CCIOT 2018
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2018 International Conference on Cloud Computing and Internet of Things

2018 International Conference on Cloud Computing and Internet of Things (CCIOT 2018)

October 29-31, 2018

Singapore

Supported by

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CCIOT 2018 Agenda

http://cciot.org/

Conference Venue

Nanyang Executive Centre

(Nanyang Technological University, Singapore)
Add: 60 Nanyang View, Singapore 639673

Nanyang Executive Centre is located amidst tranquil settings and soothing greenery at the Yunnan Garden Campus of Nanyang Technological University, offering a premier venue for corporate trainings, retreats and private functions.

The 170 guestrooms and suites have been designed to meet the needs of both training executives and business travelers. All the guestrooms are equipped with a work area and other modern amenities to ensure they provide guests with a pleasant stay. Complimentary Wi-Fi is available to all guests in their rooms, lobby and function spaces.

Be it seminars, executive trainings, workshops, conferences, social events or simply a business meeting, our meeting and event venues offers capacity for a size of 3 to 210 persons. Our newly refurbished Campus Clubhouse offers an interesting mix of local and Western cuisine at restaurant, Fusion Spoon. In addition, chill-out wine lounge and bistro, The Attic, offers guests a wide selection of beverages and snacks.

We look forward to welcome you and your guests at Nanyang Executive Centre!

NTU has 2 campuses in Singapore. The main campus is a 200-ha residential, garden campus located in the south-western part of Singapore, near the Jurong West Extension area. This campus is easily accessible by two expressways, the Pan-island Expressway (PIE) and Kranji Expressway (KJE). It is also near the Boon Lay bus interchange and the Boon Lay Mass Rapid Transit (MRT) station.

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Ben Horan,   Alex Stojcevski

Poster Session

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Conference Introductions

Welcome to 2018 CCIOT Singapore conference. This conference is organized by ACM Chapter Singapore. The objective of the Singapore conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Cloud Computer and Internet of Things.

Papers will be published in the following proceeding:

International Conference Proceedings Series by ACM (ISBN: 978-1-4503-6576-5), which will be archived in the ACM Digital Library, and indexed by Ei Compendex, Scopus and submitted to be reviewed by Thomson Reuters Conference Proceedings Citation Index (ISI Web of Science).

Conference website and email: http://cciot.org/ **and** cciot.conference@gmail.com

CCIOT 2018
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2018 International Conference on Cloud Computing and Internet of Things

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about 15 Minutes of Presentation and 5 Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on October 30, 2018.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speakers Introductions

Keynote Speaker I

Prof. Latif Ladid
University of Luxembourg, Luxembourg

Founder & President, IPv6 FORUM (www.ipv6forum.org)
Member of 3GPP PCG (Board) (www.3gpp.org)
Founding Chair, 5G World Alliance (http://www.5gworldalliance.org/)
Chair, ETSI IPv6 Industry Specification Group :
https://portal.etsi.org/tb.aspx?tbid=827&SubTB=827
IEEE Steering Committee Member: 5G, IoT
Chair, IEEE ComSoC IoT subcommittee
(http://cms.comsoc.org/eprise/main/SiteGen/TC_IOT/Content/Home.html/)
Chair, IEEE ComSoC 5G subcommittee
(http://cms.comsoc.org/eprise/main/SiteGen/TC_5GMWI/Content/Home.html?refer=18312&
Site_Name=TC_5GMWI
Vice Chair, IEEE ComSoC SDN-NFV subcommittee:
http://cms.comsoc.org/eprise/main/SiteGen/TC_SDN_NFV/Content/Home.html
Emeritus Trustee, Internet Society - ISOC (www.isoc.org)
IPv6 Ready & Enabled Logos Program Board (www.ipv6ready.org)
World summit Award Board Member (www.wsis-award.org)
Research Fellow @ University of Luxembourg on multiple European Commission Next
Generation Technologies IST Projects
Member of 3GPP2 PCG (www.3gpp2.org)
Member of UN Strategy Council
Member of Future Internet Forum EU Member States (representing Luxembourg)
Luxembourg, June 2017

Topic: "IPv6-based New Internet of Things ("Things-2-Things")"

