

 Paper

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Optical fiber macrobend sensor assisted by artificial intelligence for monitoring a flexible structure

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ARTICLE

FIGURES &
TABLES

REFERENCES

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Abstract

In this work, a multiple-macro bend sensor consisting in an optical fiber spiral was integrated into a cylindrical flexible structure with a length of 15.0 cm. When the structure is bent, the changes observed in the transmittance of the coiled fiber within the 475 - 750 nm spectral range allow the sensor operation. The cylinder was suspended by one of its extremities, and the free tip was moved in the xy-plane. Machine learning methods used for data processing resulted in an average error of less than 0.6 cm for a total range of 10 cm in detecting the position of the structure's free extremity. This result and the tests carried out under repeatability conditions indicate the sensor's potential for deformation monitoring.

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