

CS1315: Introduction to Media Computation

Movies

Movies, animations, and video

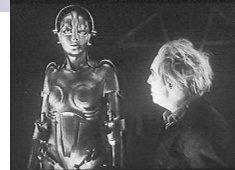
- We're going to refer generically to captured (recorded) motion as "movies."
 - **This includes motion entirely generated by graphical drawings, which are normally called animations.**
 - **This also includes motion generated by some kind of photographic process, normally called video.**

Psychophysics of Movies: Persistence of Vision



- What makes movies work is yet another bug/feature of our visual system:
 - **Persistence of vision**
- We do not see every change that happens in the world around us.
- Instead, our visual system *retains* an image for a brief period of time.
 - **If this were not the case, you would be aware of every time that your eye blinks because the world would "go away" for a moment.**

16 frames enough for motion



- If you see 16 separate pictures in one second, and these pictures are logically sequenced,
 - **That is, #2 could logically follow from the scene in #1.**
 - **16 completely different pictures doesn't work,**
- You will perceive the pictures as being in motion.
- 16 frames per second (fps), 16 pictures in a second, is the lower bound for the sensation of motion.

Why do we compress movies?

- Do the math:
 - One second of 640x480 pixels at 30 fps
 - 30 (frames) * 640 * 480 (pixels) = 9,216,000 pixels
 - With 3 bytes of color per pixel, that's 27,648,000 bytes or 27 megabytes of information *per second*.
 - For a 90 minute feature movie (short), that's 90 * 60 * 27,648,000 = 149,299,200,000 bytes (149 gigabytes)
- A DVD stores 6.47 gigabytes of data.
 - So even on a DVD, the movie is compressed.

MPEG movie = MPEG frames plus MP3 soundtrack

- An MPEG movie is actually a series of MPEG frames composed with an MP3 soundtrack.
 - It's literally two files stuck together in one.
- We're not going to deal with sound movies for now.
 - The real challenge in doing movie processing is generating and manipulating frames.



Get frames in order

- We specify the order by encoding the number of the frame into the name.
 - If you put in leading zeroes so that everything is the same length, the order is alphabetical as well as numerical.
 - E.g. "Frame01.jpg ... Frame09.jpg ... Frame10.jpg"
 - This means we have to process file names differently depending on how many digits their frame number has

A Few Frames

