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Filters in motion

Piyaluk Benjadol

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FILTERS IN MOTION

by

Piyaluk Benjadol

August, 1995
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Acknowledgements

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I would like to also thank my friends, my family, and my classmates in Computer Graphics Design at RIT—who supported me throughout this endeavor.

The “Filters in Motion” interactive project and paper were created entirely on an Apple Macintosh Quadra 660AV configured with 24 MB of RAM, an APS 540 MB Hard Drive, a Wacom Graphics Tablet, a 16” Apple Monitor, and an Apple Personal LaserWriter 320. Software used for this project and paper are:

- Adobe Photoshop 2.5.1
- Macromedia Director 4.0
- SoundEdit Pro
- QuarkXPress 3.3
- HSC Software: Kai’s Power Tools 2.0
- Finder Hider.

All images used in each filter movie and Appendix are scanned from Tony Stone Images Catalog Volume 6 and 7 and credited to the following photographers: (in alphabetical order)

- Battensby, Simon
- Brierley, Paul
- Ellis, Sean
- Lefkowitz, Lester
- McArthur, Pete
- Mercer, Ralph
- Taplin, Myron
- Walker, Spike.

Fonts used in the interactive project are Draft Plate from TypeCase Volume No.3 and Helvetica. Font used for thesis paper is Futura.
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The purpose of this thesis is to create and experiment with new techniques of applying Adobe Photoshop filters—both standard and plug-in—to still images, and arranging them in a sequence of frames in Macromedia Director to create the effect of motion or movement of those still images. This study will be presented as an interactive project which lets the user explore and navigate through the information provided.

Significantly, as Adobe Photoshop is one of the most powerful image-editing applications for designers, photographers, and illustrators, the uses of this program with their standard and compatible plug-in filters are widely expanded in different ways. Additionally, filters offer possibilities to combine their potentially spectacular effects with other techniques.

In the process of experimenting, Adobe Photoshop: a digital image processing program, and Macromedia Director: an authoring tool for interactive multimedia with animation environment, were used as tools along with other applications—such as SoundEdit Pro, and Finder Hider.

As there are almost forty-five standard filters and numerous plug-ins, this project focused on seven selected filters—six standard and one plug-in. The final implementation is an interactive project which lets users experiment with these new techniques while navigating through the potential information.

These new techniques, which combine the advantages of the two applications, would be very useful to be applied by viewers. A basic understanding of computer technology, as well as basic familiarity about Adobe Photoshop and Macromedia Director, are assumed.

Definition of terms used in this project are:
• Filter—Photoshop's small programs, which could be selected from the Filter menu to run on an entire image or a selection, work by manipulating the bits of data that make up the digital image.
• Motion—The effect of movement which is manipulated by applying some filters on a still image.
Review of the Related Literature

Adobe Photoshop is one of the most powerful visual communication tools. The program has expanded the visual vocabulary of designers, photographers, and illustrators to express their creativity. It also provides a laboratory for synthesizing textures, patterns, and special effects that can be applied to photos, graphics, or video.

Photoshop's filters are small programs that can be selected from the Filter menu to run on an entire image or a selection. These filters work by manipulating the bits of data that make up a digital image. This manipulation or "pixel processing" can create an unlimited number of permutations of the original image. Filters can be applied directly or shown in the preview windows that take the user into visual realms of infinite magnification, color, and pattern. The variety and scope of filters seem endless.

Adobe Photoshop, like many other applications such as Adobe Premiere or Fractal Design Painter, has two kinds of filters: built-in and plug-in. Built-in filters—also known as native or standard filters—are an integral part of the program and are always available in Photoshop's Filter menu. Plug-in filters are like special-effects programs—software add-ons—that "plugged into" a special folder. The Preference dialog box allows users to inform Photoshop where the Plug-ins folder is located.

Filter Categories:

1. Special-effects filters have no precedent in natural-media artwork or photography and produce a unique digital result.

2. Art-effects filters emulate natural media, such as watercolor or colored pencil, or cause an image to take on the appearance of another medium.

3. Distortion filters displace pixels by twisting or twirling them, or by using any technique to shift their shape.

4. Production filters are used by prepress houses to prepare images for print, multimedia, or video output. They emulate darkroom techniques or produce new effects for print or video jobs.

5. Conversion filters include: conversion filters proper, which transform an image from one file format to another; compression filters; format conversion filters; and special types of import transformation filters such as Photo CD.

