Coastal Engineering 142 (2018) 106–109

Contents lists available at ScienceDirect

Coastal Engineering

journal homepage: www.elsevier.com/locate/coastaleng

Discussion of "an integrated framework of extreme learning machines for predicting scour at pile groups in clear water condition" by: I. Ebtehaj, H. Bonakdari, F. Moradi, B. Gharabaghi, Z. Sheikh Khozani☆

Danial Amini Baghbadorani[a], Behzad Ataie-Ashtiani[a], Aliasghar Beheshti[b,*]

[a] Department of Civil Engineering, Sharif University of Technology, P.O. Box 11365-9313, Tehran, Iran
[b] Water Science and Engineering Department, Ferdowsi University of Mashhad, P.O. Box 91775-1163, Mashhad, Iran

1. Misapplication of the pile group scour database

In Section 2.1 of the paper by Ebtehaj et al. (2018), it is mentioned that 321 experiments are taken from papers by Ataie-Ashtiani and Beheshti (2006), Ataie-Ashtiani et al. (2010) and Amini et al. (2012). As it was discussed in Beheshti and Ataie-Ashtiani (2016), the data of Ataie-Ashtiani et al. (2010) was for complex piers and only 3 experiments can be considered as unsubmerged pile groups. These three papers include only 175 experiments related to pile group. The misuse of complex pier data was found in a similar paper about the application of soft computing methods for scour depth estimation around pile groups, which was reported in Beheshti and Ataie-Ashtiani (2016). Therefore, the whole basis of Ebtehaj et al. (2018) suffers from a misunderstanding in the definitions of pile group and complex piers. Readers are referred to Amini Baghbadorani et al. (2017) and Amini Baghbadorani et al. (2018) for the correct descriptions of pile group and complex piers, respectively.

In an effort to gather laboratory experiments for pile group scour, data from different sources were cited in Amini Baghbadorani et al. (2017), which lists 365 data points and presents them in a spreadsheet file. Apart from the mentioned sources, other sources of pile group data cited by Amini Baghbadorani et al. (2017) include: Hannah (1978), Martin-Vide et al. (1998), Smith (1999), Zhao and Sheppard (1999), Sheppard (2003), Oliveto et al. (2004), Coleman (2005), Grimaldi and Cardoso (2010), Heidarpour et al. (2010), Sheppard and Renna (2010), Movahedi et al. (2011), Ataie-Ashtiani and Aslani-Kordkandi (2012), Beheshti et al. (2013), Chreties et al. (2013), Ferraro et al. (2013), Gao et al. (2013), Imamzadehei et al. (2013), Ismail et al. (2013), Lança et al. (2013), Khaple et al. (2014), Moreno et al. (2014), Selamoglu et al. (2014), Moreno et al. (2016) and Keshavarzi et al. (2018).

2. The ELM neural network model with presented coefficients has poor performance

In Ebtehaj et al. (2018), the application of several soft computing methods are presented for prediction of scour depth around pile groups under the effect of unidirectional current. The dimensional variables are used as input and output variables to the soft computing models, following the advice of Bateni et al. (2007). Among the presented models in the paper under discussion, the best performing model is the extreme learning machine (ELM) as represented in Eq. (37) as well as Box 1 of the main paper. ELM is essentially an artificial neural network (NN) with a single hidden layer with the sine function used as the activation function. The ELM equation for predicting scour depth is given by:

$$d_s[\mathrm{m}] = \sum_{i=1}^{35} outW_i \times \sin\{BHN_i + InW_{i,1} \times n + InW_{i,2} \times D[\mathrm{m}] + InW_{i,3} \times S_n[\mathrm{m}] + InW_{i,4} \times y[\mathrm{m}] + InW_{i,5} \times U[\mathrm{m/s}] + InW_{i,6} \times U_c[\mathrm{m/s}] + InW_{i,7} \times d_{50}[\mathrm{m}]\} \quad (1)$$

The coefficients of *outW* and *BHN* vectors along with *InW* matrix are given in Eq. (37) and Box 1 of the main paper. The dimensions of variables are also placed in the formula to reduce the ambiguity associated with the dimensional equation (based on Table 1 of the main paper). The row number in the corresponding vectors and matrix is denoted with *i*, which also represents the node number in the ELM neural network. Definitions of variables are the same as the main paper.

A conflict exists between Box 1 and Eq. (37) in the main paper; the first column of the 6th and 7th row of *InW* are −0.62 and 0.96 in Box 1,

☆ In this technical comment, we are going to show that in the Ebtehaj et al. (2018) paper, there are major flaws due to the misapplication of the considered data and the applied methods. In the following, these flaws are discussed in detail.

* Corresponding author. .
E-mail addresses: danial.amini@gmail.com (D.A. Baghbadorani), ataie@sharif.ir (B. Ataie-Ashtiani), beheshti@ferdowsi.um.ac.ir (A. Beheshti).

https://doi.org/10.1016/j.coastaleng.2018.10.007
Received 6 February 2018; Accepted 20 October 2018
Available online 22 October 2018
0378-3839/