IoT Technology Enabled Heuristic Model with Morlet wavelet neural network for numerical treatment of Heterogeneous Mosquito Release Ecosystem

ABSTRACT

The utmost advancements of artificial neural networks (ANNs), software-defined networks (SDNs) and internet of things (IoT) technologies find beneficial in different applications of the smart healthcare sector. Aiming at modern technology's use in the future development of healthcare, this paper presents an advanced heuristic based on Morlet wavelet neural network for solving the mosquito release ecosystem in a heterogeneous atmosphere. The mosquito release ecosystem is dependent of six classes, eggs density, larvae density, pupae density, mosquitoes searching for hosts density, resting mosquito's density and mosquitoes searching for ovipositional site density. An artificial neural network with the layer structure of Morlet wavelet (MWNN) kernel is presented using the global and local search optimization schemes of genetic algorithm (GA) and active-set algorithm (ASA), i.e., MWNN-GA-ASA. The accurateness, reliability and constancy of the proposed MWNN-GA-ASA is established through comparative examinations with Adams method based numerical results to solve the proposed nonlinear system with matching of order 10^{-06} to 10^{-09}. The accuracy and convergence of the proposed MWNN-GA-ASA is certified using the statistical operators based on root mean square error (RMSE), Theil's inequality coefficient (T.I.C) and mean absolute deviation (MAD) operators.