Computational imaging overcomes the limitations of a smartphone's tiny lenses and sensors

The size of optical hardware used in smartphones causes limitations in capturing images. Smartphones overcome this challenge by using computational imaging (photography and video) technology that provides AI-integrated software, digital computation and powerful AI engines built into SoCs to:

- Select optimal settings
- Correct colors
- Sharpen images
- Add artificial bokeh
- Enhance details in low-light images
- Create cinematic-quality video
- Combine multiple "stacked" images to create the best image

The result: advanced-level images without professional gear or advanced editing tools

What happens when you take a photo with a smartphone?

Before you capture an image

When you open the camera app, your smartphone begins analyzing the environment and imagery that is stored in a memory buffer even before you click the shutter or record button.

- On certain smartphones, memory bandwidth and capacity are reserved — or "pinned" — for the exclusive use of the camera.
- Dedicated memory is used for processes that optimize images and help with a lag-free experience.

AI optimizes photographic parameters

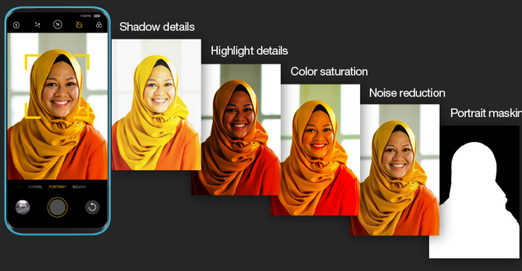
As you tap the shutter or record button, software makes adjustments to ISO, aperture and shutter speed to help capture the best images.

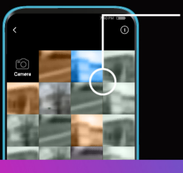
- AI uses trained models in allocated memory to make fine adjustments.
- Composition, color saturation and contrast are automatically adjusted using machine learning techniques to achieve best results.

Images merged for best results

Advanced smartphone camera techniques combine a series of images that are pulled from the memory buffer and merged by AI engines to create the perfect shot.

- Complex photography hallmarks like portrait mode's shallow depth of field are simulated using images from multiple lenses and sensors.
- Compute-intensive night mode features combine multiple images to achieve dynamic, detail-rich images in low light conditions.





Images saved for quick access

Photos and video are saved to fast local storage so they can be accessed quickly to share to social networks, for viewing or to further edit.

- Large capacity storage is necessary to keep not just high-resolution photos and video from up to 320MP sensors[1], but also all the images transferred from previous smartphones.

Memory and storage performance improves computational imaging

Memory is essential to computational imaging, providing a foundation for a smooth user experience and dynamic, high-resolution images and video. High-capacity, high-bandwidth Micron memory and storage help you capture those fleeting moments without the lag that could make you miss the moment.

Micron memory by the numbers

LPDDR5X DRAM

8.533 Gbps maximum data rate[2]

Up to **50%** increase in night mode photo resolution[3]

Up to **35%** faster shoot time[4]

Learn more: **micron.com/mobile**

Sources

[1] MediaTek's Dimesity 9000 SoC supports 320MP-resolution smartphone cameras

[2] Data rate based on published JEDEC specifications

[3] Simulated increase based on measured phone data running LPDDR5 at 5,500 Mbps and 6,400 Mbps with projected 8,533 Mbps speeds.

[4] Simulated increase based on measured phone data running LPDDR5 at 5,500 Mbps and 6,400 Mbps with projected 8,533 Mbps speeds.