SOFTWARE REQUIREMENT SPECIFICATION (SRS)

Pixlar - Online Photo Editor

Version 1.0

Anas Hassan Ansari (CS-20065)

Farrukh Ahmed Siddiqui (CS-20090)

Syed Muhammad Hamza Naveed (CS-20119)

Department of Computer and Information Systems
NED University of Engineering and Technology

Submitted to
Sir Kashif Asrar

December 12, 2022

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Chapter 1

Introduction

Pixlar – Online Photo Editor is a online easy to use photo editing tool which can benefit each and every individual from a young teenager to a professional photographer starting a new job.Photo editing is the act of altering an image.Photo editing refers to modifying or improving digital or traditional photographic images using different techniques, tools or software. Images produced by scanners, digital cameras or other image-capturing devices may be good, but not perfect. Image editing is done to create the best possible look for the images and also to improve the overall quality of the image according to different parameters. In this modern era it is almost everyone's goal to capture the aesthetics of this alluring world but to make the images even more majestic, Pixlar assists in recreating your dream images a reality. In this section a brief overview of the software which includes the product purpose , scope, acronyms and abbreviations along with certain conventions would be discussed in detail.

1.1 Document Purpose

Editing helps you get the best image possible, as close to what you imagined when you took the photo (or better perhaps)and you can share those amazing photographs on social media and showcase your skills. Niche photographers can hone and emphasize their personal style.There is a choice between doing it yourself and still craving for that certain look' or simply asking a veteran picture editor to use his talent.With the existing number of image modifying programs the task is simpler.

Therefore, the purpose of this photo editing software is to facilitate businesses as editing helps cement branding and attract traffic. Hence, Pixlar strives to be of use to every user whether they are a professional photog-

raphers working for any organization or a collage students looking to make their photos aesthetically pleasing.

1.2 Product Scope

Pixlar has been designed to have a simple and user friendly interface keeping in mind the requirements and needs for the modern generation.Some of the key highlighting features of pixlar include:

- changing contrast of image
- adding text/different annotations like stickers on images
- applying different filters on images

Pixlar main objective is to promote advancements of digital photography and image recreation in the business sector. Pixlar targets certain industries namely the media and film industry. Pixlar has introduced an infinite number of more possibilities to enable it's users to showcase their skills and helping them unraveling their imaginations. Today, with the creation of Pixlar - Online Photo Editing software, you can recreate with a click all the main techniques used in the present, but with a little more knowledge and practice, you can achieve limitless results.

1.3 Intended Audience and Document Overview

Pixlar's target audience include all such photographers that would want an efficient photo editing tool to edit images from events such as weddings, anniversaries, graduations, celebrations and business events such as conferences or award ceremonies. This photo editing tool may not be limited to just photographers but to the young generation that would want to make their social media pages more aesthetically alluring. But our main target audience is within the business sector some of which include :

1. Product photographers working with e-commerce companies since the quality of the image directly affects people's opinion of the product and sales numbers.
2. Editorial photographers working for newspaper and magazine publishers, providing images to illustrate news stories and feature articles.

3. Manufacturing companies, marketing agencies and design consultancies buy industrial photography services. They need images of products or production processes for use in marketing communications or on websites.

4. Advertising agencies hire photographers to shoot images for advertisements that appear in newspapers, magazines or billboards.

5. Sports photographers shoot live action at games and sell their images to newspaper and magazine publishers, or to the clubs hosting the games.

The rest of the SRS is organized as follows:

- Chapter 1 starts with the general introduction of the specified product. It includes the purpose for creation followed by scope , it's intended audience , a glossary of terminologies to better understand the SRS. Finally ending with the SRS development tools and references.

- Chapter 2 is about the overall description of the product. It includes all the functionalities, DFD-diagram, details about user and operating environment with constraints, assumptions and dependencies the application is based upon.

- Chapter 3 contains the specific requirements of the application including External Interface Requirements such as User Interface and Hardware Interface along with the core functional user and system requirements. At the end, the behavior requirements are also present which also contain the use case diagram.

- Chapter 4 is about all the other remaining no functional requirements regarding performance, safety and security. It also includes the software quality attributes which determine the quality services for the application.

All the chapters define the same product in the entirety of this document but are intended for different audiences to cater their needs and hence use different information and language in each section.

