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# Raster vs. Vector: How Image Format Impacts Representation

Before taking this class, I did not have a strong sense of what the differences were between different file formats, and I really did not understand the function behind how computers worked or what it was that could have made these file formats distinct from each other. As such, I would have assumed that saving every image as a ".jpeg" would have been fine; however, this class has begun to teach me that the world of digital media is more complex than that, and that I need to think about what I'm doing before I do it, or else I risk creating a file with a less-than-ideal representation of the data I am asking my computer to interpret. In other words, not all formats are created equal; there are pros and cons to using different types of file formats for different types of images, and some aspects of a digital image's format (such as whether it was created using a raster/sampling-based format or a vector/path-based format) will significantly affect the outcome of what appears on the screen.

As we learned in class, a raster image is made up of gridded pixels, or "pattern of closely spaced rows of dots," that "sample" an image, while a vector image "detects shapes to recreate as opposed to gridded pixels" (Sandvig). In other words, for a raster image, a computer approximates the color and light values in any one point of that image and creates a composition of tiny squares (or pixels) that each represent one of those tiny points/pieces. When combined – and especially when numerous enough/at a high enough resolution – those many tiny elements form a natural-enough-looking image. However, as our sunflower example in Lab showed, not

every resolution of such images remains clear. For instance, as we zoomed-in on the sunflower image, the image became very pixilated/blurry, especially in the areas where the diagonal yellow sunflower petals met white or green background. This sunflower example demonstrated that raster images are not the best at rendering "crisp" things like diagonal lines – at least when the viewer zooms-in too far or does too little sampling – which is one instance of how a digital image's format impacts its representation.

A vector image, on the other hand (like the triangle we made in Inkscape during Lab), is path-based/point-based, which means that the computer reading the image "detects shapes to recreate as opposed to gridded pixels" (Sandvig). Accordingly, zooming-in on a vector formatted image doesn't really effect a vector image's clarity like it does with a raster image, which makes vector images a bit more "accurate," perhaps, and better at rendering things like fonts, even when very zoomed-in. As such, if something needs to be blown-up to a very large size – say, for a poster on the side of a building – it is significantly better if the digital image used is in a vector format rather than a raster format because the diagonal lines in things like the letters "N" and "V" will be much crisper and "better" in a shape/point-based vector format than in a gridded/pixelated raster-format.

If we put ourselves in the shoes of a professional artist working with digital files, choosing to create raster- vs. vector-formatted images matters for what kind of art this artist will best be able to produce in high quality. For instance, with raster-formatted images, the artist could create a more "real" feel, as evidenced by ".jpeg" photographs of real-life scenes (like the beach), but they may be limited by how high of a quality camera they are using/at how high of a resolution they are able to take their pictures. This limitation could be felt especially strongly if the artist only has access to one SD/memory card and/or a computer with a smaller memory

space, since higher resolution photographs mean more data needs to be saved (although compression could help mitigate some of that extra pixel responsibility – such as if they are photographing the beach on a day with a very large, blue sky). For instance, in my own life as a photographer, I opted to buy both an iPhone and a laptop with maximum storage because I take a lot of pictures and those pictures need a lot of memory space. Using files that are lower resolution is not necessarily a bad thing, though, if the image will be used in contexts where it can remain small. For some digital artists – like postcard-makers – a small .jpeg file will look beautiful and really work for them. However, if the artist is a poster-maker, instead, it is possible that the client will want to blow up the photograph/image and hang it on their wall, so a raster image without a high enough resolution could quickly become very ugly.

An artist who works with vector formatted images, on the other hand, would not necessarily have to share these concerns. What this artist would lose in perceived "reality" – making artwork that looks more drawing-like as opposed to life-like – they would gain in clarity. Since vector art detects whole shapes instead of trying to approximate through sampling, every line (even those pesky diagonal ones) can be rendered with very high accuracy. This would also mean that artists who deal frequently with fonts might prefer to work with vector-formatted files, so as not to damage the integrity of their font shapes, no matter the size.

As evidenced in this lab assignment and other media texts in the world, some aspects of a digital image's format significantly affect the representations that are possible using that format. Raster images can be life-like representations of images due to sampling that mimics the way the eye/brain perceives shapes and colors, but vector images can be crisper when it comes to shapes like diagonal lines because vector images are shape-based. Understanding the way computers

code and read images is an important first step in understanding how digital media should be made, so I am thankful that this project help me understand the differences a little more clearly.

# Works Cited

Sandvig, Christian. “Analog vs. Digital.” University of Michigan COMM 362, 11 September 2019. https://drive.google.com/drive/folders/1bLQ_kmAd7yVQ_FyhJwWopNduFnggTrol. Accessed 30 September 2019.