

Research highlight

NIR hyperspectral imaging

HyperNIR: High-Speed Hyperspectral Imaging for Near Infrared Fluorescence and Environmental Monitoring

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Near-infrared light is invisible to humans, but contains valuable information about the chemical composition of a sample. Previous technologies captured either monochrome images or a single spectrum of an area.

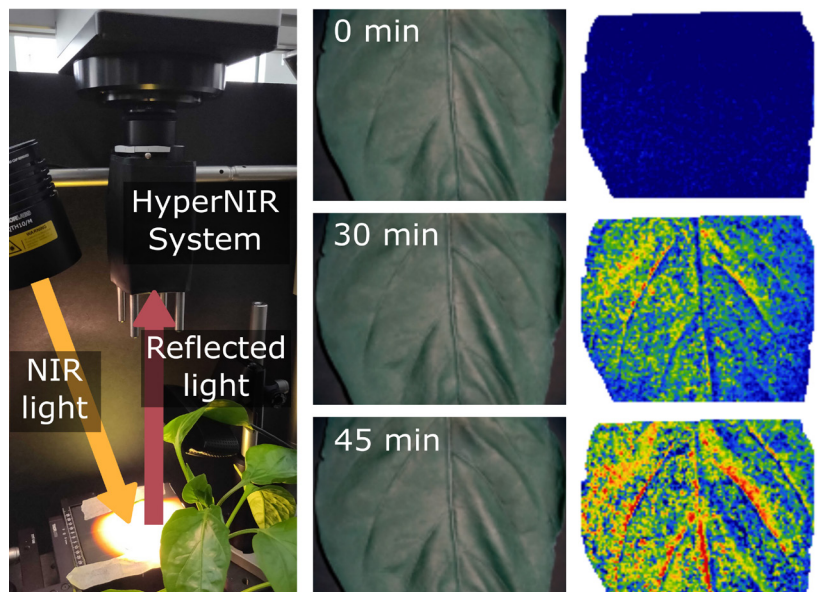
HyperNIR is a novel method for hyperspectral imaging, which combines spectral and spatial information. Using inexpensive components, we are able to transform any standard camera into a HyperNIR camera in order to capture spectral information in images. This way, fluorescent dyes, microplastics and plant stress can be detected.

Technology

- Hyperspectral imaging in the near-infrared (or visible) range with standard cameras through extension via optical module

System advantages

- The NIR range contains spectral chemical fingerprints of materials
- The design of our optoelectronic system enables high frame rates (currently: 0.2 hyperspectral cubes/s)
- Customizable spectral range allows for spectral zoom-in



The HyperNIR process can be used to show how a pepper plant absorbs water. On the right are three images of a single leaf, along with their associated HyperNIR images that visualize the water uptake in the plant. The redder the color, the more water is present in the leaf. © 2025 The Authors. Advanced Science published by Wiley-VCH GmbH (CC BY 4.0). Adapted.

Customer Benefits

- Real-time hyperspectral imaging enabled by low processing effort
- The model can be combined with any standard camera
- All camera pixels are preserved in the hyperspectral image for high resolution

Application Fields

- Imaging of NIR fluorophores
- Distinction of plastic types based on the reflection spectrum
- Live monitoring of plant health

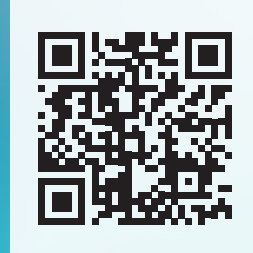
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