1.4 Definitions, Acronyms and Abbreviations

- Editor : a person who edits, or selects and revises, material for publications, films, etc.

- Tool : any instrument of manual operation.
- Photographer : a person who takes photographs, especially one who practices photography professionally.
- Parameters : a limit or boundary which defines the scope of a particular process or activity.
- Annotations : a critical or explanatory note or body of notes added to a text.
- WYSIWYG : (acronym for "what you see is what you get") of, relating to, or noting a screen display that shows text exactly as it will appear in printed output, including underlining, various typefaces, as italics, line spacing, end-of-line breaks, and paragraph indentations.
- DFD : Data Flow Diagram
- GUI : Graphical User Interface
- Browser : an application program that provides a way to look at and interact with all the information on the World Wide Web.
- Database : A systematic collection of data that is set up for easy access, management and updating.
- OS: Operating System.
- BLOB: Binary Large Objects format usually used for images in databases.
- JPEG: Joint Photographic Experts Group file format used for images.
- JPG: Same as JPEG.
- PNG: Portable Networks Graphic image format which usually has no background.
- BMP: Bitmap image file usually used for 2D photos or icons.

1.5 Document Conventions

The Latex software, a document preparation system, was used to create the SRS. The writer does not use the prepared text featured in WYSIWYG word processors when writing; instead, they use plain text since the document is displayed as a pdf and you write in a separate text editor. LaTex is preferred due to it's faster and efficient documentation.

1.6 References and Acknowledgments

1. "SOFTWARE ENGINEERING" by Ian Sommerville (10th Edition, PEARSON Education)

2. "SOFTWARE ENGINEERING A Practitioner's Approach" by Roger S. Pressman (7th Edition, McGraw Hill International Edition)

3. "SOFTWARE ENGINEERING" by Vikram Bali and Shivani Bali (S. K. Kataria and Sons)

Chapter 2

Overall Description

2.1 Product Perspective

The Pixlar - Online Photo Editor is a new, self-contained system, which would be useful for the person wanting to edit his image free of cost. A person, by signing in his account, can access all the editing tools along with the images that he previously wished to be stored within the application.

2.2 Product Functionality

Given below are the major functions that can be performed using Pixlar – Online Photo Editor. Moreover, a Data Flow Diagram (DFD) for better understanding of the system is also given. The system will:

- Allows the user to crop the image.
- Allows the user to rotate the image clockwise and anti-clockwise.
- Allows the user to increase or decrease the brightness.
- Allows the user to change contrast of an image.
- Allows the user to add text over the image.
- Allows the user to add different annotations like stickers on the image.
- Allows doodling with which user can draw anything on the image.
- Allows the user to apply different filters.
- Allows the user to save the image in its database.

