MOBILE CLOUD COMPUTING




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Mobile Cloud Computing refers to an infrastructure where both the data storage and the data processing occur outside of the mobile device. Mobile cloud applications move the computing power and data storage away from mobile devices and into the cloud, bringing applications and mobile computing not only to smartphone users but also to a much broader range of mobile subscribers.

Cloud computing is an emerging paradigm for cost efficient and reliable service provisioning. Today, the rich availability of energy-harvesting and resource-constrained mobile computing devices is beginning to converge with the great opportunity offered by the powerful cloud computing services hosted by virtualized data center resources. Although mobile applications, cloud computing, and data center networking techniques have been intensively investigated in the past couple of years, mobile cloud computing and mobile cloud networking have not raised the attention of the research community until recently.

In this feature topic we are pleased to introduce a series of state-of-the-art papers on this specific area. These articles cover the subject from a variety of perspectives, offering the readers an understanding of mobile cloud computing. A total of five papers were finally selected for this feature topic out of 33 submissions after a strict peer review process. They cover a broad range of the field of mobile cloud computing. While some articles focus on understanding the challenges and potential ways for improving the mobile cloud computing architectures and mechanisms like mobile code offloading, cloudlets and mobility, others suggest complimenting or applying the state-of-the-art mobile cloud computing technique, e.g. leveraging mobile devices' crowdsourcing and computation capabilities in accessing mobile cloud services.

An important trend occuring in the area of mobile cloud computing is the geographical distribution of cloud facilities, with the deployment of small-size data-centers to form local-area clouds. In the first article, "An Open Ecosystem for Mobile-Cloud Convergence," Satyanarayanan *et al.* discuss how the emergence of Cloudlets, local-area cloud solutions at or close to the premises of cloud users, can improve the user experience and argue how their deployment practices shall follow openness and neutrality principles.

The citizens' locations and movement patterns in daily life are of high relevance to many applications such as city planning, traffic control and personalized recommendations. In the second article of this feature topic, "Estimating Users' Home and Work Locations Leveraging Large-scale Crowd-sourced Smartphone Data," Liu *et al.* utilize crowd-sourcing techniques to collect mobile users' location data, and leverage the cloud to estimate large scale users' home and work location data with a good estimation accuracy.

In the third article, "Mobile Code Offloading: From Concept to Practice and Beyond," Flores *et al.* present issues and challenges in mobile code offloading, that is, when mobile devices can execute part of or the entire application using external cloud computing facilities, and propose improvements in the state of the art code offloading approaches.

As mobility is one of the main sources of energy harvesting and limited connectivity for mobile devices, mobility-augmented cloud service provisioning becomes an emerging issue in mobile cloud computing. In the fourth article, "Mechanisms and Challenges on Mobility-Augmented Service Provisioning for Mobile Cloud Computing," Li *et al.* provide an architecture and taxonomy of research challenges related to mobility augmentation, heterogeneous network convergence, and mobile service provisioning.

Besides data collection, mobile crowdsourcing can offer various other pervasive services, such as data processing

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and computing. In the last article of this feature topic, "Exploiting Mobile Crowdsourcing for Pervasive Cloud Services: Challenges and Solutions" Ren *et al.* adopt the mobile cloud computing paradigm for mobile crowdsourcing, leveraging the sensing and computational capabilities of mobile devices as well as user intelligence.

We hope that these articles will help readers understand the state-of-the-art advances in mobile cloud computing, providing current visions of how the mobile cloud computing architectures and applications may be developed, improved and evolving. In preparing this feature topic, we wish to thank all the peer reviewers for their efforts in carefully reviewing the manuscripts to meet the tight deadlines. We are grateful to the editor-in-chief Sean Moore for his timely and constructive suggestions.

BIOGRAPHIES

XIAOMING FU (fu@cs.uni-goettingen.de) received his Ph.D. from Tsinghua University, China in 2000. After nearly two years of postdoc work at TU Berlin, he joined the University of Göttingen, where he is a professor of computer science and head of the Computer Networks Group since 2007. His research interests lie in network architectures, protocols and applications, including content distribution, mobile and cloud computing and social networks. He is an IEEE Distinguished Lecturer, and was IEEE ComSoc TCCC vice chair and Internet TC chair.

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RITTWIK JANA is a lead inventive scientist at AT&T Labs Research. He received his B.E. degree from the University of Adelaide, Australia, in 1994, and a Ph.D. from the Australian National University in 1999. He worked as an engineer at the Defense Science and Technology Organization (DSTO), Australia from 1996 to 1999, and as a member of technical staff at AT&T, New Jersey since 1999. His research expertise falls in the areas of IPTV, P2P, mobile middleware, and wireless channel modeling.