6. Hardware Plug-Ins: All filters that add modular functionality to Photoshop and other graphics applications are "plug-ins." However, not all plug-ins are "filters" as we define them. Some are no more than interfaces that allow a particular external device (such as a scanner, printer, or digital camera) to interact with Photoshop or with other graphics applications.
Photoshop Standard
Filters

Photoshop 2.5.1 comes equipped with more than 40 filters. The filters are arranged hierarchically in the Filter menu according to their function.

1. Blur Filters:
   1.1 Blur
   1.2 Blur More
   1.3 Gaussian Blur
   1.4 Motion Blur
   1.5 Radial Blur

2. Distort Filters:
   2.1 Displace
   2.2 Pinch
   2.3 Polar Coordinates
   2.4 Ripple
   2.5 Shear
   2.6 Spherize
   2.7 Twirl
   2.8 Wave
   2.9 Zig Zag

3. Noise Filters:
   3.1 Add Noise
   3.2 Despeckle
   3.3 Median

4. Sharpen Filters:
   4.1 Sharpen
   4.2 Sharpen More
   4.3 Sharpen Edges
   4.4 Unsharp Mask

5. Stylize Filters:
   5.1 Color Halftone
   5.2 Crystallize
   5.3 Facet
   5.4 Mosaic
   5.5 Diffuse
   5.6 Emboss
   5.7 Extrude
   5.8 Find Edges
   5.9 Trace Contours
   5.10 Fragment
   5.11 Lens Flare
   5.12 Pointillize
   5.13 Solarize
   5.14 Tiles
   5.15 Wind

6. Video Filters:
   6.1 NTSC Colors
   6.2 De-Interlace

7. Special-Purpose Filters:
   7.1 Custom
   7.2 High Pass
   7.3 Maximum
   7.4 Minimum
   7.5 Offset
Plug-in Filters
(These filter sets are alphabetically listed by the company name.)

• ALARIS
  1. Apertura
    1.1 TIFF
    1.2 HandshakeCT
    1.3 HandshakeLW
    1.4 AccessCT
    1.5 AccessLW

• ALDUS
  Gallery Effects: Three separate volumes of plug-in filters (16 filters per volume) apply a variety of dramatic, photographic, and natural-media effects to images.

  2. Gallery Effects; Classic Art, Volume 1
    2.1 Chalk & Charcoal
    2.2 Charcoal
    2.3 Chrome
    2.4 Craquelure
    2.5 Dark Strokes
    2.6 Dry Brush
    2.7 Emboss
    2.8 Film Grain
    2.9 Fresco
    2.10 Graphic Pen
    2.11 Mosaic
    2.12 Poster Edges
    2.13 Ripple
    2.14 Smudge Stick
    2.15 Spatter
    2.16 Watercolor

  3. Gallery Effects; Classic Art, Volume 2
    3.1 Accented Edges
    3.2 Angled Strokes
    3.3 Bas Relief

    3.4 Colored Pencil
    3.5 Diffuse Glow
    3.6 Glowing Edges
    3.7 Grain
    3.8 Note Paper
    3.9 Palette Knife
    3.10 Patchwork
    3.11 Photocopy
    3.12 Rough Pastels
    3.13 Sprayed Strokes
    3.14 Stamp
    3.15 Texturizer
    3.16 Underpainting

  4. Gallery Effects; Classic Art, Volume 3
    4.1 Conte Crayon
    4.2 Crosshatch
    4.3 Cut Out
    4.4 Glass
    4.5 Halftone
    4.6 Ink Outlines
    4.7 Neon Glow
    4.8 Paint Daubs
    4.9 Plaster
    4.10 Plastic Wrap
    4.11 Reticulation
    4.12 Sponge
    4.13 Stained Glass
    4.14 Sumi-E
    4.15 Torn Edges
    4.16 Water Paper

• ANDROMEDA FILTERS
  5. Andromeda Series 1
    5.1 cMulti
    5.2 Designs
    5.3 Diffact
    5.4 Halo
    5.5 Prism
    5.6 Rainbow
    5.7 Reflection
    5.8 sMulti
5.9 Star
5.10 Velocity