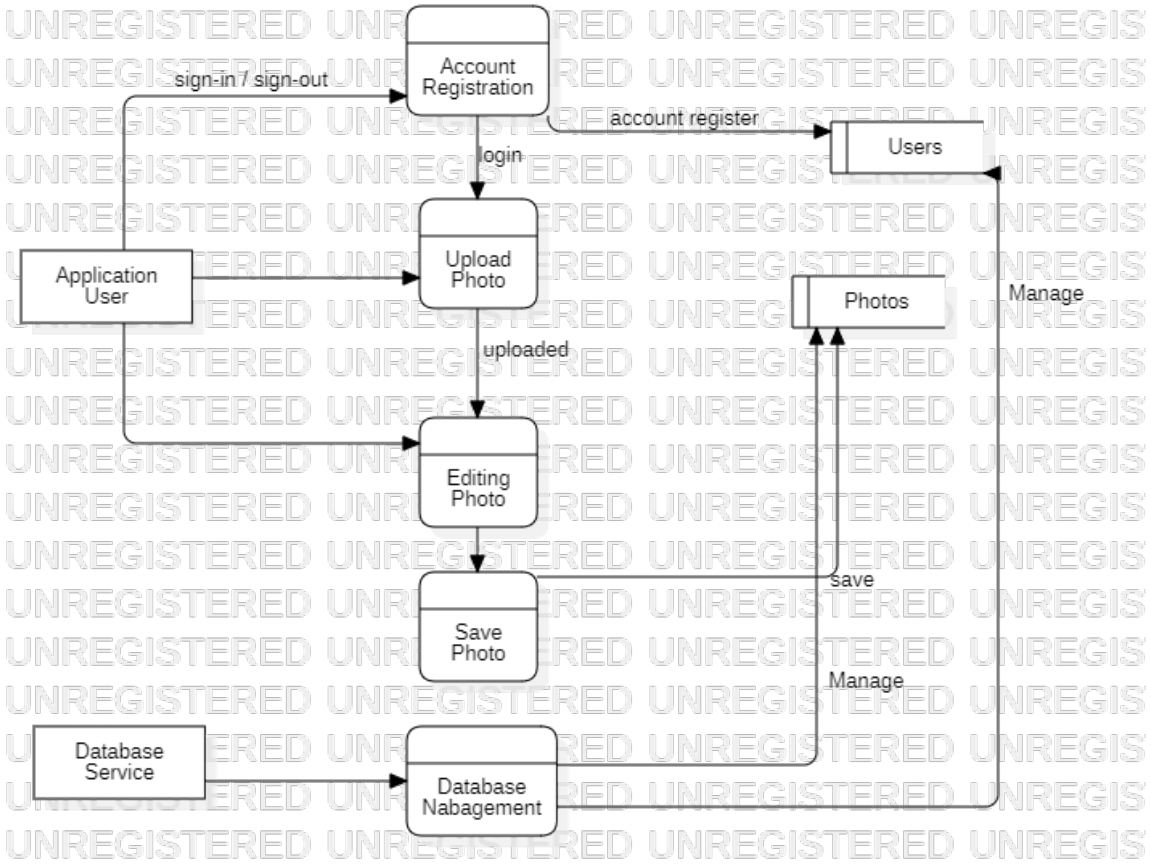

Figure 2.1: Data Flow Diagram

2.3 Users and Characteristics

2.3.1 Unauthenticated User

An unauthenticated user is a user who have not created any account on this system. This user will be permitted to use full functionality of the system and will only be able to just use crop and rotate features.

2.3.2 Authenticated User

An authenticated user is a user who have logged in with his account. He can use all the functionalities of the system.

2.4 Operating Environment

The web based Pixlar – Online Photo Editor can be used anywhere on all the browsers working on windows operating system. However the system is not familiar with touch based devices. There should be no time constraint i.e. it should work 24/7. Continuous service is preferred, minor service interruptions can be tolerated.

2.5 Design and Implementation Constraints

2.5.1 Memory Constraint

A user should be able to store not more than 500mb files within the environment of the system.

2.5.2 Browser Constraint

User must have installed browser on his PC to use this system. If user doesn't have any browser installed then he should first install the browser. The browser must support JavaScript.

2.5.3 Database Constraint

Oracle Databases are used in this system. This database is locally stored for the time being. We can use cloud database if we want to host this system on the internet.

2.5.4 Input Device Constraint

A mouse and keyboard are necessary to interact with the application. Touch screen mode is not available.

2.6 User Documentation

No complex knowledge of computers are required to run the system every individual can use this system. The GUI is very friendly with buttons for each of its functionality so it could be easily understandable by the user. However the basic knowledge of the image editor tools should be required which are although not necessary as the user can revert the changes made to an image.

2.7 Assumptions and Dependencies

2.7.1 Assumptions

- A major assumption is that user should be able to edit limited formats of images. These formats include jpg/jpeg, png and bmp. Image of any formats other than these will give an error message of unsupported format.
- An email can be used to create at most one account i.e. no user can create more than one account from the same email.
- A user can only crop and rotate the image if he is not logged in. Only the users who have created account on the system will be able to use all the available features.

2.7.2 Dependencies

This system is highly dependent on browser. The browser must be installed on the computer with stable power supply or with a charged battery.

Chapter 3

Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

The main customer interface will consist primarily of a single home page that will present all the options available for editing to the users. Other than that there will also be popup windows that will enable the users to login or sign-up for the application. The detailed layouts are as below:

1. **Home Page** This is the main operating page. On this page, options are presented in the form of a control bar located at the top of the page. Below the controls bar, the image being edited is shown as an interactive preview of the output that the user would get after saving. The controls bar is populated with different buttons and sliders that will make use of the functions defined in order to manipulate the image along with the option to upload an image for editing as well as save the image that has been edited.

