Proceedings

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Taipei, Taiwan December 17-19, 2012

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Message from Conference and Program Chairs

Welcome to the IEEE 2012 International Conference on Service-Oriented Computing and Applications (SOCA 2010) in Taipei, Taiwan. It is a perfect location for SOCA 2012 that provides an international forum for researchers to exchange and share their experiences, ideas, and latest research results on all aspects of service oriented computing. Service-oriented computing is considered today as a key technology for the development of robust and high quality intelligent distributed and embedded applications. Extensive research and development in the past few years has pushed SOA technology into state-of-the-art application areas such as context-aware, cloud-connected, mobile enterprise systems. However, many of the critical components on building reliable, robust, and user-centric sensor-based SOA systems are still open for research. Hence, it is timely to reexamine SOA research opportunities and identify new research challenges for next generation SOA.

One of the future SOA applications is Machine-to-Machine (M2M) systems that are built on top of a network of services, each of which is autonomous and collaborates with each other to form coherent and context-aware service. It has been suggested that M2M will spark the next ICT revolution based on the 15-year gold rule of the ICT technology after PC's and Internet. The services in M2M have diverse characteristics and dynamic requirements. Many of the service components are deployed on resource limited embedded systems and are performance sensitive; others are deployed on cloud servers providing highly parallel services. Two distinct sources for the increasing complexity are intelligent services in heterogenous devices, and the constantly evolving environment. Hence, the dynamic flexibility of SOA may be used to compose and invoke services in M2M to adapt to the changing sensor resources, but also to the dynamic user needs and physical environment. The 2012 IEEE International Conference on Service-Oriented Computing and Applications (SOCA 2012) will be held in Taipei, Taiwan, with a theme of "M2M SOA". The conference includes three days of parallel tracks program, special-topic workshops/ tutorials, and panel discussion.

The SOCA conference is one of the major annual events sponsored by the IEEE Computer Society Technical Committee on E-Commerce (TCEC). SOCA 2012 has received 74 high-quality paper submissions from 19 countries/regions. After rigorous review process, the program committee finally accepted 22 full papers for inclusion in the conference proceedings, together with 15 short research and experience papers. In addition, SOCA 2012 has invited two distinguished keynote speakers, Dr. Schahram Dustdar with TU Vienna, Austria, and Dr. Kang-tsung (Karl) Chang with National Taiwan University, to share their vision on SOC and applications. There are three co-located workshops in SOCA 2012, each of which targets specific application domain for applying SOA techniques. They are IoT Intelligence Management and Knowledge Coordination (IoTM), Workshop on Resilient ICT for Management of Mega Disasters (RITMAN), and International Workshop on Knowledge and Service Technology for Life, Environment, and Sustainability (KASTLES). The workshop programs will be scheduled in parallel with SOCA's technical sessions.

The excellent program and activities of SOCA 2012 are the results of diligent efforts from more than 100 program committee members as well as capable supporting staffs. Each paper has been peer-reviewed by 2-5 PC members. We thank all PC members for making an outstanding technical program. We are very grateful to the Publication Chair, Jenq-Shiou Leu of National Taiwan University of Science and Technology in Taiwan, for his great effort on editing the conference proceedings. We also would like to express our gratitude to the Publicity Chairs, Prof. Chin-Hsian Wu of National Taiwan University of Science and Technology in Taiwan and Dr. Christian Pichler of Institute of Software Technology and Interactive Systems of Vienna University of Technology, for making sure the conference events reach many important communities. We also thank Registration Chair, Dr. Ling-Jyh Chen of Academia Sinica, for his great efforts on handling conference registration and Workshop Chair, Prof. Chih-Wei Hseuh of National Taiwan University, for organizing three satellite workshops for SOCA 2012. We would like to thank the Financial Chair, Prof. Ya-Yuan Su of National Taiwan University, for making sure that all the bills are paid and our attendant have the best deal on all the services. Last but not least, we are very grateful to Web Chair, Sen Zhou of University of California, Irvine, on preparing the conference website.

We sincerely hope you will enjoy SOCA and your stay in Taipei!

