Jurying with Digital Slides: Information for Artists

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INTRODUCTION

A recent area in which digital technology has had an impact on artists participating in art festivals is the use of digital slide juries. Instead of presenting traditionally-projected slides to a jury, images of artists' work may be presented using digital projectors or may be viewed directly on computer monitors.

Digital jurying necessitates a basic understanding of terms and techniques in order that an artist can present the best possible image for a jury. This handout addresses some of those terms and techniques.

For more detailed explorations of the concepts presented, please see the references listed in the *Resources* section of this handout.

QUESTIONS AND FEEDBACK

In order that this information be of the most use to the largest number of people, your feedback is important. If there is a term or concept which you do not understand, or if you come across a requirement in the jurying process, please contact the author via e-mail at the following address:

ken@itgoesboing.com

Your individual questions will be addressed and will also be integrated in revisions of the handout. Those revisions will be available on the NAIA web site:

http://www.naia-artists.org/

PIXELS: THE SHORT VERSION

Take an image (in this context, a photograph of a piece of artwork) and place a grid work of cells over the image. For each cell, select a color which best represents the portion of the image shown in that particular cell. That cell and its color value can be thought of as a **pixel** (short for *picture element)*. The finer the grid, and therefore the more cells, the better the pixels will represent the original image.

For a more precise and detailed definition of the pixel, please see the *Pixels: The Long Version* section at the end of this hand-out.

TURNING ARTWORK INTO PIXELS

There are a number of ways in which a physical piece of artwork can be turned into that grid of pixels. A scanner can be used to capture a piece of artwork directly (if it is small enough to fit on the scanner) or to capture a traditionally-produced photographic print or transparency of the artwork. Digital cameras can be used to directly capture the artwork, skipping the step of traditional photography.

For a more detailed explorations of image capture methods, please see the *Pixels: The Long Version* section at the end of this hand-out and the references in *Resources* section.

RESOLUTION, DPI, PPI, ETC.

DPI (dots per inch) and **PPI** (pixels per inch) are two terms which are loosely equivalent and both describe the amount of visual information given area. They refer to the **resolution** of the image, or the number of pixels per unit of measurement. Occasionally you might see the term **SPI,** representing "samples per inch".

The term "dots per inch" is most appropriately used when referring to printing or output methods and is derived from the fact that those devices often put dots of marking medium on a surface (for example, an ink jet printer puts dots of ink on a piece of paper or canvas). The term "pixels per inch" is appropriate when referring to amount of original source data in a given area.

When thinking of overall image quality, the actual number of pixels, or the **pixel dimensions** ("640x480 pixels", for example), are more critical than the number of pixels in a given area (the resolution or **pixel density;** "200 ppi", for example). It is always possible to reduce a larger number of pixels to fit a smaller area, but enlarging a smaller number of pixels to fit a larger area can be problematic if the resulting proprotional pixel density is too low.

A 2x2" image at 100 PPI contains the same number of pixels as a 1x1" image at 200 PPI or a 4x4" image at 50 PPI.

(2 inches x 100 pixels per inch) x (2 inches x 100 pixels per inch) =
(1 inch x 200 pixels per inch) x (1 inch x 200 pixels per inch) =
(4 inches x 50 pixels per inch) x (4 inches x 50 pixels per inch) =
200 by 200 pixels =
400 pixels

Just as the total pixel counts for each of these image is equivalent, the images can be reduced or enlarged in order to make the resolution equivalent. For example, reducing the 2x2" image by 50% will make it equivalent in resolution to the 1x1" image.

FILE FORMATS AND IMAGE COMPRESSION

Software applications store digital information in very structured configurations in order that the information can be retrieved and used again. With image data, a number of these configurations, or **file formats,** have become standards and are available in almost every software application which interacts with image data. The two file formats which most likely will be used with digital slide jurying are JPEG and TIFF.

JPEG

JPEG (pronounced "jay-peg") is an acronym for "Joint Photographic Experts Group", the organization which created the standard. JPEG files are often identified by the following text appearing at the end of the file name (also know as **file name extensions**): ".jpeg", ".jpg" and ".jpe". JPEG is a particularly useful file format because it allows for compression of the image data. The amount that an image is compressed is controlled by the user with the adjustment of compression or quality settings. The two are inversely proportional — the higher the compression, the lower the image quality. JPEG compression is a "lossy" technique, meaning that some of the image information is lost in the compression process. This normally is not a problem, but if an image is repeatedly saved in JPEG format or the compression is set too high (or the quality set to low, depending on your software), visual artifacts can appear in the image, in the form of obvious blocks of uniform color. I always recommend saving an uncompressed version of an image for future use and using software which gives you visual feedback as you are setting the quality or compression levels so that you can see how the settings are changing the quality the image.

TIFF

While current versions of software allow you to save TIFF images using ZIP or JPEG compression, older software most likely will not be able to understand the files. It is best to use LZW or no compression. LZW compression is a "lossless" technique which compresses images without discarding image information and therefore does not have the possibility of the blocky visual artifacts found in JPEG images that have been over compressed.

