

Title: Mobile edge computing energy usage prediction

Abstract

With the increasing popularity of mobile edge computing (MEC) for processing intensive and delay sensitive IoT applications, the problem of high energy consumption of MEC has become a significant concern. Energy consumption prediction and monitoring of edge servers are crucial for reducing MEC's carbon footprint in accordance with green computing and sustainable development. However, predicting energy consumption of edge servers is a nontrivial problem due to the fluctuation and variation of different loads. To address this problem, we propose ECMS, a new edge intelligent energy modelling approach that jointly adopts Elman Neural Network (ENN) and feature selection to optimize the consumption of energy on edge servers. ECMS considers 29 parameters relevant to edge server energy consumption and uses the ENN to develop an energy consumption model. Unlike other energy consumption models, ECMS can successfully deal with load fluctuation and various sorts of tasks, such as CPU-intensive, online transaction-intensive, and I/O-intensive. We have validated ECMS through extensive experiments and compared its performance in terms of accuracy and training time to several baseline approaches. The experimental results show the superiority of ECMS to the baseline models. We believe that the proposed model can be used by the MEC resource providers to forecast and optimize energy use.

Biography



Dr. Jemal Abawajy is a full professor at Deakin University, Australia. He is an eminent highly cited scholar with more than 350 refereed publications in emerging technologies that include quantum computing, cloud computing, fog computing, Internet of Things, and blockchain. Prof. Abawajy have served/serving as associate editor on numerous international journals such as Transaction on Cloud Computing (IEEE), Discover Internet of Thing (Springer), Electronic Commerce Research (Springer), and Journal of Cloud Computing (Springer), and as a guest editor of special issues in journals such as Transactions on Industrial Informatics (IEEE), Transactions on Cloud Computing (IEEE), and Journal of Parallel and Distributed Computing (Elsevier). Professor Abawajy also served on more than 400 international academic conferences in various capacities including Chair and Program Chair. Prof. Abawajy has given over 70 invited keynote speech and numerous invited seminars. He has also given trainings such as faculty development programs all over the world. He has supervised numerous PhD/Master's degree and postdoctoral candidates to a successful completion.