Requirements Document Revision 0
Liquid Rescaling

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1 Revision History

Table 1: Revision History

Date	Developer	Changes Made
October 6, 2017	Whole Team	Initial draft
November 22, 2017	Whole Team	modified the project drivers
November 24, 2017	Whole Team	modified the Technologies Section
November 24, 2017	Whole Team	modified the Functionality
December 2, 2017	Whole Team	modified the Non Functional Requirements (Installability and Portabil

2 Project Drivers

The purpose of Liquid Rescaling is to allow the user to perform content aware image resizing on an image of choice. Many people make use of photo editing everyday. However the main stakeholders of this project will be teenagers and young adults since they are more invested in all of the social media platforms of today. This program shall be usable by people of all ages. Another stakeholder in the project are existing photo editing companies like GIMP.This program will only function on Linux operating systems since it will be developed using Visual Studios Code. Throughout the documentation of this project the name liquid rescale and rescaling algorithm will be used. These two names are synonyms for the algorithm used in this project.

Table 2: Terminology

Terminology	**Meaning**
Content-Aware Image Resizing	A method of resizing images that avoids the distortion of the main features in the image.
Seam Carving/Liquid Rescaling	Interchangeable names used to refer to the algorithm that performs content-aware image resizing.
GIMP	GNU Image Manipulation Program. An open source photoshop-like image editing application.
Visual Studios	An integrated development environment (IDE) developed by Microsoft. Used extensively for building computer programs for Windows operating systems, web applications, mobile applications, etc.
Git	A version control software that provides an easy way to manage versions of the project.
Library	An external software module that contains code that can be accessed via an API to accomplish a desired task.
API	Application Programming Interface. Documentation that describes the set of instructions that can be used to communicate with a library.

3 Scope

The advancements in imaging and video technology, brought about an era where people strived to find more effective and efficient solutions to rescale images. Today people consume an enormous amount of information, the consumption of videos and images are the most rapidly growing. Image editing algorithms such as a Liquid Rescaling algorithm are now more important than ever before due to the consumption of images and videos via social media platforms (like Facebook, Twitter, Instagram and Snapchat). Because social media platforms are such an intricate part of all our daily lives it is very important for people to be able to manipulate images to their liking. This is why tools such as the GIMP Liquid Rescaling plug-in play a major role in all our lives. The users range from children to older adults and as such creating a liquid rescaling application with an effective user interface is very important.

The scope of the project is to use the open sourced library to make an application that removes or preserves aspects of an image. The program should also be able to use content aware scaling to enlarge or shrink an image. The program will have an attractive and efficient user interface that is more intuitive than the GIMP implementation of this software.

4 Project Issues

4.1 Potential Problems

Compilation Error

- The program may have unexpected errors in the code caused by incorrect syntax.

C++ Libraries

- The library is a free wiki library therefore there might error within the source code.
- The C++ library being used has an API that group members are unfamiliar with.

Potential Problems With The Project Environment

- Visual Studio Code is a complicated IDE which could cause issues if it is used incorrectly.
- Group members lack experience using Git through Visual Studios Code, which may cause problems when pushing and pulling from the project repository.

Time Constraints

- The project uses a library to function, it has yet to be implemented in the project's source code. This code has the potential to be much longer than anticipated.

4.2 Off-the-shelf solutions

This project is based on existing open source projects so there are many other solutions that exist, like the Liquid Rescale GIMP plugin.

4.3 User documentation

This project does not require extensive user documentation. A document with a simple tutorial of how to use the user interface (i.e. an explanation of what the buttons do) is sufficient.

4.4 Waiting Room

For this project performance requirements are in the waiting room. The priority of this project is not performance. The priority of this project is to create an effective user interface for the program. The team does not have the knowledge or experience with C++ to significantly improve the performance of the program. Such as launch time, response time and image processing time.

5 Proof Of Concept

It is reasonable to create an application that performs a liquid rescaling algorithm in the next two months. Although the liquid rescaling is a complicated algorithm that requires difficult math and complicated logic, a C++ library exists on Wikidot [1][**?**] which will be used in the application. This library is available for free download online for all operating systems. The only potential issue that this library brings is that it is a C++ library - a language that the team is not familiar with. Fortunately, C++ is similar to other languages that the team members have used. This application will only be usable on Linux operating systems, as it has been decided to use Visual Studio Code (2017) IDE to develop a Linux Desktop Application. As for testing, since the seam carving is a liquid rescaling algorithm, multiple tests can be run to ensure image quality and its general ability to rescale images properly. If time becomes a factor in the development of the application, the scope of the project can always be lessened. As of now the plan is to attempt to successfully rescale images as well as to accomplish the preservation of objects within images, but if need be it can just be an application that scales images. Overall, the seam carving algorithm is complicated and novel idea but with the use of the Wikidot library it is feasible to create an application with it in a span of 2 months.

6 Functional Requirements

6.1 Input

- The program must be capable of loading JPEG and PNG images.
- The program must be capable of loading an image from any location within the operating system.
- The program must be capable of loading an image of any size and quality.
- The editing of an image will not overwrite the input file unless the user requests to overwrite said file when saving.
- The program will prompt the saving of an image if an image is being edited when the user tries to load an image.
- The program will automatically scale an image proportionally to fit the window.
- Size when the image is loaded (will not perform content-aware resizing for this).

6.2 Output

- The program must be able to save images in JPEG and PNG format.
- The program must be able to save images with a file name given by the user.
- The program must be able to save images to a location given by the user (within operating system constraints).
- The program must be able to overwrite an image when requested by the user.
- The program must save an exact copy of the image shown within the editor when the user requests the image to be saved.

6.3 Functionality

- The program must only enable editing tools if an image is loaded.
- The program must display the image in the editing pane when an image is loaded.
- The program must be capable of performing content-aware image resizing on the image being edited.
- The program must be able to automatically resize an image to the dimensions given by a user.

7 Non Functional Requirements

7.1 Appearance requirements

- The main program window will consist of a static editing and controls panel.
- The program will have a quit button in the top right of the main window.

7.2 Usability requirements

- The program is designed to be used by English speakers only.
- The program will be designed to be used by people aged thirteen years or older.
- All functionality of the program will be located in one area of the window to simplify use.

7.3 Safety requirements

- The program must not misbehave in a way that may trigger an epileptic episode.
- The program will not delete any files on the system unless explicitly instructed to by the user.

7.4 Privacy requirements

- The program must not store user data in any way possible, other than when loading and saving images to the users hard drive.

7.5 Performance requirements

- The program shall be operational within ten seconds of launch.
- The program user interface shall respond quickly.
- The program should be able to scale photos reasonably fast.

7.6 Installability requirements

- The program shall be operational without any installation. To run the program just run (i.e. double click) the executable LiquidRescaleApp

7.7 Portability requirements

- The program shall be able to function as a standalone executable application.
- The program must be operational on all Linux based desktop operating systems.

7.8 Learning Requirements

- The program must be intuitive so that a user can interpret all uses of the controls from the user interface.

8 Health and Safety

The application may cause eyestrain of the user if used for a prolonged period of time. Users with epilepsy must be aware if the screen begins to flicker that it may trigger an epileptic episode. Finally users must be aware that if they give a file name the same name as an existing file it will be over ridden.

9 Assumptions

It is assumed that the user is experienced with the basic uses of a desktop computer (mouse movement, mouse selection, keyboard use, etc).

10 References