6. Andromeda Series2
- 3D Surface Mapping

7. Andromeda Series3
- Mezzo Filter

- CANDELA
8. ColorCrypt
9. PrintCal-PI
10. ScanCal

- DPA SOFTWARE
11. Intellihance GS/RGB/CYMK
12. IntellihancePro GS/RGB/CYMK

- HSC SOFTWARE
13. Kai's Power Tools 2.0: A set of over 30 special-effects filters for Photoshop and other programs that use plug-in technology.
  - Blur Submenu:
    - Smudge Darken/Lighten
  - Distort Submenu:
    - Glass Lens
    - Page Curl
  - KPT Submenu:
    - Fractal Explorer
    - Gradient Designer
    - Gradients on Paths
    - Texture Explorer
    - 3D Stereo Noise
    - Fade Contrast
    - PixelStorm
    - PixelWind
    - PixelBreeze
    - Seamless Welder
    - Selection Info
  - Noise Submenu:
    - Grime Layer
    - Hue Protected Noise
    - Special Noises; Red, Green, and Blue
  - Stylize Submenu:
    - Diffuse More
    - Find Edges/Invert
    - Find Edges/Charcoal
    - Find Edges/Soft
    - Scatter Horizontal
  - Sharpen Submenu:
    - Sharpen Intensity
  - Video Submenu:
    - Cyclone

- KNOLL SOFTWARE
19. CyberMesh

- KODAK
20. Photo CD Acquire

- MICROFRONTIER
21. Pattern Workshop
  - 21.1 Pattern Fill
  - 21.2 Pattern Edit

- PERFORMANCE RESOURCES
22. Razza Matazz Filters
  - 22.1 Fade
  - 22.2 Tremor
  - 22.3 Sepia
  - 22.4 Split 128
  - 22.5 RGB Swap
  - 22.6 FrameMaker
  - 22.7 Modulus
  - 22.8 Trig

- PREPRESS TECHNOLOGY
23. Spectre Filters
  - 23.1 Color Correction
  - 23.2 Unsharp Masking

- RING OF FIRE
24. FotoMagic
  - 24.1 Color Expander
  - 24.2 Color Filters
  - 24.3 Color Noise
  - 24.4 Color Ranger
  - 24.5 Color Ranger II
  - 24.6 Color Reversal
  - 24.7 Color Scaler
  - 24.8 Color Shifter
  - 24.9 Color Switcher
• SAVITAR
25. ScanMatch

• SECOND GLANCE SOFTWARE
26. PhotoSpot
  26.1 Acetone
  26.2 Chromassage
  26.3 Chromapoint
  26.4 Laserseps
  26.5 Paint Thinner
  26.6 PhotoSpot

• SOUTHWEST SOFTWARE
27. Color Encore for Scanners

• STORM TECHNOLOGY
28. PicturePress

• TOTAL INTEGRATION
29. FASTedit/CT and PRO
30. FASTedit/DCS
31. FASTedit/TIFF
32. Handshake/LW
33. IRIS/CT
34. FASTedit/VUE
35. FASTedit/Filmstrip
36. FASTedit/2.5
37. Epilogue PS

• ULTIMATTE
38. PhotoFusion

• XAOS TOOLS
39. Paint Alchemy: A user-configurable brush-stroke filter that is furnished with 36 predefined brushes and 75 preset styles such as Pointillist, Screen Door, Ripple, or Sponge Print. In addition, any gray-scale PICT file can be imported as a brush. 3
40. Terrazzo: Plug-in filter that generates kaleidoscopic repeating patterns from any PICT or native Photoshop-formatted image in RGB, CMYK, or Grayscale modes. 4

• SHAREWARE & FREeware FILTERS
41. Adobe/Spectral

42. Paul Badger
  42.1 Lumpy Noise
  42.2 Vector Graph
  42.3 Radar

43. Jim Bumgardner
  - Expression 3.0

44. Jeff Burton
  - Back Swap

45. Chris Cox
  45.1 Average
  45.2 BitShift
  45.3 Total Noise
  45.4 Fractal Noise
  45.5 Plaid
  45.6 Psycho
  45.7 UnAlias
  45.8 Edge 3X3
  45.9 Erosion
  45.10 Dilation
  45.11 Skeleton
  45.12 Colorkey
  45.13 Chromakey
  45.14 Fastkey

46. John Knoll
  - Cross-Stitch

47. Thomas Knoll

48. Sucking Fish Series
  48.1 Deko-Boko
  48.2 Mr. So’Kan

49. Kas Thomas
  - Warm Contrast
This project focuses on the motion effects of the filters which are applied to a still image, by experimenting with all standard filters and some plug-ins. Finally, six standard filters and one plug-in are selected and discussed in detail.