Abstract: The IANA central IPv4 address space has been fully depleted back in February 2011 making the deploying of new large-scale networks especailly IoT networks not scalable and not what IoT really stands for. Hence the new IP protocol version 6 (IPv6) has been designed to cater for this already back in the 90s and waiting for its killer apps to take off. 4G was the first one to adopt IPv6 in larger scale.The IPv6 Deployment worldwide is becoming a reality now with some countries achieving more than 50 % user penetration, with Belgium (58%) at the top ranking (http://labs.apnic.net/dists/v6dcc.html) and reaching double digits v6 coverage on Google IPv6 stats. Many Autonomous Networks (ASN) reach more than 50% with v6 preferred or v6 capable penetration: (http://labs.apnic.net/ipv6-measurement/Economies/US/). Over 500 Million users are accessing the Internet over IPv6 and probably not even knowing it. The US was by far the biggest adopter of IPv6 with some 100 Million IPv6 users, but India has surpassed the US with over 250 M IPv6 users,   followed by Germany, Japan and China with some 20 + M v6 users. Worldwide IPv6 deployment has passed the 20 % Google usage bar doubling every 12 months (http://www.google.com/intl/en/ipv6/statistics.html). If this trend continues, we should achieve 50% by 2020 which would be the inflection point when the full roll-out of IPv6 becomes a strategic plumbing decision of the networks, a topic that is avoided so far due to many strategic and resources issues (lack of top management decision-making, lack of v6 skilled engineers and v6 deployment best practices, very limited ISP v6 access deployment, ..). The deployment of Carrier-grade NAT is in full swing making networking and user experience more brittle converting IoT to NAT-IoT (InterNAT of Things). IPv6 will kick in big time for IoT to take it to the next level   which is "Things-to-Things" beyond the current network of things under the non-IP IoT umbrella as   Kevin Ashton coined the term IoT for RFID back in 1990 before even RFID suported the IP stack and still today don't. This is another technology myth or fake news. IoT will suffer immensely under lack of   built-in security which together cybersecurity issues are like always brushed over at this stage due mainly to lack of IPv6 security skills. New topics are more on the lime light such as Cloud Computing,   SDN, NFV, 5G with no attention to the issues dragged by IPv4. These fields are taking IP networking for granted designing them on IPv4/NAT building non-scalable and non-end to end solutions. The IPv6 Forum is driving new initiatives to garner support and create awareness on the impact of IPv6 on topics such as real IoT, open Cloud Computing, openstack based SDN-NFV and IPv6 only 5G.

Keynote Speaker II

Prof. Xudong Jiang
Nanyang Technological University, Singapore

Prof. Xudong Jiang received the B.Sc. and M.Sc. degree from the University of Electronic Science and Technology of China, in 1983 and 1986, respectively, and received the Ph.D. degree from Helmut Schmidt University Hamburg, Germany in 1997, all in electrical and electronic engineering. From 1986 to 1993, he worked as Lecturer at the University of Electronic Science and Technology of China where he received two Science and Technology Awards from the Ministry for Electronic Industry of China. He was a recipient of the German Konrad-Adenauer Foundation young scientist scholarship. From 1993 to 1997, he was with Helmut Schmidt University Hamburg, Germany as scientific assistant. From 1998 to 2004, He worked with the Institute for Infocomm Research, A*Star, Singapore, as Senior Research Fellow, Lead Scientist and appointed as the Head of Biometrics Laboratory where he developed a fingerprint verification algorithm that achieved the fastest and the second most accurate fingerprint verification in the International Fingerprint Verification Competition (FVC2000). He joined Nanyang Technological University, Singapore as a faculty member in 2004 and served as the Director of the Centre for Information Security from 2005 to 2011. Currently, Dr Jiang is a tenured Associate Professor in School of Electrical and Electronic Engineering, Nanyang Technological University. Dr Jiang has published over hundred research papers in international refereed journals and conferences, some of which are well cited on Web of Science. He is also an inventor of 7 patents (3 US patents), some of which were commercialized. Dr Jiang is a senior member of IEEE and has been serving as Editorial Board Member,Guest Editor and Reviewer of multiple international journals, and serving as Program Committee Chair, Keynote Speaker and Session Chair of multiple international conferences. His research interest includes pattern recognition, computer vision, machine learning, image analysis, signal/image processing, machine learning and biometrics.

Topic: "Machine Learning from Data: from Neural Networks to Deep Learning"

Abstract: Discovering knowledge from data has many applications in various artificial intelligence (AI) systems. Machine learning from the data is a solution to find right information from the high dimensional data. It is thus not a surprise that learning-based approaches emerge in various AI applications. The powerfulness of machine learning was already proven 30 years ago in the boom of neural networks but its successful application to the real world is just in recent years after the deep convolutional neural networks (CNN) have been developed. This is because the machine learning alone can only solve problems in the training data but the system is designed for the unknown data outside of the training set. This gap can be bridged by regularization: human knowledge guidance or interference to the machine learning. This speech will analyze these concepts and ideas from traditional neural networks to the very hot deep CNN neural networks. It will answer the questions why the traditional neural networks fail to solve real world problems even after 30 years' intensive research and development and how the deep CNN neural networks solve the problems of the traditional neural networks and now are very successful in solving various real world AI problems.

Keynote Speaker III

Prof. Dimitrios Georgakopoulos
Swinburne University of Technology, Australia

Prof. Georgakopoulos is the Director of the Key IoT Lab at the Digital Innovation Platform of Swinburne University of Technology. Before that was Research Director at CSIRO's ICT Centre and Executive Director of the Information Engineering Laboratory, which was the largest Computer Science program in Australia.   Before CSIRO, he held research and management positions in several industrial laboratories in the US, including Telcordia Technologies (where he helped found two of Telcordia's Research Centers in Austin, Texas, and Poznan, Poland); Microelectronics and Computer Corporation (MCC) in Austin, Texas; GTE (currently Verizon) Laboratories in Boston, Massachusetts; and Bell Communications Research in Piscataway, New Jersey. He was also a full Professor at RMIT University, and he is currently an Adjunct Prof. at the Australian National University and a CSIRO Adjunct Fellow. Prof. Georgakopoulos is an internationally known expert in IoT, process management, and data management. He has received 20+ industry and academic awards. His 170+ journal and conference publications, which include three seminal papers in the areas Service Computing, Workflow Management, Context Management for the Internet of Things (IoT), have received 12,400+ citations. Dimitrios' research has attracted significant external research funding ($35M+) from various industry and government research funding agencies, ranging from DARPA and ARDA in the USA, to the Framework Program in the EU, to the Department of Human Services and 50+ industry partners in Australia.

