PhotoViz

User Manual

PicsAl!ve Pte. Ltd.

Version 3.3

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1. Introduction

A photograph is an effective form of communication and sharing as "A picture is worth a thousand words". PhotoViz is a freeware with a set of innovative tools that extends the traditional uses of images. PhotoViz consists of a set of tools to automatically fix basic problems in photos, read secret messages, access content or view photo galleries embedded in images. All images can be viewed by any available image viewer software but nobody knows that the image contains hidden content. They looked just like any other images and with no loss in image quality. PhotoViz provides security and secrecy by ensuring that only the targeted audience can retrieve the contents in the image.

The functional overview of PhotoViz is shown at Figure 1.1. PhotoViz functions are broadly divided into three categories: Image Correction, Content Access Control (CAC) and Active Photo (AP). Image Correction is a set of tools to automatically fix basic problems in digital photos and manage image files. Intuitive tools that adjust overall color, contrast, brightness and sharpness of the photos can be used to ensure that your photos look their best. You may resize, rotate your photos and even view imaging information. These tools are designed for casual photographers and business users who want to improve their photos for prints, emails, presentations and sharing on the Web.

The Content Access Control Module encrypts digital content into images and can restrict access to the embedded content through the use of passwords or registration images. Registration Photos are special images that must first be viewed before users can access content in subsequent images. The CAC module has a built-in encryptor in PhotoViz and a free online encryptor in the Mail ++ portal (www.mailplusplus.com). Content that can be embedded into images are files (e.g. Microsoft Office documents, pdf files etc), URLs, Web-based content (e.g. Adobe Flash), Zip files and Windows applications. Note that the built-in encryptor has a 30 day trial and a licence must be purchased at www.picsalive.com after the trial period.

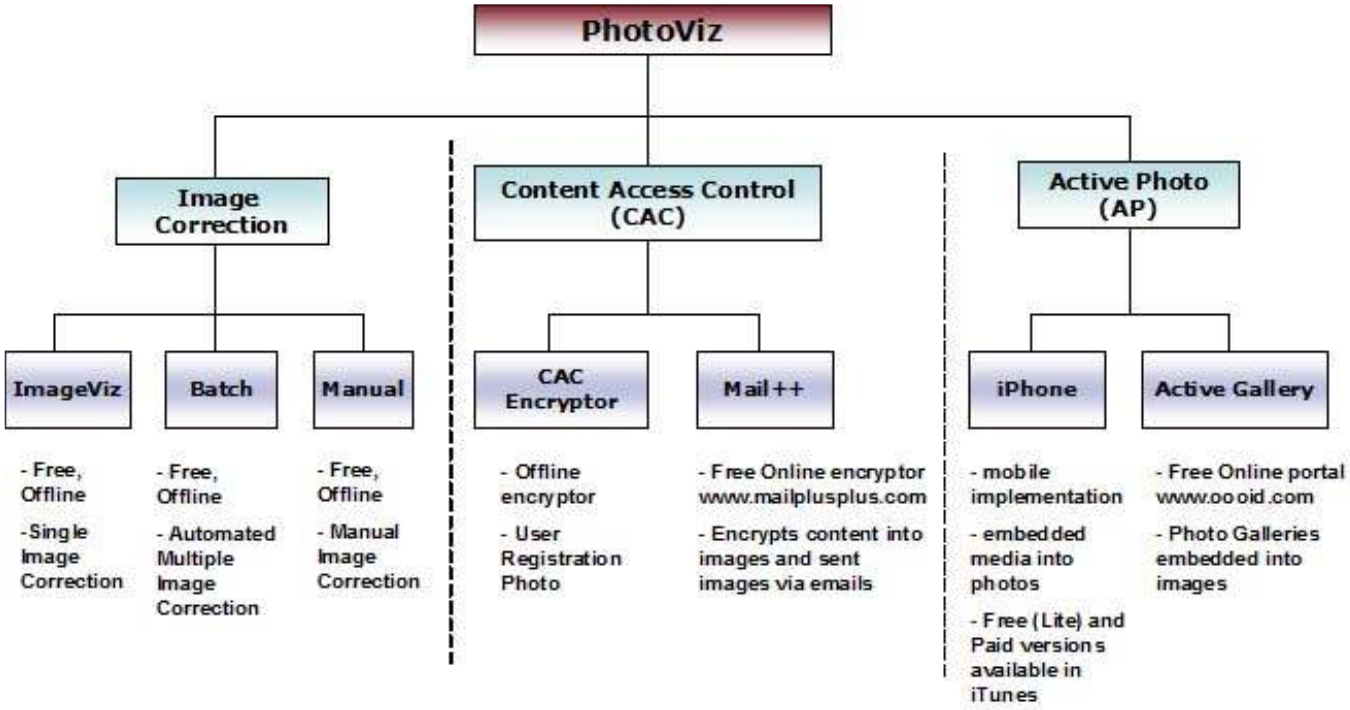

Figure 1.1: PhotoViz Functional Overview

Active Photo is a novel way of delivering content, web applications quickly and easily through the use of images. Active Photo offers an easier, more intuitive way to view, manage, and share your photos. Currently, there are two implementations of Active Photo: iphone Active Photo (or @Photo) and Active Gallery. @Photo is an iPhone app that enables users to embed media such as messages, location data and audio files into photos (see Figure 1.2a). Photos from the iphone can shared and sent via email. Embedded media, location and the phone's parameters can be accessed by PhotoViz. A free Lite version and a paid version of @Photo is available in Apple's iTunes App Store. More information about @Photo can be found at www.picsalive.com/ap.

Active Gallery enables users to create their own Photo Galleries and embed them into a single image. Viewers can also view a slide show, rate and add comments to the photo gallery. Active Galleries are created at the online OOOID portal (***www.oooid.com***) and can be viewed in PhotoViz. An Active Gallery on the Singapore Flyer is shown on Figure 1.2b. The Active Gallery can be viewed by in blogs or users' websites by inserting a few lines of codes. Photos in Active Gallery are secure and can be shared online or offline with friends and family.

(a) iPhone Active Photo (@Photo)

(b) Active Gallery on the Singapore Flyer

Figure 1.2: Active Photo Implementations

PhotoViz graphical user interface is simple and easy to use (see Figure 1.3). Thumbnails are used for easy viewing and help to quickly locate photos. PhotoViz functions are represented by quick access icons at the bottom for easy access. ImageViz (see Figure 1.4) is a user interface to view, tune and manage single images. ImageViz is integrated into PhotoViz.

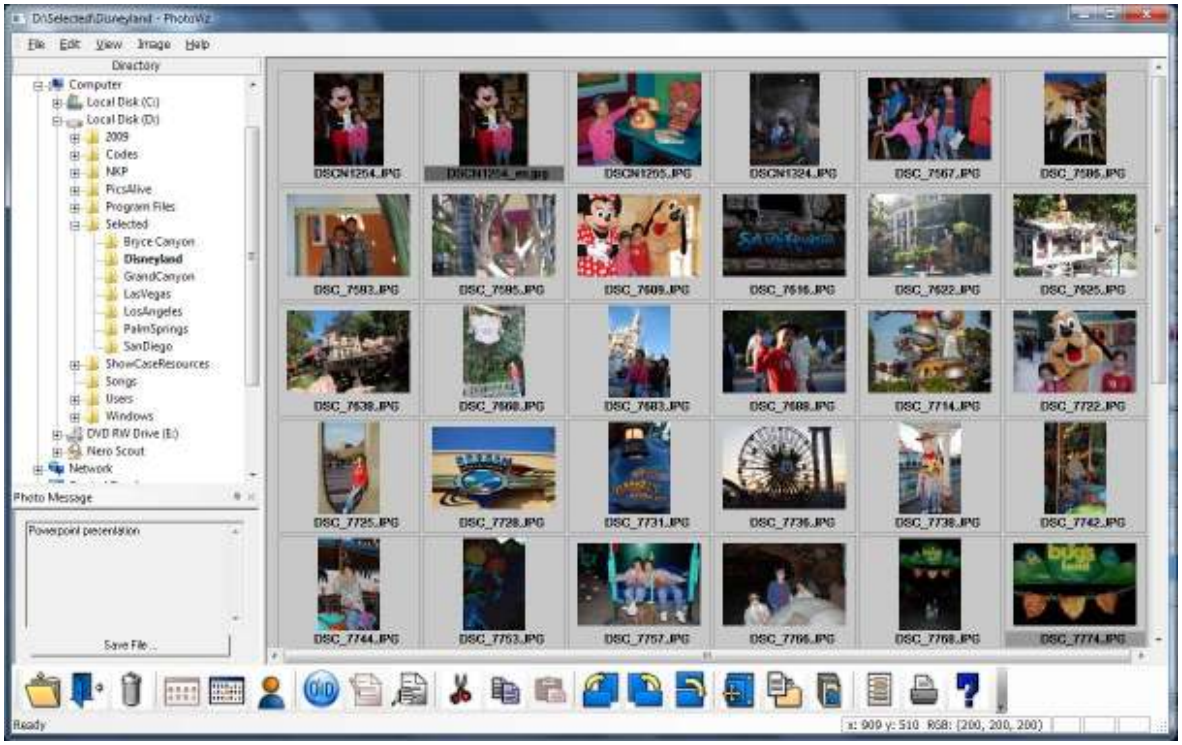

Figure 1.3: PhotoViz User Interface

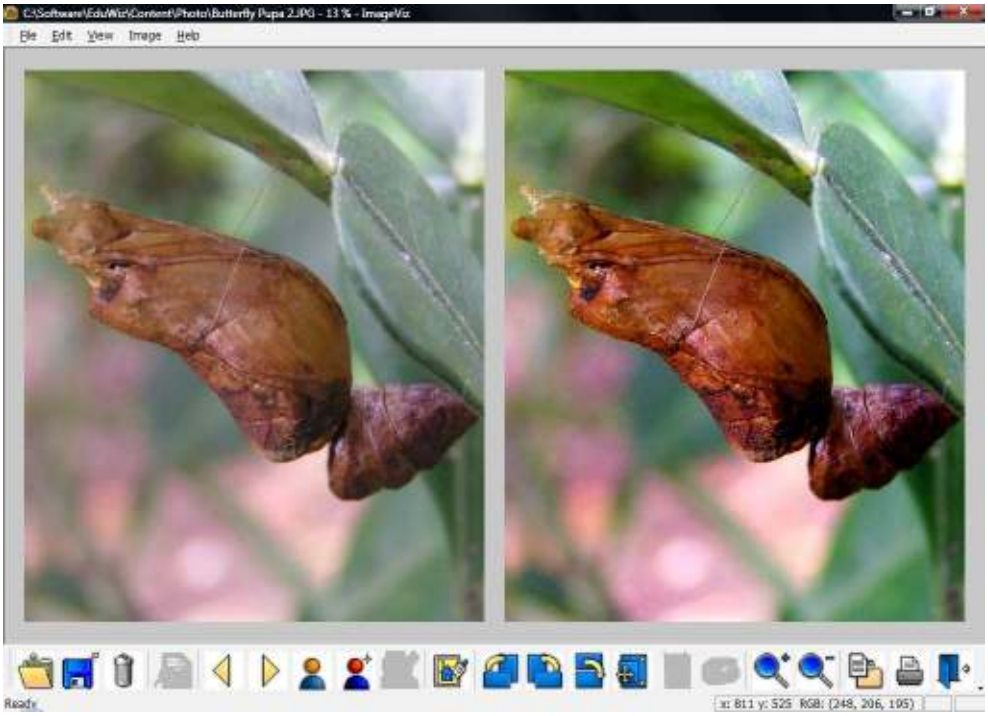

Figure 1.4: ImageViz - Original Image (Left) and Image after Automatic Correction (Right)

1.1 PhotoViz Features

a. **Embed Messages, Contents and Applications in Images with Access Control.** Secret text messages and content can be encrypted and hidden in images. Images with hidden messages and contents can be viewed with any conventional image viewer software. They looked just like any other images and with no loss in image quality. Images are distributed via the email but access to hidden messages and contents can be restricted to the targeted audience through the use of passwords or registration photos.

b. **iPhone Active Photo**. Messages, audio recordings, location data and phone parameters (e.g. phone identification number, name, model etc.) embedded into images can be viewed and accessed outside the iPhone using PhotoViz.

c. **Active Gallery.** Active Gallery enables users to create their own Photo Galleries and embed them into a single image. Photo Galleries can be viewed by inserting a few lines of codes into the user's blogs or websites. Viewers can also view a slide show, rate and add comments to the photo gallery. The Photo Galleries are secure and can be shared online or offline with friends and family.

d. **Automatic Enhancement of Photographs.** Enhances and fixes common problems in photographs automatically. Parameters in the automatic process can be defined by the user. Semi-automatic and manual photo enhancements are also supported.

e. **Intuitive Photo Editing Tools.** Intuitive editing tools such as image crop, resize, rotate, red-eye reduction, sharpening or softening are provided. There are also tools for full color spectrum corrections tools to increase color vibrancy.

f. **Easy to use and friendly User Interface.** The graphical user interface is based on thumbnails and icons for ease of use and accessibility. Real-time preview of photographs during editing and tuning.

g. **Special Photo Filters.** Jazz up your photos with filters such Sepia, Yellow Tritone, Blue Duotone, Green Duotones and Grayscale.

h. **Directories and Files Management.** Users can easily copy, cut, rotate, edit, delete and create directories and image files.

i. **Displays and Preserves Imaging Information.** Most of the digital cameras store image information using EXIF (Exchangeable Image File) specifications in the JPEG files. The EXIF metadata includes information such as the time, date, the maker and model of the camera, shutter speed, ISO, aperture etc. EXIF information is preserved when photos are saved after editing

1.2 What's New in PhotoViz 3.3?

The following features and enhancements are added into the latest version of PhotoViz:

a. **iPhone Active Photo**. View and access messages, audio recordings, location data and phone parameters from iPhone images
b. **Improved integration between PhotoViz and ImageViz**. For password protected images, users need to enter the password once when switching between the two applications
c. **Preserved Embedded Media**. Embedded media in images is preserved when the image is modified and then saved.

