

Preview

We comprehensively survey the state of the art in SDM-based OFS, detailing the operating principles and applications of multi-core fibers (MCFs) for ultra-dense sensor arrays and 3D shape sensing, as well as few-mode fibers (FMFs) for mode-division multiplexing and enhanced. We comprehensively survey the state of the art in SDM-based OFS, detailing the operating principles and applications of multi-core fibers (MCFs) for ultra-dense sensor arrays and 3D shape sensing, as well as few-mode fibers (FMFs) for mode-division multiplexing and enhanced. This review argues that the synergistic convergence of space-division multiplexing (SDM) and artificial intelligence (AI) represents a paradigm shift, enabling a new generation of intelligent, high-dimensional sensing networks. We comprehensively survey the state of the art in SDM-based OFS. Understanding this revolution requires grasping fiber sensing's principles: External physical parameters (temperature, pressure, strain, etc.) interact with light signals in optical fibers, altering intensity, phase, wavelength, or polarization. This technology, combined with big data/GIS mapping capabilities, offers differentiated, multi-dimensional, and intelligent detection and. Empower Computing with Fiber: High-Quality Data for AI.

Distributed fiber optic sensors (DFOSs) have become increasingly popular for intrusion detection, particularly in

Optical fiber sensing refers to the use of optical fibers to measure various parameters such as temperature, strain, and pressure by

In recent years, the development of fiber optic sensing technology and vision sensing technology has led to further

Imagine a world where the Internet doesn't just connect but senses --detecting earthquakes,

Here, we demonstrate an integrated real-time multidimensional optical sensing system,

AI algorithms are useful in advancing these networks and providing capabilities beyond traditional systems. This study

The growing demand for high-fidelity, multi-parameter, distributed sensing in critical domains such as structural health

This review provides a structured synthesis of AI-enhanced optical fiber sensing systems, mapping

learning-based methods across

Here, we propose an all-optical fiber sensing architecture with in-sensor computing (AOFS-IC) that achieves fully

Fiber optic shape sensors are optical Multicore Fibers (MCF) or multi-fiber cables (with a similar section geometry to

Continuous and comprehensive brain monitoring is crucial for timely identification of changes or deterioration in brain

This review argues that the synergistic convergence of space-division multiplexing (SDM)

Structural health monitoring (SHM) plays a vital role in ensuring the safety, durability, and performance of civil

Article Open access Published: 17 August 2020 Smart textiles for multimodal wearable sensing using highly

ML has demonstrated its effectiveness by mitigating the crosstalk issue to a higher degree and thereby enhancing the

Optical fiber sensors have gained widespread use in monitoring systems due to their simultaneous transmission and

Web: <https://www.kremgroup.co.za>

