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PerCom WiP 2016: 2016 IEEE International Conference on Pervasive Computing and Communications Work in Progress - Program

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PerCom PhD Forum 2016: Eightieth Annual PhD Forum on Pervasive Computing and Communications, 2016 - Program

The First IEEE International Workshop on Context-Aware Smart Cities and Intelligent Transport Systems, 2016 - Program

Opening Remarks and Keynote 1

This talk will present a vision, and real-world examples, of the use of mobile crowdsourcing for building a variety of smart-city applications and services. I will first describe the paradigm of centrally-coordinated crowdsourcing, where the crowdsourcing platform intelligently recommends different tasks to different candidate workers, and contrast it with today's prevalent paradigm, where workers select and perform tasks in an uncoordinated, opportunistic fashion. I will then describe real-world examples of such crowdsourcing (and participatory sensing) for two applications: (a) smart campus monitoring and (b) last-mile urban logistics (package pickup and delivery). The talk will also describe the opportunities and open challenges involved in making such crowdsourcing an organic part of realtime municipal services monitoring and delivery.

Archan Misra is currently an Associate Professor, and the Associate Dean of Research, in the School of Information Systems at Singapore Management University (SMU). His broad research interests lie in the areas of pervasive computing and mobile systems, with current focus on applying mobile and wearable sensing, real-time analytics and crowdsourcing technologies to understand human lifestyle-driven urban activities. A major part of his research is presently conducted under the auspices of the LARC and LiveLabs research centers at SMU. Archan chaired the IEEE Computer Society's Technical Committee on Computer Communications (TCCC) from 2005-2007. He is presently an Editor of the IEEE Transactions on Mobile Computing and the Elsevier Journal of Pervasive and Mobile Computing. Archan holds a Ph.D. in Electrical and Computer Engineering from the University of Maryland at College Park, and a B.Tech from IIT Kharagpur.

Morning Coffee

Information Processing for Smarter Transportation in Aware Cities

Afternoon Tea

IoT and Smart Services in Aware Cities

Panel Discussion

Closing Remarks

The Third International Workshop on Crowd Assisted Sensing Pervasive Systems and Communications, 2016 - Program

Keynote: Welcome Address and Keynote

Crowdsourcing offers a cost-effective approach to distributed problem solving and data collection by soliciting contributions (solutions, ideas, data, etc.) from a large group of people. Recently, due to the burgeoning smartphone industry and the surging demand for sensing data, a new mobile computing and sensing paradigm called mobile crowdsensing has emerged and has created significant momentum in both industry and academia. Pivotal to the viability of all such crowdsourcing systems, is whether there is enough incentive to attract sufficient participation.Many crowdsourcing scenarios are heterogeneous in the sense that, not only the workers' types (e.g., abilities and costs) are different, but the beliefs (probabilistic knowledge) about their respective types are also different. In this talk, we design an incentive mechanism for such scenarios using an asymmetric all-pay contest (or auction) model. Our design objective is an optimal mechanism, i.e., one that maximizes the crowdsourcing revenue minus cost. To achieve this, we furnish the contest with a prize tuple which is an array of reward functions for each potential winner (worker). We prove and characterize the unique equilibrium of this contest, and solve the optimal prize tuple. In addition, this study discovers a counter-intuitive property, strategy autonomy (SA), which means that heterogeneous workers behave independently of one another as if they were in a homogeneous setting. In the second part of the talk, we propose the use of Tullock contests as an alternative framework to design incentive mechanisms for crowdsourcing. We explore a new dimension of optimal Tullock contents design by provisioning the prize as a function. We are inspired by the conduciveness of Tullock contests to attracting user entry in other domains. In this talk, we explore a new dimension in optimal Tullock contest design, by superseding the contest prize--which is fixed in conventional Tullock contests--with a prize function that is dependent on the (unknown) winner's contribution, in order to maximize the crowdsourcer's utility. We show that this approach leads to several attractive practical advantages.