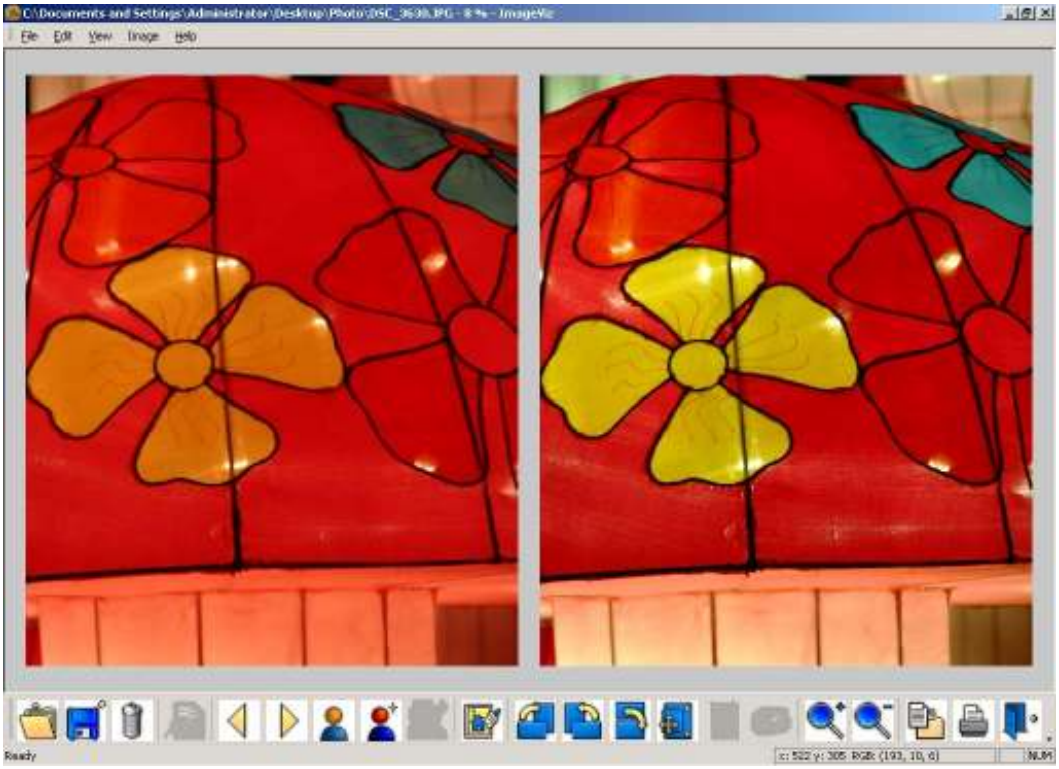

Figure 1.5: Original Image (Left) and Automatic Color Correction and Contrast Enhancement (Right)

1.3 Installation

Installation of PhotoViz is simple and straightforward. If a previous version of PhotoViz had been installed before, please ***uninstall*** the previous version first.

Installation Procedures

a. Download PhotoViz at www.picsalive.com. Unzip the downloaded file and double click the setup (.exe) file
b. The installation wizard (Figure 1.6) is displayed. Click on the "Next" button
c. Read the License Agreement. If you agree, click the "Next" button (Figure 1.7)
d. Select Destination or Installation Folder (Figure 1.8)
e. Click on the "Next" button to start the installation process (Figure 1.9)
f. When the installation is completed, click on the "Finish" button (Figure 1.10)
g. Double click on the PhotoViz icon on the Desktop to launch the application

Uninstallation Procedures

a. Click on the Windows Start Button and select Control Panel
b. Double click on the Add or Remove Programs Icon
c. Select PhotoViz from the list of Programs. Click on the Change/Remove button
d. Click on the Yes button to confirm removal of PhotoViz

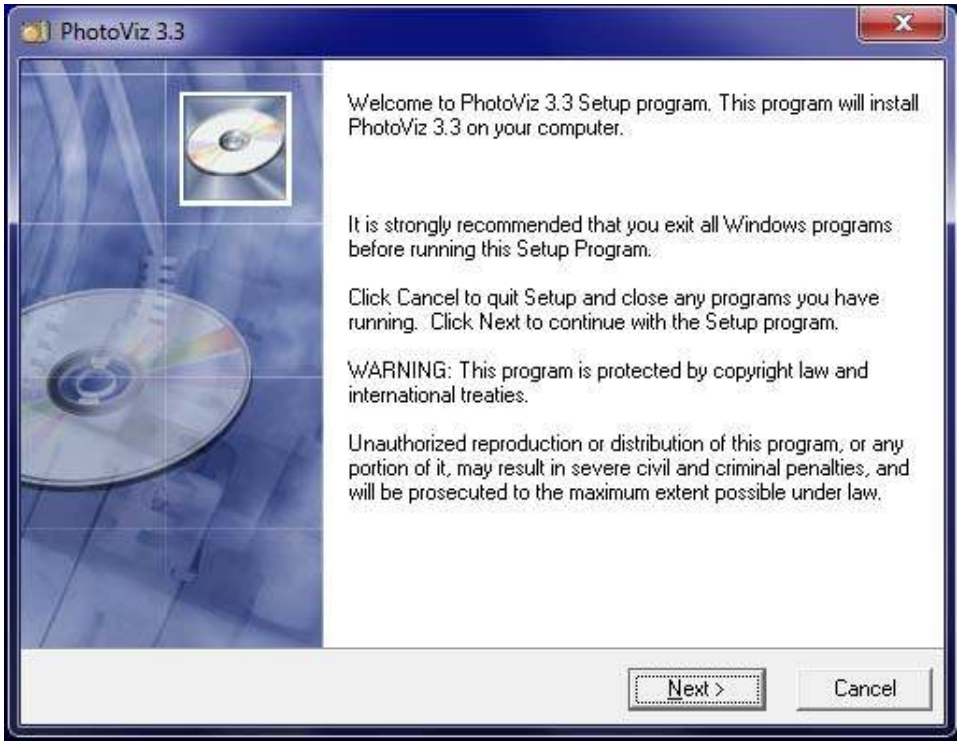

Figure 1.6: PhotoViz Installation – Step 1

Figure 1.7: PhotoViz Installation – Step 2

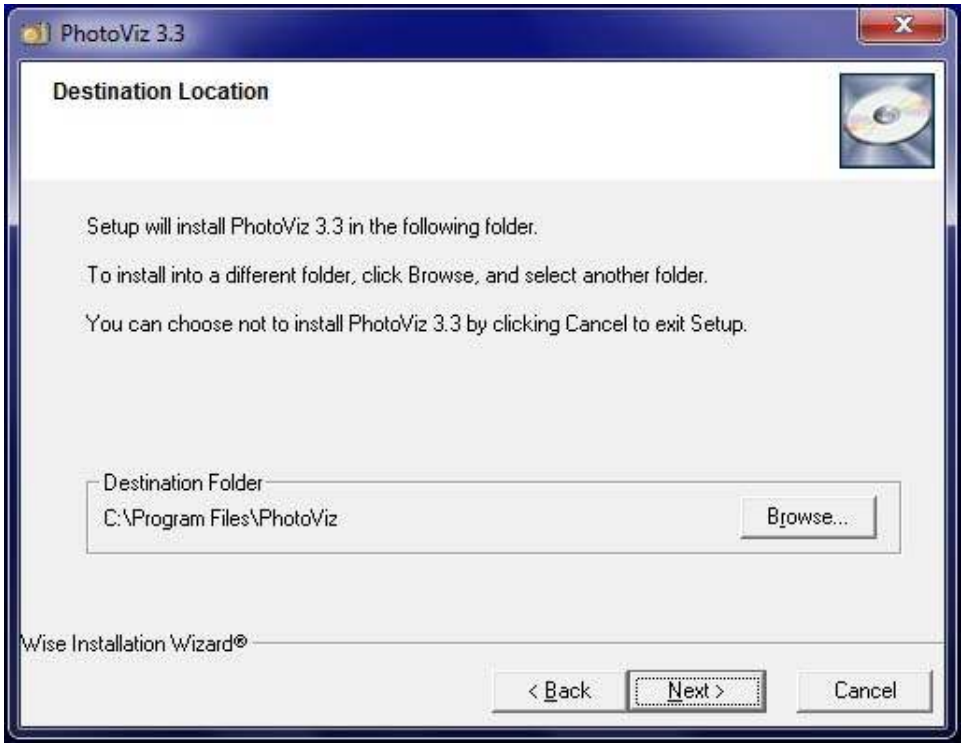

Figure 1.8: PhotoViz Installation – Step 3

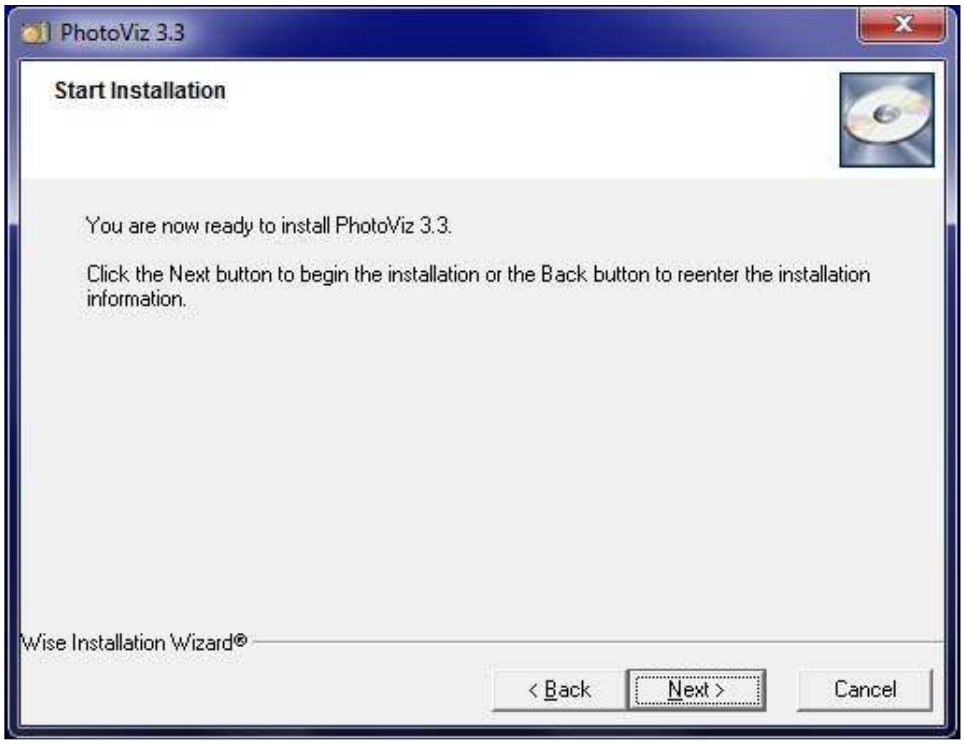

Figure 1.9: PhotoViz Installation – Step 4

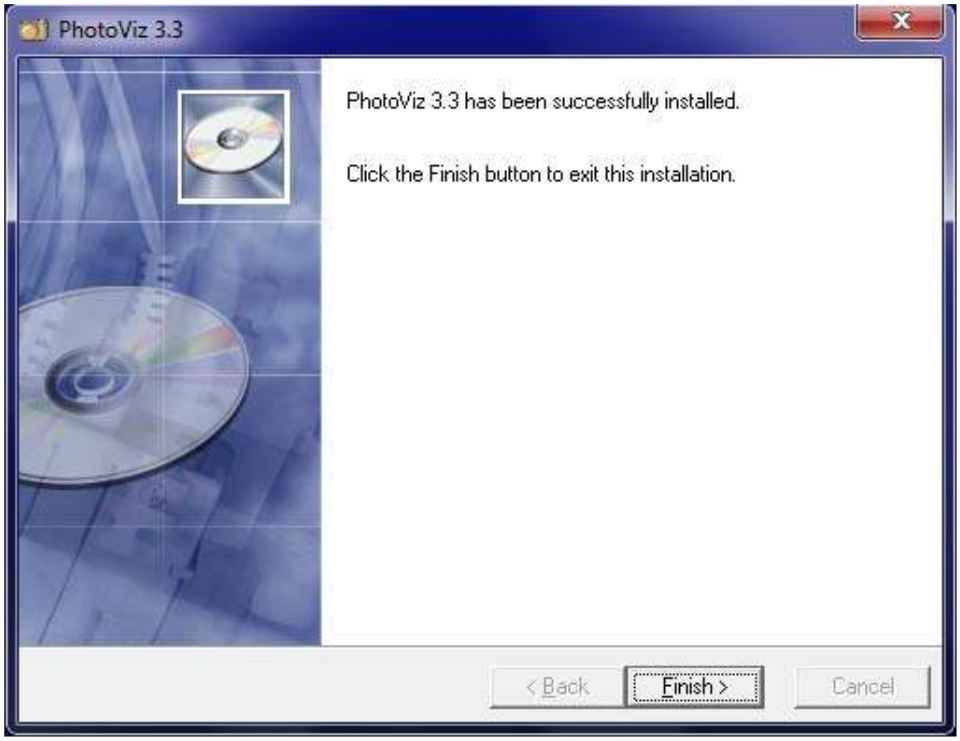

Figure 1.10: PhotoViz Installation – Step 5

1.4 Activation

All functionalities in PhotoViz are free except for the Content Access Control (CAC). The CAC has a 30 day trial and a licence must be purchased after the trial period. (Note that users can still encrypt content using the free online portal at www.mailplusplus.com after the trial period). A licence for PhotoViz can be purchased by going the www.picsalive.com and select the "Purchase" button from the top menu (see Figure 1.11). Payments by all major credit cards or Paypal are accepted.