Filters selected to be used in this project:

**Standard Photoshop filters:**
1. Blur: Radial Blur
2. Distort: Ripple
3. Distort: Spherize
4. Distort: Twirl
5. Distort: Wave
6. Stylize: Extrude

**Plug-in filter:**
7. Distort: KPT Glass Lens
   Normal/Bright/Soft

**Descriptions of Selected Filters:**

1. **Blur: Radial Blur Filter**

   **Type:** Special-effects filter

   **Description:** Radial Blur shifts and blurs pixels with two different methods of application. The Spin method blurs pixels in a circular fashion, while the Zoom method blurs pixels as if one was moving in or out of the image.
Radial Blur: 10/Spin/Good

Radial Blur: 10/Zoom/Good
2. Distort: Ripple Filter

Distort: Ripple dialog box.

Type: Distortion filter

Description: The Ripple filter distorts the image in small, medium, or large curves that affect the image horizontally and vertically. The ripple can be set intensively by entering a number from 1 to 999.
Ripple: 100/Small

Ripple: 210/Medium
3. Distort: Spherize Filter

Distort: Spherize dialog box.

Type: Distortion filter

Description: The Spherize filter gives an image the appearance of being bubbled in an outward or inward direction, depending on the positive or negative percentage entered in the dialog box. The selection can be affected on the horizontal or vertical axis only. When the selection is not square, the Spherize filter distorts it in a circular pattern by assigning the shortest dimension as the circular distortion height.
Spherize: 100/Horizontal Only

Spherize: 100/Vertical Only
4. **Distort: Twirl Filter**

*Distort: Twirl dialog box.*

**Type:** Distortion filter

**Description:** The Twirl filter makes a twirling distortion on an image, using the center of the selection as the pivot point.
Twirl: Angle 50°

Twirl: Angle 400°
5. Distort: Wave Filter

![Wave Filter Dialog Box](image)

**Type:** Distortion filter

**Description:** The Wave filter distorts an image in different sizes of curves that affect the image horizontally and vertically. The number of wave generators (range: 1 to 999), the minimum and maximum wavelength (range: 1 to 9,999), the height or amplitude of the waves (range: 1 to 9,999), the horizontal and vertical scale (range: -9,999 percent to 9,999 percent), and the wave type (sine, triangle, or square) can all be specified.

Distort: Wave dialog box.
Wave: 3/10-250/5-20/100%-100%/  
Repeat edge pixels/Sine

Wave: 3/10-999/5-15/100%-100%/  
Repeat edge pixels/Square
6. **Stylize: Extrude Filter**

![Stylize: Extrude dialog box.](image)

**Type:** Special-effects filter

**Description:** The Extrude filter cuts a selection into a series of gridded, three-dimensional chips. Either block-shaped sections that use the predominant color of each block as the front face, or blocks that use image areas as the front face of each block may be specified. Alternatively, a pyramid shape may be selected as the grid block. The size of the grid block and the depth or length of the extrusion can be controlled. The extrusion depth may be defined to correspond to the light and dark areas of the image. Light areas appear to extrude farther than dark areas.
Extrude: Blocks/30/30/Random

Extrude: Pyramids/20/40/Level-based
7. Distort: Glass Lens Filter
(HSC Software-Kai's Power Tools 2.0)

Type: Special-effects filter

Description: The Glass Lens filter produces an actual ray-traced 3-D sphere within a selection, complete with highlight, an ambient light source, and a cast shadow. The user can set the position of the highlight on the sphere and choose one of three light source intensities—Bright, Medium, or Soft.
Glass Lens: Bright

Glass Lens: Soft
Interface Design

Multimedia—such as CD-ROMs, kiosks, presentations, and training programs—should provide good information and help users learn, use, and navigate their contents. To design an interface, understanding the users and designing an appropriate interface for the audience and the contents are important. Additionally, interactive content presents two design challenges: making the material interesting and making it easy to locate.

The more familiar and appealing an interface, the easier it will be to learn and use. This applies to the design controls, typography, symbols, icons, charts, maps, diagrams, illustrations, photos, videos, any underlying grid structure, and color relationship.

