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The SIGSPATIAL Special

The SIGSPATIAL Special is the newsletter of the Association for Computing Machinery (ACM) Special Interest Group on Spatial Information (SIGSPATIAL).

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Editorial

Dear Colleagues,

Welcome to the first issue of the sixth volume of the SIGSPATIAL Special for 2014. This issue summarizes the events at the 21st ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL GIS 2013) held in Orlando, Florida from November 5-8, 2013. This issue includes reports from the main conference as well as individual reports from the workshops.

Additionally, we include a report from the China Chapter of SIGSPATIAL. Dallas, Texas hosts the 22nd ACM SIGSPATIAL GIS conference from November 4-7. We include SIGSPATIAL membership information at the end of this issue.

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GENERAL

ACM SIGSPATIAL GIS 2013 was held at Orlando, Florida and it was the 21st gathering of the conference. It is now the sixth time the conference was organized under the auspices of ACM SIGSPATIAL. The conference is the premier event for a variety of researchers, developers, and users who work in areas related to spatial information and GIS. It is an interdisciplinary gathering and provides a forum for original research contributions that cover conceptual, design, and implementation aspects of spatial information systems and GIS.

The attendance for the 2013 conference was 365. This is again an increase in terms of number of attendees from 2012 and represents yet another record for ACM SIGSPATIAL GIS. The call for papers attracted 229 papers submitted under four categories: research, industry/systems, PhD Showcase, and demo. Specifically, the research and industry/systems categories together attracted 202 submissions, the PhD Showcase category received 2 submissions, and the demonstrations category received 25 submissions. The submissions were reviewed by a program committee of 113 members including 16 meta reviewers. Each paper was reviewed by three reviewers. The resulting program included 39 full research and industry/systems papers as well as 32 research and industry/systems poster papers, 1 PhD Showcase paper, and 16 demonstration papers. These numbers demonstrate the continuing success of the ACM SIGSPATIAL GIS and the research field of spatial information and GIS.

The technical program continued the tradition of two and a half days for the main conference with workshops preceding the conference as a separate, single day event. The conference featured the following 11 pre-conference workshops:

- 5th ACM SIGSPATIAL International Workshop on Indoor Spatial Awareness (ISA) 2013 (Chairs: Martin Tomko, Scott Bell, Ki-Joune Li)
The 2013 program also featured two outstanding keynotes: Virtual Traffic for Real-World Challenges by Ming C. Lin (Univ. of N. C. at Chapel Hill, USA/Tsinghua Univ., China); and Photosynth2 by Blaise Agüera y Arcas (Microsoft, USA). This year, the conference continued to include a programming contest, the ACM SIGSPATIAL Cup. The goal of the cup was to encourage innovation and let the community have fun at the same time. It was an exciting event both for the participants and the attendees. The contest was about geo-fencing, used widely in location-based services, e.g., location-based advertisements (which send the targeted ads to the users when they are close to the shopping mall) and child location services (which notify parents when a child leaves a designated area). The conference also included a business meeting for ACM SIGSPATIAL which was open to all conference attendees and SIGSPATIAL members.

BEST PAPER AWARD

This year’s Best Paper Award will be presented during the 2014 gathering of the conference in Dallas, Texas. The best paper for 2013 is by Heba Aly (Alexandria University, Egypt) and Moustafa Youssef (Alexandria University and E-JUST, Egypt), titled “Dejavu: An Accurate Energy-Efficient Outdoor Localization System”.

Outdoor localization is a very important problem relevant to many practical applications. While the traditional approach for localization relies on GPS data, Aly and Youssef show a completely new way by using standard cell phone sensor data which can be crowd-
sourced. The proposed system called Dejavu basically uses the unique mobile sensor signatures of roadway artefacts (hills, bumps, curves, etc.) to reset the accumulated error for dead reckoning mobile positioning. It has shown to be more accurate than using GPS alone in city environments with a very useful for increasing cell phone battery life. This way, the Dejavu system goes hand-in-hand with the world movement for green technologies.