Topic: "From Internet Scale Sensing to Smart Services and Products"

Abstract: The Internet of Things (IoT) is the latest Internet evolution that incorporates billions of Internet-connected devices that range from cameras, sensors, RFIDs, smart phones, and wearables, to smart meters, vehicles, medication pills, and industrial machines. Such IoT things are often owned by different organizations and people who are deploying and using them for their own purposes. Federations of such IoT devices (often referred to as IoT things) can also deliver timely and accurate information that is needed to solve internet-scale problems that have been too difficult to tackle before.

To realize its enormous potential, IoT must provide IoT solutions for discovering needed IoT devices, collecting and integrating their data, distilling the high value information each application needs and doing these securely, on the move, and in the cloud/edge. Such IoT solutions must be capable of filtering, aggregating, correlating, and contextualising IoT information in real-time, on the move, in the cloud. In this talk we present an overview of IoT solutions we have developed to address these technical challenges and help springboard IoT to its potential. In this talk we mainly focus on open source components and standards we have developed jointly with other prominent international collaborators. We also describe a variety of IoT applications that have utilized our solutions to provide smart IoT services in the areas of smart farming, energy, manufacturing, cities, heath and proximity marketing. Finally, we discuss ongoing research for the next generation IoT infrastructure.

Keynote Speaker IV

Prof. Maode Ma

Nanyang Technological University in Singapore

Prof. Maode Ma received his BE degree in computer engineering from Tsinghua University in 1982, ME degree in computer engineering from Tianjin University in 1991 and Ph.D. degree in computer science from Hong Kong University of Science and Technology in 1999.

Dr. Ma is a tenured Associate Professor in the School of Electrical and Electronic Engineering at Nanyang Technological University in Singapore. He has extensive research interests including wireless networking, wireless network security and optical networking, etc. He has been a member of the technical program committee for more than 110 international conferences. He has been a technical track chair, tutorial chair, publication chair, and session chair for more than 50 international conferences. Dr. Ma has published more than 130 international academic research papers on wireless networks and optical networks. He currently serves as an Associate Editor for IEEE Communications Letters, an Editor for IEEE Communications Surveys and Tutorials, and an Associate Editor for International Journal of Wireless Communications and Mobile Computing, Journal of Network and Computer Applications, Security and Communication Networks, International Journal of Vehicular Technology, Journal of Computer Systems, Networks, and Communications, and International Journal of Computing & Information Technology.

Topic: "Efficient and Secure Authentication Schemes for IEEE 802.11ah Networks"

Abstract: IEEE 802.11ah, a specification belonging to 802.11 wireless local area network (WLAN) protocol family, has been recently released to support the long-range, low-power and low-rate wireless communication among smart devices used in Internet of Thing (IoT) systems. However, security requirements of the energy-constrained devices have plenty of issues different from the traditional wireless devices. It requires that the lightweight security protocols have to support low-power and low-latency as well as the long-lasting features of quantities of IoT devices. The recently released IEEE standard, IEEE 802.11ai has specified a Fast Initial Link Setup (FILS), which is a brand-new approach aiming at establishing fast, stable and secure links among smart devices. IEEE 802.11ai could be applied to other wireless systems, such as the wireless system of IEEE 802.11ah with security enhancements. In this talk, I would address the security issues of IEEE 802.11ai and IEEE 802.11ah with new proposals to enhance the authentication process in the link setup procedure.

Schedule for Conference

Day 1	**October 29, 2018 (Monday)** 13:00~17:00 **Venue: Lobby of Nanyang Executive Centre** Participants Onsite Registration & Conference Materials Collection
Day 2	**October 30, 2018 (Tuesday)** 8:45~18:10 Arrival Registration, Keynote Speech, Conference Presentation
	Morning Conference **Venue: Lecture Room 6（in the Third Floor)**
	Opening Remarks 8:45~8:50 Prof. Maode Ma Nanyang Technological University in Singapore
	Keynote Speech I 8:50~9:35 **Title: " IPv6-based New Internet of Things ("Things-2-Things") "** (Prof. Latif Ladid, University of Luxembourg, Luxembourg)
	Keynote Speech II 9:35~10:20 **Title: "Machine Learning from Data: from Neural Networks to Deep Learning"** (Prof. Xudong Jiang, Nanyang Technological University, Singapore)
	Coffee Break & Group Photo Taking 10:20~10:40
	Keynote Speech III 10:40~11:25 **Title: "From Internet Scale Sensing to Smart Services and Products"** (Prof. Dimitrios Georgakopoulos, Swinburne University of Technology, Australia)
	Keynote Speech IV 11:25~12:10 **Title: "Efficient and Secure Authentication Schemes for IEEE 802.11ah Networks"** (Prof. Maode Ma, Nanyang Technological University in Singapore)
	Lunch 12:10~13:30 **Venue: Restaurant**
	Afternoon Conference **Venue: Lecture Room 6（in the Third Floor)**
	Session 1:13:30~15:30 **Venue: Lecture Room 6（in the Third Floor)** Topic: "Cloud computing and data security" Session Chair: Prof. Latif Ladid
	Coffee Break 15:30~15:50
	Session 2: 15:50~18:10 **Venue: Lecture Room 6（in the Third Floor)** Topic: "Wireless communication and Internet of Things technology"

	Session Chair: Prof. Dimitrios Georgakopoulos
	Poster 9:00~18:00 **Venue: Lecture Room 6（in the Third Floor)**
	Dinner 18:30-19:30 **Venue: Restaurant**
Day 3	**October 31st, 2018 (Wednesday)** 9:00~17:00 One Day Tour

Tips: Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

Note:

(1) The registration can also be done at any time during the conference.

