Understanding Animation

Characters and figures that move about the screen and even talk can be a lively addition to a presentation. The two most common ways to add animation to your presentation are animated GIFs and Shockwave Files (SWF).

Animated Gifs

GIFs are the easiest way to create animations. You insert them just as you would any other graphic. If you have Adobe ImageReady or Macromedia Flash, you can save animations in a GIF format. An animated GIF is merely a series of frames combined into a single GIF file, much as a PowerPoint slide show gathers a series of slides into a single presentation. When the GIF becomes active, it cycles through each frame, making it appear that a single image is moving.

The advantage of animated GIFs is that they are easy to use. Two disadvantages of using GIFs are that (a) they do not display extensive colors (they can show only 256) and (b) the file sizes can become quite large. To keep the file size of animations as small as possible, the software provides an optimizing option to simplify this process. Optimization is similar to the compression process for JPG files that reduces the number of colors and the number of frames wherever possible. With these limitations in mind, you can use GIFs quite effectively as a means of gathering your audience's attention or making a point.

Shockwave

Another form of animation is a Shockwave **flash** file (SWF) created with Macromedia Flash or Adobe LiveMotion. It's easy to get confused with the term *flash* because in one instance the term is used to describe software marketed by Macromedia and in another it is used to describe animated software in general. To avoid confusion, the term *Flash* (capitalized) is used for the specific software and *flash* (lowercase) is used to indicate general-purpose software. The format for Flash is FLA; for LiveMotion, it is LIV. Each of these file types can be converted from the native form to SWF using animation software.

Shockwave or flash files (the terms are often used interchangeably) are created with vector graphics rather than with bitmap ones used in animated GIFs. Because of the vectors, the file sizes are much smaller so they load quickly and take up less computer memory. A disadvantage is that flash files require a plug-in in order to be seen if you're using a Web browser, although current browsers all include flash plug-ins automatically. With presentation software, viewing is not an issue. The steps to insert flash files into Microsoft PowerPoint are more complex than those required for animated GIFs.

Flash Tools

The essential tool used to create flash movies is a timeline, which records when each event will occur and what actions will happen. A keyframe is used to set the point at which a new action begins. Layers are used just as in other graphics programs to separate visual elements. Each layer can be assigned its own series of animations, so several events can be happening at the same time.

Objects in flash files can be changed in a variety of ways, called transforming, such as changing size or shape, taking new positions along a motion path, rotating or flipping, and changing color. Although flash files are vector in nature, bitmap graphics can be added to Shockwave files, and they too can be transformed. A motion path in flash is similar to the motion path you use in PowerPoint that allows you to choose the line of motion an object follows.

A common use for flash files is to create rollovers. Rollovers are "triggered" when a button is clicked or the mouse "rolls over" an image or text. Rollovers can be created in both Fireworks and Flash. Rollovers are a common means of indicating to a viewer the location of the mouse pointer, as well as of attracting attention to an item.

2-D Animation

Television programs, movies, and videotapes with animation are part of our daily lives. Animation plays a huge role in entertainment (providing action and realism) and in education (providing visualization and demonstration). Entertainment titles in general and children's titles in particular rely heavily on animation. But animation can also be extremely effective in other titles, such as training applications. For example, if a mechanic needs to be trained on the hydraulic system for the landing gear of a jet plane, a training video might be used to provide information on the flow of hydraulic fluid through the system. While it might be impossible to videotape the actual flow of the fluid inside the landing gear, an animation could provide a simulation of the process and dramatize how pressure is created during the process.

The perception of motion in an animation is an illusion. The movement that we see is made up of many still images, each in its own frame, which is like a movie. Movies on film run at 24 frames per second, whereas television uses 30 frames per second. Computer animations can be effective at 12 to 15 frames per second; anything less than 12 frames per second, however, creates a jerky motion as the eye detects the changes from one frame to the next.