Figure 1.11: Purchase of PhotoViz Pro

Activation of PhotoViz

a. In PhotoViz, select Help->Activate from the Top Menu bar
b. Figure 1.12 is displayed. Note the Installation Code
c. Goto www.picsalive.com/Activate (see Figure 1.13)
d. Enter Name, Installation Code, Email and Organization (if applicable)
e. Click on the "Get Activation Code" button and the Activation will be displayed
f. A confirmation email will also be sent

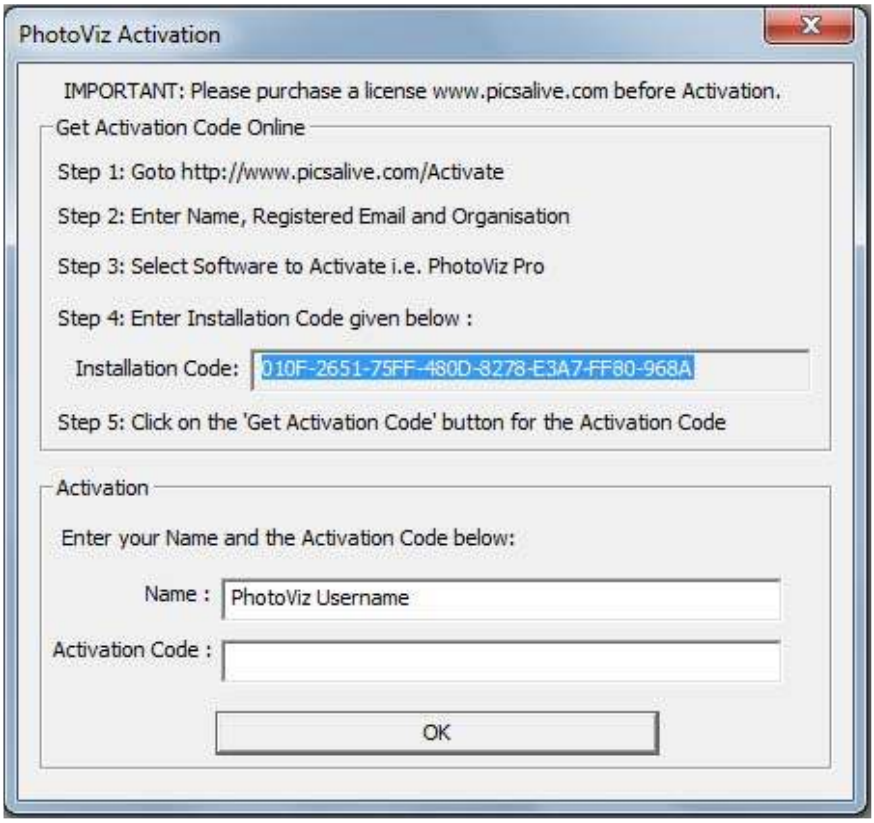

Figure 1.12: PhotoViz Pro Installation and Activation Codes

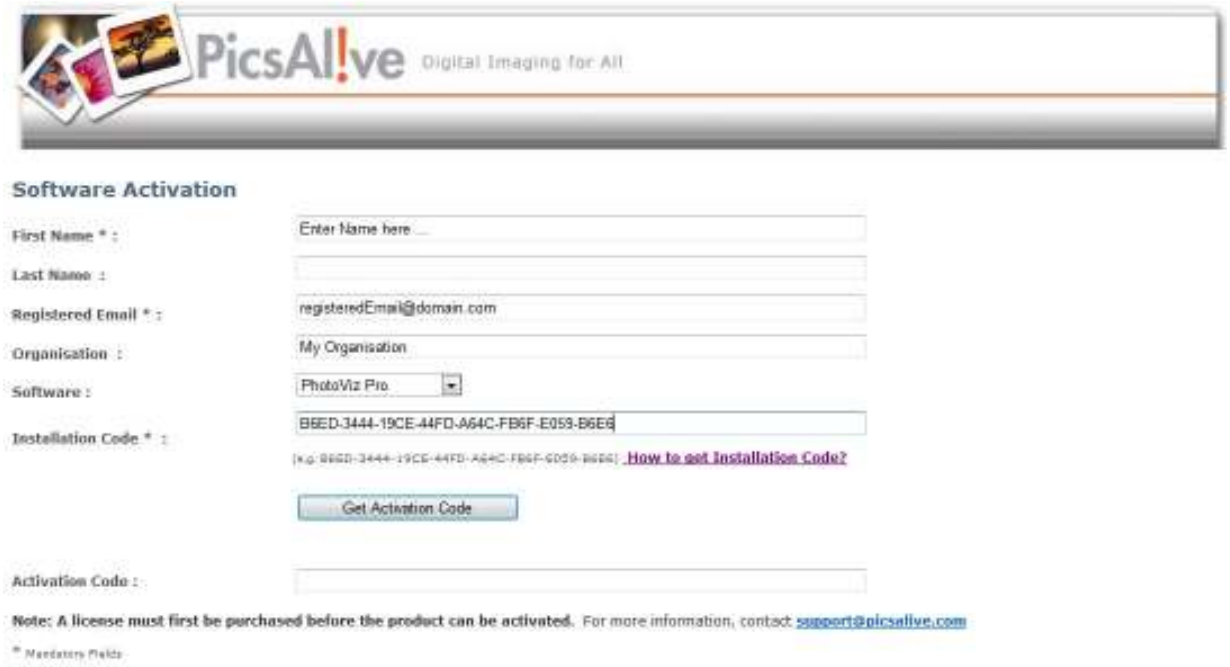

Figure 1.13: Online Activation of PhotoViz Pro

1.5 System Requirements

- Pentium® III or 4 processor
- Microsoft® Windows® XP
- 1 GB RAM memory
- High Color (16 bit) display colors setting (True Color recommended)
- At least 1024x768 display resolution recommended

1.6 Customer Support

If you have any questions or queries in PhotoViz, please contact us at support@picsalive.com and we will respond promptly.

2. Looking at the Work Area

2.1 PhotoViz User Interface

The user interface of PhotoViz consists of five areas: List Bar for directories or menus, Display Area for image files, Quick Access icons, Photo Message and Status Bar (see Figure 2.1).

Figure 2.1: PhotoViz User Interface

a. List Bar (Menus). There are four submenus: Directory List, Auto Image, Adjust Image and Sharpen/Soften. The directory list is a Windows Explorer-like interface to select the directory or folder for viewing. The thumbnails of the photographs in the selected folder will appear on the display area. User can expand a directory by double clicking on the folder or by clicking the "+" sign in front of the directory. Conversely, double clicking an expanded directory will collapse it. Clicking on the "-" sign in front of the expanded folder will also collapse the folder.
b. Display Area. There are two display modes: Large and Small Icons. Images in the selected directory are represented as thumbnails for viewing and quick selection of multiple images. The color of the display area is always gray.
c. Quick Access Icons. These icons help the user to access commonly used functions quickly. When the mouse is placed over the icons, popup text bubbles will appear to help and guide users. See Appendix A for the list of functions and their respective icons.
d. Photo Message. Secret or hidden text messages or contents (if available) are display in this dialog box. The Photo Message dialog box lets users to quickly read the hidden message, save attached documents, view web contents or execute Windows applications.
e. Status Bar. The status bar at the bottom of the user interface displays information and instructions.

Multiple images can be selected at the same time by pressing the control key and clicking the images with the mouse. When selected, the filename at the bottom of the image is highlighted. Multiple selected is useful for processing selected images in a directory, e.g. rotation, deletion or auto batch correction of selected images.

2.2 ImageViz User Interface

When an image is selected in PhotoViz, ImageViz will be launched (Figure 2.2). Like PhotoViz, the quick access icons are located at the bottom of the screen. ImageViz has several image specific icons like zoom, crop, next image, previous image etc. Users can view their images in the following ways:

a. Original Image
b. Image after Auto Image (i.e. image after automatic correction)
c. Original Image and Auto Image (see Figure 2.2)
d. Image after Manual Adjustment (i.e. manual tuning of color, saturation, sharpness and special effects like sepia, grayscale etc.)

Figure 2.2: ImageViz with Original Image (Left) and Auto Image (Right)

The current display size as a percentage of the original size is shown at the top of the ImageViz. Users can view the next or previous image using the forward and backward arrows. This function is useful for previewing all the images in the directory. ***It is important to note that changes to the image are not saved until the user saves the image using the Save As icon .*** Therefore, all changes will lost when the user switches to another image or returns to PhotoViz.

2.3 Short Cuts and Quick Access Icons

Quick Access Icons provide an easy avenue for the user to access the commonly used functions. A list of icons and their respective functions is tabulated in Appendix A. These icons are designed to be visually self explanatory. When the mouse is placed over the quick access icons, text bubbles appear to help and guide the user.

The quick access icons are automatically enabled when the functions they represent are available to the user. Conversely, icons are automatically disabled when the respective function is not available.

Functions can also be quickly accessed by right-mouse click menus. Figure 2.3 to Figure 2.4 shows the different types of menus: List Bar menu (Figure 2.3), Image menu (Figure 2.5). These short-cut menus not only provide quick access to PhotoViz functions but they also allow users to manage image files and directories. Users can easily cut, copy, paste, create and rename files and directories.

Figure 2.3: Right mouse click quick access menu from List Bar

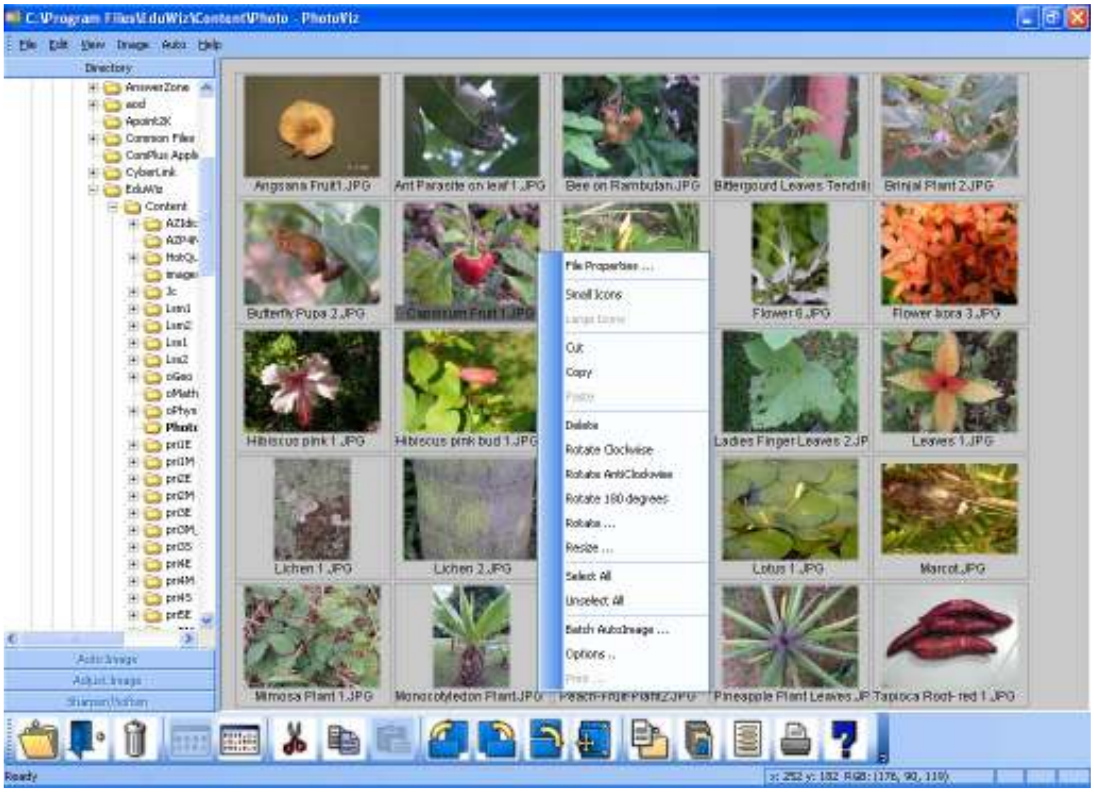

Figure 2.4: Right mouse click quick access menu in the Display Area

2.4 Status Bar

The Status Bar is located at the bottom of the user interface and comprises of two areas. On the left hand side is the instruction bar where simple tips and help are given. The right hand side shows the xy coordinates of the mouse cursor and the RGB (Red, Green and Blue) values at the current mouse location. For example,

x:695 y:485 RGB: (147,198,31)

means that the pixel at xy co-ordinate of (695,485) has a Red value of 147, Green value of 198 and a Blue value of 31. The maximum value of Red, Green and Blue is 255. The Status Bar is present in PhotoViz and ImageViz.

3. Image Correction

Photographs cannot be perfect all the time and flaws with exposure, color and orientation are common. PhotoViz is a freeware for casual photographers and business users who want to improve their photos for prints, emails, presentations and sharing on the Web. PhotoViz is a fast and easy to use application for creating professional-looking photos. PhotoViz automatically fixes basic problems in a photograph. This saves a great deal of time and effort as there is no need to manually tweak your photographs.

PhotoViz also provides you with a set of semi-automated or manual tools to enhance your photographs. Intuitive tools that adjust overall color, contrast, brightness and sharpness of the photos can be used to ensure that your photos look their best. You may resize, rotate your photos and even view imaging information. These tools are designed for casual photographers and business users who want to improve their photos for prints, emails, presentations and sharing on the Web.

PhotoViz is a versatile tool for correcting common flaws in photographs. An overview of the Image Correction in PhotoViz is given in the table below:

Image Correction	**Image Adjustments**	**Features**	**Usage**
Auto Correction	- Auto Color - Auto Contrast/ Auto Levels - Color Saturation - Sharpening	- Single Auto (Auto Image) - Batch Auto - supports further image tuning in manual mode - automatically resize image and change file format - no knowledge required	- correct flaws in many photos automatically - single click photo correction
Semi- Auto Correction	- Auto Color - Auto Contrast - Auto Levels - Auto Image - Special Filters e.g. Sepia	- Select individual image adjustment algorithm - supports further image tuning in manual mode - a little knowledge on photo enhancement needed	- put special effects on photos - applied a specific image adjustment e.g. Auto Levels
Manual Correction	- Color Balance - Color Saturation - Brightness - Contrast - Sharpen & Soften	- color correction for shadows, midtones and highlight regions - users have full control - some knowledge on photo enhancement needed	- individually tune photos

Table 3.1: Overview of Image Correction

PhotoViz lets users perform automatic image correction for multiple images in a directory using the batch processing function . Automatic, semi-automatic and manual image correction can only be performed by ImageViz.

3.1 Automatic Image Correction

Auto Correction is an easy way to fix common flaws in photography. The computer analyses the photo and optimizes the photo for viewing and printing. Single Image Correction fixes one photo at a time while Batch Image Correction can automatically correct multiple photos.

3.1.1 Single Image Correction (Auto Image)

This function is available in ImageViz only. Single Image Correction or Auto Image is a "one click" photo tuning function. Auto Image enhances the image by tuning the following parameters:

a. Color Correction
b. Auto Contrast or Auto Levels
c. Color Saturation
d. Sharpness

Figure 3.1 shows the image of a swimmer before and after Auto Image. It can be seen that the colors, contrast and sharpness is dramatically improved by the Auto Image algorithm. If there is a need to change the default settings of Auto Image, for example increase the blueness of the water, the user can make those changes in the Auto Options menu .

Figure 3.1: Original Image (Left) and After Auto Image (Right)

3.1.2 Batch Image Correction

This function is only available in PhotoViz. Multiple or Batch Image Correction is to automatically fix or enhance multiple photographs. This is a convenient and fast method to process many photographs and saves tremendous amount of time and effort. Note that PhotoViz does not overwrite the original file. Instead a new file with the extension "_viz" is created by default.

Batch Image Correction

a. Click on the Batch Image Icon and Figure 3.2 appears
b. Click on the Source Folder button to select the directory where the original photographs are saved
c. The number of files in the Source Folder automatically appears.
d. Uncheck Include subdirectories if you do not wish to process subdirectories
e. Select the AutoImage options. Click on the Settings button to change the default color settings
f. Select the destination folder to save the new files
g. Select the file format, file size and the Zip file option
h. Change filename extension if needed
i. Click on the Process Image button

The user can also batch correct selected files only by clicking on the checkbox. Files are selected by holding the control key and using the mouse to select the images in the Thumbnail mode.