(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(3) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on October 30, 2018.

(4) One day tour does not include meals, and participants need to take care of themselves.

Oral Presentation Abstracts

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 13:30~15:30

Venue: Lecture Room 6（in the Third Floor)

Topic: "Cloud computing and data security"

Session Chair: Prof. Latif Ladid

CT0019 Presentation 1 (13:30~13:50)

Efficient scheme for dynamic Cloud data shared within a static group with privacy preserving auditing and traceability

Surmila Thokchom[1], Dilip Kr. Saikia[2]
1. National Institute of Meghalaya, India; 2.Tezpur University, Assam, India

Abstract—This paper proposes an efficient auditing scheme for checking the integrity of dynamic data shared among a static group of users outsourced at untrusted cloud storage. The scheme is designed based on CDH-based ring signature scheme. The scheme enables a third party auditor to audit the client's data without knowing the content while also preserving the identity privacy of the group member who is signing the data from the auditor as well as from the cloud server. The identity of the group member who is signing the data block can be revealed only by the authorized opener, if needed. The paper presents a comparative performance study and security analysis of the proposed scheme.

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 13:30~15:30

Venue: Lecture Room 6（in the Third Floor)

Topic: "Cloud computing and data security"

Session Chair: Prof. Latif Ladid

CT0003 Presentation 2 (13:50~14:10)

Mobile Agent-based Secure Cloud Data Center Exploration for load data retrieval Using Graph Theory

R.Kanniga Devi, M Muthukannan
Department of Computer Science and Engineering, Kalasalingam Academy of Research and Education Krishnankoil, Tamilnadu, India

Abstract—This paper addresses the load information collection problem for load balancing the cloud data center. This work models Cloud data center as a graph with vertices denoting servers hosting Virtual Machines and edges corresponding to communication links among the servers. As Virtual Machines are created and released over time, a load balancer must keep track the load of the servers in cloud data center in order to distribute them uniform among the servers so as to have a load balanced cloud data center. This work harnesses mobile agent concept in cloud data center for load information collection, since both the mobile agent and cloud computing technologies are promising and commercially useful. The idea is to securely explore the cloud data center network quickly with mobile agents to collect load information from the servers and reporting them to load balancer as fast as possible. The goal is to minimize the cover time of the network and minimize the space requirement during load data collection. This paper proposes a secure network exploration algorithm for load data collection that decreases the time taken for exploration and space requirement. The theoretical analysis shows that the proposed approach takes $O (\log d\ n)$ time for network exploration, where as other deterministic approaches used for comparison take more time.

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 13:30~15:30

Venue: Lecture Room

Topic: "Cloud computing and data security"

Session Chair: Prof. Latif Ladid

CT0023 Presentation 3 (14:10~14:30)

Intrusion Detection and Mitigation System Using Blockchain Analysis for Bitcoin Exchange

Suah Kim, Beomjoong Kim, Hyoung Joong Kim
Korea University, South Korea

Abstract— Bitcoin exchanges rely heavily on traditional intrusion detection system to secure their system. However, this reliance has proven to be high risk, since Bitcoin and other blockchain-based transactions are not easily reversible. Many of the attacks have shown that the traditional intrusion detection system is not enough to safeguard against all possible attacks, and most importantly, in some cases, it takes a long time to assess the damage. In this paper, we first describe three types of intrusion models in Bitcoin exchanges and propose a detection and mitigation system using blockchain analysis for each. The proposed detection and mitigation system exploit the decentralized and public nature of Bitcoin blockchain to complement the existing traditional intrusion detection system as a fail-safe. The proposed method provides real-time intrusion detection capability that the existing work cannot provide. Although the proposed method is specifically for Bitcoin blockchain, similar ideas can be extended to other proof-of-work based blockchain cryptocurrencies.

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 13:30~15:30

Venue: Lecture Room 6（in the Third Floor)

Topic: "Cloud computing and data security"

Session Chair: Prof. Latif Ladid

CT0007 Presentation 4 (14:30~14:50)

Multimodal Deep Learning in Semantic Image Segmentation: A Review

Vishal Raman, Madhu Kumari
NIT Hamirpur, Hamirpur, Himachal Pradesh, India

Abstract— In recent years, there has been a lot of research in the area of se-mantic image segmentation, which involves breaking down an image into its discrete components, such that humans can give meaning to its contents. From the humble beginnings of image search using human-provided captions, content-based image retrieval has come a long way. Yet, areas of research and improvement are far from diminishing. In this paper we will take a look at how multi-modal approaches to semantic image segmentation are setting the new standard in image search and retrieval.