The core of the paper is a framework that identifies and localizes physical and virtual anchors which are used to reduce the accumulated error due to dead reckoning and, thus, enable accurate positioning. In particular, crowdsourcing is used to collect low energy profile sensor information from cell phones. The collected data is clustered to form anchor locations, which can then be applied to improve the localization for a user on-the-fly.

The paper received very positive reviews by the conference program committee, its presentation at ACM SIGSPATIAL GIS was clear, and the lively discussion following the presentation shows that the paper captured the interest and imagination of the audience.

ACKNOWLEDGEMENTS

Finally, we want to thank our sponsors that supported the event. This year’s conference was generously sponsored by ESRI, Google, Microsoft, Oracle, and NVIDIA.
In our increasingly urbanized world, the World’s population spends more and more time indoors. Indoor environments become our new natural habitat, and we conduct more and more activities enclosed by walls, moving vertically rather than horizontally, and without direct access to sunlight. Our daily activities are assisted by a range of sensors and human-machine interfaces that assist our senses and facilitate the transition between indoor and outdoor environments.

The combination of the unnatural indoor environments, novel technologies augmenting our interaction, and the ubiquitous connection to the Internet results in an entirely new ecosystem with particular challenges to our spatial abilities, spatial interactions (between humans, machines and the built environment) and spatial needs.

The series of ACM Workshops on Indoor Spatial Awareness addresses these challenges and explores the cognitive and semantic challenges, positioning and data processing requirements and technological innovations needed to facilitate the smooth transition to this ecosystem.

The community gathered around the ACM Indoor Spatial Awareness Workshop series now met for the fifth time. The call for papers attracted 16 high quality submissions, all of which have been reviewed by three peers from the Program Committee or by additional invited reviewers. Eight submissions have been accepted for full paper presentation and one as a short paper (one full paper was later retracted due to speaker’s inability to attend).

This year’s submissions explored cognitive aspects of learning and conceptualizing indoor environments, compare technical aspects of indoor positioning services and their accuracies, and the acquisition and use of non-spatial data about, and in indoor spaces. The accepted papers have been organized into a full day program structured along three main streams:

1. Indoor Navigation and Tracking. This session explored aspects of large tracking data exploration (Ellersiek et al.), cognitive and perceptual aspects of indoor environments and their virtual models (Li and Giudice) and on aspects of integration of different positioning methods (Radaelli and Jensen).

2. Comparison of Indoor Positioning Methods. This session focused in particular on accuracy aspects of indoor positioning. A highly interesting approach of Fudickar et al. compared a large amount of indoor positioning methods and also contributed a simulator for indoor positioning. Jung and Bell focused on the analysis of the impact of Wi-Fi access point density on indoor positioning;

3. Indoor Data Models and Applications. This session provided a complementary perspective on the indoor environments – the conceptual modeling of their subdivisions (Zlatanova et al.), as well as the discussion of application scenarios: emergency management and evacuation (Zhang et al.) and video geotagging in indoor environments (Kim et al.).

An additional – industrial – perspective on current advanced in indoor data handling has been invited as keynote, but unfortunately the speaker had to cancel due to unforeseen circumstances. The full program is available at [http://webgis.usask.ca/isa2013/](http://webgis.usask.ca/isa2013/) and the proceedings through the ACM Digital Library.
We believe that the Fifth ACM ISA 2013 Workshop provided a stimulating environment for the exchange of the state-of-the-art advances in indoor spatial data handling, and are looking forward to its sixth installment in 2014.

The ISA series of workshops aims at holistic coverage of positioning, algorithmic, data modeling, cognitive and application aspects of indoor spatial data acquisition, handling, mining and use. The maturity of positioning technologies in this area clearly leads to a larger amount of submissions in this area. We would strongly like to encourage the community to consider ISA 2014 as a venue for their papers covering not only the positioning and accuracy aspects in indoor environments, but also the conceptual, data modeling, and pattern mining aspects of data acquired in these environments. We expect that classic topics of the spatial databases and services community, such as spatial query processing in indoor spaces, indoor spatial data mining, indoor spatial indexing will become central areas of interest of this community in the coming years and we are looking forward to the lively discussions at future ISA workshops.

