The MegaPixel Paradox: Why moving to higher megapixels doesn't necessarily mean better quality images

The more megapixels, the better, right? Not if you need high-quality images from microfilm media, explains David Tyler, Editor of Document Manager magazine.

Digital camera and cell phone manufactures have long recognized that consumers are conditioned to think that an image sensor with a higher megapixel (MP) count is better: a bigger number translates into more sales and greater profits. This was how the 'megapixel race' began, and it continues still today, especially in the cell phone sector.

A major contributor to the cost of any digital camera is the image sensor. Just as the image of a slide or movie is projected onto a big screen, a digital camera projects the image onto its image sensor. That sensor is comprised of many pixels (picture elements). A physically larger sensor is more expensive than a smaller one. To entice consumers – and to reduce costs – manufacturers have developed methods of making very small pixels. This results in higher megapixel count on a physically smaller (and thus less expensive) sensor. Figure 1a illustrates a large, $250, 6.6MP sensor with large pixels. Figure 1b illustrates a small, $50, 18MP sensor with small pixels.

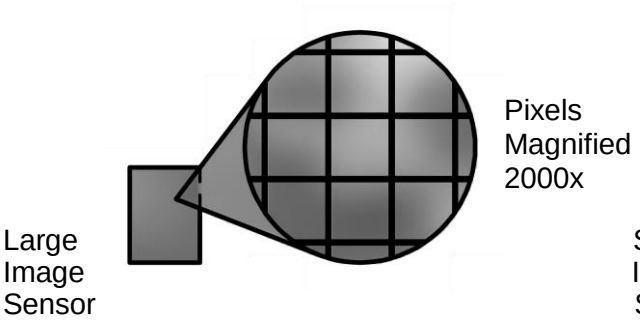

Figure 1a
Large, $250, 6.6MP image sensor
with large, 3.5um x 3.5um pixels

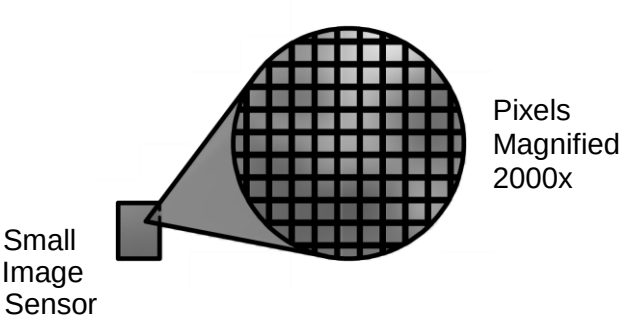

Figure 1b
Small, $50, 18 MP image sensor
with small, 1.25um x 1.25um pixels

When contemplating smaller pixels, it is tempting to think that these smaller pixels must make it possible to create images with finer detail. This is true – to a point – but is limited by a phenomenon in physics called diffraction. In an article on the effects of diffraction: Edmund Optics, a worldwide leader in the field of optics, states "The smallest

achievable spot size can quickly exceed the size of small pixels.” What does this mean in the real world?

The best way to illustrate this concept is with visible examples of the difference between ‘large pixel’ and ‘small pixel’ sensors. Figures 2a and 2b are enlarged image detail at the exact same magnification, of the exact same text on 35mm microfilm. Figure 2a was captured with a large, $250, 6.6MP image sensor with large pixels. Figure 2b was captured with a small, $50, 18MP sensor with small pixels. It is very easy to see that the image from the 6.6MP sensor is substantially clearer than the image from the 18MP sensor.

Figure 2a
Actual image from a large,
$250, 6.6MP image sensor
with large, 3.5um x 3.5um pixels

Figure 2b
Actual image from a small,
$50, 18MP image sensor
with small, 1.25um x 1.25um pixels

The conclusion is as clear as the image in Figure 2a! When choosing a microfilm scanner, don’t be enticed by higher megapixel counts. Rather, for best image clarity, choose a scanner with a physically large image sensor with large pixels. Microfilm scanners like e-ImageData’s ScanPro® devices employ a large 6.6MP sensor with large 3.5um x 3.5um pixels, almost 8 times greater pixel area than the 18MP sensor of its competitors.


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