ImageSource

Design Document

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# Introduction

## Purpose

This document is divided into three main sections. Section 1 explains the scope of the project, definitions used throughout the document and any references used. Section 2 explains the design of the project, including design patterns, class diagrams and sequence diagrams. Finally, Section 3 provides an overall description of the product, including software interfaces and requirements met by the system.

## Scope

ImageSource will allow a user to store, edit, and organize images within a single program. By combining all of the functionality into a single program, users are required to familiarize themselves with a number of different applications, for which they have limited use.

The system is designed in such a way that pictures can be moved easily between computers, without losing tagging information. This is to allow portability for the average user, who would not generally be able to perform such actions.

## Overview

The remainder of this document contains a more detailed description of how ImageSource was designed. The next section outlines design patterns used, as well as class & sequence diagrams. The final section goes into further detail about the specification of the program.

# Design

## Design Patterns

### 2.1.1 Factory

ImageSource’s tag system creates objects. The class of these objects depends on the application, so the Factory design pattern is used to solve this problem.

### 2.1.2 Singleton

There are classes for which only one instance should exist. The Singleton design pattern addresses the fact that the single-instance constraint is enforced, but also that the instance is accessible to any other classes which require it.

## Diagrams

To view the class and sequence diagrams, please find them in the Design Diagrams folder attached in this folder.

# Overall Description

## Product functions

The major functions of the end product are:

* Defining tags
* Adding tag values to individual images
* Selective viewing of images by tag
* Opening and storing of images in different formats

Additionally, ImageSource has the following image processing capabilities:

* Image resizing
* Histogram display
* Targeted grayscale conversion

## Assumptions, constraints & dependencies

The product has the following dependencies:

Platform: Windows XP

Frameworks: OpenCV, Emgu CV, .NET 4

## Software Interfaces

*More information about these products can be found in the ImageSource Reference Document.*

Name: OpenCV

Version: 2.1

Source: http://opencv.willowgarage.com/wiki/

Purpose: This open-source framework will be used for the product’s image processing capabilities.

Name: Egmu CV

Version: 2.1

Source: http://egmu.com

Purpose: This OpenCV wrapper will be used for developing the product in a .NET environment.

## Functional Requirements

* ImageSource can open and save images in the following image formats: BMP, GIF, JPG, PNG and TIFF.
* ImageSource can convert images between supported formats.
* ImageSource provides an interface to browse images.
* ImageSource provides an interface to edit images.
* ImageSource provides the following image functionalities: resizing, histogram viewing and grayscale conversion.
* ImageSource provides the functionality to search images with a tag system.
* ImageSource stores tag data in a persistent and permanent manner.
* ImageSource provides the functionality to edit, delete or otherwise manipulate tags.

## Performance Requirements

* ImageSource only supports one user at a time.
* ImageSource can open only one image at a time for editing.
* ImageSource can apply a tag to a single image.
* ImageSource will list all images available in the library.
* ImageSource will display pictures in full-size.
* The image histogram will be calculated each time an image is opened or loaded.
* No changes will be made without a confirmation from the user.