

Megapixel or sensor size is more important for smartphone cameras?

If you like smartphone photography, one of the specifications that you are often interested in is the megapixel count of the smartphone camera. But is it really a reliable indication of image quality?

If you look at SLR and mirrorless cameras and then compare them to smartphones, you'll see that some low-end and mid-range phones have higher pixel counts, but they still have image quality. worse.

So, in today's article, let's consider the number of pixels or sensor size more important in smartphone photography.

How the camera sensor works

Picture 1 of Megapixel or sensor size is more important for smartphone cameras?

Before diving into the topic under discussion, it is first necessary to understand what camera sensors are and how they work. Digital cameras must convert light into electrical signals when taking pictures. To do so, it uses a lens to focus light on the image sensor.

However, the image sensor is more than a single light sensor. Instead, it's made of many smaller light sensors called pixels. Each pixel measures the amount of light it receives and converts into a signal. The camera's built-in computer then picks up signals from each pixel and creates images from them.

There's more to the details, but that's basically how digital cameras create images. If you want to know more, you can check out the article how image sensors work.

Does the number of Megapixels really matter?

Picture 2 of Megapixel or sensor size is more important for smartphone cameras?

Individual pixels pick up light, so many would argue that megapixels are an important factor. And that's true at one point. After all, the print size of the image will depend on its pixel count. For example, at the ideal 300 pixels/inch resolution, you can only print an 8 x 10 inch image from an 8MP photo before it starts to blur.

However, in this day and age, where most photos are usually stored and shared on a phone, having a 64MP camera on a smartphone is overkill. Canon's flagship mirrorless and SLR cameras are only 24 and 20 megapixels, respectively. Even Hasselblad's mid-range professional camera has only 50 megapixels.

Effect of sensor size on image

Remember that the pixel is inside the sensor. So if you're cramming 108 million pixels into a 1/1.33" sensor, those pixels must be extremely small. When you reduce the pixel size, you also decrease the amount of light it captures. will have an impact on the final image result. Here are the possible effects:

Note : This section will discuss more about camera terminology. If you're not familiar with them, you should read this list of photography terms every photographer should know.

1. Increased noise

Picture 3 of Megapixel or sensor size is more important for smartphone cameras?

When you decrease the amount of light a certain pixel receives, it increases the signal-to-noise ratio of that pixel. That's because there will always be noise and you can only fix it by filling the sensor with actual light signals. But if your camera uses small pixels (by putting as many pixels as possible into a small sensor), there won't be much light data to tame the noise that's going on.

2. Low light performance

When you're shooting in dark areas, cameras with smaller sensors are at a disadvantage. Smaller sensors will capture less light for a given exposure time. So to make sure it can capture exactly what you're seeing, the camera will use more power to increase the ISO (thus increasing noise) or decrease the shutter speed to gather more light. (meaning you must have a tripod or keep your hands extremely steady).

3. Depth of field

Picture 4 of Megapixel or sensor size is more important for smartphone cameras?

Smaller sensors usually have a large depth of field. That's because a smaller sensor will also capture a smaller area. So if you want to capture a flower, you will have to step back further to capture the whole thing.

However, a camera with a larger sensor will capture a larger area. So if you want the flower to fill the camera's frame, you'll have to get closer to the flower or use a lens with a longer focal length. In doing so, you get a shallower depth of field in the image, thus making your subject pop out of the background.

4. Smaller field of view

With a smaller sensor, you also get a lower angle of view. So if you want to capture a wide scene but have a small sensor, you will have to use a wider lens. However, a wider lens can cause distortion, such as the fisheye effect.

5. A more affordable and compact system

Picture 5 of Megapixel or sensor size is more important for smartphone cameras?

Perhaps the only advantage of a small camera sensor over a large sensor is the price and size. Since smaller sensors consume less power and require fewer resources to manufacture, they are generally more affordable than large image sensors.

Furthermore, these sensors are also physically smaller than large ones, allowing them to be placed in thinner devices, like smartphones.

They also need smaller diameter lenses, so you don't need the big hole in the back of your phone if you have a smaller sensor.

Image processing is also important

Despite the drawbacks, smartphone manufacturers still try to add as many pixels as possible to their cameras. But besides sounding impressive on paper, smartphone companies are also interested in adding more pixels to their smartphones to take advantage of computer photography.

Smartphones can overcome many of these limitations by using powerful chips and AI. That's why today's phones have great photography performance, even if they have small camera sensors.

Picture 6 of Megapixel or sensor size is more important for smartphone cameras?

For example, the Google Pixel 6 and Apple iPhone 13 Pro Max can produce some of the best images available today. Their output is generally good and noise-free; Even night shots are sharp and clear. And while the artificial bokeh in these devices isn't exactly the same, they're getting better with each generation.

However, you will find that the trend in smartphone cameras is larger sensor sizes. You'll notice this clearly on an iPhone - the iPhone 11 Pro Max has a 1.4 μ m pixel size, while the iPhone 12 Pro Max has a 1.7 μ m pixel sensor. The iPhone 13 Pro Max has an even larger 1.9 μ m pixel size, making it arguably one of the best camera phones available today.

Don't let the Megapixel count fool you!

Many phone manufacturers use pixel counts to wow potential buyers. However, they're really not a great indication of the quality of the shot. After all, you can find low-end smartphones with 48MP rear cameras that take horrible photos.

Many manufacturers add other numbers and jargon to make their devices sound more interesting or premium, so it's best to know which specs to look at, which ones just to look at. 'coloring'. But if you're buying a smartphone for its image quality, the best thing you can do is look at reviews and actual photo samples before making a choice.

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