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Program at a glance for SOCA 2012

Time	Dec. 17			Dec. 18		Dec. 19	
8:00 ~ 8:50	Registration			Registration		Registration	
8:50 ~ 10:00	Opening Remark and Keynote I			Keynote II		Keynote III (RITMAN and SOCA)	
10:00 ~ 10:20	Coffee Break						
10:20 ~ 12:10	Session 1: Service-Oriented Applications	Session I01: IoTIM Workshop	Session K01: Framework and Foundations	Session 4: Cloud and Mobile-based Service-Oriented Services	Session 5: Service Composition with QoS	Session 8: Service-Oriented Applications Management	Session R01: Information and Communication Technology for Disaster Management
12:10 ~ 13:30	Lunch						
13:30 ~ 15:00	Session 2: Intelligent Service Management	Session I02: IoTIM Workshop	Session K02: Platform and Systems	Session 6: Cyber-Physical and M2M systems	Session 7: Security and Privacy for SoA	Session 9: Service-Oriented Applications Management	Session R02: Work-in-Progress
15:00 ~ 15:30	Coffee Break						

Time	Dec. 17			Dec. 18	Dec. 19	
15:30 ~ 17:00	Session 3: Dynamic Service Composi-tion	Session I03: IoTIM Workshop	Session K03: Panel Discussion	Excursion (National Palace Museum, Bus departs at 3:20PM)	Session 10: Service Oriented Architec-ture	Session R03: Panel Discussion
18:00 ~ 21: 00	Conference Reception (Leader Hotel)			Conference Banquet	Conference Closing	

Advanced Program for SOCA 2012

Session 1: Service-Oriented Applications

Flexible Information Design for Business Process Visualizations by Alexander Nowak(University of Stuttgart), Dimka Karastoyanova(University of Stuttgart), Frank Leymann(University of Stuttgart), Andrej Rapoport(University of Stuttgart), David Schumm(University of Stuttgart)

Application-Level Performance Monitoring of Cloud Services Based on the Complex Event Processing Paradigm by Philipp Leitner(Vienna University of Technology), Christian Inzinger(Vienna University of Technology), Waldemar Hummer(Vienna University of Technology), Benjamin Satzger(Vienna University of Technology), Schahram Dustdar(Vienna University of Technology)

Adaptive Load Shedding via Fuzzy Control in Data Stream Management Systems by Can Basaran(Daegu Gyeongbuk Institute of Science & Technology), Kyoung-Don Kang(Binghamton University), Yan Zhou(Cisco Systems), Mehmet Hadi Suzer(Harran University)

Object Identity Set Algebra for Object-Oriented Database Systems by Shugang Wang(China Lottery Online)

Session 2: Intelligent Service Management

Spectrum-based Fault Diagnosis for Service-Oriented Software Systems by Cuiting Chen(Delft University of Technology), Hans-Gerhard Gross(Delft University of Technology), Andy Zaidman(Delft University of Technology)

A Module-based Approach for Structural Matching of Process Models by Hamida Lagraa Seba (University Lyon1), Sonia Abbas(University Lyon1)

Pattern-based Process Discovery by Robin Fischer(Karlsruhe Institute of Technology (KIT)), Erik Wittern(Karlsruhe Institute of Technology (KIT)), Julian Schneider(Karlsruhe Institute of Technology (KIT)), Stefan Tai(Karlsruhe Institute of Technology (KIT))

Session 3: Dynamic Service Composition

A Software Framework for Enabling Smart Services by Jae Yoo Lee(Soongsil University), Moon Kwon Kim(Soongsil University), Hyun Jung La(Soongsil University), Soo Dong Kim (Soongsil University)

A Rule-based Approach for Dynamic Adaptation of Service Flow by Chi-Ming Ma(Dahan Institute of Technology), Tai-Jung Wu(Taipei Municipal Da-An Vocational High School), Shiow-Yang Wu(National Dong Hwa University)

Risk in Modern IT Service Landscapes: Towards a Dynamic Model by Nico Rodder(FZI Forschungszentrum Informatik), Rico Knapper(FZI Forschungszentrum Informatik), Jochen Martin(FZI Forschungszentrum Informatik)

On Evolving Partitioned Web Service Orchestrations by Walid Fdhila(University of Vienna), Stefanie Rinderle-Ma(University of Vienna), Aymen Baouab(University of Lorraine), Olivier Perrin(University of Lorraine), Claude Godart(University of Lorraine)

