrian, police officers etc..Mainly the purpose of smart traffic management system is to give the details which can be used and they can be implemented in their daily life. The problem which has been occurred at their presence can be solved by this smart traffic.

## Product Scope

Smart traffic is a Video Analytics Module and provides Traffic Incident Detection, and real time Traffic Flow Metrics & statistical analysis. Smart traffic monitoring can integrate with third party traffic management and smart roadway systems and hosts a feature rich product scope itself. The system can be used for incident detection or for statistical metrics of a roadway.

## Intended Audience and Document Overview

* Traffic police: He co-insides with the remaining users to upgrade the complaints and implement it.
* Vehicle owners: They use the traffic data and implement when they require. If they have any complaint, they can provide.
* Admin: A person who is designated the whole dataset.
* Pedestrians: A person who use the dataset provide by the admin

## Definitions, Acronyms and Abbreviations

* HTML (Hyper Text Markup Language): It is used to create static web pages.
* JSP (Java Server Pages): It is used to create dynamic web content.
* J2EE (Java 2 Enterprise Edition) It is a programming platform, belonging to the Java platform, which is used for developing and running distributed java Applications.
* DB2 (IBM Database 2): It is a database management system that provides a Flexible and efficient database platform to raise a strong "on demand" business
* HTTP (Hyper Text Transfer Protocol): It is a transaction-oriented client/ server

## Document Conventions

All the videos should be in AVI format which is the common video format recognized by OpenCV. This dynamic system is completely hidden from the secondary users i.e. the public it has been created for. The database administrator (DA) has the rights of monitoring and halting  
the system only if the system has more setbacks than the anticipated value. In that scenario, the DA can easily stop the process and start the previous system. For maintenance to be done at regular intervals, appropriate timings should be fixed-when there is hardly any traffic (like in night etc). The DA can also analyze the system by keeping track of system log.

## References and Acknowledgments’

# Anderson, J. E. 2003. “Control of Personal Rapid Transit Systems.” Eektronikk, Vol. 99, No. 1, 108-116

# Bretherton, D., Bowen, G., Wood, K. 2002. ‘Effective urban traffic management and control –SCOOT VERSION 4.4’. Proceedings of European Transport Conference Proceedings Cambridg

# Christos Xithalis, 2008, PRT Hermes

# Overall Description

## Product Overview

In our proposed System, four cameras at one junction of a four-way road will be installed. Individual camera will monitor one lane. Cameras will continuously collect the recordings. A computer system which is centralized for the all four cameras will be connected with these cameras. By using Visual c++ software and Intel’s OpenCV video stream processing system, automatic vehicle detection and vehicle counting can be done. The analysis on the recordings should be parallel and synchronized for the effective decision making. The processed output which is number of vehicles is feed to the system which would be allocating resource to each lane using proposed adaptive algorithm.

## Assumptions and Dependencies

* The administrator is aware of the system workings and different attributes attached to it. The various configurations should be known to him/her. Since the result would be in terms of values, to monitor it properly, the DA should be aware of the significance of each value.
* She/he should also be familiar with Image Processing Domain

# Specific Requirements

## External Interface Requirements

### User Interfaces

* The design and layout of every form will be very clear and very interactive to the administrator.
* When the administrator opens the software, the welcome window will appear.
* From each window the user can easily go to any desired window so that there will be an absolute and relative linking and admin can monitor and track the process easily.
* There should be proper coordination between the different modules and that should also be maintained at the front end in terms of look and feel to the DA.
* In the screen layout, the background color is very light, and the graphics and font style will be in proper manner and well organized.
* The admin will be able to check out the logs anytime for identification of errors or lags in the system.

### Hardware Interfaces

Even the system administrator need not act as an interface. His/her only work would be to initiate the process. Afterwards, the management system takes over and it won’t stop unless stopped by an external force or system breakdown. Initiation would start from:

* Add the chosen traffic CCTVs whose recording is to be done. Analyze those videos and the format configuration for recording should be AVI format.
* Calculate timing information and give it to the signal systems

### Software Interfaces

An external firewall can be attached to the application in order to prevent unauthorized access to the system. Also, a user authentication- Login system should be there to identify the System administrator

## Functional Requirements

Functional requirements capture the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform.

Following are the required features of this project:

* The system will show the traffic on a road graphically.
* System will allow the vehicle owner and pedestrian to view road model graphically and view traffic situation.
* System will allow admin of the system to rewrite traffic data.
* System will provide interface to admin to control the flow of traffic i.e. manage emergency situation and reconfigure device.
* System will allow admin to adjust signal timing.
* According to the adjusted timing of signal the system should clear out the particular way and then the next route accordingly.
* By measuring the traffic lined up on road signal timings should be adjusted.
* According to the adjusted timing of signal the system should clear out the particular way and then the next route accordingly.
* There should be an emergency override that allows traffic authorities to remotely let go a particular signal in case an ambulance or important vehicle arrives on that way

