

VTT creates the world's first hyperspectral iPhone camera

November 24 2016

VTT Technical Research Centre of Finland has created the world's first hyperspectral mobile device by converting an iPhone camera into a new kind of optical sensor. This will bring the new possibilities of low-cost spectral imaging to consumer applications. Consumers will be able to use their mobile phones for example to sense food quality or monitor health.

Hyperspectral cameras, which are traditionally expensive, have been used for demanding medical and industrial, space and environmental sensing. The cost-effective optical MEMS (Micro Opto Electro Mechanical Systems) spectral technology enables the development of new mobile applications for environmental sensing and observation from vehicles and drones. Other applications include health monitoring and food analysis. All of this forms part of an environment combining smart sensors with the Internet.

"Consumer benefits could appear in health applications, such as mobile phones that are able to check whether moles are malignant or food is edible. They could also verify product authenticity or identify users based on biometric data. On the other hand, driverless cars could sense and identify environmental features based on the representation of the full optical spectrum at each point of an image," explains Anna Rissanen, who is heading the research team at VTT.

VTT has already developed a wide range of new applications for the innovative hyperspectral cameras. These include the diagnosis of skin cancer, environmental sensing based on nanosatellites, various drone

applications for precision agriculture and forest monitoring, and projects underway for the remote measurement of vessel emissions.

Spectral imaging everywhere

Optical [spectral imaging](#) offers a versatile way of sensing various objects and analysing material properties. Hyperspectral imaging provides access to the optical spectrum at each point of an image, enabling a wide range of measurements. The adjustable tiny MEMS filter is integrated with the camera lens and its adjustment is synchronised with the camera's image capture system.

"Today's smart devices provide huge opportunities for the processing of image data and various cloud services based on spectral data. Mass-produced sensor technology will enable the introduction of [hyperspectral imaging](#) in a range of devices in which low-cost camera sensors are currently used," Rissanen comments.

VTT Technical Research Centre of Finland aims to cooperate with companies to commercialise the technology and bring new, innovative [optical sensor](#) products to the market.

Provided by VTT Technical Research Centre of Finland

Citation: VTT creates the world's first hyperspectral iPhone camera (2016, November 24)
retrieved 19 April 2024 from
<https://phys.org/news/2016-11-vtt-world-hyperspectral-iphone-camera.html>

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