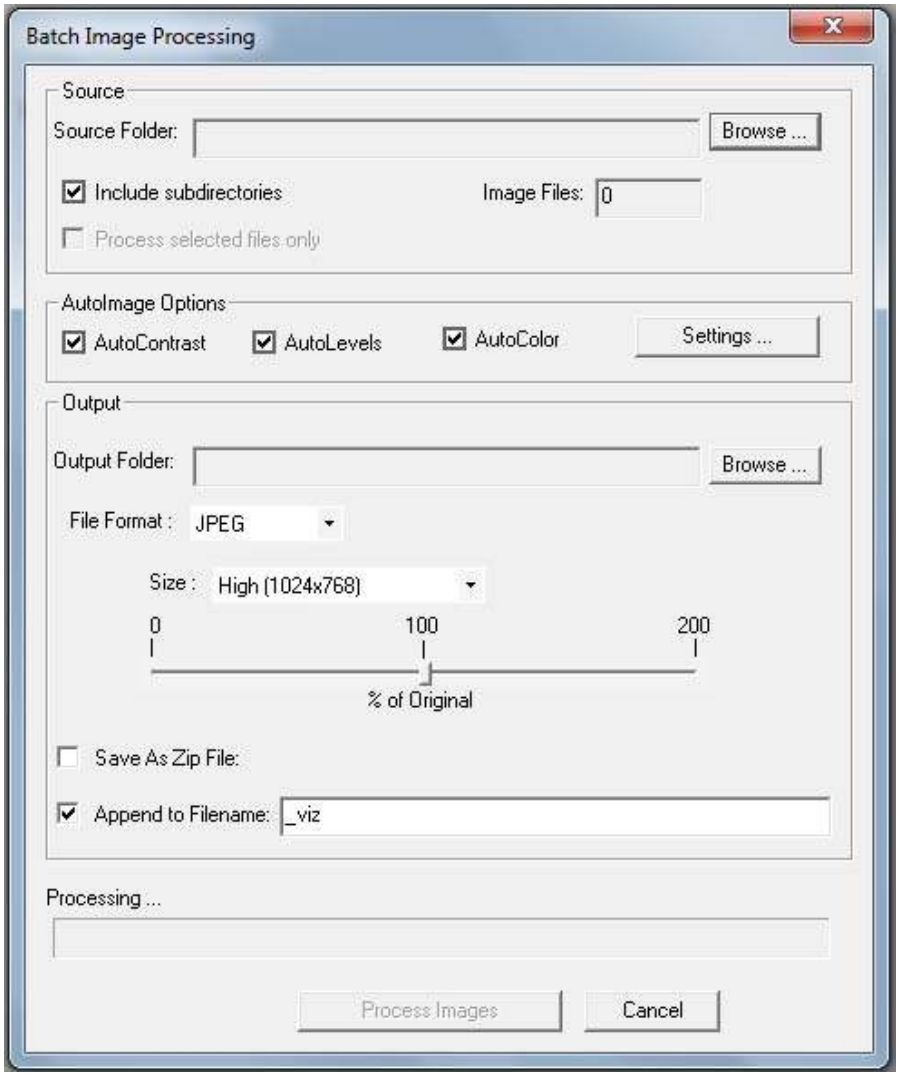

Figure 3.2: Batch Image Correction Menu

3.2 Semi-Automatic Image Correction

The automatic image correction consists of several sub-processes: Auto Color, Auto Contrast and Auto Levels. The semi-automatic image correction enables the user to select and individually apply these sub-processes to the

image. In addition, special effects filters can also be applied to the image. Semi-Automatic Image Correction is available in ImageViz only.

3.2.1 Auto Color

Auto Color performs an automatic color correction on the image. Auto Color analyses the image and adjusts the color balance sliders to remove any color casts. The "white" regions in the image are identified and the color sliders are automatically adjusted so that these regions will appear as the white point. The white point is defined in the Advance Options menu with the default value of 33 for the red, green and blue colors (see Figure 3.4).

Figure 3.3 shows the image before (left) and image after (right) color correction using Auto Color. In this example, the red value in the Advance Options menu is set to 40, green to 33 and blue to 28. It is advisable to maintain the sum of the red, green and blue components to 100. Note also that further changes to the color of the photo can be made using the Manual Color Correction sliders.

<u>Auto Color</u>

a. In PhotoViz, double click on the selected image to launch ImageViz
b. In ImageViz, select Image->Auto Color from the menu at the top
e. Save the image if necessary

Figure 3.3: Original Image (Left) and Image after Auto Color (Right)

3.2.2 Auto Contrast

Contrast is simply as the difference between the lightest and darkest regions in an image. Contrast is important to an image because it enhances the visibility of the details and makes the image vibrant and lifelike. An image with a good contrast should have a wide range of brightness values properly distributed throughout the image. An example is the image of the monkeys shown in Figure 3.4. The image (on the right) after Auto Contrast looks better with more tonal difference between dark and light regions.

Auto Contrast clips all color channels identically and preserves overall color relationships while making the highlights appear lighter and the shadows appear darker. Note that Auto Contrast is a non-linear transformation compared to the contrast slider in the manual image correction which is a linear transformation.

Figure 3.4: Original Image (Left) and Image after Auto Contrast (Right)

3.2.3 Auto Levels

Auto Levels maximizes the tonal range of each color channel independently. The result is a more dramatic increase in contrast as compared with Auto Contrast. However, Auto Levels may introduce color casts because it alters each color channel separately. Figure 3.5 shows the effects of Auto Levels. It can be seen that there is an orange cast on the image due to the lighting. The color casts is removed by Auto Levels

<u>Auto Levels</u>

a. In PhotoViz, double click on the selected image to launch ImageViz
b. In ImageViz, select Image->Auto Levels from the menu at the top
e. Save the image if necessary

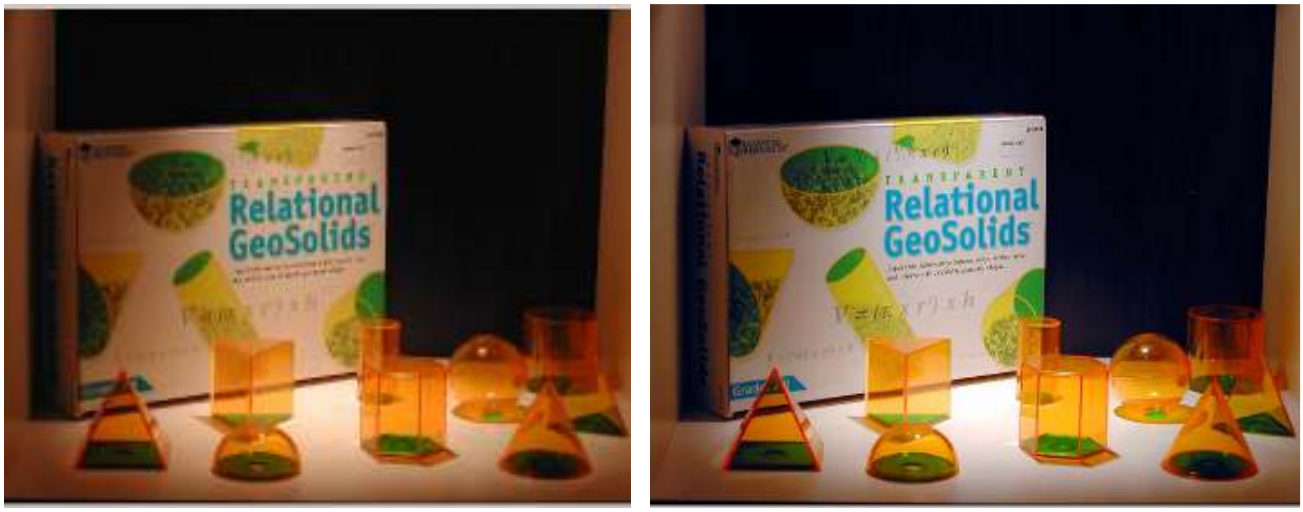

Figure 3.5: Original Image (Left) and Image before Auto Levels (Right)

3.2.4 Special Effects Filters

There are five preset special effects filters: Blue duotone, Green Duotone, Yellow Tritone, Sepia and Grayscale. Figure 3.6 to Figure 3.10 shows the effects of applying these five different filters. The original image is shown on the left and the results of the after the filters are on the right.

<u>Special Effects Filters</u>

a. In PhotoViz, double click on the selected image to launch ImageViz
b. In ImageViz, select Image and the desired filter from the menu at the top
e. Save the image if necessary

If further adjustments are needed after applying the filter, the user can tune the image using the manual mode. Manual Image Correction will be described in the next section.

Figure 3.6: Original Image (Left) and Image after Blue Duotone Filter

Figure 3.7: Original Image (Left) and Image after Green Duotone Filter

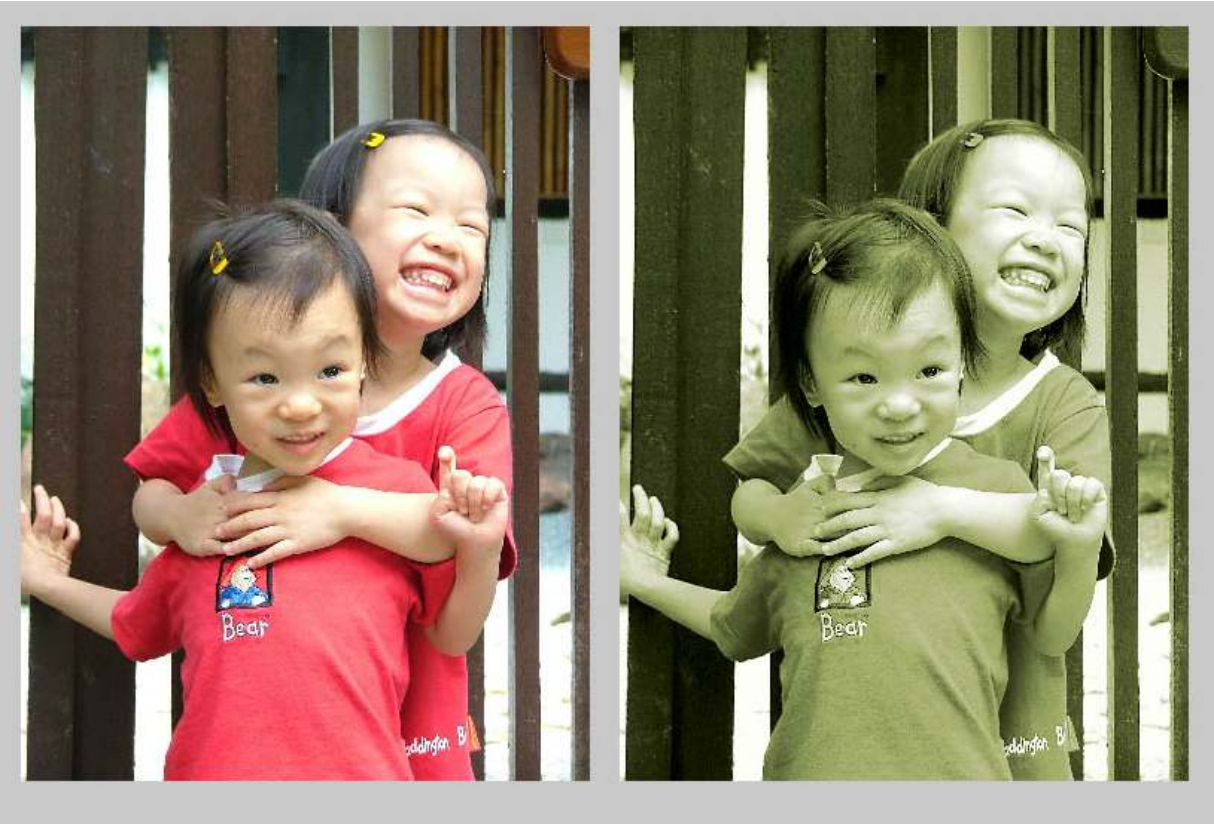

Figure 3.8: Original Image (Left) and Image after Yellow Tritone Filter

Figure 3.9: Original Image (Left) and Image after Sepia Filter

Figure 3.10: Original Image (Left) and Image after Grayscale Filter

3.3 Manual Image Correction

Manual Image Correction enables advance users to manually enhance images. There are four main groups of manual adjustments: color balance, color saturation, brightness/contrast and sharpening/softening.

<u>Manual Image Correction</u>

a. In PhotoViz, double click on the selected image to launch ImageViz
b. In ImageViz, select Image and Manual Image Adjustment icon
c. The Manual Image Adjustment dialog box appears (Figure 3.11)
d. Adjust image using the sliders for color, brightness, contrast and saturation
e. Save the image if necessary

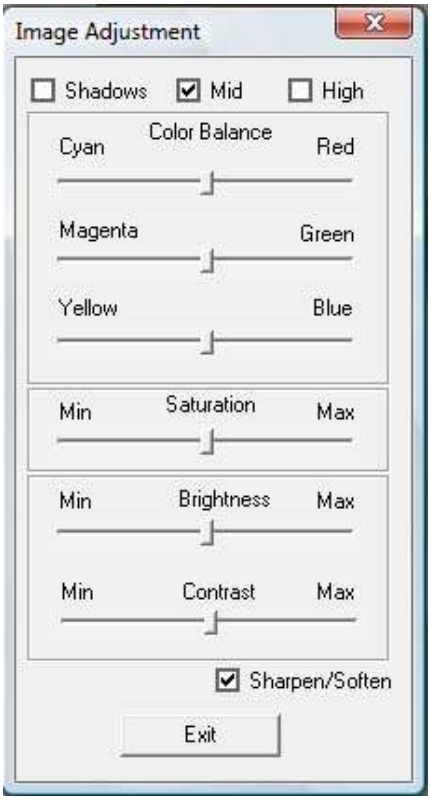

Figure 3.11: Manual Image Adjustment Menu

3.3.1 Color Balance

The color balance consists of three sets of sliders: Red/Cyan slider, Green/Magenta slider and Blue/Yellow slider. The range of the sliders is from 0 to 20 with the neutral point at 10. For example, in the Red/Cyan slider, 0 is for Cyan, 20 is for red and 10 represents the original image. In addition color adjustment can be applied to three distinct regions: Shadows, Midtones and Highlights. Shadows are the darkest part of the image containing significant visible detail. Midtones are the middle part of the tonal range of the image. Highlights are the brightest part of an image, especially the brightest part that still retains distinct detail.

Figure 3.12 to Figure 3.14 shows the effects of increasing the red component by the same amount in the shadows, midtones and highlights regions in the Merlion image. In Figure 3.12, it is seen that the red component is enhanced more in the darker regions of the image as compared to the lighter regions. Similarly, in Figure 3.13, the red component in the middle range of the image's tonal values is enhanced more than the dark and light regions. In Figure 3.14, the red component in the lighter regions of the image is enhanced more than the shadows and midtones.

