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# Sustainable Cities and Society

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## Editorial

### Social, mobile, analytic and cloud technologies: Intelligent Computing for future smart cities



A smart city refers to a city equipped with the basic infrastructure to give a decent quality of life, a clean and sustainable environment to the citizens using smart technology-based solutions. It is a smarter way to deliver governance, providing city services to its residents and develop the infrastructure. Cities in many countries globally are governed by multiple organizations and authorities. The different spatial entities with multiple boundaries deter effective planning and governance. Thus, to realize a viable and resilient smart city-smart nation scenario, “people-centric” strategic technology components are imperative to eventually create smart outcomes for citizens. SMAC (Social, Mobile, Analytic and Cloud) technologies give instant access to desired data for building an intelligent environment which creates value for people, cities, and industries. These technologies are considered to drive the next generation of data analytics and permeate intelligence and decision making into the physical world to continually shape the future cities and enhance the human experience in real-time.

The special issue of the Journal titled “SMAC Social, Mobile, Analytic and Cloud Technologies: Intelligent Computing for future smart cities” is an excellent collection of review and research articles in the field of smart cities. An open call for papers was issued for this special issue.

From a wide range of interesting research papers on various aspects of Blockchain, Sustainable Smart Cities, Internet of Things, Green IoT, Communication Systems and Healthcare systems were received. And the research papers have undergone with exhaustive peer reviews from experienced and well-known reviewers and we carefully selected 14 Articles for the publishing.

A brief summary of the research papers included in this special issue is enlisted as follows:

The first article titled “BitFund: A blockchain-based crowd funding platform for future smart and connected nation” by [Hassija, Chamola, and Zeadally \(2020\)](#) proposed a global crowdfunding platform called BitFund for developing smart nation inheriting the features of blockchain and Ethereum smart contracts. An optimal-cost job assignment based on Hungarian algorithm is applied and implemented iterative auction algorithm that allow developers to vary their bid amounts over iterations to increase their chances of winning and the platform eliminates the need for any mutual negotiation between investors and developers for the project parameters.

The second article titled “Enabling technologies and sustainable smart cities” by [Ahad, Paiva, Tripathi, and Feroz \(2020\)](#) provides a holistic description of smart cities and related technologies and discusses challenges and limitations connected to smart cities. The paper provides best practices and roadmap for attaining a comprehensive sustainable cities ecosystem.

The third article titled “A novel and secure attacks detection

framework for smart cities industrial internet of things” by [Qureshi, Rana, Ahmed, and Jeon \(2020\)](#) proposed a novel and secure framework to detect security threat like HELLO-Flood Attack and the performance of framework was evaluated on attack detection accuracy, true positive rate, false positive rate, throughput and end to end delay. And the results observe that the proposed framework is better for RPL based IIoT environments.

The fourth article titled “Blockchain for smart cities: A review of architectures, integration trends and future research directions” by [Bhushan et al. \(2020\)](#) discusses the blockchain technologies to solve security issues in smart cities and in addition to this, the paper presents characteristics, security requirements and issues of smart cities and specifies the importance of blockchain technology in smart cities.

The fifth article titled “A reliable and cost-efficient code dissemination scheme for smart sensing devices with mobile vehicles in smart cities” by [Singh, Kaur, and Kumar \(2020\)](#) proposes a reliable and cost-efficient code dissemination scheme for smart sensing devices with mobile vehicles in smart cities and a rank-based ant system is applied to optimize the Code Mule selection process to minimize the cost and maximize the completion rate and the experimentation was conducted through real taxi trajectory dataset under sparse scenario.

The sixth article titled “Integrated framework for identifying sustainable manufacturing layouts based on big data, machine learning, meta-heuristic and data envelopment analysis” by [Tayal, Solanki, and Singh \(2020\)](#) proposes an energy-efficient sustainable sub-optimal layout under uncertain demand over multiple periods to address the 3P’s (Planet, people and profit) of sustainability using Big Data, Machine Learning, Hybrid Meta-Heuristic, Data Envelopment Analysis (DEA) and K-Mean Clustering.

The seventh article titled “Fog computing for sustainable smart cities in the IoT era: Caching techniques and enabling technologies- an overview” by [Zahmatkesh and Al-Turjman \(2020\)](#) highlights the main applications of fog computing and discusses various caching techniques in IoT era and also reviews the use of UAVs and AI/ML techniques in caching data for fog-based IoT Systems.