ACKNOWLEDGMENTS
We would like to acknowledge the contribution of the Program Committee and additional volunteer reviewers to the maintenance of the high standard of the peer review process and thus the quality of this workshop. We would also like to thank the local organizing committee of ACM SIGSPATIAL 2013 for providing the workshop with excellent facilities and a very pleasant environment to meet in. Finally, the three Chairs of the Workshop would like to thank their respective home universities for support.
6th ACM SIGSPATIAL International Workshop on Computational Transportation Science

Organized by

Monika Sester, Leibniz Universität Hannover, Germany
Clément Mallet, IGN, France
John Krumm, Microsoft Research, USA

Report by

Johannes Lauer, Heidelberg and Monika Sester, Hannover

The 6th International Workshops on Computational Transportation Science was held in conjunction with the 21st ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL GIS 2013) on November 5, 2013 in Orlando, FL. It brought together communities interested in the computation, knowledge discovery and technology policy aspects of surface transportation systems and the workshop series has become a platform for interdisciplinary dialog, reflected again in this year’s proceedings.

Computational Transportation Science has been the suggested umbrella term for the scientific questions behind Intelligent Transportation Systems in an attempt to separate fundamental research questions from applications [15]. The current trends in ubiquitous sensing, cloud computing, mobile communication, social media, and urbanization generate significant research questions relating to computation, knowledge discovery and technology policy for intelligent transportation systems. Ultimately transportation systems can become the ultimate test-bed for a ubiquitous (i.e., embedded, highly-distributed, and sensor-laden) computing environment of unprecedented scale. Information technology is the foundation for implementing new strategies, particularly if they are to be made available in real-time to wireless devices in vehicles or in the hands of people. Contributing are increasingly more sophisticated geospatial and spatio-temporal information management capabilities.

The 6th International Workshop on Computational Transportation Science continued to explore this area. In this year the view has broadened in the direction of data acquisition through imagery – the workshop was also supported by two Working Groups of the International Society of Photogrammetry, Remote Sensing - ISPRS (WG III/3: Image Sequence Analysis and WG II/8: Mobility: Tracking, Analysis and Communication). The relevance of imagery as input was reflected prominently by the first invited keynote talk about Camera Networks and wide Area Scene Analysis by Dr. Mubarak Shan, Center for Research in Computer Vision at the University of Central Florida, USA. The second keynote was given be
an expert in another important field in the context of CTS, geosimulation: Dr. Paul Torrens from the University of Maryland, College Park will talk about “Modeling Agent Pedestrians”.

Out of 22 submissions the program committee selected 14 presentations dealing with different topics of the transportation science field of research. The workshop has been structured in four sessions.

Mubarak Shah, Trustee Chair Professor of Computer Science at the University of Central Florida (UCF) presented the first keynote talking about Camera Networks and Wide Area Scene Analysis. He described the problems of finding moving objects and motion patterns within image time series. Tracking swarms (in this case cars) and the extraction of movement trajectories from individual objects using contextual information are the objectives in this research field. By using the demonstrated methods they achieved an object detection rate of 90%.

The first session started with “Multi-agent Infrastructure Assisting Navigation for First Responders” [13]. An architecture for emergency routing has been presented by TU Delft researchers around Sisi Zlatanova. By comparing different routing algorithms, they showed the applicability for first responder routing use cases. Handling static and moving obstacles were some of the challenges that have to solve in this areas. The second presentation [11] was given by Stephan Winter from the University of Melbourne who presented a simulation approach which supports the decision for a collaborative public transport system. By considering the spatial distribution of trip requests, results of the simulation show, that especially this additional variable has an effect on the level of service and the cost-effectiveness of the system. The first session closed with the presentation on “VTIS: A Volunteered Traveler Information System” [12]. Combining different crowd data sources was the aim of the research of Roland Varriale and the CS Team, University of Illinois. After an overview on related work like Smarter City, TrafficPuls, Waze, IDOT and CTA Bus Tracker, he presented solutions how mined Twitter data as well as crowd sourced information from travelers by active inputs on their mobile devices within the VTIS app can influence the route calculation.