Figure 3.12: Increasing the Red Color Balance in Shadows

Figure 3.13: Increasing the Red Color Balance in MidTones

Figure 3.14: Increasing the Red Color Balance in Highlights

3.3.2 Color Saturation

Saturation sometimes called chroma is the strength or purity of a color. Saturation represents the colorfulness of an area, judged in proportion to its brightness. The saturation slider has a range of 0 to 20 with 10 being the neutral point. When the saturation is set to 0, the image becomes grayscale. The maximum saturation has the value of 20. Figure 3.15 shows an image with the saturation value of 18. Notice the strength of the colors especially the red T-shirt. In contrast, setting a saturation value of 4 desaturates the image as seen in Figure 3.16.

Figure 3.15: Increasing Saturation with saturation set to 18

Figure 3.16: Desaturating the image with saturation set to 4

3.3.3 Brightness and Contrast

It is important to note the distinction between brightness and contrast. Brightness makes the image lighter or darker overall, while contrast either emphasizes or de-emphasizes the difference between lighter and darker regions. Figure 3.17 shows an image of three elephants in a pond. Figure 3.18 to 3.21 shows the effects of various settings of brightness and contrast. The range of the brightness and contrast sliders are from 0 to 20 with 10 being the neutral point.

When the brightness is increase, the whole image becomes brighter (see Figure 3.18). Notice the difference when the contrast is increased in the same image (Figure 3.20). For example, the legs of the elephant become brighter in Figure 3.18 and darker in Figure 3.20. This is because contrast enhanced the difference between light and dark regions while brightness increased the overall lightness of the image.

When brightness is decreased, the whole image slowly becomes darker and eventually becomes completely black when brightness is zero. Figure 3.19 shows the image when the brightness is reduced to 3. Decreasing the contrast also darkens the image as seen in Figure 3.21. However, when contrast is zero, the image does not become completely black. Instead, it is becomes a grayscale image with a constant value.

Figure 3.17: Original Image before Brightness and Contrast Adjustments

Figure 3.18: Image of Elephants with brightness value of 20

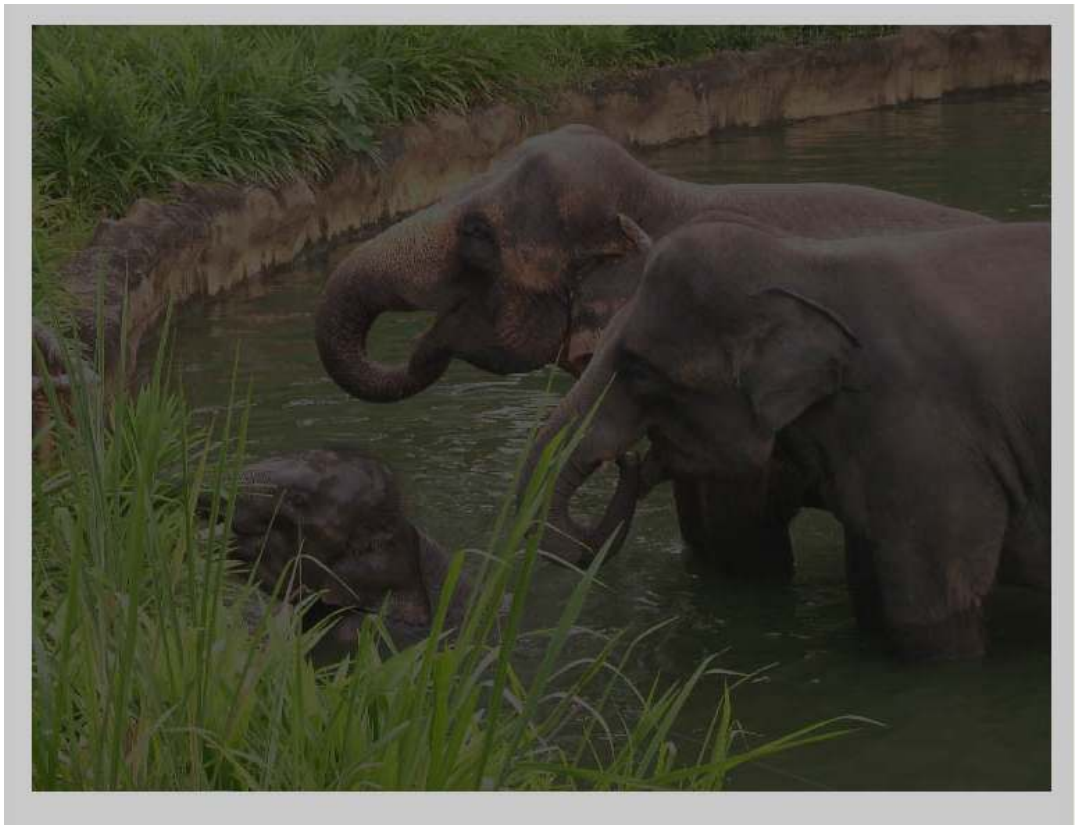

Figure 3.19: Image of Elephants with brightness value of 3

Figure 3.20: Image of Elephants with contrast value of 20

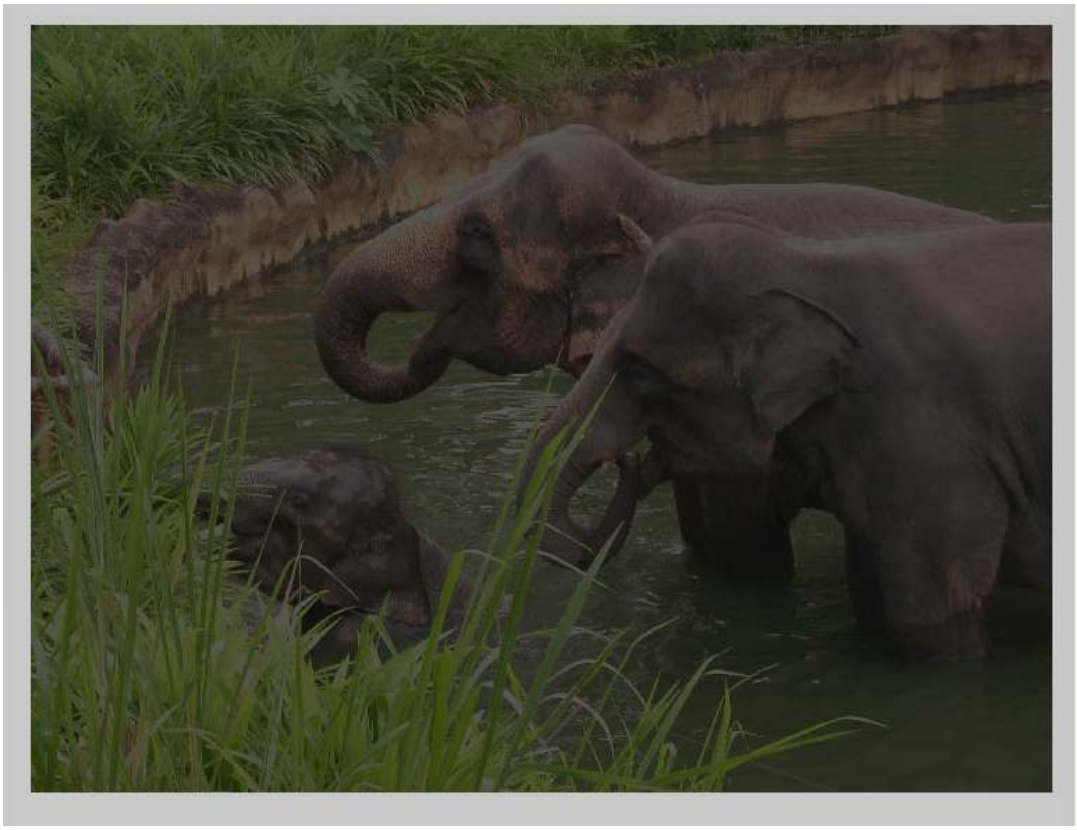

Figure 3.21: Image of Elephants with contrast value of 3

There is also an important distinction between Auto Contrast and the contrast parameter in this section. Auto Contrast is a non-linear transformation of all the three color channels in the image using histograms. Contrast on the other is a linear transformation on the color channels of the image.

3.3.4 Sharpening and Softening

All digital images, whether scanned or captured with a digital camera, share a common weakness: they're slightly soft or out of focus. This is due to physical limitations in the way input and output devices capture and reproduce color. To compensate for this softness, images must be sharpened but with great care, because sharpening can add noise, edge distortion and color artifacts.

In Figure 3.22, the image on the left is the original image of a Merlion and the other image show the Merlion after Auto Image with softening. This is contrasted with Figure 3.23 which shows the Merlion after Auto Image and sharpening. The user can turn on/off the sharpening/softening process by checking on the checkbox below the contrast slider.

Figure 3.22: Original Image (Left) and Effects of Softening on the Merlion (Right)

Figure 3.23: Original Image (Left) and Effects of Sharpening on the Merlion (Right)

Figure 3.24: Original Image (Left) and Sharpening on the Merlion (Right)

Sharpening is extremely dependent on the image size. To perform manual sharpening, the image must be viewed at the original resolution. There is therefore a separate menu for sharpening or softening of the image.

Figure 3.24 shows the Merlion image in the Sharpen/Soften Menu. The square image on the left is the original image and the right image is the output. The user can navigate around the image by depressing the left mouse button and moving the mouse. The user can also zoom in or zoom out for ease in navigating the image.

<u>Sharpen/Soften</u>

a. In PhotoViz, double click on the selected image to launch ImageViz

b. In ImageViz, select Image->Sharpen and Soften Image from the top menu
c. The Sharpen/Soften dialog box appears (Figure 3.25)
d. Adjust image using the sliders
e. Save the image if necessary

There are two sliders in the Sharpen/Soften menu. The first slider has a range of 0 for softening and 20 for sharpening. The neutral point is 10. The second slider is the radius or mask-size and has a range of 1 to 5. The greater the radius, the more the image is sharpened or softened and vice versa.

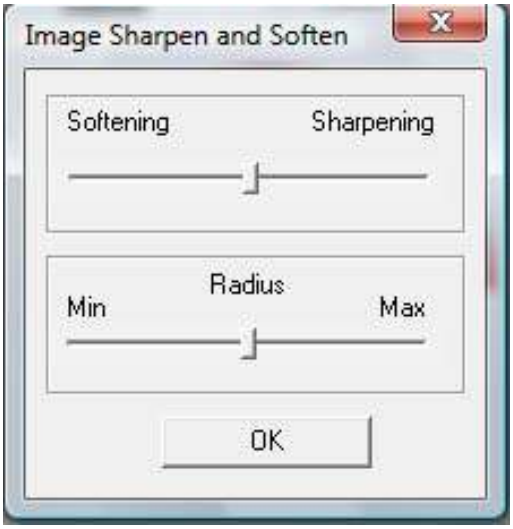

Figure 3.25: Sharpen/Soften Menu

3.4 Auto Options and Language Settings

This is only available in PhotoViz. Auto Options allows the user to specify or control the automatic image correction process. Both the Single and Batch image correction uses the parameters in Auto Options. There are two menus in Auto Options: Auto Image Options and Advance Options. The Auto Image Options menu (see Figure 3.26) specifies the tuning algorithms, output file size, JPEG file quality and the file format. Note that ImageViz also uses the settings in Auto Options.

PhotoViz supports three languages: English, Chinese and Thai. On startup, PhotoViz will automatically set the language according to the Windows language options. However, the user can overwrite the automatic language detection using the "Set as Default Language" checkbox.

Users can select the algorithms (i.e. AutoContrast, AutoLevels and AutoColor) using the checkboxes. By default, only the AutoContrast is selected. It must be noted that the Auto Level algorithm may sometimes result in color casts after correction. For Advance users, the parameters of the automatic tuning of images can be customized in the Advance Options Menu by clicking on the "Settings …" button.

PhotoViz can automatically format the file size and file format during batch image correction. This is a convenient automation tool when many images must be resized for presentation or web delivery. There are five settings for files sizes: low resolution, medium resolution, high resolution, original resolution and customized resolution. The low resolution file size is about 75K pixels (320x240 pixels), medium resolution is about 300K pixels (about 800x600 pixels), and high resolution is about 469K pixels (1024x768 pixels). Customized file sizes can also be specified using the slider which denotes the output file size as a percentage of the original size. The customized

size range from 0% to 200% with the default value at 100%. This output file size to select depends on the final objective – for a computer presentation a High resolution is recommended and the Original resolution in used for archive or backup purposes.

PhotoViz supports four output file formats. These formats are bmp, jpeg, tiff and png. The default value is the original file format. It is recommended to use the JPEG file format for digital photos and the quality of the images can be customize by the JPEG Quality drop down list. A description of the various file formats is found in the Glossary in Appendix B.

In the Advance Options Menu (Figure 3.26), the user can specify a list of parameters in color balance, color saturation, auto contrast, auto sharpening and auto levels. The Advance Options Menu is activated by clicking on the "Settings …" button in Figure 3.25. For white balancing, there are three basic colors: red, green and blue. The user can increase or decrease the color components of the image. For example, if the image has a bluish cast due to the lighting, the user can manually increase the red and the green components to reduce the bluish cast. The default values of red, green and blue components are 33.

