

# **Smart sensors for the petroleum sector based on long period gratings supervised by artificial neural networks**

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## **ABSTRACT**

This work shows the use of long period gratings in the petroleum sector, in two specific applications. The proposed sensors are employed both to identify substances in a simulated flow inside a pipeline, and to assess the gasoline conformity commercialized in gas stations. The gratings responses for each specific case were employed to train and to validate two different topologies of artificial neural networks: perceptron multilayer and radial base function. The obtained results show that fiber optic sensors supervised by artificial neural networks can constitute systems for smart measurement with high applicability in the petrochemical field.

**Keywords:** Long-period grating, artificial neural networks, fuel quality control, detection of substances in pipelines