Dr. Salil Kanhere received his M.S. and Ph.D. degrees, both in Electrical Engineering from Drexel University, Philadelphia in 2001 and 2003, respectively. He is currently an Associate Professor in the School of Computer Science and Engineering at the University of New South Wales in Sydney, Australia. His current research interests include pervasive computing, crowdsourcing, embedded sensor networks, mobile networking, privacy and security. He has published over 150 peer-reviewed articles and delivered over 15 tutorials and keynote talks on these research topics. He is a contributing research staff at National ICT Australia and a faculty associate at Institute for Infocomm Research, Singapore. Salil regularly serves on the organising committee of a number of IEEE and ACM international conferences (e.g, IEEE PerCom, ACM MobiSys, ACM SenSys, ACM CoNext, IEEE WoWMoM, IEEE LCN, ACM MSWiM, IEEE DCOSS, IEEE SenseApp, ICDCN, ISSNIP). He currently serves as the Area Editor for Pervasive and Mobile Computing, Computer Communications, International Journal of Ad Hoc and Ubiquitous Computing and Mobile Information Systems. Salil is a Senior Member of both the IEEE and the ACM. He is a recipient of the Humboldt Research Fellowship in 2014.

The Twelfth International Workshop on Context and Activity Modeling and Recognition, 2016 - Program

S1: Keynote Session: On the impact of activity recognition in monitoring cognitive decline

The world senior population is projected to double as a percentage over the whole population in the next decades. In order to preserve or improve the quality of life of this population, as well as to keep healthcare costs sustainable, it is important to better support their ability of independent living. Among the major threats to independent living is cognitive decline that may be experienced in normal aging but that may lead to mild cognitive impairment (MCI) and more serious neurodegenerative cognitive disorders. Early detection of cognitive decline, accurate diagnosis and monitoring of its evolution for early intervention are a priority. Researchers have found that subtle differences in performing instrumental activities of daily living (IADLs) as well as the recognition of subtle errors while performing IADLs may be useful for MCI diagnosis as well as to differentiate different forms of cognitive disorders. However, occasionally performing ability tests in equipped rooms on medical premises has several shortcomings including cost and reliability of results. Pervasive computing coupled with intelligent data analysis can have a major role in this application domain by continuous monitoring of activities at home during daily life. This idea has been at the core of several recent research projects. The main challenges that we are facing are: a) reliability, unobtrusiveness and affordability of the sensor infrastructure, b) precision and robustness of techniques for IADL recognition, c) effectiveness of algorithms for recognizing "fine-grained" abnormal behaviors identified by clinicians as relevant indicators, d) identification of relevant patterns through long-term data analysis, e) privacy-awareness of data acquisition and management, f) effectiveness of visualization and interaction tools for clinicians. This talk will discuss the above challenges, report the experience on using hybrid statistical and knowledge-based techniques for addressing the recognition tasks, and identify critical aspects still to be investigated.

Lunch

S3: Activity-Recognition

Afternoon Tea

CoSDEO 2016: Contact-free Ambient Sensing - Program

Keynote

The proliferation of RF networks coupled with the diverse and growing set of mobile devices, opened the doors for a new class of context awareness through contact-free ambient sensing. Since our initial challenges paper in 2007, the field of device-free passive sensing has witnessed an exponential growth; covering areas such as intrusion detection, mobile healthcare, whole-home gesture recognition, traffic estimation, border protection, among others.In this talk, we give a holistic overview of the area of contact-free ambient sensing based on RF technology, highlighting how it evolved over a decade from binary-detection in controlled environments to commercial systems for border protection and smart homes. We also give insights about the current trends andpossible future research challenges.

Morning Coffee

Depth-, sound-, and environmental sensors

Lunch

Invited talk

RF-based sensing

The First IEEE International Workshop on Benchmarks for Ubiquitous Crowdsourcing: Metrics, Methodologies, and Datasets, 2016 - Program

Welcome & Opening Remarks

Keynote Talk - Dr. Seng W. Loke (La Trobe University, Australia)

Crowd-Powered Mobile Computing: Mobility Meets Collective Computing

A recent paper by Abowd proposed collective computing, that integrates the cloud, the crowd and the shroud, defining a new era of "cooperation between humans and computing that enhances both computational capabilities and the human experience." Mobile computing in its current and future states presents interesting developments where tens to thousands of mobile nodes can cooperate in new ways, in order to provide new capabilities and applications, from scalable context awareness to new distributed computational platforms. Mobile crowdsourcing, crowdsensing, crowd-steering, participatory social systems, mobile device clouds, and cooperative Intelligent Transport Systems are examples. This talk will explore several ideas in crowd-powered mobile computing, including crowd machines, scalable context-awareness, extreme cooperation, and drone services for mobile crowds.