The eighth article titled “Blockchain and federated learning-based distributed computing defence framework for sustainable society” by [Sharma, Park, and Cho \(2020\)](#) proposes a distributed computing defence framework for sustainable society using blockchain and federated learning and model presents an algorithm to meet the challenges of limited training data to obtain high accuracy and avoid a reason specific model. In experimentation, the proposed approach was found better in accuracy and loss as compared to baseline approach.

The ninth article titled “I-AREOR: An Energy-balanced clustering protocol for implementing green IoT in smart cities” by [Chithaluru,](#)

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Al-Turjman, Kumar, and Stephan (2020) proposes an Improved-Adaptive Ranking based Energy-efficient Opportunistic Routing Protocol (I-AREOR), based on regional density, relative distance and residual energy. The protocol considers the energy parameters based on dynamic threshold for each round and experimental results state that I-AREOR is better in lifetime as compared to other algorithms.

The tenth article titled “Enabling the content dissemination through caching in the state-of-the-art sustainable information and communication technologies” by Naeem, Ali, Alazab, Yhui, and Zikria (2020) proposes an innovative cache deployment strategy titled “Most Interested Content Caching (MICC) to enhance the content dissemination by caching the transmitted content. After experimentations, it was proved that MICC is better as compared to NDN-based caching in terms of cache hit, stretch, eviction and diversity.

The eleventh article titled “Decentralized accessibility of e-commerce products through blockchain technology” by Kumar et al. (2020) proposed a generic blockchain titled “PRODCHAIN” with lattice-based cryptographic processes for reducing the complexity for tracing the e-commerce products. The methodology was tested on Ethereum Network and results provide that PRODCHAIN performs better in e-commerce products and services in terms of latency and throughput.

The twelfth article titled “An Interference aware energy efficient data transmission approach for smart cities healthcare systems” by Qureshi, Tayyab, Rehman, and Jeon (2020) proposes Interference aware energy efficient transmission protocol (IEETP) for wireless body sensor networks to reduce energy consumption due to higher number of re-transmission efforts for successful transmission. The proposed protocol selects the next forwarder node based on residual energy of nodes, distance, node’s position and node density and experimentations prove that the proposed protocol is better in performance as compared to other protocols.

The thirteenth article titled “A research on remote fracturing monitoring and decision-making method supporting smart city” by Liang, Xian, Mao, Ni, and Wu (2020) studies the relationship between the pressure-time curve and crack and pressure curve is optimized by OP-TICS algorithm by adjacency list and conduct the unsupervised learning about the stress data. The classification improves the intelligence and accuracy of data analysis and makes monitoring of fractures better.

The fourteenth article titled “A genetic algorithm for energy efficient fog layer resource management in context-aware smart cities” by Reddy, Luhach, Pradhan, Dash, and Roy (2020) proposes a virtual machine management approach for effectively allocating service requests with a minimal number of active fog nodes using a genetic algorithm and thereafter a cement learning approach is incorporated to optimize the period of fog nodes duty cycle. The experimentations were conducted on MATLAB software and it was proved that proposed scheme is better in energy consumption of fog layer by 11–21 % as compared to other existing context sharing based algorithms.

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Anand Nayyar<sup>a</sup>, Sara Paiva<sup>b,\*</sup>, Anand Paul<sup>c</sup>, Akshi Kumar<sup>d</sup>  
<sup>a</sup> Duy Tan University, Viet Nam

<sup>b</sup> Instituto Politécnico de Viana do Castelo, Portugal

<sup>c</sup> Kyungpook National University, South Korea

<sup>d</sup> Delhi Technological University, New Delhi, India

\* Corresponding author.

E-mail addresses: [anandnayyar@duytan.edu.vn](mailto:anandnayyar@duytan.edu.vn) (A. Nayyar), [sara.paiva@estg.ipv.pt](mailto:sara.paiva@estg.ipv.pt) (S. Paiva), [Paul.editor@gmail.com](mailto:Paul.editor@gmail.com) (A. Paul), [akshikumar@dce.ac.in](mailto:akshikumar@dce.ac.in) (A. Kumar).