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 13:30~15:30

Venue: Lecture Room 6（in the Third Floor)

Topic: "Cloud computing and data security"

Session Chair: Prof. Latif Ladid

CT0006 Presentation 5 (14:50~15:10)

Predicting Credit Card Defaults with Deep Learning and Other Machine Learning Models

Mingmin Lo, Tsungnan Chou
Chaoyang University of Technology,Taiwan

Abstract—Since the overdue amount of credit cards has been increasing year by year, the rising credit card delinquencies might prevent the commercial banks to allocate more funds in profitable investments. At the same time, the high processing costs of credit card delinquencies through manual verification also affect the competitiveness of credit card issuers. Because the market competition becomes strict in the era of financial technology, to predict correctly whether cardholders will be unable to pay off credit card debt and establish an effective risk prediction model is the major purpose of this study.

We first implemented four machine-learning approaches to predict the default cases, however, most models encountered challenges to resolve imbalance problem of delinquency cases in data sets and reported lower predictive accuracy. Two inference strategies including grey incidence analysis and fuzzy decision tree were proposed to improve the predictive performance. The average accuracy for both strategies were increased from 0.82 to 0.86 and 0.89 respectively. In addition, the deep learning approach integrated with various network structures was also incorporated to evaluate model performance. The experiment results indicated the deep neural network performed better in most evaluation metrics and achieved an impressively high accuracy of 0.93 if compare to the machine learning models. Finally, three feature selection methods were employed with the deep learning model, and the results showed similar predictive accuracy as the original deep learning models with slightly better performance being reported by filtering variables with the grey incidence analysis. This research work could be extended to apply more complicated deep learning algorithms to learn and trace the behaviors of the credit card holders and reduce the default risks for banking industries.

Session 1

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Afternoon, October 30, 2018 (Tuesday)

Time: 13:30~15:30

Venue: Lecture Room 6（in the Third Floor)

Topic: "Cloud computing and data security"

Session Chair: Prof. Latif Ladid

CT0009 Presentation 6 (15:10~15:30)

Research on Distributed Storage and Query Optimization of Multi-source Heterogeneous Meteorological Data

Jinfang Jia, Xiaodong Hu, Huanli Xu, Xiaoying Wang
Department of Computer Technology and Applications, Qinghai University, Xining, China

Abstract—The growth of massive data makes the real-time data service of meteorological forecast and climate analysis facing severe challenge. Distributed database is a good solution to meet the needs for massive multi-source heterogeneous meteorological data storage. Since the current mainstream HBase database fails to support the non-Rowkey query, the poor performance of the realtime query of meteorological data is unsatisfactory. To address this issue, three kinds of distributed data query optimization strategies are proposed in this paper, including query optimization based on secondary index, secondary index query optimization based on hotscore, and query optimization based on the Redis hot data caching strategy. The corresponding experimental results indicate that the search scheme based on the Redis hot data caching strategy has the best performance among the three schemes, not only can meet the needs of meteorological service query, but also can achieve 3-8 times efficiency enhancement than standard HBase.

Coffee Break	15:30-15:50

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT0017 Presentation 7 (15:50~16:10)

Hybrid Cloud - An Inter-Cloud Communication Mechanism

M S Raghunandan
PES University, Bangalore, India

Abstract— Cloud computing has been in existence since the early 2000s and the growth in this domain of Computer Science has been by leaps and bounds. Cloud computing service providers offer 3 different services - Software, Platform and Infrastructure. Hybrid Cloud Deployment has become commonplace in today's world. The reason for the rise of hybrid cloud is the advantage of leveraging some high-cost operations onto a public cloud – provisioning and scalability, just to name a few – and at the same time making use of a private cloud for application deployment. In the current market trends, interoperability between Cloud platforms have put immense pressure on vendors to provide suitable features that would enable inter-cloud communication whilst at the same time trying to eliminate problems that plague today's applications – more notably Vendor Lock-In and Portability. This paper explores the possibility of exchanging data amongst intercloud instances that are constrained by geographical properties.

Session 2

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Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT3001 Presentation 8 (16:10~16:30)

Deep Cooperative Spectrum Sensing Based On Dimension Reduction and Clustering Algorithm in Cognitive Radio Networks

Dezhi Yang[1], Yanyun Tao[2], Cuimei Cui[3], Lijun Zhang[4]
1,2,4, Intelligence structure and system, School of railway transportation, Soochow University, China; 3, Jiangsu Key Laboratory of Wireless Communications, Nanjing University of Posts and Telecommunications, Nanjing, China

Abstract—Since spectrum environment is increasingly complex and more devices accessed communication networks, traditional spectrum sensing algorithms have not adapted to an extreme volume of spectrum data. In this paper, a novel deep cooperative spectrum sensing scheme is proposed, which combined principal component analysis (PCA) with clustering algorithm. First, a multi-dimension feature matrix, consisting of energy vectors generated in fusion center, is reduced to a lower-dimension matrix according to the PCA algorithm. Subsequently, a clustering algorithm with Kmeans++ method is utilized to train the classifier by the lowerdimensional matrix. The simulation results show that the proposed scheme has shorter training duration about 64% of no PCA processing when the primary user power is 400 mW , and ensures spectrum sensing accuracy of secondary users. More importantly, the proposed scheme, compared with the others' cooperative spectrum sensing schemes, can significantly reduce the required hardware memory.