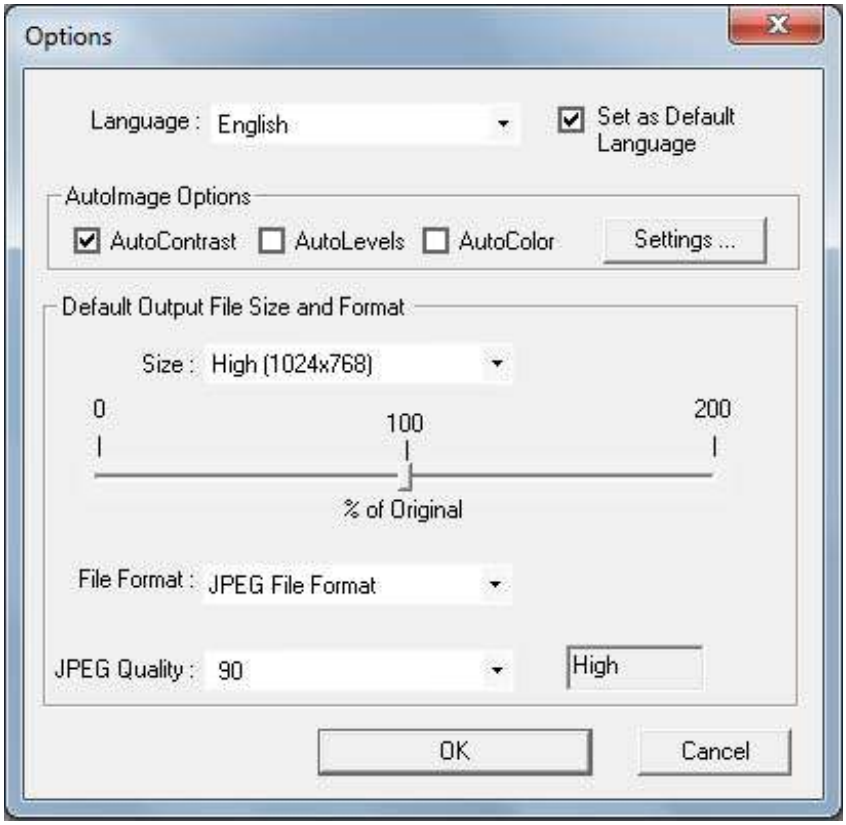

Figure 3.26: Auto Image Options Menu

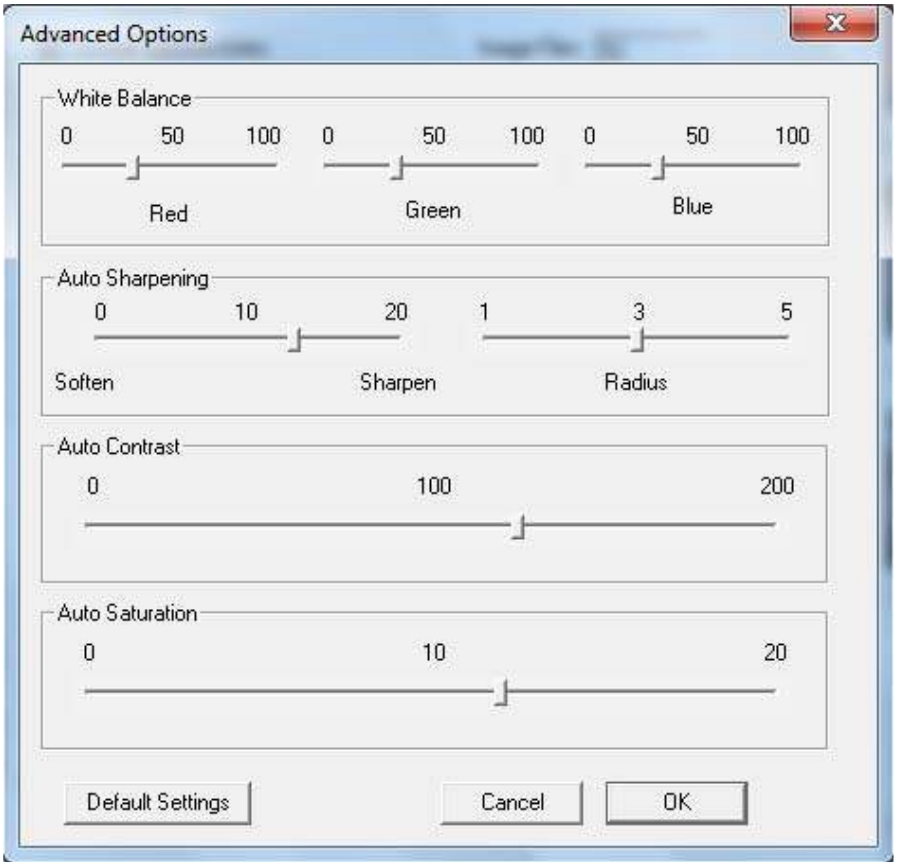

Figure 3.27: Advanced Options Menu

The contrast parameter is for the Auto Contrast algorithm. Increasing this parameter will increase the amount of contrast in the image and a contrast parameter of 0 will give minimum contrast. The default value of the contrast parameter is 125.

Saturation is the purity of the color or the amount of dilution with white. The saturation value in PhotoViz ranges from 0 to 20. A saturation value of 20 gives stronger color hues and a value of 0 results in a grayscale image. The default saturation value is 12.

The Auto Sharpening has two sliders. The first slider controls the sharpening or softening process. A value of 0 indicates softening while a value of 20 indicates sharpening. The neutral value (i.e. the original image) is 10. The second slider is the radius parameter and this parameter controls the amount of softening or sharpening. The range of the radius parameter is from minimum 1 to maximum 5. For example, maximum sharpening is obtained by setting the sharpening to 20 and the radius to 5. In the automatic image correction of PhotoViz, the default value for sharpening is 13 and for radius are 3.

4. File Management and Other Functions

PhotoViz and ImageViz provide many image and file editing functions. Image editing functions are image resize, rotate, undo and reset. File operations are file information, open, save as, delete, print, exit and help.

4.1 Image Rotate

This function is available in PhotoViz and ImageViz. Images can be rotated in Thumbnail or Image mode. Multiple images can also be rotate in Thumbnail mode. Three quick access icons are provided for rotation:

a. rotates image 90 degrees clockwise

b. rotates image 90 degrees anticlockwise

c. rotates image 180 degrees

After selection, photographs are quickly rotated by clicking on the above icons.

Photographs or images can also be rotated using the Rotate Dialog Box. Figure 4.1 shows the visual representation of the rotation results. As seen in Figure 4.1, images can be rotated in three orientations: 90 degrees clockwise, 90 degrees anti-clockwise and 180 degrees. If multiple images are selected for rotation, only the last selected image will be displayed even though rotation is applied to all the images.

Image can also be rotated in Image Viz. The main differences between rotation in PhotoViz and ImageViz are:

a. One image is rotated in ImageViz while multiple images can be rotated in PhotoViz
b. Images rotated in Image mode are not automatically saved. The user must save the changes by clicking the Save As Icon.

<u>Rotate Multiple Images</u>

a. In PhotoViz, select images to be rotated by depressing the control key and clicking the images with the mouse.
b. On the top menu, select Image->Rotate
c. Select the desired rotation (see Figure 4.1)
d. Uncheck the checkbox if you do not wish to overwrite the original file
e. Click on the OK button

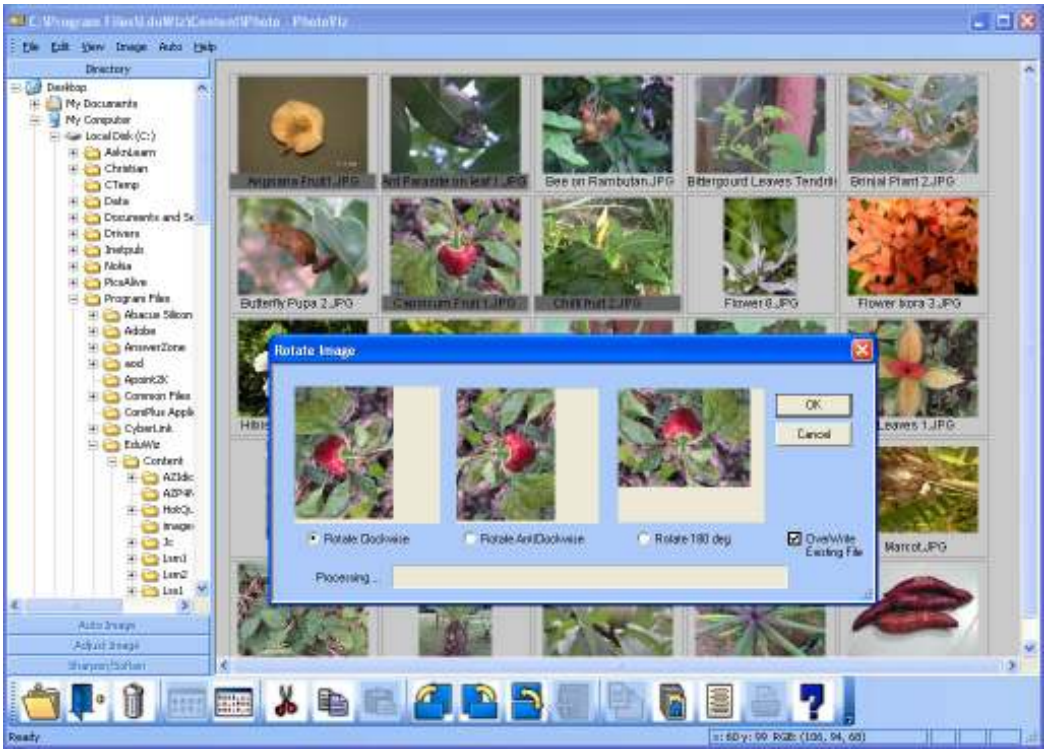

Figure 4.1: Rotate multiple images in PhotoViz

4.2 Image Resize

This function is available in PhotoViz and ImageViz. PhotoViz is a handy tool for resizing of multiple images for printing, emails, presentations or publishing to the web. The user can also resize a single image by clicking on the Resize Icon . A dialog box shown in Figure 4.2 appears with the size of the currently selected image. Click on the checkbox if the proportion or the aspect ratio between the width and height of the image is to be maintained. If the width or height is changed, PhotoViz will automatically calculate the other parameter. In PhotoViz, the user can also choose to overwrite the existing file. The Overwrite Existing File checkbox is disabled in the ImageViz.

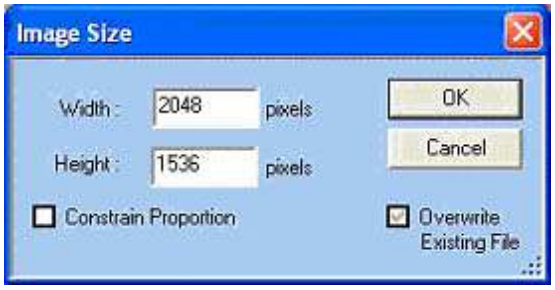

Figure 4.2: Resize Dialog Box

4.3 Image Zoom

This function is only available in ImageViz. ImageViz optimizes the viewing size of the image to the display area. This means that the image is automatically scaled to fit the display area (in gray). Most modern digital cameras have very high resolution and display image is usually scaled downwards to fit the display.

For customized viewing, users can use the Zoom In or Zoom Out icons to scale the images. The Zoom Out Icon will reduce the image (Figure 4.3) while the Zoom In Icon (Figure 4.4) will enlarge the image in the display. The size of the original image is not changed.

Figure 4.3: Viewing Image at 10% of original size (Zoom Out)

Figure 4.4: Viewing Image at 22% of original size (Zoom In)

4.4 File Information and File Rename

This function is available in PhotoViz and ImageViz. When the File Properties Icon is clicked, a dialog box shown in Figure 4.5 is displayed. In Figure 4.5, the first parameter is the file name. The file name is editable and can be changed.

Two types of properties are displayed: image properties and camera properties. The image properties show the image name, image size (in pixels) and the number of bits per pixel. The imaging parameters are displayed in the camera properties. Note that these imaging parameters are only available in JPEG file formats only. Most camera manufacturers stored imaging parameters using the EXIF standard. The EXIF information displayed by PhotoViz is: Date/Time, Camera Made, Camera Model, F-Stop, Shutter Speed, Focal Length, ISO Rating and Flash Used. PhotoViz also preserves the EXIF information when a new file is created.

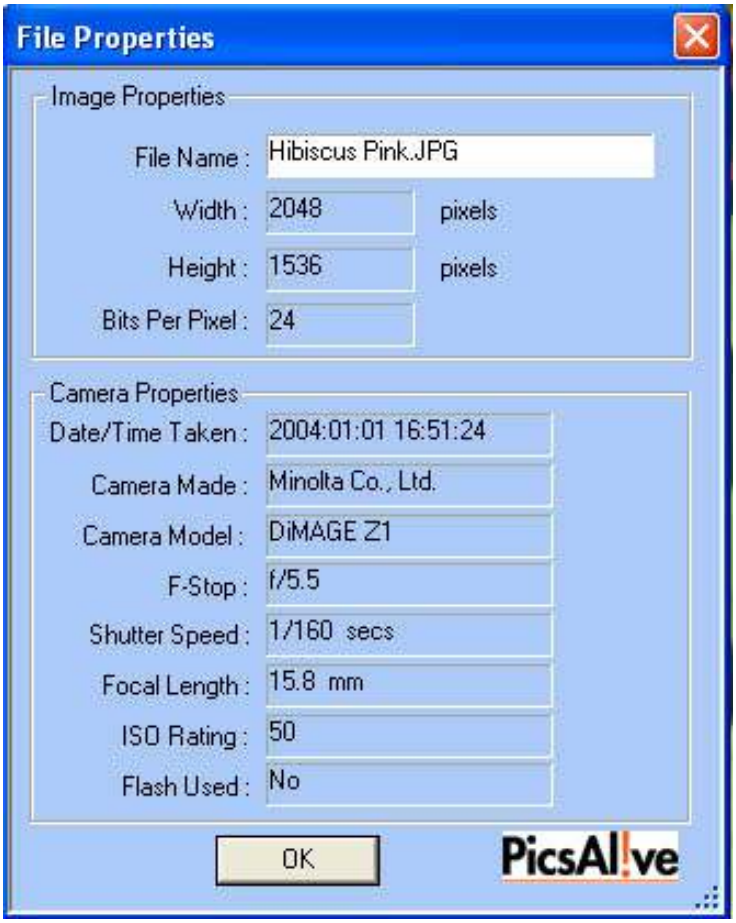

Figure 4.5: File Properties Dialog Box

4.5 Image Reset and Image Undo

This function is available in ImageViz. The Reset function restores the image to its original state. This function is useful when the useful wants to discard all the tuning process and starts over again.

The Undo function on the other hand restores the image to the state of the previous operation i.e. only the last image operation is removed.

4.6 Print

This function is available in PhotoViz and ImageViz.

Print Image

a. In PhotoViz, select image to be printed

b. Click on the Print Icon

c. Select Landscape or Portrait layout

d. Click on the OK button

It is advisable to sharpen the image before printing as printers tend to soften printouts due to limitations in color reproduction.

4.7 Image Open and Save As

This Image Open function is available in PhotoViz and ImageViz. The Save As function is only available in ImageViz. Images can be opened by double clicking of the image in PhotoViz or by clicking the Open Image Icon.

Image Open

a. Select image in PhotoViz

b. Click on the Open Image Icon or by Double clicking the image

Image Save As

a. In ImageViz, click the Save As Icon and a dialog box appears

b. In the dialog box, select the directory to save image, key in the filename and select the file format

c. Click on the OK button

d. For JPEG files, select the file quality and click on the OK button

4.8 Delete

This function is available in PhotoViz and ImageViz. Single or multiple file deletions are supported.