Session 4: Cloud and Mobile-based Service-Oriented Services

Cost-driven Service Provisioning in Hybrid Clouds by Mathias Bjoerkqvist(IBM Research Zurich), Lydia Y. Chen(IBM Research Zurich Lab), Walter Binder(University of Lugano)

Extracting RESTful Services from Web Applications by Bipin Upadhyaya(Queen's University), Foutse Khomh(Queen's University), Ying Zou(Queen's University)

WS-Agreement based Service Negotiation in a Heterogeneous Service Environment by Ralph Vigne(University of Vienna, Faculty of Computer Science), Juergen Mangler(University of Vienna), Erich Schikuta(University of Vienna), Stefanie Rinderle-Ma(University of Vienna)

Selecting the right mobile app paradigms by Ngu Phuc Huy(Norwegian University of Science and Technology), Do van Thanh(Telenor and Norwegian University of Science & Technology)

Session 5: Service Composition with QoS

A Novel Two-Phase Approach for QoS-Aware Service Composition Based on History Records by Zhu Yong(Southeast University), Li Wei(Southeast University), Luo Junzhou(Southeast University), Zheng Xiao(Southeast University, and Anhui University of Technology)

Revenue Maximization with Quality Assurance for Composite Web Services by Miroslav Zivkovic(TNO), Daniel Worm(TNO), Hans van den Berg(TNO), Rob van der Mei(CWI)

Real-time Service Process Scheduling with Intermediate Deadline Overrun Management by Weiran Nie(University of California, Irvine), Sen Zhou(University of California, Irvine), Kwei-Jay Lin(University of California, Irvine)

Composing Trustworthy Context-dependent Services by Naseem Ibrahim(Albany State University)

Session 6: Cyber-Physical and M2M Systems

Eventlets: Components for the Integration of Event Streams with SOA by Stefan Appel(TU Darmstadt), Sebastian Frischbier(TU Darmstadt), Tobias Freudenreich(TU Darmstadt), Alejandro Buchmann(TU Darmstadt)

M2M Platform-as-a-Service for Sustainability Governance by Hong-Linh Truong(Vienna University of Technology), Schahram Dustdar(Vienna University of Technology)

A Fuzzy Approach for Ranking Adaptation Strategies in CLAM by Asli Zengin(Fondazione Bruno Kessler), S. Hossein Siadat(Ulsan National Institute of Science and Technology), Annapaola Marconi(Fondazione Bruno Kessler), Barbara Pernici(Politecnico di Milano)

Utilizing Descriptive Documents for Adaptive and Reconfigurable M2M Systems by I-Lung Tsai(National Taiwan University), Wan-Rong Jih(National Taiwan University), Yen-Ling Kuo (National Taiwan University), Jane Yung-jen Hsu(National Taiwan University)

Session 7: Security and Privacy for SOA

Security Measurement in Service-based Computing Systems by Chunyan Mu(Newcastle University), Wen Zeng(Newcastle University)

Security Certification-Aware Service Discovery and Selection by Claudio Agostino Ardagna(University degli Studi di Milano), Marco Anisetti(University degli Studi di Milano), Ernesto Damiani(University degli Studi di Milano), Jonatan Maggesi(University degli Studi di Milano)

A Trust Vector Approach to Transaction Context-Aware Trust Evaluation in E-commerce and E-service Environments by Haibin Zhang(Macquarie University), Yan Wang(Macquarie University), Xiuzhen Zhang(RMIT University)

Session 8: Service-Oriented Applications Management

A Concept Analysis Approach for Guiding Users in Service Discovery by Bipin Upadhyaya(Queen's University), Ying Zou(Queen's University), Foutse Khomh(Queen's University)

Enabling Tenant-Aware Administration and Management for JBI Environments by Steve Strauch(University of Stuttgart), Vasilios Andrikopoulos(University of Stuttgart), Santiago Gómez Sáez(University of Stuttgart), Frank Leymann(University of Stuttgart), Dominik Muhler(SAP (Schweiz) AG)

State Propagation-based Monitoring of Business Transactions by Sebastian Wagner(University of Stuttgart), Christoph Fehling(University of Stuttgart), Dimka Karastoyanova(University of Stuttgart), David Schumm(University of Stuttgart)

