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MetaHDR: single shot high-dynamic range imaging and sensing using a multifunctional metasurface

Single-shot HDR imaging system capturing rich detail for surveillance, microscopy, and advanced manufacturing applications.

Researchers at Purdue University have developed MetaHDR, a single-shot high dynamic range (HDR) imaging and sensing system. MetaHDR system captures HDR images with a single or few exposures and creates multiple low dynamic range (LDR) images simultaneously. Current solutions for generating single-capture HDR images require specialized photosensors and circuitry. MetaHDR instead utilizes more conventional camera and sensor technologies. Single-shot HDR photography and videography with real-time sensing applications make MetaHDR particularly useful for surveillance, microscopy, and advanced manufacturing.

Technology Validation:

This technology was validated through experimentation using a fabricated metasurface. Results show more than a 50 dB increase in dynamic range.

Advantages:

-Captures multiple imagines simultaneously in a single shot

-All photodetectors have the same integration time

-Wide range of applications

-Improves dynamic range

-Multifunctional

Applications:

-Surface Monitoring

-Surveillance and Security

Technology ID

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Category

Artificial Intelligence & Machine Learning/AI-Integrated Imaging Systems & Industrial Vision and Inspection

Computing/Photonic & Optical Computing Technologies

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View online

-Microscopic Imaging

-Advanced Manufacturing

-Computational imaging

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