Effective Feature Selection Using Hybrid GA-EHO for Classifying Big Data SIoT

Iyapparaja M, Vellore Institute of Technology, Vellore, India  
Deva Arul S, Vellore Institute of Technology, Vellore, India

ABSTRACT

Several novel applications and services of networking for the IoT are supported by the Social Internet of Things (SIoT) in a more productive and powerful way. SIoTs are the recent hot topics rather than other extensions of IoTs. In this research, the authors have extracted the Big Data SIoT using the well-known model named MapReduce framework. Moreover, the unwanted data and noise from the database are reduced using the Gabor filter, and the big databases are mapped and reduced using the Hadoop MapReduce (HMR) technique for improving the efficiency of the proposed GA-EHO. Furthermore, the feature selection using GA-EHO is processed on the filtered dataset. The implementation of the proposed system is done by using some machine learning classifiers for classifying the data and the efficiency is predicted for the proposed work. From the simulation results, the specificity, maximum accuracy, and sensitivity of the proposed GA-EHO are produced about 87.88%, 99.1%, and 81%. Also, the results are compared with other existing techniques.

KEYWORDS

Big Data, Elephant Herd Optimization (EHO), Gabor Filter, Genetic Algorithm (GA), Machine Learning, Social Internet of Things (SIoT)

1. INTRODUCTION

In this modern era, the development of solutions and technologies based on IoT are becoming a crucial challenge. Moreover, the IoT technology is the collection of pervasive data and its sharing for obtaining a certain goal. The data in IoT refers the integer values or variables of certain attributes for a condition to be reached. A predefined interface is used for carrying the certain functions that allowed by IoT services (Lopez, Rios, Bao, & Wang, 2017; Ahmad, Rathore, Paul, & Rho, 2016). Several researchers are giving interest in finding the security issues that are arising during the integration and discovery of data within IoT. Moreover, the SIoT is the combination of large social networks that are connection of people and objects, people-to-people, and objects-to-objects. For this reason, data processing faces various challenges for improving storage and cleaning, data collection, and performing real-time analysis (Yim et al., 2017; Song et al., 2019; Nagarajan & Gandhi, 2019). Furthermore, in the field of Big Data, several platforms and standards have introduced by the vendors of relational database which can be used for data analysis and data aggregation (Ochoa, Fortino, & Fatta, 2017; Wasi-ur-Rahman et al., 2013).

The SIoT and big data are perfect characterization of social systems and human progression is represented by IoT. Several feature selection algorithms are proposed that are mainly classified into two main categories; wrapper-approaches, and filter-approaches. In filter-based approach, the process of filtration is analyzed before classification because of the independent usage nature of classification-
algorithms (Ahmed et al., 2017; Iyapparaja & Bhanupriya 2017; Rathore, Ahmad, & Paul, 2016). Several machine learning algorithms are used for classifying the data collected from the SIoT. These approaches have various benefits of resolving nonlinear, little specimen, and pattern recognition of high dimensional. In addition, advanced things cannot be applied to SIoT as it has huge amount of data processed along with a high bandwidth (Iyapparaja et.al., 2012; Iyapparaja & Tiwari, 2017).

- The main endowment of this research is to ensure the system of SIoT structure with big data on classification model for helping features.
- For analyzing the process, some social network databases are used and classification model is finally performed. Moreover, the systems performance is improved using the classifiers based on the optimal features which are used in this approach.
- This proposed work helps SIoT systems and provide guidance for the researchers to analyze the SIoT big data.

The rest of this research is described as follows, segment 2 describes the literature review of the existing works, segment 3 presents the proposed GA-EHO algorithm, and segment 4 defines the simulation results of the proposed system and comparison of various classifiers with previous works are processed and finally the conclusion of the research work is given with future enhancement.

2. RELATED WORKS

Hasan and Al-Turjman (2018) has proposed embedded sensors for SIoT for exchange and gather information of individuals or protests associated with the developing system. The authors proposed Particle Multi-Swarm Enhancement (PMSO) which is a bio-inspired for calculating directly to recoup, select and build disjoint ways that disappoints the endure while fulfilling the parameters of Quality of Service (QoS). The optimal directions are decided by multi-swarm technique for choosing the directed multipath and trading of messages at the same time from all position of the systems. The qualities utilized from all the individuals best data that demonstrated from the results which is substantial technique which is a motivation for the enhancement of the PMSO execution.

Hussein, Han, Lee, Crespi, and Bertin (2017) used a reasoning approach view for examining the novel administration structure for dynamic SIoT declaration in smart spaces. Therefore, situational needs, reasoning about clients, encompassing conditions of social angles, and inclinations are proposed to create a file known as situation-aware services that will coordinate the needs of clients. The proof of idea model is actualized from this reasoning approach, specifically that are analyzed for Airport Dynamic Social. Nguyen, Tran, Baraki, and Geihs (2017) proposed a model–driven approach for investigating the issue and optimizing the applications of IoT with regards to prerequisites of non-practical. The source code is updated by the source-code transformation with movable parameter of values produced and compiler executes for making the application of the binary image. The simulations results show the perquisites of non-useful that is reliability and power consumption which can be generously enhanced at the optimization time.

Ahmad et al. (2018) proposed a solution using High-Performance Computing (HPC) which turned to be a key issue for several considerations. The authors presented an engineering framework that chooses the algorithm named Artificial Bee Colony (ABC). Furthermore, the Hadoop biological system uses the Kalman filter as a part of it which used for evacuation of the noise. The information is productively totaled by recommending the total 4-level engineering when superfluous information is removed and the proposed ABC algorithm based on Hadoop is used for investigating the information. The framework of MapReduce and Hadoop is utilized for executing the proposed model for checking the effectiveness of the calculations with ABC calculation. Murugan and Devi (2018) proposed a hybrid...
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