TIFF ("Tagged Image File Format") is another popular file format. TIFF images are most often stored using LZW or no compression. LZW compression can be used without hesitation as it will never degrade the visual quality of the image. The file name extensions for TIFF most commonly are ".tiff" and ".tif".

GIF

GIF or "graphics interchange format" is a file format commonly used for web graphics and it is not appropriate for digital slide jurying.

SAMPLE SPECIFICATIONS

A "good" example

Here is an example of a specification for images to be submitted for a digital slide jury. This specification gives us all of the information we need to prepare and submit the digital slides.

When having digital photographs taken of artwork, the artist should always ask for an original, full-resolution, uncompressed (or LZW-compressed) TIFF file, in addition to whatever specific files might be produced for jury submissions. As technology changes (and hopefully improves), the specifications for submitted images will also change. Having the original, full-resolution image allows the artist to produce images to the new specifications.

Image dimensions:	640 pixels horizontal maximum
	480 pixels vertical maximum
File names:	Artist's last name, first name and a sequential number indicating slide viewing sequence, example: "DoeJane1.jpg", "DoeJane2.jpg", etc.
File formats:	JPEG or TIFF
Compression:	Compression is not required
Media:	Internet submissions only

The image dimensions show the largest pixel dimensions acceptable. Note that these are examples of absolute limits. In this example vertically-oriented images will end up being smaller than horizontally-oriented images. An actual digital jury system may limit both dimensions to the smaller number so that image orientation would not offer a visual advantage.

The naming scheme for files should be simple, intuitive and could allow for the artist to specify the order in which the images should be viewed.

The JPEG and TIFF file formats are universally available and can represent images completely without requiring a reduction in color range or fidelity. Image compression should not be required if it necessitates the reduction of quality.

While requiring submission via the Internet does require access to the Internet, it can also provided immediate feedback to the artist as to whether or not the images have been successfully received. The festival's submission system can simply redisplay the image on a web page. Using a web-based submission system would also allow the artist to see that the images are in the proper sequence.

A "bad" example

The following is an example of the digital slide image requirement which might appear on an event application:

"Maximum 480x720 pixels (vertical or horizontal) at 300 DPI"

While this specification does give us a pixel dimension ("480x720"), it is ambiguous as to whether that specification is given as width first or height first. It also does not specify the acceptable file format, such as JPEG or TIFF, nor does it tell us how the image is to be submitted (electronically via the Internet, on recordable compact discs [CD-Rs], on floppy diskette?) If the image is submitted on a disk, what platforms are supported (PC and/or Macintosh)?

RESOURCES

Adobe Systems, Incorporated

Adobe Photoshop is one of the most popular image manipulation programs. The Adobe web site is an excellent resource. Specifically, the Technical Guide, "Introduction to Halftones and Scanning" is a good overview of information pertinent to digital images and scanning. The "Scanning Images" section is particularly relevant.

http://www.adobe.com/

http://www.adobe.com/support/techguides/printpublishing/scanning/psscanning.html

An Introduction to Digital Scanning

Agfa has published an small, excellent, very visual, inexpensive ($7.50) book, *An Introduction to Digital Scanning.* Unfortunately, they have made it a bit difficult to order. Follow the link below. You will be redirected to the Agfa Professional Support web site. Look for the link to the "APS Store". Once you follow it, look for the small pop-up asking where you want to shop. Select the only option, "United States". Now click on the "Books" icon. Look for the title above in the list presented. Follow the instructions for ordering. The book is worth the effort. Really. If I could have given you a more direct link, I would have. Really.

http://www.agfabooks.com/

The Computer in the Visual Arts

The Computer in the Visual Arts, by Anne Morgan Spalter (1999; Addison-Wesley; ISBN 0-201-38600-3), gives an excellent, detailed overview of digital technologies and their use in the visual arts. The author documents the history of digital art and places it in context in art history.

SHIFT+CTRL+A(RT): The Use of Digital Tools in the Visual Arts

Digital technologies have caused fundamental changes in many areas, not the least of which are the visual arts. One of the many challenges presented by these new tools is not only understanding how they work and are used, but why.

This paper highlights some fundamental concepts which make easier the understanding of the use of digital technology in the visual arts. A simplified workflow is presented with overviews of how elements are brought into the computer, how those elements can be modified and entirely new elements created, how elements can, in turn be brought from the virtual to the physical world and some of the ways the results can be modified and integrated with other physical elements.

