## Accepted Manuscript

Uncertainty Analysis of Intelligent Model of Hybrid Genetic Algorithm and Particle Swarm Optimization with ANFIS to Predict Threshold Bank Profile Shape Based on Digital Laser Approach Sensing

Azadeh Gholami, Hossein Bonakdari, Isa Ebtehaj, Majid Mohammadian, Bahram Gharabaghi, Saeed Reza Khodashenas

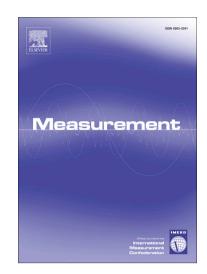
PII: S0263-2241(18)30169-6

DOI: https://doi.org/10.1016/j.measurement.2018.02.070

Reference: MEASUR 5318

To appear in: *Measurement* 

Received Date: 16 February 2017 Revised Date: 27 February 2018 Accepted Date: 28 February 2018



Please cite this article as: A. Gholami, H. Bonakdari, I. Ebtehaj, M. Mohammadian, B. Gharabaghi, S.R. Khodashenas, Uncertainty Analysis of Intelligent Model of Hybrid Genetic Algorithm and Particle Swarm Optimization with ANFIS to Predict Threshold Bank Profile Shape Based on Digital Laser Approach Sensing, *Measurement* (2018), doi: https://doi.org/10.1016/j.measurement.2018.02.070

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## **ACCEPTED MANUSCRIPT**

Uncertainty Analysis of Intelligent Model of Hybrid Genetic Algorithm and Particle Swarm Optimization with ANFIS to Predict Threshold Bank Profile Shape Based on Digital Laser Approach Sensing

Azadeh Gholami<sup>1, 2</sup>, Hossein Bonakdari<sup>1, 2, \*</sup>, Isa Ebtehaj<sup>1, 2</sup>, Majid Mohammadian<sup>3</sup>, Bahram Gharabaghi<sup>4</sup>, Saeed Reza Khodashenas<sup>5</sup>

bonakdari@yahoo.com

#### **Abstract**

Measuring the bank profile shape when bank sediment particles are undergoing incipient motion (threshold) is notable for researchers. In the present study, an advanced laser gauge sensor instrument is utilized to measure the coordinates of points located in a stable channel bank cross section. A robust Particle Swarm Optimization (PSO) algorithm combined with a Genetic Algorithm (GA) is developed in an Adaptive Neuro-Fuzzy Inference System (ANFIS) model to predict and compare the bank profile with measured data. The results show that the proposed ANFIS-PSO/GA optimization method had a determination coefficient  $(R^2)$  and Mean Absolute Relative Error (MARE) of 0.9951 and 0.1575, respectively, and was

<sup>&</sup>lt;sup>1</sup>Department of Civil Engineering, Razi University, Kermanshah, Iran.

<sup>&</sup>lt;sup>2</sup>Environemental Research Center, Razi University, Kermanshah, Iran.

<sup>&</sup>lt;sup>3</sup>Department of Civil Engineering, University of Ottawa, 161 Louis Pasteur, CBY A114, Ottawa, ON K1N 6N5, Canada

<sup>&</sup>lt;sup>4</sup>School of Engineering, University of Guelph, Guelph, Ontario, NIG 2W1, Canada

<sup>&</sup>lt;sup>5</sup>Department of Water Engineering, Ferdowsi University of Mashhad, Mashhad, Iran.

<sup>\*</sup>Corresponding author, Phone: +98 833 427 4537, Fax: +98 833 428 3264, E-mail:

### Download English Version:

# https://daneshyari.com/en/article/7121490

Download Persian Version:

https://daneshyari.com/article/7121490

<u>Daneshyari.com</u>