Software Requirements Specification

For

Real-time Clothing Classification System

Version 1.0 approved

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# Introduction

## Purpose

*This System Requirement Specification (SRS) aims to provide the readers and users information about the system and its functions and specifications. SRS describes the data, functional and behavioural requirements of the software. This will make it easier for the users to control and manage the use of Real-time Clothing Classification System (RCCS).*

*RCCS is designed to replace the traditional storing and updating of information regarding the clothing of people. It shall reduce the costs associated with manual recording and updating such as, reporting delays, mismanaged conflicts and other inconsistencies in the information. It shall also be a ready source of trend information. Moreover, it shall improve the efficiency and it shall also maximise the productivity of the users because of its convenient usage.*

## Document Conventions

The Times New Roman is the official font for headings and sub-headings with font sizes 17 and 14 respectively. The descriptions are provided in Italics Arial font at 11pt font size. The bold fonts are of higher priority that the normal font. The sub-headings are provided under the main heading with conventions such as 1.x, 2.x, and so on.

## Intended Audience and Reading Suggestions

*The intended readers of this SRS are application developers. These developers can use the system as a means of collecting information about different clothing. Reading the general descriptions before proceeding to the specific requirements would help the readers easily understand the background behind the functions of the system.*

## Product Scope

The system has been developed to provide the application developers, strategy-makers, and retailers assistance in handling information about their customers needs. It will allow the users to effectively administer the consistent demand of its clients.

The system allows use of a regular web-camera to be used to analyse clothing of people and classify it into various categories by colour and pattern. Since it is a real-time system, it captures data from a live feed. The RCCS can be used with security and surveillance cameras in malls, allowing us to track the clothing trends of people over a period of time. This will help retailers judge what products are more favoured by customers.

RCCS can be used to generate metadata or tags for clothing in the backend, for e-commerce websites such as Flipkart, Myntra, etc. The system will automate the process of adding tags and will hence improve efficiency.

The system can also be used to enhance personalised experience of online shoppers, by keeping tab of their likes and clothing choices, while they sit and home and search for clothing online.

If integrated with social media websites and forums, such as Facebook and Instagram, the system could be trained to recognise people and determine their clothing choices. This information can be used to suggest and advertise clothing.

Additional attributes, such as gender, skin colour, type of clothing, mood etc. can be added to the system based on various needs of the users.

# Overall Description

## Product Perspective

*The software is a new, independent product. Although with a few modifications, it could be used as. a component of another program. It is intended for the administration of the malls and other concerned users. The product will export its data to a Microsoft Word file and use the Visual Studio 10.0 for its integrated development environment.*

*This information can be viewed by anyone who has access to the Microsoft Word file. Errors are minimised through the use of a single video feed, along with display of output, eliminating the use of text input. The product specified will be developed for Microsoft Windows XP, Microsoft Windows 7 and Microsoft Windows 8. It requires only a webcam, as hardware, to function. Since webcams are part of most laptops and smartphones today, our system doesn’t require any external hardware.*

## Product Functions

*RCCS is a program designed to assist retailers who deal with crowds each day, and to help manage their customers’ clothing data in an orderly manner. It shall perform the following functions:*

* *Accurately recognises colour of shirt and trousers of customer, according to 13 pre-defined colours.*
* *Determines pattern of clothing as horizontal stripes, vertical stripes, checks, abstract pattern or plain pattern.*
* *Uses only a regular webcam for capturing frames. Cost of additional hardware is reduced as there is no need for 3D webcams or infrared cameras.*
* *Easy to use and install into existing systems.*
* *Once system is started, no human involvement is required. Frames are captured automatically.*
* *Simultaneous recognition of multiple people in a frame.*
* *Recording of entries in a Microsoft Word file.*

## User Classes and Characteristics

*The following are the target users of RCCS:*

* *Retailers/Managers:*

*The primary target users of this software are the managers and retailers of various malls and clothing stores. They are responsible to keep up the sales in the store, whatever may be the season or trend, thus, they will be the most frequent users of this software. They must possess computer literacy and analytical skills so as to use the software and make good use of the information provided by the same. They will use it in monitoring what their head has accomplished and what still needs to be done.*

* *Application developers:*

*The application developers shall also have access to the software. These people are assumed to be familiar with basic computer processes that will enable them to use this software. Their aim in the use of this software is to access existing clothing information, use this system as part of a bigger application. Furthermore, they shall also use it in times when they need information as input for other applications.*

## Operating Environment

The RCCS shall operate on a Windows environment. For a model we are using it on Windows 7.