Subsequently, the 2\textsuperscript{nd} session started with Padraig Corcoran, who presented the collaborative work of UCD (University College Dublin) researchers on quality assessment of OpenStreetMap data, especially on road networks generated from volunteers. In their contribution they developed a multi-granular graph based representation for street networks which allows a better and easier quality assessment of VGI road data [7]. In his 1\textsuperscript{st} presentation within the workshop “Optimizing Landmark-Based Routing and Preprocessing”, Alexandros Efentakis and Dieter Pfoser optimized a landmark based routing using the ALT (A* + Landmarks + Triangle equality). By improving the preprocessing time and the query phase they made the algorithm feasible for nearly real-time routing services.[4] To get a better data set for pedestrian navigation the collaborative work of Yirci et al. demonstrate a new approach for pedestrian network generation by using computational geometry and graph theory methods on vector data sets. With this approach they are able to build up a hierarchical object model by spatial partitioning. Using a centerline technique creates a topological graph for pedestrian routing [14]. “Modality Classification Method Based on the Model of Vibration Generation while Vehicles are Running” was the topic of the last presentation of session two. From the Hitachi central research lab Ohashi et al. have developed a classification method for transport modes. The team made use of the
popular acceleration sensors within smartphones and obtained an accuracy of over 80% for the distinction between cars and motorbikes. [10]

After lunch, Paul Torrens from the Department of Geographical Sciences and Institute for Advanced Computer Studies, Univ. Maryland, held the second keynote. He showed how evacuation and disaster simulation can be improved using real data. Getting the knowledge on a scenario he created models by using tracking data of real scenarios.

Analysis of trajectories and sensor data has been one focus of the 3rd session. Starting with “Processing Crowd Sourced Sensor Data – From Data Acquisition to Application” [8], Johannes Lauer, Nicolas Billen and Alexander Zipf of the Heidelberg GIScience chair implemented a workflow for sensor data acquisition mainly from smartphones. The architecture is also able to process sensor data from further connected sensor systems. As a first application the processing of smartphone acceleration sensor data for mapping purposes has been implemented. The result is a classification of normalized acceleration data for OpenStreetMap road surface tags. In “Incremental Frequent Route Based Trajectory Prediction” [2] the authors proposed IncCCFR as a new, incremental approach for incremental frequent route based trajectory prediction. As evaluation data set they used the samples of taxi GPS positions within Wuhan, China. An analysis of Traffic collision data has been given in “Discovering Spatial Co-Clustering Patterns in Traffic Collision Data” [9] where Mario A. Nascimento presented the work of the University of Alberta and the Office of Traffic Safety, Edmonton. They developed the concept of Spatial Co-Clustering Pattern (SCCP) to combine non spatial attribute value pairs with the spatial clustering of traffic collisions. Using real data provided by the city of Edmonton their approach allows a better explanation of certain hot spots. In “Efficient Wayfinding in Complex Environments: Derivation of a continuous space shortest Path” [6] Inso Hong from the GeoDa Center, Arizona State University showed how they improved their previously developed convex path approach by considering only the relevant subset of obstacles. Hence they are able to improve the computation time and the obstacle detection.

The final session of the workshop comprised work on traffic analysis, location quality prediction and fleet management. Gautam S. Thakur from Oak Ridge National Laboratory demonstrated how collecting and processing real time traffic data provided by public online traffic cameras can be used for traffic density estimations. Furthermore they used the data for traffic forecasts and compared six Granger networks of the investigated cities [5]. This paper has been awarded the best paper award. A new way for quality of service prediction of GNSS for planned routes was presented by Hassan Karimi from the University of Pittsburgh. With their module-based method (segment sampling, point based -, tracking based - QoS prediction and iGNSS QoS segmentation), it is possible to be prepared before the GNSS positional quality is getting worse [1]. The final session closed with the presentation of Alexandros Efentakis. In his work “Towards a Flexible and Scalable Fleet Management Service” [3], he gave a broad view on the simplefleet system. He showed their architecture from data acquisition via storing to processing and presenting for end users of Floating Car Data. A nearly real time traffic flow overlay demonstrates the system performance.
Further initiatives within the scope of Computational Transportation Science will be posted on the community homepage, www.ctscience.org. If you are interested to join an email list please register on this website.