Push-style WS-Notification System Based On Semantic Preserving by Zhaohang Chai(Beijing University of Posts and Telecommunications), Yang Zhang(Beijing University of Posts and Telecommunications), Junliang Chen(Beijing University of Posts and Telecommunications)

Session 9: Service-Oriented Applications Management

A Pattern Language and Repository for Service Network Management by Ulrich Scholten(Karlsruhe Institute of Technology(KIT)), Nelly Schuster(Karlsruhe Institute of Technology (KIT)), Stefan Tai(Karlsruhe Institute of Technology (KIT))

BPEL Conformance in Open Source Engines by Jörg Lenhard(University of Bamberg), Simon Harrer(University of Bamberg), Guido Wirtz(Distributed and Mobile Systems Group - University of Bamberg)

Service Graph Base: A Unified Graph-based Platform for Representing and Manipulating Service Artifacts by Xi Chen(Southwest Jiaotong University), Angel Lagares Lemos(University of New South Wales), Moshe Chai Barukh(University of New South Wales), Boualem Benatallah(University of New South Wales)

Session 10: Service-Oriented Architecture

Service integration via target-transparent mediation by Mila Dalla Preda(Univeristry of Bologna), Maurizio Gabbrielli(University of Bologna), Claudio Guidi(italianaSoftware srl), Jacopo Mauro(University of Bologna), Fabrizio Montesi(IT University of Copenhagen)

Bridging the Heterogeneity of Orchestrations - A Petri Net-based Integration of BPEL and Windows Workflow by Stefan Kolb(University of Bamberg), Jörg Lenhard(University of Bamberg), Guido Wirtz(Distributed and Mobile Systems Group - University of Bamberg)

Optimizing Pipe-like Mashup Execution for Improving Resource Utilization by Jingbo Xu(Beihang University), Hailong Sun(Beihang University), Xu Wang(Beihang University), Xudong Liu(Beihang University), Richong Zhang(Beihang University)

Performance Evaluation of a Massively Parallel ESB-Oriented Architecture by Ridha BENOSMAN(CNAM), Kamel BARKAOUI(CNAM), Yves ALBRIEUX(CNAM)

Advanced Program for KASTLES

Session K01: Framework and Foundations

Finding Linkage between Sustainability Science and Technologies based on Citation Network Analysis by Katsuhide Fujita (University of Tokyo)

Abnormality Detection by Model-based Estimation of Power Consumption by Chiao-Ching Huang(National Taiwan University), Yi-Ting Tsao(National Taiwan University), Jane Yung-Jen Hsu (National Taiwan University)

Innovating Multiagent Algorithms for Smart City: The Overview of our Research Project by Takayuki Ito (Nagoya Institute of Technology), Shantanu Chakraborty (Nagoya Institute of Technology), Ryo Kanamori (Nagoya Institute of Technology), Yadanobu Otsuka (Nagoya Institute of Technology)

Session K02: Platform and Systems

A Data Retransmitting Mechanism for Ecological Monitoring System by Yu-Chi Chang(National Taiwan University), Chi-Yang Lee(National Taiwan University), Xiang-Yao Zheng(National Taiwan University), Cheng-Long Chuang(National Taiwan University), Joe-Air Jiang (National Taiwan University)

On Implementing a Market-based Agent-mediated Resource Control Framework for Middle-scale Smart Grids: A Preliminary Study by Naoki Fukuta (Shizuka University), Takayuki Ito (Nagoya Institute of Technology)

A Self Sustainable Air Quality Monitoring System Using WSN by Chien-Hao Wang(National Taiwan University), Yu-Kai Huang(National Taiwan University), Xiang-Yao Zheng(National Taiwan University), Tzu-Shiang Lin(National Taiwan University), Cheng-Long Chung (National Taiwan University), Joe-Air Jiang (National Taiwan University)

Advanced Program for RITMAN

Session R01: Information and Communication Technology for Disaster Management

DR. ION: Disaster Rescue over Information-Oriented Network
by Wei-Chun Chung (Academia Sinica), Chi-Jen Wu (Academia Sinica), Chin-Fu Ku (Academia Sinica) , Der-Tsai Lee (Academia Sinica), Jan-Ming Ho (Academia Sinica)