Artists use digital tools in a wide variety of ways. Examples are given from the work of a number of artists, along with statements from the artists on their work, the use of technology in their work and the reasons behind its use.
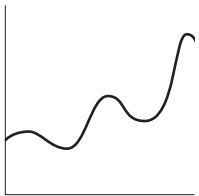
Finally, the author shares some thoughts on topics ranging from print longevity to the place of digital art in art festivals.
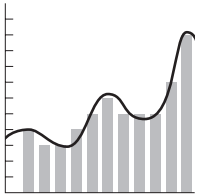
http://www.itgoesboing.com/ShiftCtrlArt/

The information below is extracted from *SHIFT+CTRL+A(RT).*

PIXELS: THE LONG VERSION

Continuous versus discrete

Computers work entirely with numbers. All of the complex interaction that takes place as we use a computer to send e-mail, browse the Internet, scan an image or create art is processed as a series of discrete numbers.

The power of digital technology is in the manipulation of numbers. The trick is often how to turn the elements to be manipulated into the numerical terms that can be processed using the digital tools.

Digital representations of visual information can be created by assigning different numerical values to different colors. This process is fairly simple if the visual source is broken up into discrete units, such as in a mosaic. Each tile of the mosaic is separate and discrete from its neighbors and each color could be assigned a unique number. What should be done though with visual information which is continuous, such as a painting or a photograph? One can find another color between any two points in the image and transitions of color are often continuous gradations. With digital tools, the answer can be found in sampling.

Sampling

The process of **sampling** involves measurements being taken of a continuous or analog source at various points. Those measurements are translated into discrete numerical values or **samples** *(see left).*

In order to increase the accuracy of the digital representation, the number of samples and the precision of those can be increased.

The Pixel

A **pixel** (short for *picture element)* is a point sample, the value of a continuous thing at a particular location. Pixels most commonly refer to the square representations of color in computer images. This is not entirely accurate as mathematical points do not have dimension (width, height or depth). In addition, a pixel also can refer to the smallest unit able to be imaged by a particular device, whether it be a computer monitor or a digital printing device.
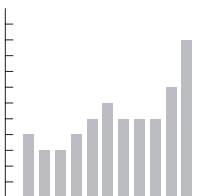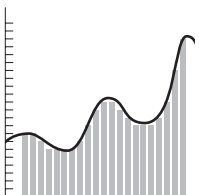
Sampling

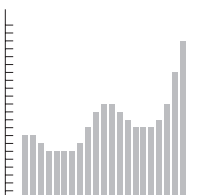*Imagine that this continuous wavy curve represents the colors in some portion of an image...*

...by measuring the height of the curve at various points, numerical values could be produced.

Notice though that the resulting values do not represent the shape of the curve very well.

*By increasing the number of measurements taken (the **frequency)** and the precision of the measurements...*

...a more accurate representation of the curve can be recorded.

Scanners

Devices collectively known as "scanners" operate by measuring the light reflected from or transmitted through some object. Often, these devices have an array of sensors, each of which samples a portion of the object.

Two-dimensional scanners can be divided into two main groups, flatbed and drum. **Flatbed scanners** move a row of sensors across the object being scanned, producing rows of samples at a time. Within reason, almost anything can be placed on the scanning surface of a flatbed scanner. A variation of the flat-bed scanner is the **slide scanner.** This specialized device is used to scan slides or other small transparencies and is optimized for the smaller format of these materials.

When using a **drum scanner,** the object being scanned is wrapped around and affixed to a cylindrical drum. The drum is spun, usually at high speeds, and a single sensor is slowly moved parallel to the axis of rotation. In this way, the entire object is scanned, one sample at a time.

Historically, drum scanners have been able to sample at much higher frequencies and with greater range of color. They have the disadvantage of requiring the material be flexible enough to wrap around the drum and shallow enough that the scanning sensor can pass over the surface.

Surface texture can be sampled to some degree with all of the two-dimensional scanners, but only as a function of the shadows cast by the light illuminating the object.

Three-dimensional scanners are used to sample three-dimensional physical objects to produce three-dimensional data sets. Scanners are now available which will record not only the physical coordinates of the surface of an object, but also the color of the surface at those coordinates.

Digital cameras

Digital cameras can be thought of as variations of scanners. Instead of sampling one pixel or one row of pixels at a time, digital cameras usually capture a two-dimensional array of pixels all at once, and in the case of **digital video cameras,** the sampling also takes place over time.

ABOUT THE AUTHOR

Ken has been creating images with his current technique for almost ten years. His work is displayed on his web site, www.itgoesboing.com, and is held in public, private and corporate collections around the world.

Ken's images are renderings of imagined three-dimensional scenes entirely created using computer software, primarily *Maya* from Alias|Wavefront. This software also is used for character animation and special effects in motion pictures. His work is not manipulated photography and does not contain physical objects.

He often is the first and only digital artist accepted to festivals in which he has participated, has received over eighty-five awards, and currently is serving as a digital art category advisor for the National Association of Independent Artists. Born in Bismarck, North Dakota, in 1969, Ken lives in Tampa, Florida. He is a self-taught, independent fine artist. He began exhibiting his work in October 1997.

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While this hand-out was initially prepared for the 2003 NAIA Artist Conference, the opinions expressed are not necessarily those of the National Association of Independent Artists or its board of directors.

The author welcomes and encourages comments, suggestions and criticisms (see contact information above).