With the proliferation of the Internet as the primary medium for data publishing and information exchange, we have seen an explosion in the amount of online content available on the Web. Thus, in addition to professionally-produced material being offered free on the Internet, the public has also been encouraged to make content available online to everyone. The volumes of such User-Generated Content (UGC) are already staggering and constantly growing. Here, our goal has to be to take advantage of this explosion in Volunteered Geographic Information (VGI), which applied to the geospatial domain translates to massively collecting and sharing knowledge to ultimately digitize the world.

Researchers have been quick to realize the importance of these developments and have started working on the relevant research problems, giving rise to new topical research areas such as geographic information retrieval, crowdsourcing, geospatial (semantic) Web, linked geospatial data, GeoWeb 2.0 etc. The GEOCROWD workshop was designed to bring together researchers and practitioners from the above areas to discuss open research problems and to develop a research agenda for the future. The workshop should also serve as a common platform for the exchange of ideas and results coming from existing global research initiatives and projects that currently investigate this topic.

The Second ACM SIGSPATIAL International Workshop on Crowdsourced and Volunteered Geographic Information (GEOCROWD) was held in conjunction with the 21st ACM SIGSPATIAL GIS Conference in Orlando, FL on November 5, 2013. The workshop was again a great success in that it not only attracted a considerable number of submissions (20), but also a significant number of registrations and actual workshop participants (+30).

The scientific program included a unique panel addressing “Social Media Mining and Geo-spatial Data”. The panelists included Alexei Pozdnoukhov, UC Berkeley, Judith Gelernter, Carnegie Mellon University, and Steven Verstockt, Ghent University, Belgium. Topics that were addressed in the presentations and in the discussion with the workshop audience were the perception of space, graph databases as a storage means for VGI, Wikipedia as a model for VGI collecting and also as a reference dataset for integrating crowdsourced geospatial data, the concept of active POIs in a city, data quality in relation to VIG and scarcely populated places, NLP concepts such as spelling, the use of VGI to assess form and function of space.

The scientific program offered 12 full paper contributions selected from 20 submissions with the help of 21 reviewers and several additional external referees. The presentations were organized in the following three sessions: (1) Routes - addressing route extraction from VGI, routing algorithms and trip planning, (2) Spatiotemporal Data and Sensors, and (3) Crowdsourcing Datasets and Data Enrichment.

Based on scientific merit and the quality of the presentation, the following paper was recognized with the GEOCROWD best paper award: Web-based Enrichment of Bike Sensor Data for Automatic Geo-annotation by Pieterjan De Potter, Olivier Janssens, Viktor Slavkovikj, Rik Van de Walle, Steven Verstock, all from Ghent University, and Jürgen Slowack, Barco NV, Belgium. Due to the great interest in the workshop topic, it is planned to organize a similar event again at next year’s ACM SIGSPATIAL GIS conference.

Finally, the organizers would like to thank the panelists, authors, presenters, workshop participants, program committee members and ACM SIGSPATIAL workshop chairs for their work and contribution. Without their efforts the workshop would not have been such a successful event.

The GEOCROWD Workshop Web site can be found at http://www.geocrowd.eu/workshop_2013.
The Second ACM SIGSPATIAL International Workshop on the Use of GIS in Public Health was held on November 5, 2014 in Orlando Florida, in conjunction with the 21st ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems. It has brought together researchers whose research is in the intersection of geospatial data management and public health. This workshop provided a forum for researchers and practitioners to share new ideas and techniques for Health-related GIS applications. Original research related to all aspects of GIS usages and applications in medical and in healthcare systems was invited; especially papers based on real-world experience were encouraged. The program committee consisted of a diverse set of members from academia, industry, and government research laboratories, each with expertise in different areas of HealthGIS: development, applications, and public health research. The workshop has provided a platform for an interdisciplinary dialog that is reflected in the program of the workshop.

A total of 13 paper submissions were received out of which 11 papers, which all received good reviews, were accepted – two position papers and 9 full papers. These papers were broken into three sessions:

1) Collecting and Analyzing Health-Related Data;
2) Web Services and Social Media; and
3) Toward Healthier Cities and Healthier Life.