Image Delete

a. Select single image or multiple images in PhotoViz

b. Click on the Delete Image Icon and a dialog box appears (see Figure 4.6)

c. Click on OK to confirm deletions

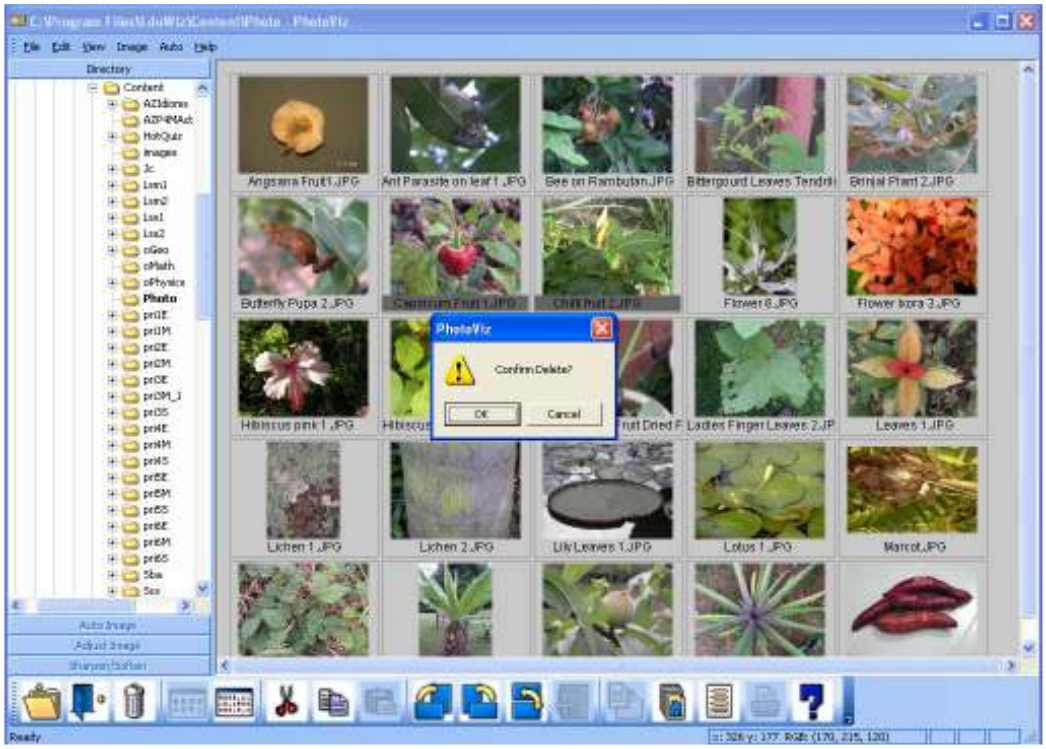

Figure 4.6: File Deletion Dialog Box

4.9 Launching Application

This function is available in PhotoViz and ImageViz. Microsoft Paint can be launched within PhotoViz to further edit the image.

<u>Launching Microsoft Paint</u>

a. Select image to edit
b. In the top menu, select Help->Launch Application to Edit
c. If multiple images are selected in PhotoViz, only the last selected image will be used

4.10 Exit

This function is available in PhotoViz and ImageViz. The Exit Icon will quit the PhotoViz application. Remember to save the image in Image mode before clicking on the Exit Icon.

5. Accessing Embedded Content

The Content Access Control (CAC) module in PhotoViz embeds user content into images and can restricted access to the encrypted content using passwords and registration photos. The CAC embeds two types of data: a text message (or Photo Message) and file attachment (or Content). The following content can be embedded into images:

a. Documents and files. Any single document regardless of the file format and file extension e.g. Microsoft Office documents, PDF files, image files etc. For multiple files, it must first be zipped into a single file
b. URL. If an Internet is available, the URL will automatically be launched using the Internet Explorer (IE) browser
c. Web-based content. The web content (e.g. a product website) must be zipped into a single file. An index file to the web content is then specified. PhotoViz will launched the web content using the index file in the IE browser
d. Windows Applications. Any Win 32 application (*.exe) can be embedded. The difference between this content and the documents is that the application will automatically be executed by PhotoViz.

The CAC module in PhotoViz has a 30-day trial and a licence must be purchased at www.picsalive.com after the trial period. If users do not purchase a licence after the trial period, a free online encryptor is available in the Mail ++ portal (www.mailplusplus.com).

5.1 Registration Photos

Registration Photos are special images that must first be viewed before users can access content in subsequent images. Photo Messages and Photo Contents can be personalized so that only selected recipients will be able to access the messages or contents encrypted in the image. Personalization of Photo Messages and Contents creates a "personal" community or a social network structure where members can exchange photos, share feelings, notes securely.

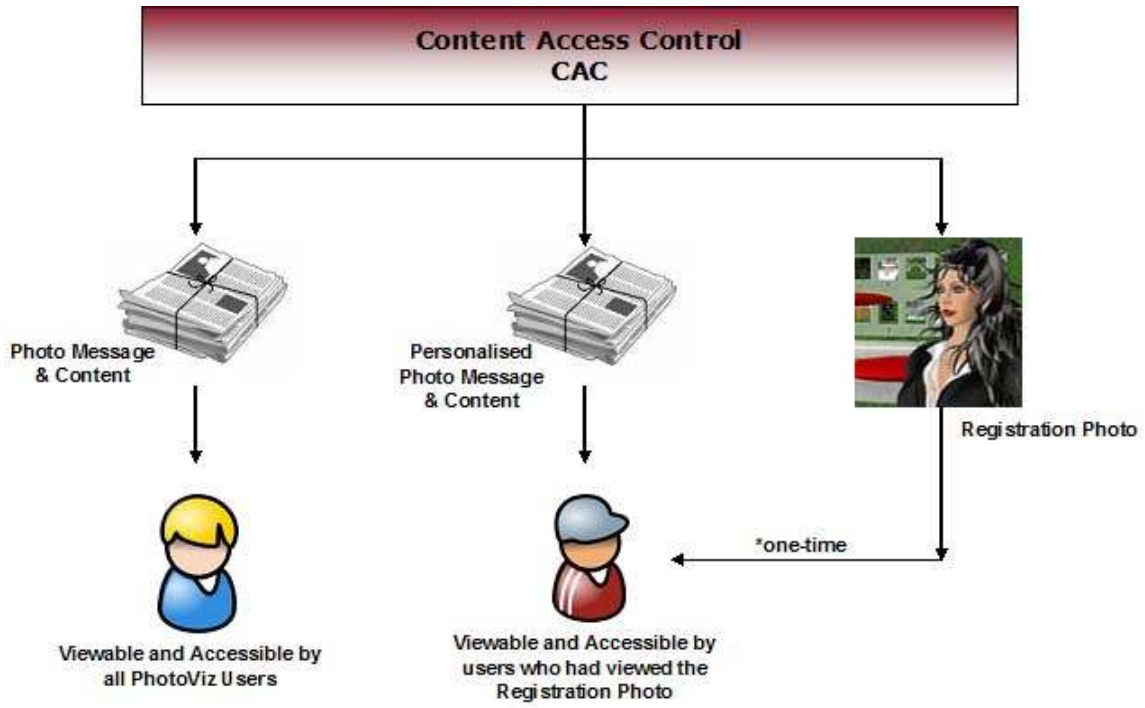

Figure 5.1: Registration and Personalization of Photo Messages and Photo Contents

Figure 5.1 shows an overview of the registration and personalization process. If a user wants to create a secure community with a selected audience, the user must first send a Registration Photo to all members in the group. When members of the group view the Registration Photo in PhotoViz, they are automatically registered and will be able to read all future Photo Messages or Contents from that member i.e. one-time registration. If Photo Messages or Contents are not personalized, all users of PhotoViz will be able to access and read the contents.

5.2 Message and Content Encryption

Users can embed message, content, create Registration Photo and password-protect their data in the CAC module.

Encryption

a. Select a photo in the main PhotoViz user interface

b. Click on the icon to launch the CAC module (Figure 5.2)

c. Select a new output image filename if necessary. By default, "_en" is appended to the filename

d. Enter your text message in the Hidden Message box

e. Enter a password to protect the content if needed

f. Select the content type by checking the appropriate checkbox

g. Upload file using the "Browse …" button. For Zip files, an index file must be specified

h. To create a Registration Photo, check on the Personalized Message checkbox and the Registration Photo checkbox. Enter UserID to identify the group or person. All subsequent images to the same group or person, the Enable Registration checkbox need not be checked

i. Click on the "Encrypt" button

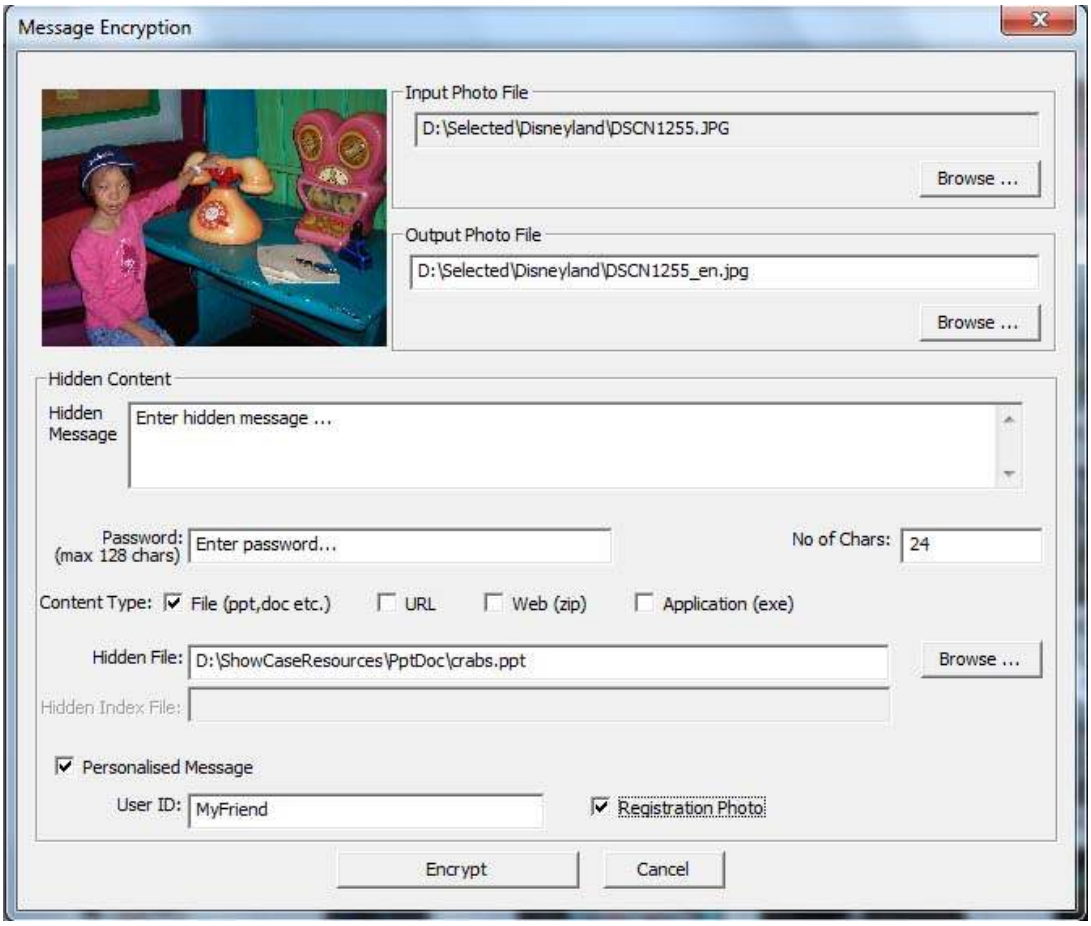

Figure 5.2: Photo Message and Content Encryption

5.3 Accessing Photo Messages and Photo Contents

There are two ways to access Photo Messages and Photo Contents in PhotoViz. The first method is to select the image in Display Area. The Photo Message, if available, is displayed on the dialog box located on the bottom of the left hand side of the user interface (see Figure 5.3).

Another way to access Photo Messages is to click on the quick access icon . A separate dialog box showing the photo as well as the Photo Message is displayed as shown in Figure 5.3.

Photo Contents are currently classified into three categories: Web contents, File Attachment and Windows Applications. PhotoViz automatically detects the type of Photo Contents and the appropriate button is displayed. Figure 5.4 shows an Adobe Flash contents being embedded into a photo. The web contents are launched upon the clicking of the "View Web Contents" button.

Figure 5.3: Access a Photo Message

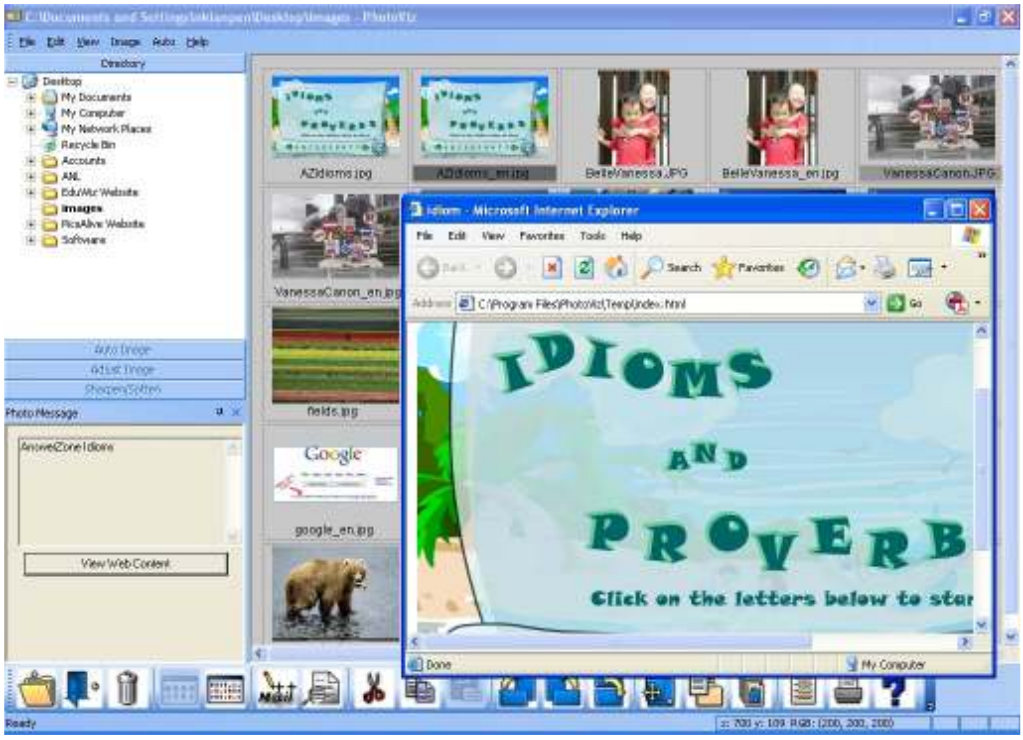

Figure 5.4: Accessing a Photo Web-Contents

If the contents are password protected, a dialog box to enter the password is displayed as shown in Figure 5.5. This is an added security feature to prevent unauthorized access to the contents encrypted in the images. The maximum length of the password is 128 characters.

