

NTU researchers develop lensless camera that captures infinite spectra

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A lensless camera that can capture sharp, multicoloured images without lens or colour filters has been developed by scientists from Nanyang Technological University (NTU).

In contrast to existing camera technology, which can capture up to 36 colour channels, this new technology – which uses only a piece of ground glass and a monochrome sensor – can detect infinite spectra within a single image.

The camera uses speckle patterns instead of conventional colour filters to detect and display the different spectra within an image that are not visible to the naked eye.

As a result, infinite spectra – including UVR (UV Reflected), UVF (UV Fluorescent), IR (Digital Infrared), and VIS (visible) – can be captured at once.

Dr Sujit Kumar Sahoo, one of the researchers behind the project, said: “It could be used in food safety, where one can take a photo of fruits or meat in particular spectra to look for spots that are associated with chemicals or bacterial activity

leading to spoilage.”

It could also be used to verify the authenticity of artwork by capturing the different layers of paint not visible to the naked eye, or in the pharmaceutical industry as a cheaper and more flexible option to hyperspectral cameras, used for quality control of drugs.

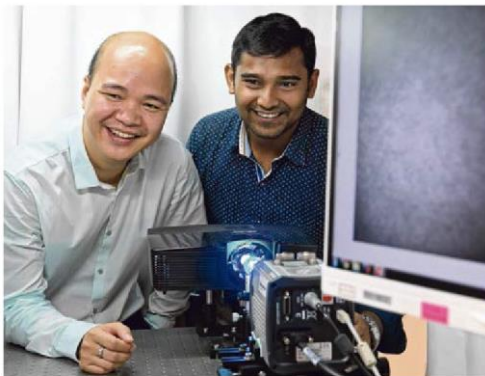
Now, a spectrometer, an apparatus that can split light into separate colours, is used to detect different spectra within an image. But it is expensive.

The cost of a commercial spectrometre can range from \$3,000 to over \$40,000, said Assistant Professor Steve Cuong Dang, who led the research.

The researchers did not elaborate on how much cheaper it will be but Prof Dang said the new technology could also potentially be used in smartphones and even DSLR cameras, to help make them slimmer by reducing the need for bulky and expensive lens and colour filters.

A patent for the new technology is pending.

ckaiyin@sph.com.sg



TNP PHOTO: NG SOR LUAN

I see what you did there

Nanyang Technological University (NTU) Assistant Professor Steve Cuong Dang (left) and Dr Sujit Kumar Sahoo with a multispectral lensless camera developed by NTU scientists. The new technology, which can detect infinite spectra within a single image, can be used for a variety of purposes. **FOR MORE, SEE PAGE 8**