Fusing Human Sensor and Physical Sensor Data by Jane Liu (Academia Sinica), Edward Chu (National Yunlin University of Science and Technology), and Pei-hsuan Tsai (National Cheng Kung University)

Shadow Phone: Context Aware Device Replication for Disaster Management by Chi-Sheng Daniel Shih (National Taiwan University) and Trang-Khon Trieu (National Taiwan University)

Virtual Disaster Management Information Repository and Applications Based on Linked Open Data by Yi-An Lai (Academia Sinica), Yi-Zong Ou (Academia Sinica), Jan Su (Academia Sinica), Sheng-Han Tsai (Academia Sinica), Cheng-Wei Yu (Academia Sinica), Derrick Cheng (University of California, Berkeley)

Advanced Program for IoTIM

Session I01
Introduction to Knowledge Coordination Management by Guangfei Yang, Yanzhong Dang.

Software Development Concerns in the Building of Service-Oriented Based Enterprise Systems by Chia-Chu Chiang.

Opinion Transfer: Sentiment Classification with Limited Labeled Data by Jiangning Wu, Guangfei Yang, and Fengzha Ma.

Towards Secure Software Development Assimilation: The Effect of Software Champion via Top Management by Mingqiu Song, Donghao Chen

Towards IoT-based Amicable Intelligence: Case of Smarter Cities by Haoxiang Xia, Chonghui Guo, Mingzheng Wang.

Keynotes

Keynote Ⅰ

Title: Integrating sensor and social interactions as a service
Speaker: Prof. Ted Selker, Carnegie Mellon University Silicon Valley, CA

ABSTRACT
The talk will describe experiments and opportunities for personal and organizational considerate services to improve people and organizations effectiveness. We will describe several considerate services that can improve human system communication. We will focus on SmartFeedback a system that creates provocative user experience services to support a smart and efficient building and its inhabitants. NASA's Leed's platinum Sustainability base was designed to be one of the most efficient office buildings in the world, We focused on the need for people to be part of the way the building achievies its design goals. We created Sweetfeedback a locally deployable USB connected gumball/token dispenser, to help individuals at their desks feel part of the energy efficient community. The client system recognizes and rewards a person for closing windows, turning off monitors, reporting or solving temperature, sound and lighting problems. The smartfeedback server allows people to monitors peoples contributions to the building, methods of transporation with an Android application, gives feedback to help people compete for energy efficiency, and encourages other forms of community support behavior. We are working towards social feedback services that will improve human performance.

SPEAKER's BIO

Dr Ted Selker is Associate director of mobility research at Carnegie Mellon Silicon Valley where he has been developing the campus's research community and also the considerate computing group. He is well known as a creator and tester of new scenarios for working with computing systems. Ted spent ten years as an associate Professor at the MIT Media Laboratory where he created the Context Aware Computing group, co-directed the Caltech/MIT Voting Technology Project, and directed a CI/IDI: kitchen of the future/ product design of the future project. His work is noted for creating demonstrations of a more considerate world in which intentions are recognized and respected in complex domains, such as kitchens, cars, on phones and in email. Ted's work takes the form of prototyping concept products supported by cognitive science research.

His successes at targeted product creation and enhancement earned him the role of IBM Fellow and director of User Systems Ergonomics Research. He has also served as a consulting professor at Stanford University, taught at Hampshire, University of Massachusetts at Amherst and Brown Universities and worked at Xerox PARC and Atari Research Labs.

Ted's innovation has been responsible for profitable and award winning products ranging from notebook computers to operating systems. For example, his design of the TrackPoint in-keyboard pointing device is used in many notebook computers; his visualizations have made impacts ranging from improving the performance of the PowerPC to usability OS/2 ThinkPad setup to Google maps, his adaptive help system has been the basis of products as well. Ted's work has resulted in

numerous awards, patents, and papers and has often been featured in the press. Ted was co-recipient of the Computer Science Policy Leader Award for Scientific American 50 in 2004, the American Association for People with Disabilities Thomas Paine Award for his work on voting technology in 2006 and the Telluride Tech fest award in 2008.