The first session focused on geocomputational approaches to the collection and analysis of health-related services. Topics covered in this session included studies of spatial distribution and spatio-temporal analysis of diseases, and the effect of data quality on spatial analysis of diseases. The second session focused on topics related to web services and social media. This session included a position paper envisioning spatial-health CyberGIS marketplace, a paper on the use of social media tools in accessing health information, and papers on visualization of spatiotemporal health-related data and on authorization of location-based health data, for web services and data.
services. The third session focused on healthier cities and healthier life. Papers in this session included health-optimal routing in urban cities, mobile applications to encourage long-term fitness, a study of the relationship between accessibility of public-health services and socio-demographic factors and presentation of a simulation how restrictions can mitigate influenza outbreaks. Between the second and the third research sessions there was a session that included an invited talk and a panel.

The invited talk was about utilizing mobile sensors, streaming video and geographical information, for evacuation assistance in disaster areas and it was given by Flora Gilboa-Solomon from IBM Haifa Research Labs. The invited panel session was a discussion where the panelists presented issues in privacy and security of health data and tried to depict the line between effective utilization of health-related data and preserving patients’ privacy. This panel included a vibrant discussion during the workshop and a follow up in emails.

The workshop organizers sought to bring together a diverse set of participants representing voices from GIS, Computing, and Public Health. By all measures, the Second ACM SIGSPATIAL International Workshop on the Use of GIS in Public Health (HealthGIS 2013) was a success. The papers received and presented, and the participants who attended represented a diverse group spanning practitioners to researchers, academics to professionals, with interests and expertise equally as broad. There were, on average, about 15 to 20 participants in the different sessions. The panel session and the concluding discussion included lively and constructive conversations from many perspectives. This venue offered an opportunity for research and ideas to span traditional boundaries of disciplines. All participants capitalized on the opportunity to meet and develop relationships with those from other disciplines working on related research or application problems. This served the workshop continuing goal of building a community of HealthGIS researchers and practitioners within the Spatial Computing, GIS, and Public Health communities, in order to develop creative solutions drawing from the best research ideas in each of these disciplines to help relieve the burden of disease worldwide and to improve public health services.

Finally, we would like to thank the authors for publishing and presenting their papers in HealthGIS 2013, the program committee members and the external reviewers for their professional evaluation of the submitted paper, the members of the panel and Flora Gilboa-Solomon who gave the invited talk. We also want to thank the participants who made the workshop as lively as it was and the session chairs. Last, but not least, we would like to thank the ACM SIGSPATIAL 2013 Workshops chairs, Mohamed Mokbel and Egemen Tanin for their great organization of the workshops, and thank Hanan Samet for his continuous advice, guidance and support in organizing this workshop.
The subject of Geographical Information Retrieval (GIR) is concerned with providing methods to access the vast amount of relatively unstructured geographical information that is embedded in documents on the web and in other digital resources. GIR uses and builds upon methods both from geographical information systems (GIS) technology, which is designed to access structured geo-spatial data based on digital maps, and from the field of Information Retrieval (IR) in which the emphasis is on access to text documents. There are many research challenges in developing effective GIR systems, relating for example to detection and disambiguation of references to geographic information in text, spatial indexing of documents and their content, development of spatially aware search engines, and visualization of geo-information. The Workshop on Geographical Information Retrieval provides a forum to discuss these issues and to present new research results. The GIR workshop held on 5th November 2013 at the ACM SIGSPATIAL conference in Orlando, Florida, was the seventh in a series that started in 2004 and has been held previously in combination with the SIGIR and CIKM conferences. The workshop has continued to attract a stimulating mix of researchers and practitioners from a variety of academic disciplines and industrial backgrounds.

At GIR’13 there were 16 presentations being a mixture of 9 long and 7 short papers. The four sessions included a wide range of topics that covered spatial and spatio-temporal (event-based) information extraction from web sources, including Twitter; various aspects of geo-parsing to detect and disambiguate toponyms, with particular attention to multi-lingual issues and problems of vagueness and uncertainty; methods for relevance ranking in GIR systems; and the creation of test collections to evaluate the quality of results from retrieval tasks.