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT0002 Presentation 9 (16:30~16:50)

A Framework to Apply the Internet of Things for Medical Care in a Home Environment

Hlengekile Jita, Vreda Pieterse
University of Pretoria, South Africa

Abstract—The Internet of Things (IoT) is revolutionizing the way in which we do a number of things including in-home medical care. An in-home care system that uses IoT technology offers a number of benefits; it enables remote monitoring by the caregivers and the physicians, empowers the patient, allowing them to be more independent, offers loved ones peace of mind and reduces costs. This paper through a literature study explores possibilities for the architectural design of an in-home medical care system (IHMCS) that integrates smart devices used for the monitoring of the vitals of a patient. This work proposes using the microservices architectural style and Blockchain technology for the architectural design of the in-home care system. In support of this work, a preliminary proof of concept explores this theoretical framework.

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Session 2

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Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT0016 Presentation 10 (16:50~17:10)

IoT-Based System Health Management Infrastructure as a Service

Mehdi Seyedmahmoudian[1], Gokul Sidarth Thirunavukkarasu[2], Benjamin Champion[3], Ben Horan[4], Alex Stojcevski[5]
1,2,5 Swinburne University of Technology, Australia ; 3,4 Deakin University, Australia

Abstract—Customization, enhanced quality of streamlined maintenance services and uplifted productivity are some of the key highlights from the rapidly evolving concept of Industry 4.0. IoT (Internet of things) based service infrastructure models designed for delivering enterprise services with capabilities of pro-actively sensing malfunctions and responding with preventive measures to streamline the automated service offered is one of the prime application of this concept. Continuous maintenance services increase the optimum through-life cost and in-service life cycle of the product providing the customer with the feel of full ownership. In-service feedbacks also help the manufactures to identify issues with respect to the designs and improve it in the future versions. In this paper, as a proof of concept a cloud-based IoT service infrastructure for providing real-time prognostic and supervised vehicle maintenance system is proposed. This proposed system aims at providing an enterprise service infrastructure to the registered vehicle service centers to keep track of the real-time vehicle diagnostic information of their client's vehicle over cloud and use prognostic algorithms to identify any malfunctions or abnormal behavior of the vehicles for automatically scheduling a service appointment and automating the maintenance cycle of the vehicle. In addition to this, the system provides features like remote supervision and diagnostics maintenance enabling technicians to fix issues remotely, ensuring streamlined and reliable service. Initially, before building the proposed prototype system, a few experimental trails where conducted for analyzing the use of different IoT models used in the development to identify the best-suited approach. The results indicated that the publisher-subscriber (NodeJS) based model outperforms the request-response (PHP) based model in terms of the hits per second and mean request time for an increased number of active users. The results of the initial tests justify the reason for the using the publisher-subscriber based IOT architecture. The conceptualized enterprise infrastructure illustrated in the manuscript aims at providing streamlined maintenance service.

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT0022 Presentation 11 (17:10~17:30)

An Investigative Study on the Quality Aspects of Linked Open Data

Monika Rani H G[1], Sapna R[2], Dr. Shakti Mishra[3]
1,2, Sir. MVIT, Bangalore, India; 3, NMIT, Bangalore, India

Abstract—Linked Open Data refers to a set of best practices that empowers enterprises to publish and interlink their data using existing ontologies on the Semantic Web. The focus of linked open data is to move from document-based Web to a Web of interlinked data, created by typed links between data from different data sources. Linked open data expert group has taken cognizance of data quality importance, as the amount of linked data publications grown on the Web substantially. Measures have been taken to check the linked data quality. But, these measures are diverse in nature with respect to quality terms. This makes the comparison and evaluation difficult, leading to an incorrect selection of accurate data sources based on quality requirements. In this paper, we carried out an analysis on linked data, the quality of linked data, the frameworks to assess the quality of linked data and the challenges to achieve the quality of linked open data.

Session 2

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Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT0008-A Presentation 12 (17:30~17:50)

Evaluation of Die Sinking Electric Discharge Machine with Smart Machine Controller

Sukhwant Singh Banwait[1], Manish M Pawade[2]
1, Department of Mechanical Engineering, National Institute of Technical Teachers Training & Research, Chandigarh, India;
2, Department of Mechanical Engineering, Government Polytechnic, Arvi, Maharashtra, India

Abstract—A programmable logical control based Smart Machine Controller has been developed to control the Electrical Discharge Machining (EDM) process. The Smart Machine Controller (SMC) extracts the EDM process parameters for rough, semi-finish and finish machining operations from the developed database. The experimental database was created by conducting pilot experimentations after conducting the validation experiments, the SMC was tested on six different die and mould steel materials with the original machine controller and the results shows that the material removal rate and surface finish improves by 1.35% to 11.50% and 3.83% to 15.05% respectively when used with SMC machining parameters. The developed Smart Machine Controller has been found to be very useful and highly interactive as compared to the original die sinking EDM machine controller.

