Software Requirements Specification

SUPERMARKET MANAGEMENT SYSTEM

SUBMITTED BY

Komma Sai Krishna Kumar

Table of Contents

1.Inrtoduction

1.1 Definition .........................................................................................................................................

1.2 Purpose ............................................................................................................................................

1.3 Scope ......................................................................................................................

1.4 Survey..........................................................................................................................

1.5 Abbreviations ......................................................................................................................

1.6 Overview...................................................................................................................................

2. Requirements................................................................................................

2.1 Functional Requirement……………………………………………………………………………………………………………

2.2 Non-Functional Requirement…………………………………………………………………………………………………….

2.3 Specific Requirements……………………………………………………………………………………………………………….

2.4 User Functional Requirements…………………………………………………………………………………………………

3.Overall Description………………………………………………………………………………….....

3.1 Product Perspective……………………………………………………………………………………………………………………

3.2 Product Functionalities……………………………………………………………………………………………………………

1.Intruduction

1.1 Definition

Problem Definition In order to define the problem, one should imagine a scenario in which a standard customer enters to a supermarket. When a customer enters to a supermarket, he finds himself in a huge, crowded environment that has lots of rayon and messy amount of products. For a customer to achieve his purpose he should make a lot of effort at the same time such as finding the exact places of the products he is searching for, while he is trying to carry the products that he is willing to buy and pay attention to his surroundings such as other people. We intend to solve this problem which is making shopping easier for an ordinary customer by improving the interaction between the customer and his environment. In other words, the real-world problem which this project aims to handle is to collect information from the surrounding area without any effort by a standard user, namely customer in a supermarket. The desired information to be collected is expected to consist of finding the locations of the desired products, and classifying the products according to their costs and different other categories in huge supermarkets

1.2 Purpose

This document aims to specify the requirements for Supermarket management system that implements augmented reality, and to give detailed information about features of the resulting application, interfaces of the application, and what the application is capable of. It will explain the scenario of the desired project and necessary steps in order to accomplish the task, such as overall description of the project, the definition of the problem that this projects presents a solution, and definitions and abbreviations that are relevant to the project. One of the main purposes is to establish the basis for agreement between the developers and the suppliers on what this project is to do. The preparation of this SRS will help consider all of the requirements before design begins, and reduce later redesign, recoding, and retesting. The review of SRS can reveal omissions, misunderstandings, and inconsistencies early in the development cycle when these problems are easier to correct..

1.3 Scope

The project which is going to be presented in this document is called Fresh Supermarket Application. This application is planned to be used by any person who is willing to do shopping in huge supermarkets. It is designed to run on a hand-held mobile device connected to a head mounted display. By the application, the real-world scene captured in the supermarkets will be enriched by the information obtained from the real-time inputs which allow customers to do an interactive shopping. The application will start to run by the desire of the customer. First, the customer using this application is expected to choose from the products which are defined and listed previously in the application database. After the customer chooses the demands and lists them, the application interface will change into a real-time camera which is capable of 5

1.4 Survey

The previous projects which are also a solution to a real-world problem mostly rely on the single images, not on the videos, so they are not real time applications. Related to shopping, there exists a project which recognizes the furniture patterns and puts them on the image of room for the customer to see whether it’s suitable for their room or not. Although this project is related to shopping and helps the customer, it does not include augmented reality, instead, it uses the taken image of the room and then puts the recognized furniture on the screen. Hence, this project is not real time. However, the presented project in this report is a real time project which combines both image processing and augmented reality concepts by an interaction with the whole environment aiming to be a solution to a real-world problem. The potential users of the explained application are everybody who do shopping and wants to find a desired product in an efficient way without losing much time and without paying lots of attention.

1.5 Abbreviations:

Software Requirements Specification AR: Augmented Reality, a term for a live direct or indirect view of a physical real-world environment whose elements are augmented by virtual computer generated sensory input such as sound or graphics. OpenCV: Open-Source Computer Vision Library IDE: Integrated Development Environment GPS: Global Positioning System, is a space-based global navigation satellite system that always provides reliable location and time information in all weather and and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites. Head Mounted Display: a display device, worn on the head or as part of a helmet, that has a small display optic in front of one or each eye. ER: Entity – Relationship Diagram, a specialized graphic that illustrates the interrelationships between entities in a database. ER diagrams often use symbols to represent three different types of information. Boxes are commonly used to 8 represent entities. Diamonds are normally used to represent relationships and ovals are used to represent attributes. GUI: A graphical user interface, a type of user interface that allows users to interact with programs in more ways than typing such as computers. UML: Unified Modelling Language, a standardized general-purpose modelling language in the field of software engineering.