Morning Coffee

Presentations

Closing Remarks

Lunch

The Thirteenth IEEE International Workshop on Managing Ubiquitous Communications and Services, 2016 - Program

Lunch

K: Keynote

First part of this talk will discuss how the community is converging towards the IoT vision having worked in wireless sensor networking and Machine-2-Machine (M2M) communication. This will follow a general discussion of security challenges in IoT. Finally I will discuss some results from an ongoing project on security of bodyworn devices. Wireless bodyworn sensing devices are becoming popular for fitness, sports training and personalized healthcare applications. Securing the data generated by these devices is essential if they are to be integrated into the current health infrastructure and employed in medical applications. In this talk, I will discuss a mechanism to secure data provenance for these devices by exploiting symmetric spatio-temporal characteristics of the wireless link between two communicating parties. Our solution enables both parties to generate closely matching `link' fingerprints, which uniquely associate a data session with a wireless link such that a third party, at a later date, can verify the links the data was communicated on. These fingerprints are very hard for an eavesdropper to forge, lightweight compared to traditional provenance mechanisms, and allow for interesting security properties such as accountability and non-repudiation. I will present our solution with experiments using bodyworn devices in scenarios approximating actual device deployment.

A Changing Landscape: Securing the Internet of Things (IoT)....328
Sanjay Jha (University of NSW, Australia)

S3: Models and Architectures for Managing Ubiquitous Communications

A Study on the Optimization of the Uplink Period Using Machine Learning in the Future IoT Network....366
Jae Seong Jang, Young Lak Kim and Jin Hyo Park (SKtelecom, Korea)

Towards Programmable and Scalable IoT Infrastructures for Smart Cities....369
Andreea Ancuta Corici and Ronald Steinke (Fraunhofer FOKUS, Germany); Thomas Magedanz (Fraunhofer Institute FOKUS / TU Berlin, Germany); Louis Coetzee (CSIR, South Africa); Dawid Oosthuizen (CSIR, Germany); Buhle Mkhize (CSIR, South Africa); Marisa Catalan (i2CAT Foundation, Spain); Jacint Castells Fontelles (I2CAT, Spain); Josep Paradells (UPC, Spain); Ranjan Shrestha (Fraunhofer FOKUS, Germany); Daniel Nehls (Technische Universität Berlin & FOKUS Fraunhofer, Germany); Bjoern Riemer (Technische Universität Berlin, Germany)

Session discussion

Afternoon Tea

W: Interactive Working Session

This session will foster an interactive discussion with all participants on a current issue in managing ubiquitous communications and systems.

The First IEEE International Workshop on PervAsive Technologies and care systems for sustainable Aging-in-place, 2016 - Program

Keynote

Morning Coffee

S1: Session 1

Lunch

S2: Session 2

The Seventh IEEE Workshop on Pervasive Collaboration and Social Networking, 2016 - Program

Lunch

K1: Keynote

Pervasive Collaboration and Social Networking

S1: Collaborative Healthcare

Afternoon Tea

S2: Collaboration Infrastructures

Second IEEE Workshop on Pervasive Energy Services 2016 - Program

S1: Welcome and Keynote

One of the foundations of the Smart Grid is the real-time information and data exchange between all of its components, facilitated by the extended application of smart metering and information technologies. Advanced control functions integrated with the complicated and slow-dynamic electricity grid, will necessitate the use of an "electricity buffer" in order to maintain balance and stability at all times. Owing to their relatively low footprint and flexible geographical placement, Battery Energy Storage Systems (BESS) will play the key role of providing the electricity buffer of the future smart grid. The challenge of BESS and their different technologies will be discussed in various scenarios of grid-related functionalities and roles. The development of BESS in Australia will be reviewed, identifying market potential and opportunities.

