

DIGITAL PHOTOGRAPHY AND YOUR COMPUTER

About Digital Cameras (Session 1)

(handout)

ALIASING

Jagged look in a digital picture. Is caused by enlarging/resizing a picture too much. During resizing pixels are added by extrapolation and too much extrapolation leads to the jagged look also known as having the Jaggies.

BIT DEPTH

Refers to the number of colors that a scanner will capture. A 1 bit scan will capture only black and white. A 4 bit scan will capture 16 colors, 8 bit = 256 colors, 16 bit = 65,000 colors, 24 bit = 16.8 million colors.

CAMERA SENSITIVITY

In film cameras this was measured by the speed of the film being used and was measured as an ASA number. Digital cameras have ISO settings rather than ASA however the ISO available in our cameras are equivalent to the ASA numbers. The sensitivity settings available are usually Auto, ISO 50, ISO 100, ISO 200, and ISO 400.

CMYK

Cyan, Magenta, Yellow, Black - mode for printing color images.

COMPUTER COLORS

Most common setting is 256 colors. 16 bit color displays more than 65,000 colors and 24 bit or true color displays more than 16 million colors.

DITHERING

A technique for achieving 24 bit quality in 8 bit or 16 bit frame buffers. Is a process of mixing two or more solid colors to form another color. Has to do with how dots of the printer's primary colors (cyan, yellow, magenta & black - CMYK) are mixed to produce other colors. Fine dithering is small dots and produces high quality images. Error diffusion uses variable sized dots.

DPI

Dots per inch.

GRAYSCALE

There are 256 gradations of grayness from 000 (total black) to 255 (total white).

HSB

Hue, Saturation, Brightness - is a model to represent color values in palettes and dialog boxes.

MEMORY CARDS

CF = Compact Flash

SD = Secure Digital

MMC = Multimedia Card

SM = Smart Media (Sony Memory Stick)

xD = eXtreme Digital (Fujifilm & Olympus) - not popular

Cards now have high capacity. A 512 MB or 1 GB card can store hundreds of JPEG pictures and at the lower resolutions even thousands of pictures.

Recommendation - do not buy cards with a capacity above 250 MB. If a fault occurs while your camera is storing a picture the card will freeze up and not allow any more pictures to be stored. It would be better to have two 250 MB cards rather than one 500 MB so a new card can be put in the camera and you can proceed to take pictures. When you get home you can retrieve the good pictures from the "froze up" memory card, reformat the card and use it again.

MOVIE IMAGES

Many digital cameras have a movie mode that can run up to approximately 3 minutes at a time. This is called a clip. It should be noted that some still image cameras will run in this mode until the camera memory is full. These images will be either 160 x 120 pixels or 320 x 480 pixels. These resolutions will not produce good prints from any of the movie frames. Even at a low printer resolution of 100 dpi the largest usable picture size you will get will be 3.2 x 4.8 inches. If you want printed pictures then take your pictures in the still image mode. Movie clips from still image cameras do not match the quality of a video camera.

PIXELS

A dot that forms a part of a picture. Smallest dot on computer screen that can be controlled by the computer. With a color image this dot is actually 3 dots, i.e. red, green and blue in equal intensity.

Digital cameras use megapixel ratings. One megapixel is approximately 1,000,000 pixels (one megapixel is actually 1,048,576 pixels). Most cameras have several resolutions available that you can select such as 640 (width) x 480 (tall), 900 x 600, 1024 x 768, 1600 x 1200, 2272 x 1704. The higher the numbers the higher the picture quality.

To convert the above resolutions into megapixels multiply the width by the height then divide by 1,048,576. Therefore 640 x 480 pixels requires a camera that is rated at 0.30 megapixels, 900 x 600 pixels requires 0.514 megapixels, 1024 x 768 pixels requires 0.75 megapixels, 1600 x 1200 pixels requires 1.83 megapixels and a 2272 x 1704 pixels requires 3.692 megapixels. These would also be the size of each of your picture files if you shot in the RAW mode. Your camera normally shoots in JPEG mode which is a compressed mode so that a 2272 x 1704, 3.692 megapixel picture is actually recorded and saved as a 1.153 megapixel file.

By the way, the 640 x 480 (0.30 megapixels) was the resolution of the original Apple Quick Take camera in 1994.

How do Digital Camera resolutions compare to what we used in the past?

Very high resolution digital cameras up to 8 megapixel are available to the general public and somewhat higher are available for professionals.

By comparison the old Polaroid Color Shot had a resolution of 2 megapixels however 35 mm color film has a resolution of 20 megapixels.

RESOLUTION

Digital images are broken down and stored as pixels, dots of light with their color value stored as a series of zeros and ones. Resolution measures the number of pixels per square inch (ppi) and serves as a guideline for the amount of detail available in the final image. The number of pixels that a computer monitor uses on the screen is measured horizontally and vertically. A display set to 640 x 480 means there are 640 pixels across the screen and 480 down and there will be a total of 307,200 pixels displayed. Increasing the screen resolution to 1024 x 768 gives a sharper, clearer image but the pixels will be smaller because more are being squeezed into the same space. This causes the image to be smaller.

The resolution of computer CRT monitors is approximately 72 DPI (dots per inch) while the resolution of LCD monitors is 96 DPI. Pictures displayed on a monitor look good however that same picture printed at this resolution will look poor. For a high quality picture you should set your camera to get 300 pixels of resolution per inch of a printed picture. For a 4 x 6 inch print select a camera resolution as close to 1800 x 1200 as possible.

A 1 megapixel camera can produce a good quality printed image up to 5 x 7 inches at 200 dpi. A 2 megapixel camera can produce a good quality image up to 6 x 8 inches at 200 dpi. A 4 megapixel camera can produce a good quality image up to 8 ½ x 11 inches at 200 dpi.

The preferred formats for pictures to be printed are JPEG or TIFF.

RGB

Red, Green, Blue - mode for displaying color images on monitor or TV screen. These are colors in “light” rather than colors in pigments. Printers convert RGB into CMYK.

SOME HELPFUL WEB SITES

For more detailed information about how cameras, scanners and printers work go to web site:
<http://computer.howstuffworks.com>

For definitions of acronyms or other technical terms go to web site:
www.webopedia.com

For free digital imaging tools:
www.irfanview.com
www.photofiltre.com
www.gimp.org

To outsource your printing:
www.shutterfly.com
www.kodakgallery.com
www.walmart.com

To prepare pictures for e-mailing:
www.picasa.com