

Codec Examples

- Video
 - MPEG1, MPEG2, DIVX, WMV(WINDOWS MEDIA VIDEO), MPEG4-H264, RealVideo
- Audio
 - MP3,ATRAC, AAC, WMA (WINDOWS MEDIA AUDIO), DTS, RealAudio
- Image
 - JPEG, JPEG2000, PNG, GIF
- Data
 - ZIP, STUFFIT

Multimedia Protocols

- TCP (Transmission Control Protocol)
- UDP (User Datagram Protocol)
- RTP (Real-time Transport Protocol)
- RSVP (Resource ReSerVation Protocol)

Network Protocol	Advantage	Disadvantage
TCP	<ul style="list-style-type: none"> · Dominate protocol for data transfer of data over the Internet · Streaming through firewall · Reliable 	<ul style="list-style-type: none"> · Typically need large buffer to handle data rate variation · Loss recovery needs retransmission causing further jitter or skew · No support for multicast
UDP	<ul style="list-style-type: none"> · Suitable for streaming · Allows packet drops; if packets arrive late or damaged, streaming will continue · No retransmission needed 	<ul style="list-style-type: none"> · Many network firewalls block UDP data · Need error concealment for video packet loss · No support for congestion control · Cannot be played using popular

		stream players such as QuickTime
RTP/RTCP	<ul style="list-style-type: none"> · Support real-time transmission · Provide timing reconstruction, loss detection, security and content identification · Allows retrieval of very interesting network statistics 	<ul style="list-style-type: none"> · No guarantee for QoS · Header is larger than UDP · More complicated than UDP · No support for congestion control
RSVP	<ul style="list-style-type: none"> · Reliable connection · Receiver can obtain different levels of service 	<ul style="list-style-type: none"> · Complicated request mechanism · Receivers may experience random packet loss for small reservation

Animation Lecture

Introduction:

- ▣ Animation may be defined as the creation of moving pictures one frame at a time; the word is also used to mean the sequences produced in this way. Throughout the twentieth century, animation has been used for entertainment, advertising, instruction, art and propaganda on film, and latterly on video; it is now also widely employed on the World Wide Web and in multimedia presentations.

Traditional Methods:

- ♦ Drawings/paintings on paper
- ♦ Cel
- ♦ Clay animation

Drawings/paintings on paper:

- ▣ Consider making a sequence of drawings or paintings on paper, in which those elements or characters intended to change or move during the sequence are altered or repositioned in each drawing. The changes between one drawing and the next may be very subtle, or much more noticeable.
- ▣ Once the drawings are complete, the sequence of drawings is photographed in the correct order, using a specially adapted movie camera that can advance the film a single frame at a time. When the film is played back, this sequence of still images is perceived in just the same way as the sequence of frames exposed when live action has been filmed in real time: persistence of vision causes the succession of still images to be perceived as a continuous moving image.

1440 Drawings for every minute of film:

As film is projected at 24 frames per second, drawn animation, as we have just described it, technically requires 24 drawings for each second of film, that is, 1440 drawings for every minute — and even more for animation made on video. In practice, animation that does not require seamlessly smooth movement can be

shot 'on 2s', which means that two frames of each drawing, or whatever, are captured rather than just one. This gives an effective frame rate of 12 frames per second for film, or 15 for NTSC video.

Cel:

- ▣ In an effort to reduce the enormous amount of labor that animation process involves, many techniques of animation have been devised. The most well known and widely used has been **cel animation**.
- ▣ In Cel method, those elements in a scene that might move are drawn on sheets of transparent material known as 'cel', and laid over a background drawn separately.
- ▣ In producing a sequence, only the moving elements on the cel need to be redrawn for each frame; the fixed part of the scene need only be made once. Many cels might be overlaid together, with changes being made to different ones between different frames to achieve a greater complexity in the scene.
- ▣ To take the approach further, the background can be drawn on a long sheet, extending well beyond the bounds of a single frame, and moved between shots behind the cels, to produce an effect of travelling through a scene. The concepts and techniques of traditional cel animation have proved particularly suitable for transfer to the digital realm

Clay animation:

- ▣ A distinct alternative to all of these essentially two-dimensional forms is three-dimensional or stop-motion animation. This encompasses several techniques, but all use miniature three-dimensional sets, like stage sets, on which objects are moved carefully between shots. The objects may include articulated figures, whose limbs can be repositioned, or solid figures whose parts are replaced, or substituted, between shots, to produce an effect of gestures, walking, and so on. Figures and other objects made out of a malleable modeling material, such as Plasticine, may be used instead; these can be manipulated between shots, to produce both natural movement, and otherwise impossible changes and transformations. This latter form of animation — often called clay animation.

Wallace and Gromit Animations:**Hybrid Techniques:**

- ▣ Although it may be convenient to consider the various techniques of animation separately, hybrid forms of animation are often produced — mixing cel and 3-D, for example.
- ▣ There is also a long tradition of combining animation with live footage.
- ▣ All of the established forms of animation have their counterparts in the digital realm. Moreover, digital technology affords new opportunities for using animation and techniques derived from it in new contexts. Animation is now embedded in web pages or used as a component of rich media interface to computer programs.

Image Sequences:

- ▣ preparing animation by using digital technology together with a video camera and traditional animation methods — offers much richer expressive possibilities to the animator working in digital media than the purely computer generated methods.
- ▣ For drawn or painted animation you can dispense with the external form and the digitization process entirely by using a graphics program to make your artwork, and save your work as a movie or as a sequence of image files.

Captured Sequences:

- ❑ Instead of recording your animation on film or videotape, a camera can be connected directly to a computer, to capture each frame of animation to disk—no matter whether it is drawn on paper or cel, constructed on a 3-D set, or made using any other technique that does not depend on actually marking the film.
- ❑ Instead of storing the entire data stream arriving from the camera, as you would if you were capturing live video, you only store the digital version of a single frame each time you have set up a shot correctly.
- ❑ Most digital video editing applications provide a facility for frame grabbing of this sort.
- ❑ This causes a recording window to be displayed, showing the current view through the camera. You can use this to check the shot, then press a key to capture one frame, either to a still image file or video file. You then change your drawing, alter the position of your models, or whatever, and take another shot. Frames that are unsatisfactory can be deleted; an option allows you to see a ghost image of the previously captured frame, to help with alignment and making the appropriate changes. When you have captured a set of frames that forms a sequence, you can save it as a movie or a set of sequentially numbered image files.

Animation File Format:

- ❑ Instead of using a set of still image files to hold an animation sequence, you can sometimes use a single 'image' file to hold several images. While a surprising number of file formats offer this facility, by far the most common is GIF.

GIF:

- ❑ GIF files' ability to store a sequence of images has been used to provide a cheap and cheerful form of animation for Web pages.
- ❑ GIF files can be used to store any form of animation.
- ❑ No add sound.