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, October 30, 2018 (Tuesday)

Time: 15:50~18:10

Venue: Lecture Room 6（in the Third Floor)

Topic: "Wireless communication and Internet of Things technology"

Session Chair: Prof. Dimitrios Georgakopoulos

CT3005-A Presentation 13 (17:50~18:10)

Structure fracture detection and vibration monitoring using WSN AND Zigbee

Alin Mostafa, Aziz Arman, Jannatun Nur-E Rukhsana, Zunayeed Bin Zahir
Electrical and Computer Engineering, North South University, Dhaka, Bangladesh

Abstract— Monitoring the condition of structures and detection of fracture is a demanding challenge. Our primary contribution of this work is to investigate the current difficulties of structures in our country and involves the application of technology to civil structures and platform for realizing the full benefit of structure health monitoring.
We are using XBee Pro S2B for the wireless connectivity. Our purpose is to basically measure the fracture condition of bridges and its vibration measurement. We are also using Nuvoton NUC 140 for communication board which is powered by ARM cortex M0. XBee mini USB adapter is used to interface it with PC and NUC 140 as it doesn't directly interface with PC. We are also using different sensors to measure those parameters. Zigbee mesh connection is used for this project so the data can transmit to different base stations simultaneously.
We are applying new implementation technology of sensors here and also improved leach protocol.
Sensors will take data from site and send it to NUC 140. NUC 140 will process the sensor data and send data from coordinator XBee to router XBee and router XBee will send to end device on base stations.
XCTU is used to configure XBee coordinator, router and end device. Keil Uvision 5 is used to configure NUC 140.
Our research is designed to investigate the current difficulties of bridges in our country primarily and after that we will try to improve and implement it on broader perspective.
It will also be able to take more different parameters from environment by further upgradation.

Poster Presentation Abstracts

Poster 1

October 30th, 2018 (Tuesday)

Time: 9:00~18:00

Venue: Lecture Room 6（in the Third Floor)

CT0013 Presentation (9:00~18:00)

An Information Monitoring Platform for Thermal Energy Storage Systems Using Cloud Computing

Jiamin Liu, Yan Chang, Dong Wei, Dapeng Wang and Tieyan Zhang
School of Information Science & Engineering, Shenyang University of Technology, Shenyang, China

Abstract—Energy storage plays a key element to use new energy to replace traditional coal and petrochemical energy, and it plays an important role of shifting energy utilization ways. Nowadays energy internet is a way of renewable and sharing energy. A cloud platform for monitoring energy information of thermal storage systems is developed by using cloud computing, IoT and energy storage technologies. This platform allows a user to monitor the running conditions of regional thermal energy systems in real-time from anywhere as the condition data are synchronized to the client-side website, and data are stored into a data storage server. To quickly locate any thermal energy storage system, the geographical locations of the systems built anywhere are marked on the map of the web page. The condition data of all systems can be collected and communicated between the control unit installed in the heat system and the servers on cloud. The gathered data can be worked out for further allocating energy consumption. This platform has been launched after successfully tested on a number of practical thermal energy storage systems at different regions. This will provide a guarantee for further intelligent analysis and optimization of energy deployment.

Poster 2

October 30th, 2018 (Tuesday)

Time: 9:00~18:00

Venue: Lecture Room 6（in the Third Floor)

CT0020 Presentation (9:00~18:00)

CVEM: A Cross-chain Value Exchange Mechanism

Shilan Yang[1], Huaimin Wang[2], Peichang Shi[3], Xiang Fu[4], Xikun Yue[5]
1，2，4，Science and Technology on Parallel and Distributed Laboratory, College of Computer, National University of Defense Technology, Changsha, China；3，5，Troops No. 75835, PLA，National University of Defense Technology, Changsha, China

Abstract—Blockchain is distributed ledger with the advantage of high security, tamper resistant and traceability. However, in the process of the growth of Blockchain, network isolation hinders the cooperative operation among different Blockchains and greatly restricts the development of Blockchain. There is an urgent need to break the barriers among Blockchains, thus cross-chain communication become a new trend of the Blockchain technology. In this paper, we propose CVEM, a value exchange mechanism which supports different kind of tokens transfer cross-chain. First, we put the main exchange process execute off-chain and the final result on-chain. Then, we combine Revocable Sequence Maturity Contract (RSMC) with the idea of cross-token exchange of Blockchain, and use the mechanism of multi-signatures address to constrain the users' behaviors. In addition, we introduce the Simple Payment Verification Proof (SPV Proof) to verify transactions. Our work, to some degree, shortens the transaction process delay and also ensures the security and scalability of the value exchange.

Poster 3

October 30th, 2018 (Tuesday)

Time: 9:00~18:00

Venue: Lecture Room 6（in the Third Floor)

CT3004-A Presentation (9:00~18:00)

Design and Manufacture of Mobile Intelligent Garbage Bin

Mingyu Zhang
Department of Electronic and Communication Engineering, Suzhou Institute of Industrial Technology, Suzhou, China

Abstract—This paper designs a mobile intelligent ash bin by automatic tracking based Arduino microcontroller. Arduino microcontroller is the core to control, with the voice of the way to open and close the lid, realize the trash tracking using reflective photoelectric sensor to detect black line, using voice broadcast sound to remind pedestrians to avoid the use of LCD1602 display, temperature and humidity. Finally, the intelligent garbage can goes forward and backward, turns, runs, prompts and displays the temperature and humidity according to the black line on the ground. The design of the intelligent garbage can meets the practical requirements and has certain reference value in application.