1.6 Overview

This document contains a detailed description about Supermarket management system. In the introduction part, it mostly gives a general overview about the project including the definition of a real-world problem that project intends to solve, the scope of this project, and the information about similar projects and how they differs from this project. Also in this part, the purpose of the SRS and the scope of the project are explained. Second part of the document is the overall description of the project. This part explains the product perspective of the application, the functions included in the application and the constraints, assumptions and dependencies of the desired application.

2.Requirements

2.1 Functional Requirements

Functional requirements of this application can be categorized in two parts, namely user functional requirement, the functions called with the user activity, and device functional requirements, the functions called automatically.

2.2 Non-Functional Requirements

Non-functional Requirements I. Performance requirements This application will be used by a single user. There will be no multiple user handling since the application runs on a single portable device without needing any network. The amount of the input maybe huge since the input data of the application depends on the number of products. Interest objects may be more than one at the same time, that the software must handle multiple object recognition with the barcode. The major issue here is the application should answer in real-time, namely, the recognizing and labelling operations must be handled in less than 1 second.

2.3 Specific Requirements

Specific Requirements The specific requirements of this project will be considered in following three subsections, which are interface, functional and non-functional requirements. III.1. Interface Requirements The interface of the application will be a simple start menu at the beginning and then turn into a real-time camera mode with enriched data. When the user starts the application, this act will call the function Start (), and this function will bring the product selection mode on the screen. The user will be able to move around between the columns, left and right, and inside the columns, up and down. The user will be able to call the function Add Product () by choosing an entry in the first column, this function call will result in adding the product into the second column, namely the demand list of the customer. The user will also be able to call the function Delete Product () by deselecting with the help of control buttons, and this function will result in removing the product entry from the demand list of the customer. When the customer is done choosing the products that he wishes to buy, he will be able to save the list by pressing the save button with the help of control buttons and this act will call the function Load () and move to the camera mode.

2.4 User Functional Requirements

Start application Description: The user shall start the application. Assumption: The application is loaded on the device. How: By running the application. III.2. ii. Product Selection Mode Handler Functional Requirements Add Product Description: The user shall add the product to the list. Assumption: The list is already defined and displayed on the screen. The screen is on menu mode, it is not displaying the output of the camera yet. How: The user adds the current product to the list. Delete product Description: The user shall delete the product from the list Assumption: The list is already defined and displayed on the screen. The screen is on menu mode, it is not displaying the output of the camera yet. How: The user deletes the current product from the list.

3.Overall Description

3.1 Product Perspective

Product Perspective Fresh Supermarket Application is totally an independent application which is not related to any other system and not a component of a larger system. This application has only one type of user, and thus there is no functionality differences between users. Thus, has one type of user interface. The interface of the application has a 8

starting menu, which consists of a list of predefined products that the supermarket provides. The interface allows the user to choose from the products. After the choice, the interface changes into a real-time camera scene, and until the user quits the application, the interface remains as a video. This video consists of the real scene enriched by surrounding information by labelling in terms of augmented reality. The interface quits by the demand of the user. In terms of hardware, we’ll use a portable device with a camera, display screen and control buttons connected to it. We will be recognizing the data which is captured by the camera and the screen will display that captured video with augmented reality labels. In terms of software interfaces, this application will run on Windows 7 Operating System, and it will be implemented making use of Eclipse IDE with OpenCV plug-in integrated on it as a mathematical package. OpenCV is a fast library which is appropriate for real-time video input-outputs.

3.2 Product Functionalities

The major functionalities of our application are:

 Creating Lists from the Products -The program allows user to choose the products that he wants and adds them to the list or delete the products that he does not want from the list.

 Object Detection-The program detects predefined objects according to their shapes and colours.

 Real-Time Object Tracking- The program tracks the detected objects in real time even if the orientation of the camera changes. 9

 Labelling- The program can label the detected objects according to their features like wanted, on-sale, high-quality and popular.

THE END