

TAU researchers develop a smarter smartphone camera

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Despite an addiction to taking pictures everywhere they go, cellphone junkies have not been able to ditch their stand-alone cameras quite yet. Smartphones still don't possess the sharp zoom capabilities of digital still cameras, so the resulting pictures can be messy and out-of-focus.

That won't be the case for long, however. Prof. David Mendlovic of Tel Aviv University's School of Electrical Engineering and his former doctoral student Dr. Gal Shabtay, who together established the startup Corephotonics, have now successfully bridged the gap between the cellphone [camera](#) and the [digital still camera](#), developing a smartphone camera with high-quality zoom capabilities. The solution is based on a cutting-edge lightweight cellular camera that uses a two-lens approach to produce sharper images.

Smartphone pictures lack the focus of standard snaps because a cellular camera features a digital zoom that manipulates images electronically, as opposed to a lens that manipulates them optically. A conventional zoom requires a relatively thick

lens, which would weigh down the ever-shrinking smartphone.

Two cameras in one

Prof. Mendlovic and Dr. Shabtay have devised an ingenious, lightweight two-lens camera with two fields of vision—broad and close, and narrow and distant. The two lenses combine images from the two fields of vision, fusing them into one sharply defined picture.

"Our technology provides up to three times the zoom factor, has improved low-light performance, and can fit into compact dimensions," said Prof. Mendlovic. "We used three novel approaches: a unique lens design that enables the high zoom factor in a compact size, an algorithm for achieving a continued zoom factor, and a technique that enables compact and efficient micro-mechanics in the camera."

Corephotonics has designed the hardware and software for the [smartphone](#) camera and has already sold the blueprint to at least one device manufacturer.

Just around the corner

"The first handset with our technology will be available on the market in the first quarter of 2015," said Prof. Mendlovic. "If successful, we'll define a new standard for the next-generation compact camera, providing necessary validation of the new approach and resulting in an entirely new user experience."

The new technology requires that smartphones have good, but not exceptional, processing capabilities. Corephotonics has already demonstrated that its two-lens technology works with a processor that is currently used in most high-end smartphones on the market.

Smartphone owners should find it easy to operate as well. "We worked with users from day one," said Prof. Mendlovic. "It's important to develop what the user actually needs. We also took a holistic approach, investigating the entire camera system instead of specific camera components. This point is important since the camera is a complex system and you have to design it as such."

Corephotonics has raised \$10 million from BetaAngels, Magma and Horizon Ventures.

Together with doctoral candidate Ariel Raz, Prof. Mendlovic is currently at work on the "next generation camera" at TAU's Optical Signal Processing Laboratory. Funded by the new Momentum Fund, established by Ramot, the project, "SIS: Smart Image Sensor," is aimed at re-establishing the basic concept of color image acquisition by using sensors and computation platforms.

According to Prof. Mendlovic, the new next generation camera offers four times the resolution, better low light performance and a unique user experience. "Momentum Fund provides an excellent path for commercializing promising technologies and definitely helps bridge the gap between academia and the commercial world," says Prof. Mendlovic.

Provided by Tel Aviv University

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