## Design and Implementation Constraints

*The system should be able to work on a regular web-camera. Although, this reduces the capital investment greatly, it can also affect the accuracy of the system, since the colour and pattern detection depends greatly on the quality of the image captured by the webcam. Thus, the resolution of camera plays an important role. The lighting conditions also play a large role in the accuracy of the system. There should be ample light falling on the person for the system to detect the colour and pattern correctly.*

## User Documentation

*The system shall provide a detailed manual that describes and illustrates all system functions.*

## Assumptions and Dependencies

*The final classification of the clothing depends largely on the lighting conditions in the installation area and the position of the person. The system is designed only to accept faces if they are facing the camera. The colour and pattern detected by the system also depends on the resolution of the webcam; Higher the resolution of the camera, better is the accuracy of the system.*

# External Interface Requirements

## User Interfaces

The interface of the software provides a single video feed, on which people are detected and clothing is labelled. The detected faces and clothing will be marked by a red coloured square, to improve visibility. Once the system is started, there is no need for human involvement. The system is self sufficient after that. With all these, target users of this software will relatively find it not difficult to use it.

## Hardware Interfaces

To be able to run the system, the minimum requirements of the hardware for this system are:

CPU 2.0 GHz or CPU (laptops) Core 2

CPU (desktops) RAM 2 GB RAM

HDD 60 GB min

7200 RPM6 GB or at least 10% free space (whichever is greater)

Webcam (preferably HD)

The hardware used must have a competent firewall to secure the data in the system.

## Software Interfaces

The system was developed to serve as a database for the clothing in a mall. It is a stand-alone system; hence, it does not need an internet connection. However, the system requires minimum specifications for the software interfaces to be able to use it efficiently.

The operating system (OS) required in order to use the system is at minimum Windows XP, but may also be Windows Vista, or Windows 7, or Windows 8. Microsoft Visual Studio 10 and Microsoft Office 2010 must also be installed to their devices. These two application software were used to make the database, thus, having them in the computers will make the system proceed successfully and run error-free.

## Communications Interfaces

Communication interface is not needed as this software is a stand-alone system.

# System Features

## Labelling of attributes

4.1.1 Description and Priority

This feature will label all the attributes such as, colour of shirt and trousers, and the pattern on the shirt. These attributes are labelled only after the face is found using Haar cascades and marked in the frame. This feature shows the real-time result on the screen and improves the user experience. Hence, it has a medium priority.

4.1.2 Stimulus/Response Sequences

There are no response sequences for this feature.

4.1.3 Functional Requirements

*REQ-1: The software must be able to correctly identify the face of the person. If the person is not facing the camera, then their face will not be recognised.*

*REQ-2: The square box surrounding the features of the person in the frame should be easily visible in the window. Thus the colour red has been used.*

## 4.2 Report Generation

4.2.1 Description and Priority

*This feature will create a portable document format of the records. This will help to take print of all the details.*

4.2.2 Stimulus/Response Sequences

*Option will be provided to save the document in doc/docx format.*

4.2.3 Functional Requirements

*REQ-1: The default location mentioned must be correct.*

*REQ-2: If the administrator wishes to change any of the details of clothing, the file must be opened only after stopping the video feed. The system should be started only when the file is closed.*

# Other Nonfunctional Requirements

## Performance Requirements

Although the system is a simple one, a literate manager who is able to understand simple computer processes is needed to run the system. A manager is one who is knowledgeable about the ins and outs of the store and is learned in the field of retail. The manager will be the person to view the data collected into the system, thus a manager needs to be efficient to utilise fully the benefits that can be provided by this software. The system also needs Microsoft Office 2010 for the file management system.

## Safety Requirements

*Different information is entered into the database such as information about the different colleges, volunteers and participants. Mismanagement of information might cause participant dissatisfaction that will eventually lead to profit loss, only because of mistakes on giving information.*

## Security Requirements

The system Microsoft Word file should be accessible only to the manager of the store. If it is accessed by anyone, the information can be tampered with and the reliability of the data will come into question. The file should thus, be password protected.

## Software Quality Attributes

Correct information must be entered into the system to prevent mismanaged conflicts to occur. This will make the information provided by the system to be reliable and useful. However, in case an error occurs, changes may be immediately effected provided the user notices the error. This is why periodic monitoring and run-through of the database and the system must be done. The target users of the system are deemed to understand basic computer processes so use of this system will be easy for them. They will not need to undergo rigid training and instruction in order to use the software.

# Other Requirements

Since trends change every few months, the database must be stored in the form of a Microsoft Word document and then erased once a particular period is over. This allows a fresh database to be used each time without losing previous records permanently.