2. **Login/Sign-up Popup** This is a popup window/ page that will let the users sign-up for an account or login to an already existing account in order to use the application as a registered user. This will enable the users to save their images on the database and also get a history of the images that have been edited in the past by that user.

The canvas on the main page previewing the image being edited will be on a fixed size to fit the window and would otherwise be re-sizable for other functions such as cropping, but still the canvas has a lower constraint on its height and width as to remain visible.

3.1.2 Hardware Interfaces

There are no hardware interfaces in our application as Pixlar is a lone standing software application making use of only digital resources and hence does not require using any hardware component.

3.1.3 Software Interfaces

- For database services, the application uses oracledb library for Oracle database connection inside Python.
- The application is able to run on any Windows operating system supporting Python 3 and it's related libraries -preferably on Windows 10- and other OS including various Linux distributions.
- The images can be exported to the database and saved through files in the formatting of BLOB.
- The files inputted to the application can be in the form of several popular image formats like JPG, JPEG, PNG, BMP.
- The image editing functionality is obtained from the Pillow library which is an openly available and up to date fork of the original PIL library used for image manipulation.
- The advanced editing options such as filtering and transforming through interpolation is achieved from opencv library which is a popular open source library of Python for computer vision implementations.

3.1.4 Communications Interfaces

Pixlar is an online image editor so it requires internet to maintain connection with the database and the server. Also, the application works on an internet browser using HTTP standards for a website. The application is also able to use email services to allow the users to register their accounts. These accounts and their credentials are encrypted using standard encryption services for Python to ensure complete account security.

3.2 Functional Requirements

3.2.1 Main Page

User Requirement

The user will view the home page of Pixlar.

System Requirement

The user will click on any of the available buttons or adjust any given slider on the main page. After performing an operation the new preview of the image is generated on the canvas with the updated view of the image.

3.2.2 Login/Sign-up

User Requirement

The user will select the menu option to login or sign-up.

System Requirement

The application will show a popup window showing the necessary text fields required for logging in or registering as a user.

3.2.3 Curves Adjustment

User Requirement

The user will interact with a slider related to hue, saturation, brightness or the RGB components.

System Requirement

The application will change the respective setting curve of the image to match the respective slider value with the image and preview the image with the new adjustment value.

3.2.4 Add Annotations

User Requirement

The user will select the menu option to add text boxes, stickers or markdowns (doodling).

System Requirement

The application will show their annotation being added and its current position on the image as a preview allowing the user to adjust its parameters to suit their needs and then allow the user to commit their added annotation.

3.2.5 Filtering

User Requirement

The user will select a desired filter.

System Requirement

The application will show the preview of the image with the filter applied on it and show the options of committing, reverting or changing their applied filter.

3.2.6 Transforming

User Requirement

The user will select the menu option to resize or rotate their image.

System Requirement

The application will show the preview of the cropped or rotated version of the picture and allow the user to commit their changes.

3.3 Behavior Requirements

3.3.1 Use Case View

Main Page Use Case

The user opens up Pixlar and is greeted by several different options for image editing. This use case extends into 4 more use cases and includes 1 use case:

Login/Sign-up Use Case

The user logs in their account or registers a new account and is then taken back to the home page.

Curves Adjustment Use Case

The user changes the value on a slider and the preview is updated to show the new resulting image.

Add Annotations Use Case

The user presses the button to add a text box or other notation and the newly added component is added to the image.

Filtering Use Case

The user selects a filter from a list of available filters to apply and the filtered image is shown in the preview.

Transforming Use Case

The user selects one of the options to transform the physical aspects of the image and then the changed image is shown as output preview. This is a dependent on Main Page Use Case.

Save Image Use Case

The image being edited by user is saved in the database to keep track of the current progress made in editing provided the user is registered.