The award of best paper went to Marco Adelfio and Hanan Samet, both from the University of Maryland, for their paper “Structured Toponym Resolution Using Combined Hierarchical Place Categories”. The paper presents a machine learning method to allocate toponyms in the column of a data table to a particular category that is a combination of a feature type, geographic container and geographic prominence (defined by population ranges). Once the category of the column has been decided, that information is used to disambiguate the contained toponyms.

In recognition of some common ground between the subject of this workshop and of the ACM SIGSPATIAL Workshop on Computational Models of Place, a joint session was convened at the end of the day to report on key themes and issues that arose in each of the two workshops.
Combining the functionality of mobile devices (smartphones and tablets), wireless communication (Wi-Fi, Bluetooth and 3/4G), and positioning technologies (GPS, Assisted GPS and GLONASS) results in a new era of mobile geographic information systems (GIS) that aim at providing various invaluable services, including location-based services, intelligent transportation systems, logistics management, security and safety, etc. Many mobile GIS applications have been developed to solve challenging real-world problems and improve our quality of life.

MobiGIS 2013 (http://www.mobigis.org) was held in conjunction with the 21st ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (SIGSPATIAL 2013) on November 5, 2013 in Orlando, Florida, USA. It aims at bringing together researchers and practitioners from the GIS community, the mobile computing community, and the data management community. Many current research areas, such as spatio-temporal databases, spatio-temporal data mining, mobile cloud computing, remote sensing, participatory sensing, or social networks, raise research problems that lie at the boundary between these three communities. MobiGIS’s goal is to foster an opportunity for researchers from these three communities to gather and discuss ideas that will shape and influence these emerging GIS-related research areas.

MobiGIS 2013 has received 11 submissions in which 9 research papers were accepted as full research papers and for presentations (30 minutes for each paper). MobiGIS 2013 was a one-day workshop consisting of three sessions: (1) Discovery and Analysis for MobiGIS, (2) Location-based Services for MobiGIS, and (3) Smart Applications for MobiGIS.

We would like to thank the authors for publishing and presenting their papers in MobiGIS 2013, and the program committee members and external reviewers for their professional evaluation and help in the paper review process. We hope that the proceedings of MobiGIS 2013 will inspire new research ideas, and that you will enjoy reading them.
Highlights from IWGS 2013
The 4th ACM SIGSPATIAL International Workshop on GeoStreaming
(Orlando, Florida- November 5, 2013)

Farnoush Banaei-Kashani1, Anas Basalamah2, Chengyang Zhang3
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The ACM SIGSPATIAL International Workshop on Geostreaming (IWGS) was held for the third time in conjunction with the 21st ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS 2013). The workshop has been a successful event that attracted participants from both academia and industry. The workshop addressed topics that are at the intersection of data streaming and geospatial systems. The workshop fostered an environment where geospatial researchers can benefit from the advances in geosensing technologies and data streaming systems.

Workshop Description
Real-time stream data acquisition through sensors and imagery devices has been widely used in many applications. In addition to the temporal nature of stream data, various sources provide stream data that has geographical locations and/or spatial extents such as point coordinates, lines, or polygons. Thanks to advances in geosensing technologies, researchers in the geospatial community have been able to acquire huge amounts of streamed sensor data. On one hand, this amount of streamed data has been a major propeller to advance the state of the art in geographic information systems. On the other hand, the ability to process, mine, and analyze that massive amount of data in a timely manner prevented researchers from making full use of the incoming stream data. The geostreaming term refers to the ongoing effort in academia and industry to process, mine and analyze stream data with geographic and spatial information.

This workshop addresses the research communities in both stream processing and geographic information systems. It brings together experts in the field from academia, industry and research labs to discuss the lessons they have learned over the years, to demonstrate what they have achieved so far, and to plan for the future of geostreaming.