Keynote Ⅱ

Title: Elastic Computing - Principles, Models, and Algorithms for Software Services, Things, and People on the Cloud

Speaker: Prof. Schahram Dustdar, TU Vienna, Austria

ABSTRACT
Elasticity is seen as one of the main characteristics of Cloud Computing today. Social computing, as one of the most prominent applications deployed on Cloud infrastructures, as well as Service and Software Engineering would gain significantly from better understanding the main principles of elasticity. In this talk I will discuss the main principles of elasticity, present a fresh look at this problem, and examine how to integrate people in the form of human-based computing and software services into one composite system, which can be modeled, programmed, and instantiated on a large scale in an elastic way.

SPEAKER's BIO

Schahram Dustdar is Full Professor of Computer Science (Informatics) with a focus on Internet Technologies, heading the Distributed Systems Group. From 2004-2010 he was Honorary Professor of Information Systems at the Department of Computing Science at the University of Groningen (RuG), The Netherlands. From 1999 - 2007 he worked as the co-founder and chief scientist of Caramba Labs Software AG in Vienna (acquired by Engineering NetWorld AG), a venture capital co-funded software company focused on software for collaborative processes in teams. Caramba Labs was nominated for several (international and national) awards. Since 2011 he is also director of the Pacific Controls Cloud Computing Research Lab at the TU Vienna.

He received the ACM Distinguished Scientist award in 2009 and receeived the IBM Faculty Award in 2012. He is Editor in Chief of Computing (SCI-ranked Springer journal), an Associate Editor of IEEE Transactions on Services Computing, and an Editorial Board member of IEEE Internet Computing.

Keynote Ⅲ

Title: An Early Warning System for Rainfall-Induced Shallow Landslides on a Regional Scale in Taiwan

Speaker: Prof. Kang-tsung (Karl) Chang, National Taiwan University, Taiwan

ABSTRACT. Taiwan is located in a tectonically active zone. Three quarters of the island comprises hilly and mountainous areas, with small drainage basins, fractured rock formations, and steep stream gradients. Taiwan also has a tropical/sub-tropical climate, with heavy rainfall in the summer typhoon season. The combination of steep slope gradients, fragmented surface materials, and abundant water naturally leads to landslides and debris flows, causing casualties and heavy economic losses to the affected areas. This paper presents the conceptual framework of an early warning system for rainfall-induced shallow landslides on a regional scale and technical issues associated with the implementation of the system. The system consists of two main parts: a processing chain, and a validation component. To predict areas where landslides are likely to occur, the processing chain uses the inputs of (1) radar rainfall data showing the spatiotemporal pattern of precipitation; and (2) geomorphic, geologic, land cover, and soil data of the region. Synchronization tools are required to ensure that data from different sources and resolutions can be combined and processed in near real-time. Data analysis is typically based on statistical models or physically based models. The result of the process chain is a landslide susceptibility map, delineating areas with different probabilities for landslide occurrence. The accuracy of the map must be validated. Mapping landslides from high-resolution satellite images (e.g., FORMOSAT II images) and comparing the mapped landslides with predicted landslides is a common validation method. A variety of semi-automatic techniques have been developed for mapping landslides from satellite images, including visual analysis, the maximum likelihood classifier, the normalized differential vegetation index, multiple change detection, and object-based image analysis. There are other data sources for validation. For example, the Debris Flow Monitoring System maintained by Taiwan's Soil and Water Conservation Bureau can provide timely data for the occurrence of debris flows. And, as witnessed in recent disasters such as the Great East Japan Earthquake and Tsunami, volunteered geographic information (VGI) through social media is also valuable for validating landslide prediction. Similar to the process chain, a major challenge facing the validation phase is how to derive useful information for emergency management from various data sources. A landslide early warning system is therefore an information system that requires the use of data and techniques from different fields including meteorology, hydrology, geomorphology, remote sensing, and geospatial information science.

SPEAKER'S BIO

Kang-tsung (Karl) Chang received his B.S. in geography from National Taiwan University (NTU) and M.A. and Ph.D., also in geography, from Clark University. He had a 34-year teaching career in the United States, before returning to Taiwan to teach at NTU in 2005. Currently, he is a chair professor at Kainan University and an adjunct professor of geography at NTU. His research interests include geographic infor-

mation system (GIS) and its applications, natural hazards, and spatial analysis. He is author of numerous journal articles on GIS, landslide modeling and landslide mapping, and Introduction to Geographic Information Systems (6th edition) published by McGraw-Hill.