Two types of 2-D animation exist: cel animation and path animation. Cel animation is based on changes that occur from one frame to another, which give the illusion of movement. "Cel" comes from the word *celluloid*, which is a clear sheet material on which images were drawn by movie animators. The celluloid images are then placed on a stationary background. The background remains fixed as the object changes from frame to frame. You can have more than one object move against a fixed background. Cel animation is an important innovation to traditional animation, as it allows some parts of each frame to be repeated from frame to frame, thus saving labor. Computer-based cel animation usually employs specific animation programs, although some multimedia authoring programs can create cel animations which can also referred to as frame-by-frame animation.
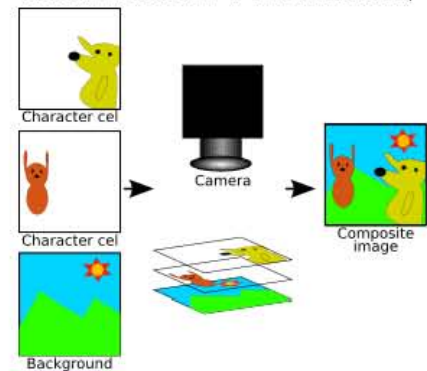
Path animation moves an object along a predetermined path on the screen. The path could be a straight line or it could include any number of curves. Often the object does not change, although it might be resized or rotated. Path animation can be relatively easy to create as compared with cel animation, because you need only one object (the ball), instead of several objects. In addition, you can use a multimedia authoring program to create the path simply by dragging the mouse pointer around the screen or by pointing to different locations on the screen and clicking the mouse button. Some authoring programs even allow you to set the object's beginning position on one frame and it's ending position on another frame. Then the program uses a technique called **"tweening"** to automatically fill in the intervening frames. Tweening is a useful function that allows the software to make a series of gradual changes or transformations for you. For example, if you want an object to grow from small to large on the screen, setting it to tween from one point on the timeline to a later point means the object will automatically enlarge without your having to create a series of changing figures.

Software used to create 2-D animations ranges from shareware products, to low-cost, easy-to-use programs that can create basic cel animations quickly, to sophisticated multimedia authoring programs that cost hundreds of dollars. These programs allow you to determine the **frame rate,** which sets the speed of the animation, and allow you to include **transitions,** which determine special effects such as fade-in and fade-out. In addition, these programs allow you to define user control for playback and to specify how many times to run the animation; in **looping,** for example, the animation continues to play over and over until the user stops the animation, or the loop is complete.

The more powerful 2-D animation programs allow the developer to draw an object, animate the object, provide a sound clip such as a narration, and provide controls for the user such as play, pause, and quit. There are even

GIF animation programs, which allow you to assemble a series of **GIF** images that are then displayed in rapid succession to give the appearance of motion.

2-D animation can be an acceptable alternative to the expense of creating video, especially in those applications in which the realism provided by video is not critical.

3-D Animation

While 2-D animation can be effective in enhancing a multimedia title, 3-D animation takes the entire multimedia experience to another level. 3-D animation is the foundation of many multimedia CD games and adventure titles. Top-selling products such as Myst and 7th Guest use 3-D animation to bring users into the setting as participants, not spectators. Creating 3-D animation is considerably more complex than creating 2-D animation.

3-D animation involves three steps: modeling, animation, and rendering.
- ► Modeling is the process of creating the broad contours and structure of 3-D objects and scenes. One technique is drawing various views of an object (top, side, cross section) by setting points on a grid. This is done by creating a polygon mesh. These views are used to define the object's 3-D shape.
- ► Animation is the process of defining the object's motion. This step defines how the lighting and perspective views also create change during the animation.
- ► Rendering is the final step in creating 3-D animation. It involves giving objects attributes such as colors, surface textures, and amounts of transparency. Initially, animators may render the animation using a quick, lower-resolution process as a test. They will then analyze the test and make adjustments accordingly. Once they are satisfied, they will use a slower, higher-quality process to render the finished animation. This is changing with video graphics equalizers such as Sony's GSCube that allow animators to create complex scenes in real time. Strata 3D, LightWave 3D, 3D Studio Max, Maya, and Houdini are examples of programs that can produce quite sophisticated 3-D animations.

A commonly used special effect for animations is morphing. Morphing is the process of blending together two images into a series of images. Morphing is useful in showing not only how two images blend together, but also how an image might change over time. Morphing can be done in 2-D animation, but is more commonly carried out in 3-D animation because of the subjects' used-people.

Warping is a related special effect that allows you to distort a single image. For example, you could warp a facial feature to change a frown into a smile.

Virtual reality (VR) creates an environment that surrounds the user so that he or she becomes part of the experience. The term *virtual reality* has been used to describe various types of applications, some of which are more experiential than others. Examples of virtual reality include the following:

- The Boeing Corporation uses flight simulators that are cockpits of actual airplanes. These cockpits are mounted on hydraulically controlled legs that can simulate every motion of an aircraft. Flight crews training in these simulators can be presented with any number of virtual reality environments (airports, weather conditions, landing approaches) on displays viewed through the cockpit windows. These simulators are so realistic that the FAA will approve current pilots for certification on a specific model using the simulator alone.

- CD-based adventure games, such as Myst and 7th Guest, create scenes by having the user point the mouse cursor and walk through doors, go up stairs, turn left or right, or otherwise move through the changing surroundings. The goal for the multimedia developer is to make it seem as though the user is standing in the middle of a room, in an arcade, in a haunted house, and so on.

- Some VR applications, such as the Zion National Park CD-ROM, allow a "virtual tour" of a site. Arcade-type games, such as BattleTech and the Red Planet, require special equipment – some games even require headgear with goggles that allow the user to "step into" a virtual world. As the user turns his or her head, a different view of the world appears. Gloves and hand-held equipment can be used to allow the person to interact with the environment. Haptic interface devices and virtual reality caves are being used in medical, engineering, and other fields.