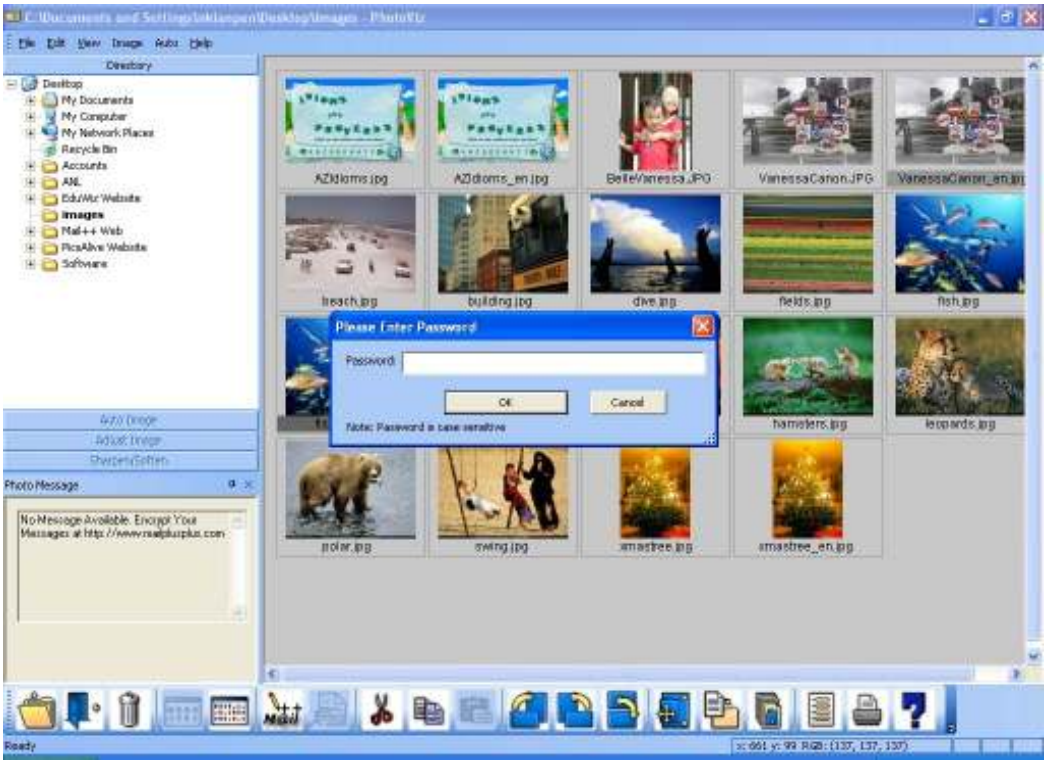

Figure 5.5: Password Protection

5.4 Accessing Embedded Media from iPhone

Images from the iPhone app - Active Photo can be emailed or through direct transfer between the iPhone and computer via a WiFi connection. To access embedded media and data, select the image in PhotoViz and click on the quick access icon . A dialog box display the media embedded by the iPhone is shown in Figure 5.6.

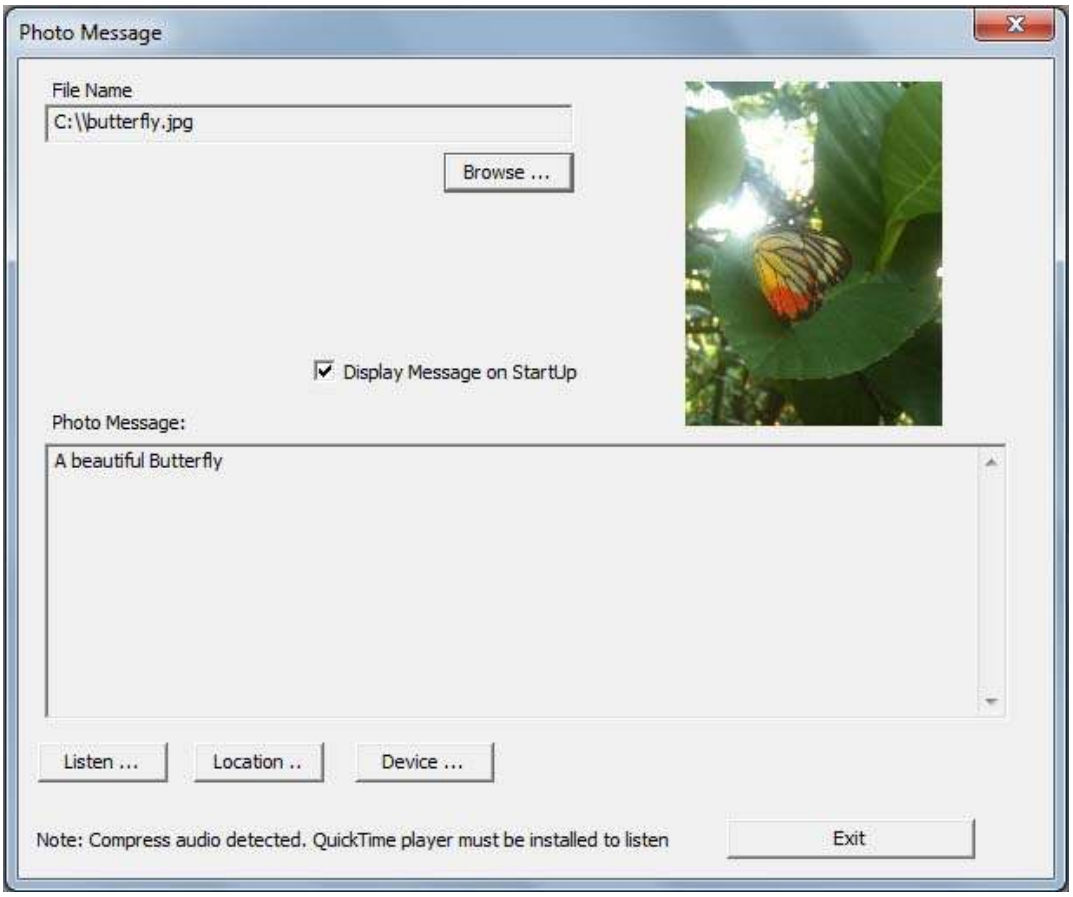

Figure 5.6: Embedded Content from iPhone

Figure 5.6 shows the message, audio recording, location data and the device parameters. There are two types of audio recordings: compressed (*.caf file format) and uncompressed (*.aif file format). By default, PhotoViz uses the Windows Media Player for uncompressed audio. To listen to compressed audio recordings, a QuickTime player is needed. When the "Location …" button is clicked, an Internet Explorer browser showing the location where is the image is taken will be launched. The location is displayed using Google Maps.

The phone's parameters are shown when the "Device …" button is clicked (Figure 5.7). As seen in Figure 5.7, phone details such as name, identification number, model, system, system version are recorded. The time stamp as well as the location data are also shown. These parameters enable users to verify the authenticity of the image.

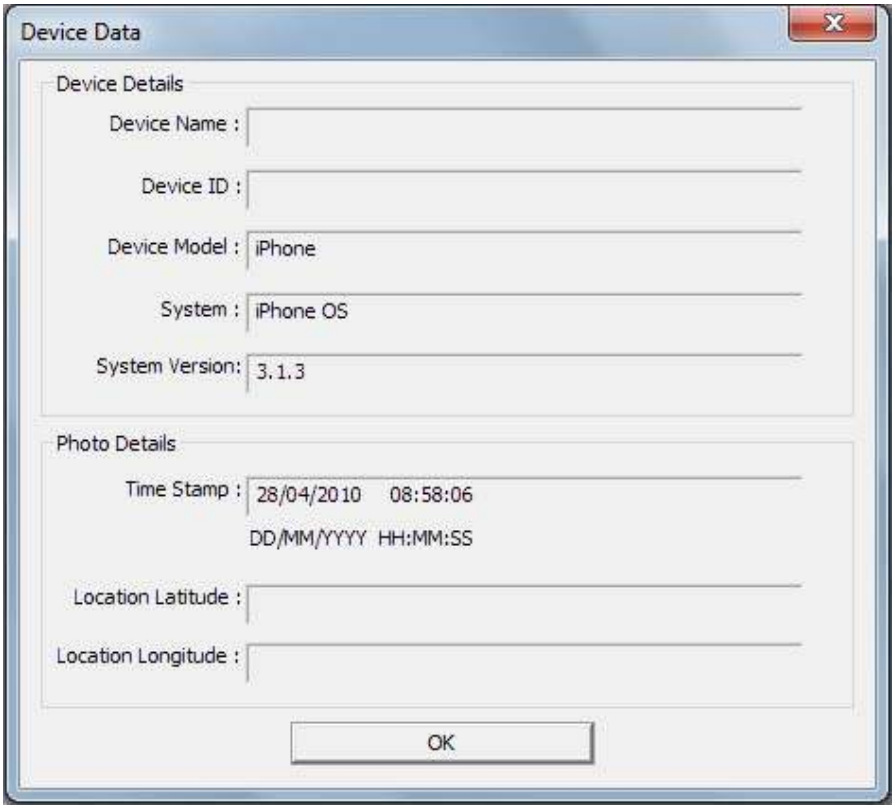

Figure 5.7: iPhone Parameters, Time Stamp and Location Data

Appendix A : List of Function Icons

Icons	Function
	File Open
	Save As
	Exit Application
	Delete Photo
	Cut Selection
	Copy Selection
	Paste Selection
	View Photos as Large Icons
	View Photos as Small Icons
	Encrypt Messages and Contents
	Access Hidden Messages and Contents
	Original Image
	Image After Auto Image
	Original Image (Left) and Image After Auto Image (Right)

	Automatic Image Correction for multiple images in a directory
	Manual Image Adjustment (Color, Saturation, Brightness and Contrast)
	View Previous Photo
	View Next Photo
	Rotate Photo Anticlockwise by 90 degrees
	Rotate Photo Clockwise by 90 degrees
	Rotate Photo 180 degrees
	Resize Photo
	Image Crop
	Red Eye Removal
	File Properties of Photo
	Auto Options
	Zoom In
	Zoom Out
	Print
	Help

Appendix B : Glossary

Algorithm	A sequence of instructions that defines a method of solving a problem.
Bit	A binary digit: a zero or one.
Bitmap	A grid of pixels used to generate an image.
Blue	A primary color of light in the RGB color model.
Brightness	An attribute of color according to which an area looks more or less light.
Byte	Eight bits.
Channels	The individual color or grayscale components of an image. A gray scale has just one channel, whereas an RGB image has three channels, one each for red, green and blue components.
Color Cast	An overall color imbalance in an image, sometimes limited to a specific tonal range.
Color Correction	Altering the tonal properties of an image to optimize its appearance.
Color Model	A coordinate system used to numerically describe colors such as CIELAB, RGB, and CMYK.
Color Space	A specific variant of a color model, with a defined color gamut. For example, the RGB color model encompasses a number of color spaces including Adobe RGB, Color Match RGB and sRGB.
Color Temperature	The temperature in degrees Kelvin (K) of a theoretical black box, heated to produce a certain color light.
Contrast	The tonal range between the lightest and darkest points in an image. Also the tonal difference between two parts of an image.
Cropping	Removing unwanted portions in an image to reduce the size of the image.
Cyan	One of the subtractive primaries used in color printing devices. Cyan ink absorbs red light and reflects green and blue light.
Digital	Any system in which information is stored as discrete numerical values.
Digitize	To convert analog signals or other continuous quantities into discrete digital values.
Dynamic range	The difference between the minimum and maximum values that can be attained in any system.
EXIF	EXIF stands for Exchangeable Image File Format. EXIF is a variation of JPEG, used by almost all digital cameras to record extra interchange information to image files as they are taken.
GIF	Graphics Interchange Format, a widely used file format for images and graphics, particularly for the Web.
Grayscale	An evenly graduated series of tones from black to white and containing no color.
Halftone	An image that has been photographically or digitally transformed into an array of dots in order to be printed.
Highlight	The brightest part of an image, especially the brightest part that still retains distinct details.
Histogram	A graph of tonal contents of an image from highlights to shadows, with the height of the graph indicating the number of pixels at each brightness level.

Hue	The name of a color such as blue, green or orange. Also, the property of color that corresponds to wavelength.
JPEG	Joint Photographic Experts Group, a standard technology for compressing image files.
K	See Kelvin.
Kelvin	A unit of measure used for color temperature, based on the centigrade scale extended down to absolute zero (0K or -273.1C).
Lightness	The property of a color that distinguishes white from gray or black.
Megabyte	A million bytes; a thousand kilobytes.
Midtones	The middle part of the tonal range of an image, between the quarter tones and the three-quarter tones.
Photo Contents	File attachments, Windows Applications and Web-based Content are encrypted into images. Photo Content can be executed and viewed in PhotoViz.
Photo Messages	Secret or hidden text messages encrypted into an image. Photo messages can be personalized i.e. only registered users can access the messages. A Registration Photo is used to register users.
PNG	PNG is an extensible file format for the lossless, portable, well-compressed storage of raster images. PNG provides a patent-free replacement for GIF and can also replace many common uses of TIFF. Indexed-color, grayscale, and true color images are supported, plus an optional alpha channel for transparency. Sample depths range from 1 to 16 bits per component.
Pixel	A picture element – the smallest area that can be sampled or addressed by a digital device or system.
Quartertones	The tonal areas between the highlights and midtones.
Registration Photo	This image enables the viewer to read all future photo messages from the sender.
Resample	Changing the size of an image file by altering its resolution. Sampling down reduces files size, and involves minimal data loss. Sampling up increases file size and relies on interpolation, a process in which the software makes up pixel values based on the colors of surrounding pixels. This always results in a loss of detail.
Resolution	The smallest sample size that a digital device can detect or produce.
RGB	The red, green blue color model used in color photographic film, monitors, scanners, digital cameras and film recorders.
Saturation	The strength or purity of a color, sometimes called chroma. Saturation represents the colorfulness of an area, judged in proportion to its brightness.
Shadow	The darkest part of an image containing significant visible detail.
Sharpening	The process of increasing the appearance of detail in an image by artificially exaggerating contrast differences around edges.
Three-quarters tones	The tonal range between the midtones and the shadows.
TIFF	Tag Image File Format, widely used file format developed at Aldus and now controlled by Adobe Systems. TIFF files are used for black and white, grayscale, RGB and CMYK images.
White balance	The process of adjusting the RGB signals in a device such as a monitor to make it produce a neutral white.
White point	The color temperature at which a monitor combines red, green and blue phosphors to create pure white.