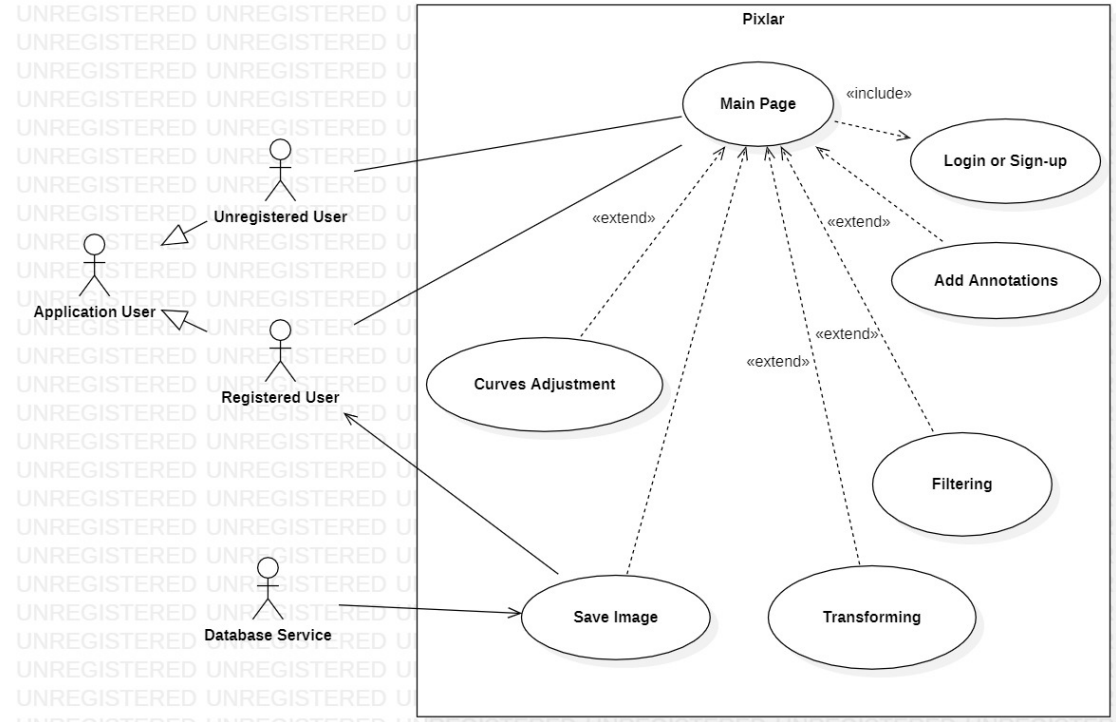

Figure 3.1: USE CASE DIAGRAM

Chapter 4

Other Non-Functional Requirements

4.1 Performance Requirements

Pixlar is an image editing software, so the primary performance requirement is related to storage capacity:

- The images passed to the application must follow the storage constraint of maximum 500 MB storage space available per user.
- Before the application takes an image for input, it would estimate the output image size since the size of output image would consume around the same space as the input.

Since the application would produce real-time previews of the output image, high speed of responses along with low execution times are the second major performance requirement:

- The time taken to produce the preview must be under a second to keep up with the user constantly changing the value.
- The time taken to perform or apply any visual filter must not take any longer than a second to keep up with the rest of the system.

4.2 Safety and Security Requirements

Safety

The only safety requirement of this application is regarding the visuals which may produce flashing images and cause epileptic seizure to some individuals.

WARNING: If you experience dizziness, altered vision, eye or muscle twitches, loss of awareness, disorientation, any involuntary movement, or convulsions while using this application, please immediately discontinue the usage and consult your doctor.

Other than that, there are normal safety requirements which are the same for using a computer such as prolonged usage may put severe strain on the user's eyes.

Security

There are no security requirements for this application since it is a free application built solely for academic purposes and no personal data is being stored or collected. Hence there is no necessity for a login id and password for every user and all clients can freely access its services. However, some features will only be unlocked upon registration such as database image saving. It is a closed source software therefore necessary actions need to be taken to ensure that the source code for the tool is secure from hackers since any change might hinder the working of the tool which can lead to a nuisance for the clients.

4.3 Software Quality Attributes

4.3.1 Adaptability

The database and other features of the application can be changed to suit varying user requirements.

4.3.2 Availability

The application is able to run 24/7 and is able to operate at any given time as it is does not require any server.

4.3.3 Interoperability

The application is able to run across a wide variety of operating systems and devices through the web services.

4.3.4 Portability

The application can be easily installed and run on devices by just getting the copy of the application in the system and would require no special installations.

4.3.5 Reliability

The application is guaranteed to produce a consistent and accurate result regardless of the number of users operating the system.

4.3.6 Maintainability

The application is easy to maintain in case of any new function implementation or correcting any existing feature.