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Emerging Solutions in Big Data and Cloud Technologies for Mobile Networks

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With the emergence of the recent internet and mobile technologies, the massive user-generated data has started driving our daily lives. The popularity and wider utilization of Cloud Technologies and Big data have attracted global researchers in solving the complex and heterogeneous real-world problems. The deployment of cloud technologies for big data problems is much helpful in addressing the scalability and security issues. The fusion of the big data and cloud technologies has created new opportunities for the development of effective solutions to the key research domains such as the Internet of Things, health care, travel, smart city, energy, and agriculture. Data analytics, trust management, massive data management are few of the well-established research areas which have gained increased importance over the past years. The technological advancements enrich the creativity of researchers which helps in attaining efficient adaptive solutions. Such rich adaptive solutions open the way to new dimensions of security violations in mobile networks.

This Special Issue aims to bring together researchers to publish state-of-art research findings in Big Data and Cloud Technologies for Mobile Networks, focusing on both theoretical and applied techniques. We expect the papers of the special issue to serve as valuable references for a large audience from both academia and industry. After a stringent peer-review process, this special issue features eight selected papers with high quality.

The first article titled "Efficient User Profiling Based Intelligent Travel Recommender System for Individual and Group of Users" presents Activity and Behavior induced Personalized Recommender System (ABiPRS) as a hybrid approach to predict persuasive POI recommendations [1]. The proposed ABiPRS is designed to support travelling user by providing effective list of POIs as recommendations. Further, the authors have developed a novel hybridization approach for aggregating recommendations from multiple RSs to improve the effectiveness of recommendations and the proposed approaches are evaluated on the real-time large-scale datasets of Yelp and TripAdvisor. The second paper, "E-Health Cloud Security Using Timing Enabled Proxy Re-Encryption" analyzes the security issues in the E-Health cloud and presents a planning empowered intermediary re-encryption method to defeat the security issues [2]. The develop technique will allow only limited access rights to an authorized agent to access the records for a specific time period and it will use a searchable encryption and proxy Re-encryption techniques.

The third paper entitled "Secure Remote User Mutual Authentication Scheme with Key Agreement for Cloud Environment" demonstrates the security limitations of a password based authentication scheme, and show that the existing scheme is still vulnerable to forgery and offline password guessing attacks and it is also unable to provide user anonymity, forward secrecy and mutual authentication [3]. The authors present a new secure authentication scheme and proved that the proposed scheme is invulnerable to various attacks together with attacks observed in the analyzed scheme through both rigorous formal and informal security analysis. The next article "Energy-Aware Fault-Tolerant Dynamic Task Scheduling Scheme for Virtualized Cloud Data Centers" describes the developed dynamic task assignment and scheduling scheme as the energy-aware fault-tolerant dynamic scheduling scheme (EFDTS), to co-ordinately optimize resource utilization and energy consumption with a

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fault tolerant mechanism [4]. Authors have designed an elastic resource provisioning mechanism in the context of fault-tolerance to improve resource utilization and energy efficiency. Furthermore, authors also developed a migration policy improve resource utilization and energy efficiency simultaneously.

The fifth article titled "Price Versus Performance of Big Data Analysis for Cloud Based Internet of Things Networks" makes detailed discussions on the issues of handling Big Data from an operational perspective in this new cloud based IoT network architecture [5]. The authors have proposed an optimization model to address the price versus performance while carrying out Big Data analysis in the cloud based IoT networks. The next paper entitled "A Performance Evaluation of Resilient Server with a Self-Repair Network Model" presents the performance evaluation of a resilient server that we built by combining virtualization technology and a self-repair network model in which represents the in-VMI [6]. The experiments conducted by the authors have revealed the performance of their proposed method in terms of low performance losses and high service availability.

The seventh paper entitled "Two-Server 3D ElGamal Diffie-Hellman Password Authenticated and Key Exchange Protocol Using Geometrical Properties" presents cutting edge tetrahedron (3D) based two-server Password Authenticated Key Exchange (PAKE) protocol using ElGamal and Diffie-Hellman (DH) mechanism [7]. The authors have analyzed and implemented the mechanism using geometrical shape based properties - circumcenter (ω) and the angle between the medians (θ). The last article "A Deep Learning Spatiotemporal Prediction Framework for Mobile Crowdsourced Services" presents a deep learning-based framework to predict crowdsourced service availability spatially and temporally [8]. The authors have introduced a novel two-stage prediction model based on historical spatio-temporal traces of mobile crowdsourced services and validated the effectiveness of the proposed framework through multiple experiments.

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Ron Doyle is division-wide lead architect for enterprise and cloud application design/delivery, focusing on public SaaS, hybrid cloud and on-premise software products. The technical focus is all aspects of cloud and on-premise application/infrastructure architecture, services, APIs, containerization and DevOps. He is a member of the Board of Directors of the Eclipse Foundation. Before the Broadcom acquisition of CA Technologies, he was Vice President of Continuous Delivery Portfolio Architecture. He drove cross-product integration and product delivery models (SaaS and on-prem) for products in modeling, functional and performance testing, service virtualization and orchestration. Previously, he was a Distinguished Engineer for DevOps transformation across the IBM cloud development organization, focusing on both strategy and hands-on initiatives to address the organization, tools and methodologies needing to enable world-class service delivery. He has been a technical executive, project lead, designer, architect and developer on large scale projects, working with small and large customers at every level of the business. Previously he served as the technical lead for a cross-company organization focusing on key technical and strategic issues across IBM Cloud. His areas of interest include distributed systems and managed resource sharing, focusing on virtualization and cloud computing. He led the IBM involvement in the Open Virtualization Format (OVF) standard in the DMTF. He also spend time working on university accreditation for computer science programs. He has been a program evaluator and team chair for a number of years and currently on the ABET Computing Accreditation Commission Executive Committee and he is a Representative Director for the CSAB Board of Directors.

Sven Groppe earned his diploma degree in Informatik (Computer Science) in 2002 and his Doctor degree in 2005 from the University of Paderborn. He earned his habilitation degree in 2011 from the University of Lübeck. He worked in the European projects B2B-ECOM, MEMPHIS, ASG and TripCom. He was a member of the DAWG W3C Working Group, which developed SPARQL. He was the project leader of the DFG project LUPOSDATE, an open-source Semantic Web database, and one of the project leaders of two research projects, which research on FPGA acceleration of relational and Semantic Web databases. He is also the chair of the Semantic Big Data workshop series, which is affiliated with the ACM SIGMOD conference (so far 2016 to 2018), and of the Very Large Internet of Things workshop in conjunction with the VLDB conference in 2017 and 2018. His research interests include databases, Semantic Web, query and rule processing and optimization, Cloud Computing, peer-to-peer (P2P) networks, Internet of Things, data visualization and visual query languages.