Metaphor
Consistency and clarity are two of the most important concerns in developing metaphors or the interface design. All data and functions should be appropriately organized and presented in a way that users can easily navigate through the contents.

• Use concrete metaphors so that users have a set of expectations to apply to computer environments.
• Whenever appropriate, use audio and visual effects that support the metaphor.

Tools
The tools for navigation—such as menus, dialog boxes, and control panels—should make data and functions appear simple. Appropriate organization of content and layout help users to navigate and interact in an effective way. The appearance, the caption, and the size of the buttons are all aspects that tell users how to control movement within the project.

Planning
The planning process for an interactive project is significantly different from that of the more traditional, linear model. The way in which one topic is accessed from another reveals new challenges for users more comfortable with a model where a second topic follows the first. Planning these topical relationships can be done using several methods, such as:

• building a flow chart
• creating an outline
• using an alphabetical index to make topics more accessible.

The appropriate method should both match the ability to organize and complement the complexity of the content.
**Visual Appeal**

Visual design within an interactive environment not only helps support the content, but supports how users will find and access the content. Consider the ways in which one moves forward and backward (previous and next), jumps to a related topic or views a table of contents/index page. These are all critical aspects of good interface design.

**Simplicity**

Using a simple organizational strategy, the project will be easier to produce and will be easier for viewers to use. Nothing is more distracting to the content of an application than getting lost in a web of instructions. Including an index or other master topic list will effectively hide the complexity and confusion introduced by facing too many choices at once, yet provides the functionality when it is needed.9

**Testing**

An important process between design and production is testing. The finished project should be tested without the guidance of the author. It’s the last chance to find any hidden problems. Testing may be partially done by the author, but will be most effective if done by other people. Check the project on all configurations of memory and machines on which the author intends the stack to run.

“Have someone else test every button, command, and dialog box option. Check animation for speed and smoothness, for visual impact, and for synchronization with sound. Evaluate visual effects for consistency. Check sound for volume, pace, and smoothness. Edit writing for flow, typographical or grammatical errors, and consistent font usage. Check button, field, and graphic placement.”10
Procedure

Working with Adobe Photoshop

In Adobe Photoshop, images were manipulated and experimented with by applying seven selected filters—both standard and plug-in.

Filters selected to be used in this project:
Standard Photoshop filters:
1. Blur: Radial Blur
2. Distort: Ripple
3. Distort: Spherize
4. Distort: Twirl
5. Distort: Wave
6. Stylize: Extrude

Plug-in filter:
7. Distort: KPT Glass Lens
   Normal/Bright/Soft

All images were scanned from Tony Stone Images Catalog, Volumes 6 and 7 at 72 dpi. (RGB mode). After manipulated, they were saved as PICT files and numbered sequentially (ex. Ripple1, Ripple2, Ripple3, etc.). Also they were put in the same folder in order to be easily arranged in the correct sequence when imported as cast members in Macromedia Director.

The following images are shown in order with the caption below. Numerical settings are listed in the order they appear in the filter’s dialog box. If the default settings were used, no settings are shown. (Images are shown smaller than the actual size.)

1. Distort: Radial Blur Filter
   Actual Size: 319 x 380 pixels
   Resolution: 72 dpi.
   Actual File Size: 356k
   Mode: RGB
   • Circle selection: Size 360 x 360 pixels with feather 10 pixels

Radial Blur1
Circle selection with Brightness -33,
Radial Blur amount 26/
Zoom/Good
Radial Blur 2
Circle selection with Brightness -31,
Radial Blur amount 41/
Zoom/Good

Radial Blur 3
Circle selection with Brightness -34,
Radial Blur amount +56/
Zoom/Good
Radial Blur 4
Select All, Color Balance: Cyan -100, Blue +100, Radial Blur amount 74, Zoom, Good

Radial Blur 5
Load circle selection, Inverse, Radial Blur amount 21, Spin, Good, Brightness +30
Radial Blur 6
Inverse selection, Radial Blur amount 66/Spin/Good
Circle selection, Radial Blur amount 92/Zoom/Good

Radial Blur 7
Inverse selection, Brightness +60
2. Distort: Ripple Filter

Actual Size: 299 x 385 pixels
Resolution: 72 dpi.
Actual File Size: 338k
Mode: RGB

- Chalk selection with feather 1 pixel
Ripple2
Chalk selection then inverse,
Ripple amount -56