Morning Coffee

S2: Paper Presentations and Closing Notes

Lunch

International Workshop on the Impact of Human Mobility in Pervasive Systems and Applications (PerMoby 2016) - Program

Session 1: Keynote Lecture

In this keynote, we look the fundamental limits of the information propagation speed in large scale mobile and intermittently connected networks, where end-to-end multihoppaths may not exist and communication routes may only beavailable through time and mobility. We first introduce some analytical toolsto derive generic theoretical bounds for the informationpropagation speed in this networks. We upper-bound the optimalperformance, in terms of delay, that can be achieved using anyrouting algorithm. We also show how our analysis can be appliedto specific mobility models to obtain specific analytical estimates.We then look at the maximum amount of data that can be transferred: (i) from a source to a destination in a given journey, (ii) overall in the network compared to the average delay.Finally we look at the particular case of multi-lane vehicle-to-vehicle networks such as roads or highways. We focus on the impact of time-varying radio ranges and of multiple lanes of vehicles, varying in speed and in density. We show the existence of a vehicle density threshold under which information propagates on average at the fastest vehicle speed and above which information propagates dramatically faster. We characterize conditions under which the phase transition occurs and we derive bounds on the corresponding threshold as a simple relationship between the vehicle density on the fastest lane and the sum of densities on the other lanes. Our results intrinsically encompass a wide range of vehicular network scenarios, including one-way and two-way roads, as well as special cases such as road side units and/or parked cars being used as relays.

Morning Coffee

Session 2: Patterns, Dynamics, and Data

Lunch

Session 3: Systems

Afternoon Tea

Session 4: Activity Monitoring

The First IEEE International Workshop on Security, Privacy and Trust for IoT, 2016 - Program

S1: Workshop Opening and Keynote

The Internet of Everything or Internet of Things (IoT) paradigm refers to the growing number of smart connected products or things, which is now giving rise to huge set of opportunities on the one hand while at the same time causing many technical challenges. In this talk, we will address some major challenges in security, privacy and trust that IoT brings. We will start with one of the major security challenges which arises from the introduction of an overwhelming amount of new and diverse devices by the IoT, with different operating systems, with different networks and associated protocols. This leads to a substantial increase in the security attack surface giving rise to new threats. This problem is further aggravated as the devices become smarter, as there is more functionality which often leads to more possibilities for attacks. Compromise of one of more devices in the infrastructure can lead to malware proliferation and can lead to the compromise of the whole network system. Then we will consider an immediate and direct consequence of these IoT devices generating huge quantities of data. Just because data is accessible, it does not mean the data is trustworthy or reliable to make decisions, or even ethical to access and use it. Here there are a number of research questions that are not easy to answer: how trustworthy is the data? How to reliably identify and secure the data provenance in the IoT? Who should be allowed to see the data and modify it? As the data moves over the IoT infrastructure and gets aggregated, the issue of dynamic security policy management on the data needs to be addressed. Finally we will consider the security and privacy challenges that arise due to the interactions between the IoT and the cloud infrastructures. In particular when different data from different devices need to be combined to offer seamless cloud based distributed services. A range of security and privacy issues arise from - how to securely store and manage large scale data in the cloud coming from different devices, to how to deal with the ownership issue of data to enforcement of user-centric policies by the cloud provider offering privacy to data owners. If the data is encrypted to protect it from the cloud providers, then the issue of security policy enforcement on encrypted data will arise and that too with different security policies in different jurisdictions. When discussing these challenges we will outline some security and privacy techniques and solutions that are available and which can be implemented in practice to offer better protection. Internet of Things has incredible potential to change the world but it is critically important to ensure that security and privacy are not an after-thought as they are integral to their reliable functioning.

Morning Coffee

S2: IoT Systems and Security

The Second IEEE International Workshop on Sensing Systems and Applications Using Wrist Worn Smart Devices, 2016 - Program

KN: Keynote Talk

This keynote talk will present our ongoing research on elderly cognitive care with the help of complex at-home activities recognition with smart wearable, and user emotional behavior signatures detection with smart chair. For activity recognition, our innovative methodology is the first of its kind that detects 21 fine-grained and complex at-home activities by wearable devices, as compared to typical 6-12 at-home activities recognized by relevant works in the existing literature. The smart chair based novel framework can accurately detect user functional and emotional activities, in addition to static and movement based sedentary postures that are more common in current works. In collaboration with Phelps County Regional Medical Center, the proposed solutions are being validated with clinical data and patient studies.

Morning Coffee

S1: Health and Wellbeing

Lunch

S2: Sensing systems

Afternoon Tea

S3: Recognising activities