## Use Case Model

|  |  |
| --- | --- |
| **Use Case Title** | View Traffic graphically |
| **Actor** | Vehicle Owner/Pedestrian |
| **Use Case ID** | 01 |
| **Description** | In this use case system will allow the user to view the road graph to view situation of traffic flow. |
| **Task Sequence** | 1. This use case starts when user wants to view the traffic situation. 2. User option to road graph. 3. System open road graph. 4. This use case end.   **Extend/include : None** |
| **Exceptions** | None |
| **Pre-Conditions** | User must open the application. |
| **Post Conditions** | Operation done successfully. |
| **Author** |  |
| **Modification History** | 1.0 |

|  |  |
| --- | --- |
| **Use Case Title** | View road model and traffic |
| **Actor** | Admin |
| **Use Case ID** | 02 |
| **Description** | In this use case admin will view the road model and traffic as graphically. |
| **Task Sequence** | 1. This use case starts when admin wants to view the road model. 2. System saves the operation. 3. This use case end.   **Extend/Include : None** |
| **Exceptions** | None |
| **Pre-Conditions** | User must open the application. |
| **Post Conditions** | Operation done successfully. |
| **Author** |  |
| **Modification History** | 1.0 |

|  |  |
| --- | --- |
| **Use Case Title** | Rewrite Traffic data |
| **Actor** | Admin |
| **Use Case ID** | 03 |
| **Description** | In this use case admin will rewrite the traffic data. |
| **Task Sequence** | 1. This use case starts when admin wants to rewrite the traffic data. 2. Admin option to road graph. 3. System open road graph. 4. Admin perform the rewriting operation and option to save. 5. System verifies and ask confirmation message. 6. Admin click ok to confirm. 7. System saves the rewriting operation. 8. This use case end.   **Extend/include : None** |
| **Exceptions** | None |
| **Pre-Conditions** | User must open the application. |
| **Post Conditions** | Operation done successfully. |
| **Author** |  |
| **Modification History** | 1.0 |

|  |  |
| --- | --- |
| **Use Case Title** | Control the flow of Traffic and Priority Vehicle |
| **Actor** | Admin |
| **Use Case ID** | 04 |
| **Description** | In this use case admin will have to perform the Traffic Control operation i.e. emergency management operation when critical and expected emergency situation like accident and also to reconfigure device. |
| **Task Sequence** | 1. This use case starts when admin wants to control the traffic. 2. Admin open to traffic flow. 3. System asks to perform the required operation. 4. Admin perform the control operation and option to save. 5. System verifies and ask confirmation message. 6. Admin click ok to confirm. 7. System saves the last performed operation. 8. This use case end.   **Include : Reconfigure device, Manage Emergency** |
| **Exceptions** | None |
| **Pre-Conditions** | User must open the application. |
| **Post Conditions** | Operation done successfully. |
| **Author** |  |
| **Modification History** | 1.0 |

|  |  |
| --- | --- |
| **Use Case Title** | Adjust Signal Timing |
| **Actor** | Admin |
| **Use Case ID** | 05 |
| **Description** | In this use case admin will Adjust signal timing during schedule signal operation. |
| **Task Sequence** | 1. This use case starts when admin wants to schedule signal. 2. Admin option to signal. 3. System asks to perform the required operation. 4. Admin adjust the signal timing. 5. System saves the operation. 6. This use case end.   **Extend/Include : None** |
| **Exceptions** | None |
| **Pre-Conditions** | User must open the application. |
| **Post Conditions** | Operation done successfully. |
| **Author** |  |
| **Modification History** | 1.0 |
| **Use Case Title** | Login |
| **Actor** | User/Admin |
| **Use Case ID** | 06 |
| **Description** | In this use case User/admin will login in the application |
| **Task Sequence** | 1. This use case starts when /User admin login in the application. 2. System saves the operation. 3. This use case end.   **Extend/Include : None** |
| **Exceptions** | None |
| **Pre-Conditions** | User must open the application. |
| **Post Conditions** | Operation done successfully. |
| **Author** |  |
| **Modification History** | 1.0 |

# Other Non-functional Requirements

## Performance Requirements

• The performance of the functions and every module must be well.  
• The overall performance of the software will enable the users to work efficiently.  
• System should give better resource sharing results.  
• Performance of the results and data application should be efficient and fast enough.

## Safety and Security Requirements

Since, these systems affect the daily traffic population, the system should be secure enough and shouldn’t allow intruders to make changes or install bugs in it. Only System administrator should be authorized to access, modify, halt and carry out any other functions.

## Software Quality Attributes

• Availability

System should be available every time and on every window it should support.

• Reliability

System should be reliable enough to satisfactorily the performance.

• Supportability

It should provide support to user to easily access all the pages without much effort and it should be capable to update and maintain in future.

• Maintainability

System should be easily maintainable. It should be flexible enough to stand with change and exceptions. The system should also handle new requirements. It should have capability to maintain in new environment.

• Usability

System should be user friendly and should provide informative error message to inform user when something goes wrong

• Security

Security is the main issue. System should be safe and ensure the security. It will ensure secure transfer of data.

Appendix A – Data Dictionary

Appendix B - Group Log