Ripple3
Chalk selection then inverse,
Ripple amount -156
Ripple4
Chalk selection then inverse,
Ripple amount -484

Ripple5
Chalk selection then inverse,
Ripple amount -999
Ripple6
Chalk selection,
Ripple amount -225

Ripple7
Chalk selection,
Ripple amount -650
3. Distort: Spherize Filter

Actual Size: 298 x 380 pixels
Resolution: 72 dpi.
Actual File Size: 332k
Mode: RGB

- Circle selection (inside the magnifying glass) with feather 2 pixels

*Spherize 1*
Selection, Spherize amount 54%, Vertical Only

*Spherize 2*
Selection, Spherize amount 100%, Vertical Only
Spherize3
Selection, Spherize amount 54%,
Horizontal Only

Spherize4
Selection, Spherize amount 100%,
Horizontal Only
Spherize 5
Selection, Spherize amount -43%,
Normal

Spherize 6
Selection, Spherize amount 1%,
Normal
Spherize Z
Selection, Spherize amount 48%, Normal

Spherize B
Selection, Spherize amount 92%, Normal
3. **Distort: Twirl Filter**

- Actual Size: 344 x 248 pixels
- Resolution: 72 dpi.
- Actual File Size: 250k
- Mode: RGB

- Image1: Original image
- Image2: Some areas were changed into orange color
5. Distort: Wave Filter
   Actual Size: 284 x 385 pixels
   Resolution: 72 dpi.
   Actual File Size: 321 k
   Mode: RGB

- Distort: Wave filter details:
  Number of Generators: 5
  Type: Sine
  Wavelength Min.: 5, Max.: 20
  Amplitude Min.: 5, Max.: 16
  Undefined Areas: Repeat edge pixels
Wave 2
Wave: Scale Horizontal 0%, Vertical 26%

Wave 3
Wave: Scale Horizontal 0%, Vertical 54%
Wave 4
Wave: Scale Horizontal 0%,
Vertical 100%

Wave 5
Wave: Scale Horizontal 21%,
Vertical 0%
Wave6
Wave: Scale Horizontal 56%,
Vertical 0%

Wave7
Wave: Scale Horizontal 89%,
Vertical 89%,
Blur: Gaussian Blur 2 pixels
6. **Stylize: Extrude Filter**
   - Actual Size: 344 x 263 pixels
   - Resolution: 72 dpi.
   - Actual File Size: 266k
   - Mode: RGB

   - Clock selection with feather 1 pixel
Extrude3
Clock selection, Extrude(Blocks)
Size 10/Depth 30,
Random

Extrude4
Clock selection, Extrude(Blocks)
Size 20/Depth 30,
Random
Extrude 5
Clock selection, Extrude(Blocks)
Size 20/Depth 50, Random

Extrude 6
Select All, Extrude(Blocks)
Size 20/Depth 50, Random
Extrude7
Select All, Extrude(Blocks)
Size 20/Depth 80, Random

Extrude8
Select All, Extrude(Blocks)
Size 30/Depth 100, Random
7. Distort: Glass Lens Filter
   Actual Size: 294 x 385 pixels
   Resolution: 72 dpi.
   Actual File Size: 332k
   Mode: RGB

- Using different sizes of circle selections (from small to large)
Glass Lens 2
Glass Lens: Soft

Glass Lens 3
Glass Lens: Bright,
Color balance: Blue +100
Glass Lens 4
Glass Lens: Normal,
Brightness: +18

Glass Lens 5
Glass Lens: Soft,
Color balance: Blue +100
Glass Lens 6
Glass Lens: Normal,
Brightness: +18

Glass Lens 7
Glass Lens: Soft,
Color balance: Blue +100
Working with Macromedia Director

For each filter, a Director file was separately constructed by sharing some cast members, background, sound, and interactive graphic elements. All graphics and texts were created in Adobe Photoshop and saved as PICT files. Each filter movie was saved as a Director file, except the introduction which was saved as a projector.

In each Director file, the images manipulated with filters were imported and arranged on the stage in a sequence of frames. Repeating or reversing frames performed a loop of motion. An appropriate frame rate (frames per second) effectively brought up the visual effect of motion for each filter.

For each filter, the following information provides the frame rate, the number of total frames, the number of total images, and the sequence of frames in a loop.

