Design Document Revision 1
Liquid Rescaling

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1 Revision History

Table 1: Revision History

Date	Developer	Changes Made	Revision
November 10, 2017	Whole Team	Initial draft	Revision 0
December 3, 2017	Marlee Roth	Requirements and Design Relationship	Revision 1
December 4, 2017	Marlee Roth	Modified Module Hierarhy	Revision 1
December 5, 2017	Daniel Wolff	Modified traceable matrix	Revision 1
December 6, 2017	Marlee Roth	Modified the uses Hierarchy	Revision 1

2 Introduction and Overview

The goal of this project is to implement a seam carving algorithm to perform content aware scaling on images. The program will intelligently scale an image in order to prevent the deformation of important features. The following documentation will be a MIS representation of the existing code for this project. The MIS will be following the design principles of information hiding and encapsulation.

2.1 Document Structure

- Section 3 - Anticipated and Unlikely Changes
- Section 4 - Requirements and Design Relationship
- Section 5 - Module Hierarchy and Secrets
- Section 6 - Traceability Matrix between Modules and Requirements
- Section 7 - Module Interface Specification
- Section 8 - Uses Hierarchy
- Section 9 - Gantt Chart

3 Anticipated and Unlikely Changes

3.1 Anticipated changes

1. Changing technologies from Windows C++ CLI/.NET to Linux GTK+/GTKmm.
2. Changing integrated development environments from Visual Studio Community 2017 to Visual Studio Code.
3. Using Glade to build user interfaces instead of Visual Studio.

3.2 Unlikely changes

1. General UI design/layout.
2. LiquidRescaling module functionality.
3. Usage of the liblqr library.
4. Usage of the C++ programming language.

4 Requirements and Design Relationship

4.1 Software Decision Module

The draw module contains generic image loading and saving handlers that can be used in other applications to provide image handling capabilities. The rescale module contains generic functions that provide a simple interface to the liblqr library.Ui is the module that initiates the user interface and it was developed using glade. Finally, there is the dialog module that handles any dialog action that may occur. These functions can be implemented seamlessly into another project, assuming the library is available to use.

4.2 Connection Between Requirements and Design

The following design decisions were made in order to satisfy the requirements of the project:

- When loading a file using the main.cpp module, the dialog module needed to take extra steps to assert that the file chosen by the user was a file accepted by the requirements (a PNG or JPEG file).
- When saving a file using the dialog module, the image saving handler needed to take extra steps to assert that the file name defined by the user matches the accepted types defined by the requirements (a PNG or JPEG file). If the file name did not satisfy this requirement, a default extension (.PNG) would be added to the file name.

5 Module Hierarchy

Table 2: The Hierarchy of Modules

Level 1	Level 2
Resale.h	
UI.h	dialog.h
	draw.h

Table 3: One module one secret

Module	Secret
UI.h	User Interface functions and Event Handlers
dialog.h	Handles dialog actions
draw.h	Handles image display
rescale.h	Algorithm used for image processing

6 Traceable Matrices

6.1 Requirments Matrices

M1 $\rightarrow$ *rescale*
$M2 \rightarrow UI$
$M3 \rightarrow dialog$
$M4 \rightarrow draw$

Table 4: Traceability matrix between modules and requirements

Function Requirements	Module
FR1	M2, M3
FR2	M2, M3
FR3	M1, M2, M4

Non-Function Requirements	Module
NF1	M2, M3, M4
NF2	M2, M3
NF3	M2
NF4	M3
NF5	M1
NF6	M1, M2, M3, M4
NF7	M1, M2, M3, M4
NF8	M2

Please see Requirements document for corresponding requirement.

6.2 Anticipated Changes Matrices

Table 5: Traceability matrix between modules and anticipated changes

Anticipated Change	Module
AC1	M1, M2, M3, M4
AC2	M1, M2, M3, M4
AC3	M2

6.3 Unlikely Changes Matrices

Table 6: Traceability matrix between modules and unlikely changes

Unlikely Change	Module
UC1	M2
UC2	M1
UC3	M1
UC4	M1, M2, M3, M4

7 Uses Hierarchy

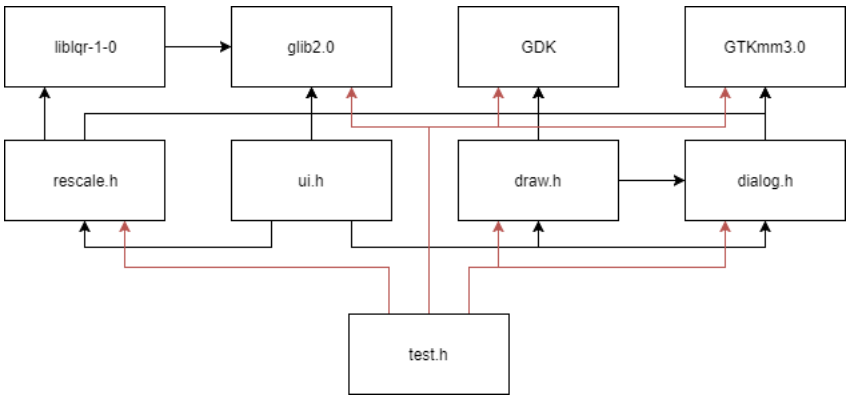

Figure 1: Uses Hierarchy

8 Gantt Chart

The updated Gantt Chart can be found in the git repository marked Revision 1. See File **Liquid Rescaling Development Schedule - Version 4.pdf**