-

Animation File Formats

Animated Gif

Animated GIFs are a special kind of GIF. They can be used to create animated two-dimensional and three-dimensional images for Web pages. An animated GIF file stores multiple images as separate blocks within a single GIF file. Consequently, animated GIFs are also called multiblock GIFs. When the animated GIF is viewed on the Web, the multiple images are streamed, or played back one at a time. This streaming creates the illusion of motion. Animated GIFs are very efficient because the viewer does not have to wait for the entire GIF to be downloaded before it begins running on the Web page. Animated GIFs require no plug-ins and most major browsers including Netscape, Internet Explorer, AOL, and Mosaic support them. You can include animated GIFs in Web pages without being concerned about compatibility or user accessibility.

AVI

Another common animated file format is **AVI** or the **Video for Windows** format. This is Microsoft's animation and movie file format. Although AVI files are native to Windows, OuickTime will also play them. This makes them a suitable, although not necessarily optimal, option for the Web. Although the quality of AVI files is adequate, AVI files don't offer the sophisticated management features and cross-platform compatibility found in some of the other formats such as OuickTime. In addition, the compression available for AVI files is not as high as some of the other file formats, which means these files may take longer to download. Therefore, if you want your animation to reach the widest audience possible in the shortest amount of time, there are file formats that are better suited for most Web animation. Conversion programs do exist that allow you to convert animation files from AVI to other formats.

DCR

Files with a **DCR** extension are considered Shockwave content files. A Shockwave file is a compressed version of an animation that was usually created in Macromedia Director or Authorware and saved primarily for distribution and playback via a Web browser. When a file is saved in a DCR format, all of the information needed to edit the file is removed. The file is for viewing only and in order to be viewed, the Shockwave player must be installed. The Shockwave player is a system component that comes with most operating systems and Web browsers. The Shockwave player will play a DCR file as a stand-alone application both inside a Web browser and outside the browser.

MNG

MNG stands for **Multiple-image Network Graphics**. This file format is an out-growth of the PNG graphics file format. Similar to an animated GIF, this file format stores multiple images that are streamed for quick download and playback. Just as the PNG format offers advantages over the GIF format, the MNG file format offers many of the same advantages over an animated GIF or GIF89a file. MNG supports alpha-channel transparency, which permits subtle changes in opacity for the creation of animation that is more professional in appearance. It also offers platform-independent color correction, so that animation will display accurately across multiple platforms. In addition, it offers better compression than the GIF89a format.

MPEG

Different types of **MPEG** files have developed and evolved through the work of the **Moving Picture Experts Group**, which created standards for interactive animation and video. MPEG is the name given to this entire family of standards used for coding audiovisual information (e.g., animation, movies, video, music) in a digital compressed format. The major advantage of MPEG files as compared to other coding formats is that MPEG files tend to be much smaller and of much higher quality for the size. This is because MPEG uses very sophisticated compression techniques.

QUICKTIME (MOV)

QuickTime (MOV) is Apple's animation and movie file format. QuickTime animation is non-platform specific. You will find QuickTime files running on Macs and PCs, as well as on most other platforms. QuickTime files can either be downloaded or streamed for quicker viewing. The QuickTime file format is among the most convenient and powerful formats for storing animation. Like many of the other animation file formats already mentioned, QuickTime files are viewed with the QuickTime plug-in. The QuickTime plug-in is free and will display a multitude of different file formats. Because the QuickTime player has been widely distributed, most users will already have it available for viewing files that have been saved in this format.

SWF

The **SWF** (**"swiff"**) file format was designed from the ground up to efficiently deliver graphics and animation over the Web. It is a compressed Macromedia Flash or Shockwave Flash file type. Flash files are designed to be rendered very quickly and at a very high quality. Because SWF files are small and because they support streaming, they can be delivered over a network with limited bandwidth. Like the DCR format, this file format is for viewing only; the content of SWF files cannot be edited. To view SWF files, the Flash player, which is free and widely distributed, must be installed on the viewer's computer.

Sources

Coorough, C. (2001). <u>Multimedia and the Web</u>. Orlando, FL: Harcourt, Inc.

Lake, S. E. & Bean, K. (2004). <u>Multimedia and Image Management</u>. Mason, OH: Thomson SouthWestern.

Shuman, J. (2002). <u>Multimedia Concepts, Enhanced Edition—Illustrated Introductory</u>. Boston, MA: Thomson
    Course Technology.

Solomon, A.W. (2004). <u>Introduction to Multimedia</u>. Woodland Hills, CA: Glencoe/McGraw-Hill.

Vaughan, T. (2001). <u>Multimedia: Making it Work</u> (5th ed.). Berkley, CA: Osborne/McGraw-Hill.