1. Distort: Radial Blur Filter
   - Frame rate: 8 frames per second
   - Total frames: 14 frames
   - Total images: 7 images

<table>
<thead>
<tr>
<th>Frame number</th>
<th>Image number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14</td>
<td>1 2 3 4 5 6 7 1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

The sequence of frames and images in 1 loop
2. Distort: Ripple Filter

- Frame rate: 6 frames per second
- Total frames: 15 frames
- Total images: 7 images

<table>
<thead>
<tr>
<th>Loop</th>
<th>Frame number</th>
<th>Image number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5 6 7 8 9 10 11 12 13 14 15</td>
<td>1 2 3 4 5 5 4 3 2 1 1 6 7 6 1</td>
</tr>
</tbody>
</table>

The sequence of frames and images in 1 loop

3. Distort: Spherize Filter

- Frame rate: 8 frames per second
- Total frames: 16 frames
- Total images: 8 images

<table>
<thead>
<tr>
<th>Loop</th>
<th>Frame number</th>
<th>Image number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5 6 7 8 9 10 11 12 13 14 15 16</td>
<td>1 2 3 4 5 6 7 8 7 6 5 6 7 8 7 6</td>
</tr>
</tbody>
</table>

The sequence of frames and images in 1 loop
4. Distort: Twirl Filter

- Frame rate: 10 frames per second
- Total frames: 16 frames
- Total images: 9 images

```
<table>
<thead>
<tr>
<th>Frame number</th>
<th>Image number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16</td>
<td></td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 7 8 5 6 3 4 1</td>
<td></td>
</tr>
</tbody>
</table>
```

The sequence of frames and images in 1 loop

5. Distort: Wave Filter

- Frame rate: 8 frames per second
- Total frames: 15 frames
- Total images: 7 images

```
<table>
<thead>
<tr>
<th>Frame number</th>
<th>Image number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</td>
<td></td>
</tr>
<tr>
<td>1 2 3 4 3 2 1 1 5 6 7 7 6 5 1</td>
<td></td>
</tr>
</tbody>
</table>
```

The sequence of frames and images in 1 loop
6. Stylize: Extrude Filter

- Frame rate: 8 frames per second
- Total frames: 16 frames
- Total images: 8 images

The sequence of frames and images in 1 loop

7. Distort: Glass Lens Filter

- Frame rate: 10 frames per second
- Total frames: 14 frames
- Total images: 7 images

The sequence of frames and images in 1 loop
Sounds were copied from *A Zillion Sounds CD-ROM* (Ebook, Inc., 1993) and edited in SoundEdit Pro. These sounds were added to the buttons as feedback when users clicked on them.

At last, the Introduction was saved as a projector—a play-only version of a Director movie. So anyone—even someone who does not own a copy of Director—can play it.

Each section provided buttons for accessing “Help”, “Appendix”, and “Quit” sections. Finally, all “Filter Movies”, “Introduction”, “Appendix”, and “More Info” sections were linked together by Lingo script. The navigation structure is shown by the chart on the next page.
This “Filters in Motion” project consists of 10 Director files—one projector and nine Director movies.

The Introduction is a projector file which also includes the “More Info” section. Other Director files are:
- Movie Radial Blur
- Movie Ripple
- Movie Spherize
- Movie Twirl
- Movie Wave
- Movie Extrude
- Movie Glass Lens
- Appendix
- Shared.dir

All texts, backgrounds, and graphic elements, which were totally created in Adobe Photoshop 2.5.1, combined in harmony. Both geometric and organic shapes and patterns made a perfect contrast, even emphasized each other. On some screens, faded backgrounds made the texts more dominant and easier to read.
Introduction

This background was created in Fractal Explorer 2.0. It also was used throughout the project by fading or cropping some areas. A brief explanation about the project was placed at the bottom of the screen. The word "Motion" was centered on the screen and was twisted by applying the Twirl filter in two directions—inward and outward.

Sound was also incorporated with the motion of the filter.

Users had to click on the invisible button behind the screen to continue.
Introduction section manipulated by using Twirl filter.
Filter Menu

The same background used in the Introduction was faded to emphasize the Filter buttons, which were aligned with the pattern of the background behind. The buttons and the sample image at the center were both in circular shapes.

When a user rolled over the buttons, the text was highlighted, and the sample image of each filter was accordingly shown at the center. The user selected a filter by clicking on the button.

From this screen, access to the "Help"", "Appendix", "More Info", and "Quit" sections was provided.