Poster 4

October 30th, 2018 (Tuesday)

Time: 9:00~18:00

Venue: Lecture Room 6（in the Third Floor)

CT0024 Presentation (9:00~18:00)

xxTEA-VCLOUD:A Security Scheme for the Vehicular Cloud Network using a Lightweight Encryption Algorithm

Abderrahim Abdellaoui, *Oussama Azzam, Habiba Chaoui, Hicham elachgar, Nabil Hmina*
Systems Engineering Lab, National School of Applied Sciences, Ibn Tofail University, Kenitra, Morocco

Abstract—The recent developments in the field of cloud computing and the increasing number of vehicles on roads have led to develop a method that exploits underutilized vehicular resources called the vehicular cloud computing (VCC). It is a paradigm that combines the vehicular ad hoc network VANET and the cloud computing to benefit from their advantages and to provide road safety to drivers. However, authentication and confidentiality are considered as the most challenging issues in VCC. To cope with those challenges, we propose a new security mechanism for the vehicular cloud based on the implementation of a lightweight encryption algorithm with several techniques to ensure authentication and confidentiality.

Dinner Time	18:30-19:30

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Listeners

Note:

• Session photo will be taken at the end of each session.

• The certificate for listeners can be collected at the registration counter.

• To show respect to other authors, especially to encourage the student authors, we strongly suggest you attend the whole session

Listener 1

Beomjoong Kim

Korea University,
South Korea

Listener 2

Kumar Ankit

Nanyang Technological
University, Singapore

Listener 3

**Kushan Sudheera
Kalupahana Liyanage**

Nanyang Technological
University, Singapore

Listener 4

Sungbin Park

Korea University,
South Korea

Listener 5

Stefan Eder

Benn-Ibler, Austria

Listener 6

Utkarsh Jain

Nanyang Technological
University, Singapore

Listener 7

Ali Ozhelvaci

Nanyang Technological
University, Singapore

To be Continuous updating

One Day Visit

October 31st, 2018 (Wednesday) 9:00~17:00

(Tip: Please arrive at Nanyang Executive Centre, Singapore before 9 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)

1. **(9:00am) Assemble at Nanyang Executive Centre**
2. **(9:00-12:00pm) Morning Visit**

Visit Merlion Park

Merlion Park, is a Singapore landmark and major tourist attraction, located at One Fullerton, Singapore, near the Central Business District (CBD). The Merlion is a mythical creature with a lion's head and the body of a fish that is widely used as a mascot and national personification of Singapore. Two Merlion statues are located at the park. The original Merlion structure measures 8.6 meters tall and spouts water from its mouth. It has subsequently been joined by a Merlion cub, which is located near the original statue and measures just 2 metres tall.The park was first designed by the Singapore Tourism Board (STB) in 1964 as an emblem of Singapore.

Visit St Andrew's Cathedral

In the mid-1980's, St. Andrew's Cathedral was restored and renovated to its present. Though there are many changes in the liturgical space, they made every effort to respect the Victorian period during which the Cathedral was designed. Restoration architects, Bawlf, Cooper & Associates completed the design work. The decorative panels are designed by Nicholas Bawlf and based on the Book of Kells. The Cathedral's altar is of particular significance. It was built by acclaimed West Coast native artist Charles Elliot. The top of the altar is yellow cedar, weighing about 400 pounds, which rests on two traditional native "bent boxes". Each box has a different picture carved on each of its four sides, representing different events in the life of Christ or stories from Scripture. These altar panels are rotated several times a year, to coincide with the events in the Church's liturgical year. The lectern was carved by native artist Roy Henry Vickers. It has a carving of Christ on the front, symbolizing both death and resurrection, the red side being the crucified Christ wearing the crown of thorns and the black side being the risen Christ. A new icon of the Holy Family was formally installed on September 8, 2007. The icon, which is 7 feet high by 5 feet wide, is the largest ever written

by iconographer André Prevost of Manitoba.

Visit Chinatown, Singapore

Chinatown in Singapore is a sharp contrastto the rest of the city, with low rise buildings and culture bursting out onto the streets, from the fragrant smells of traditional cuisine to the bold red and gold tones that run through the neighbourhood. This is an area that's proud of its heritage, and has it very much on display. There are ornate Chinese, Buddhist and Hindu temples, museums galore and plenty of opportunities to soak up the bustling streets lined with old shophouses.

3. **(12:00-14:00) Lunch time**

4. **(14:00-17:00) Afternoon visit**

Visit Gardens by the Bay

Gardens by the Bay is an independent organization responsible for developing and managing one of Asia's foremost garden destinations.

The Gardens is led by a multidisciplinary

team of professionals who have been involved in the greening of Singapore and had worked alongside international and local experts to develop the Gardens. It has an in-house team of skilled landscape designers, horticulturists, arborists, engineers, plant health, garden and turf management experts, as well as plant research and orchid breeding professionals, who leverage on the extensive global network of plant sources cultivated during the development days, to continuously curate and grow the Gardens.

Guided by its vision to be a world of gardens for all to own, enjoy and cherish, Gardens by the Bay has earned numerous awards and accolades including the World Building of the Year in 2012, the President's Design Award (Singapore) in 2013, the Outstanding Achievement Award by the Themed Entertainment Association in 2014, the Largest Glass Greenhouse (Flower Dome) in the Guinness World Records for 2015, and the TripAdvisor Certificate of Excellence in 2016. These achievements are testament to the ongoing excellence of the Gardens and spur the team towards attaining greater success.

Visit Little India

Little India is an ethnic district in Singapore. It is located east of the Singapore River—across from Chinatown, located west of the river—and north of Kampong Glam. Both areas are part of the urban planning area of Rochor. Little India is commonly known as Tekkain the Indian Singapore an community.

5. **(17:00) Back to Nanyang Executive Centre**

Note

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