Integrated Optoelectronic Chip for Sensing Storage and Computing

Overview

Technology eliminates optical-electronic conversions, holds promise for revolutionizing edge intelligence Caption: Researchers have developed a new intelligent photonic sensing-computing chip that can process, transmit and reconstruct images of a scene within nanoseconds. With advantages of highly parallel computing and massive interconnection, the optical. Performance of the integrated sensing-memory-processing diode. Credit: Yuanmin Luo Think about how easily you recognize a friend in a dimly lit room. Your eyes capture light, while your brain filters out background noise, retrieves stored visual information, and processes the image to make a match. Institute of Intelligent Photonics, Nankai University, Tianjin 300071, China 2. Department of Chemistry, City University of Hong Kong, Kowloon, Hong Kong 999077, China Abstract: An amorphous Ga2O3 versatile memristive device has been fabricated to realise four-in-one functionality, merging multibit.

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The underlying resistive switching mechanisms of volatile/nonvolatile optoelectronic devices and their processing operations are explored. Finally, a perspective on the future ...

Here, we demonstrate an integrated real-time multidimensional optical sensing system, enabled by a sensitizer and a nonlinear optical neural network (ONN) on a fully integrated silicon ...

We highlight advancements in 2-D semiconductor-based in-sensor computing devices, focusing on material diversity, tunable photoresponsivity, device architectures, and operational ...

If engineers want to add memory or computing directly to a sensor, they often need to integrate extra electronic components around each pixel. This increases hardware complexity, takes ...

Here, we present a sensory-memory optoelectronic device that couples ambient electromagnetic energy with the human body to generate electrical energy for self-powering. This ...

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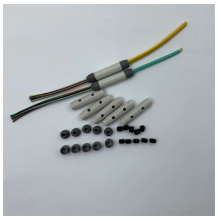

Here, we present a sensory-memory optoelectronic device that couples ambient electromagnetic energy with the human body to generate ...

Here, artificial optoelectronic memristors array was fabricated and the feasibility of optical sensing, data storage, Boolean logic operations and neuromorphic computing were demonstrated.

This system integrates UV light sensors, data storage, logic gates, and neuromorphic computing in one single device. We adjusted the Icc to achieve four low resistance states (LRS).

Caption: The new intelligent optical computational array (OPCA) chip performs end-to-end image processing, transmission and reconstruction by integrating sensing and computing on one ...

Abstract: An amorphous Ga2O3 versatile memristive device has been fabricated to realise four-in-one functionality, merging multibit memory, logic operation, light detection, and neuromorphic ...

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