Filter Menu with seven buttons and sample image at the center.
Filter Movies

After loading the movie file, the circular sample image transformed into a full image, which showed the motion of the filter in loops. At right, the frame and image numbers were accordingly displayed along with the images.

Beneath the image, a user could control the movie by clicking on the control panel. These buttons were indicated by the icons of “Rewind”, “Forward”, “Stop”, “Backward”, and “Play” functions.

For more information about the frames and images, the “Info” button was provided near the control panel. The user could go back to the menu by clicking on the “Filter Menu” button.

From this screen, access to the “Help”, “Appendix”, “More Info”, and “Quit” sections was provided.

Each Filter movie provided the buttons to control the looping movie.
When clicking on the "Info" button, filter and image information showed on the screen frame by frame.

Each Filter movie used the same background, graphics, and layout, except the changing of color in the squares which showed the number of the frames.
Help Screen

When clicking on the "Help" button, the dialog box explaining the different functions of the buttons and how to navigate through the project appeared on the screen. The user had to click again on the button to exit "Help".

"Help" dialog box provided information about the buttons for different functions and navigation.
Appendix

The Appendix provided information about three topics:

1. Photoshop Filters  
2. Descriptions of Filters  
3. Working with Director.

The user could browse through these topics by clicking on the three buttons at the bottom of the screen.
1. Photoshop Filters

This screen provided a list of seven selected filters with the buttons linked to the appendix. Tips for rerunning the filters were also shown by clicking on the “Tips” button.

The user could go back to the “Filter Menu”, or access “Help”, “More Info”, or “Quit” sections from this screen.
2. Descriptions of Filters

This topic provided the descriptions of each filter with a sample image manipulated by that filter. A user could click on the forward or backward buttons to browse through the seven selected filters. After clicking on the sample image, the number in the dialog box changed in accordance with the image before or after applying the filter.

The user could go back to the “Filter Menu”, or access “Help”, “More Info”, or “Quit” sections from this screen.
3. Working with Director

This section briefly explained how to import and arrange PICT files from Photoshop in Director in five steps. The user could navigate by clicking on the five buttons with numbers at the bottom of the screen.

The user could go back to the "Filter Menu", or access "Help", "More Info", or "Quit" sections from this screen.

"Working with Director" briefly explained how to import and arrange PICT files in Director.
More Info

The More Info part explained the development of this interactive project, listed credits for the support and inspiration of my advisors, along with the hardware and software used.

The user could access the "Filter Menu" and "Quit" sections from this screen.

"More Info" section explained about the development of this project and the credits.
Conclusion

The purposes of this thesis were to create and experiment with new techniques of applying Adobe Photoshop filters to still images, then arranging them in a sequence of frames in Macromedia Director to create the effect of motion, and also to present this information as an interactive project. This study had succeeded in these goals.

Technically, it suggested the idea of applying the useful features of standard and plug-in Photoshop filters and combining them with the advantages of animation features of the Director program. This experimentation furthered the usage of filter manipulation—from still to motion effects—and presented these recommended results with information as parts of the interactive project. Aesthetically, the appropriate conjunction of selecting and combining the image with the visual effects of selected filters was shown in each filter movie. Moreover, all texts, graphics, and navigation tools were designed in consistency and clarity for the users.

Recommendations

After the study of this project, hopefully these recommendations would be helpful for others to apply these techniques or further their studies.

- Appropriate sound effects could be added to emphasize the effect of “Filters in Motion”.

- The series of images which were manipulated with filters could be put in a video-editing program such as Adobe Premiere or the arranged frames in Macromedia Director could be exported as a QuickTime movie.

- Filter combinations could make the movie more complex and create more stunning effects.

- These effects of “Filters in Motion” could be applied as computer arts project, story animation, or transition effects which transform one image to another.

- Adobe Photoshop 3.0 (or newer) provides more filters—such as Clouds, Dust & Scratches, and Mezzotint. The “Filter Factory” on the included CD-ROM allows the users to create their own filters and preview effects in a preview box. The Lighting filter brings 3-D lighting effects to 2-D images. Additionally, the multiple layers allow the users to work on isolated elements without affecting the rest of the image. These new features should increase the ability to create more striking effects.
Endnotes


4 Abes, 45.


8 Dawes, 25.

9 Ibid., 26.

10 Apple Computer, 166.

Bibliography


