

## Accepted Manuscript

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PII: S0263-2241(17)30128-8  
DOI: <http://dx.doi.org/10.1016/j.measurement.2017.02.032>  
Reference: MEASUR 4617

To appear in: *Measurement*

Received Date: 22 December 2016  
Revised Date: 5 February 2017  
Accepted Date: 17 February 2017

Please cite this article as: L. Morales-Velazquez, R. de Jesus Romero-Troncoso, G. Herrera-Ruiz, D. Morinigo-Sotelo, R.A. Osornio-Rios, Smart Sensor Network for Power Quality Monitoring in Electrical Installations, *Measurement* (2017), doi: <http://dx.doi.org/10.1016/j.measurement.2017.02.032>

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# Smart Sensor Network for Power Quality Monitoring in Electrical Installations

Luis Morales-Velazquez<sup>1</sup>, Rene de Jesus Romero-Troncoso<sup>2</sup>, Gilberto Herrera-Ruiz<sup>1</sup>, Daniel Morinigo-Sotelo<sup>3</sup>, Roque Alfredo Osornio-Rios<sup>1\*</sup>

<sup>1</sup> CA Mecatronica, Facultad de Ingenieria, Universidad Autonoma de Queretaro, Campus San Juan del Rio, Rio Moctezuma 249, Colonia San Cayetano, 76807 San Juan del Rio, QRO, Mexico ;

lmorales@hspdigital.org

<sup>2</sup> CA Telematica, DICIS, Universidad de Guanajuato, Carr. Salamanca-Valle km 3.5+1.8, Palo Blanco, 36885 Salamanca, GTO, Mexico ; troncoso@hspdigital.org

<sup>3</sup> Department of Electrical Engineering, University of Valladolid (UVa), 47011 Valladolid, Spain; daniel.morinigo@eii.uva.es

\* Corresponding author: raosornio@hspdigital.org; Tel.: +52-442-192-1200 Ext. 6090.

## Abstract

Smart meters are one of the basic components of the future smart grid, they allow remotely monitoring each point in the grid in order to know in real-time the performance of the system and to detect potential failures. In this paper, a smart sensor network is introduced and the most important features are presented in three different scenarios: a residential home, an industrial installation, and a public building. The proposed system demonstrates its capabilities of in situ real-time processing and big-data off-line network processing. The suggested smart meter is based on field programmable gate array (FPGA) technology that allows a reconfigurable architecture, which lets the user to select the proper processing modules according to their application. The developed smart sensor network calculates standard figures such as effective values, power factor, and total harmonic distortion; in addition, it detects power quality disturbances such as dips, swells, or interruptions. Moreover, the smart sensor network can continuously detect events to identify certain kind of appliances or industrial equipment such as: fans, lighting, microwave ovens, refrigerators, among others; it is a powerful tool to analyze an entire building in a non-intrusive load monitoring approach.

**Keywords:** Smart sensor network; power quality; FPGA; smart grid.

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