Keynote
The workshop featured a keynote by Joe Newell from BI, providing history and concepts of “offender tracking”, its challenges and a discussion of needs and opportunities for additional research. On one side, the keynote provided a good opportunity for researchers to better understand the business scenarios currently targeted by this major industry leader. On the other side, the workshop was useful for the industry representative to learn about the ambitions and directions of researchers in order to better shape the future of geostreaming.
Research papers
The call for paper resulted in 15 submissions of research papers. A program committee of 11 members reviewed the submissions and as a result 11 highest quality papers were accepted. On average, 20 attendees were present at every session of the workshop. The topics presented in the workshop include but are not limited to: Geostream Query Processing, Geostream Data Mining and Compression, Geostreaming Systems, and Geostream Data Analytics and Quality Assurance.

Comments and suggestions for the organizers
The following feedback has been received from the workshop participants:

1. **Keynote:** A suggestion has been made to invite speakers not only from technology providers (e.g., Microsoft, IBM, Oracle) but also from industries that apply and use the geostreaming technologies within real-world applications. This mixture would provide a deeper view of use cases and practical scenarios.

2. **Future Focus:** The audience raised the point that geostreaming is now part of the mainstream geospatial research; a great success that should be partly credited to the IWGS workshop. Accordingly, they encourage the organizing committee to continue leading the community to investigate the less explored areas under the topic of geostreaming.
Big data is emerging as an important area of research for data science researchers and scientists. This area has also seen significant interest from the industry and federal agencies alike, as evidenced by the recent White House initiative on "Big data research and development." Within the realm of big data, spatial and spatiotemporal data is one of the fastest growing types of data. With advances in remote sensors, sensor networks, and the proliferation of location sensing devices in daily life activities and common business practices, the generation of disparate, dynamic, and geographically distributed spatiotemporal data has exploded in recent years. In addition, significant progress in ground, air- and space-borne sensor technologies has led to an unprecedented access to earth science data for scientists from different disciplines, interested in studying the complementary nature of different parameters. Today, analyzing this massive data poses a several challenge to the researchers.

In 2012, we organized the first workshop on Analytics for Big Geospatial Data (BIGSPATIAL-2012) which was highly successful in bringing together researchers working in this area for a day long program consisting of several invited and technical talks. The 2nd workshop on Analytics for Big Geospatial Data (BIGSPATIAL-2013) builds on the success of the previous edition by bring together researchers from academia, government and industrial research labs that are working in the area of spatial analytics with an eye towards massive data sizes. The main motivation for this workshop stems from the increasing need for a forum to exchange ideas and recent research results, and to facilitate collaboration and dialog between academia, government, and industrial stakeholders.

This year we have received 13 technical submissions out of which 8 were selected for full presentations and 2 were selected for short presentations. The technical program also consists of two invited talks from well-known experts from academia. As first keynote speaker, Prof. Professor Anthony Stefanidis from the George Mason University delved into the big data challenges stemming from analyzing social media data for geoinformation extraction. In the second keynote, Professor Sushil Prasad of Georgia State University discussed emerging GPU technology for geocomputation. Technical program covered a broad range of topics starting from big spatial data management to the analytics on modern computing platforms.
As part of the technical program presentations, ACM SIGSPATIAL GIS sponsored best paper award was given to the following paper:

*Xun Zhou (University of Minnesota), Shashi Shekhar (University of Minnesota) and Dev Oliver (University of Minnesota). “Discovering Persistent Change Windows in Spatiotemporal Datasets: A Summary of Results.”*

Full workshop proceedings are available in the ACM Digital Library at:
*Proceedings of the 2nd ACM SIGSPATIAL International Workshop on Analytics for Big Geospatial Data.*

We hope that BigSpatial workshop will continue to provide a leading international forum for researchers, developers, and practitioners in the field of data analytics for big geospatial data to exchange cutting edge research results, and identify current and future areas of research.

Finally, we would like to take this opportunity to thank all the authors for submitting high quality papers to this workshop, and PC members for their excellent reviews, which helped us to put together a strong technical program. We would like to thank Prof. Mohamed Mokbel and Prof. Egemen Tanin for their support of the workshop and Dr. Andrew Danner, editor of SIGSPATIAL Special for helping us to put together the workshop report. We would also like to thank the University at Buffalo (UB) and the Oak Ridge National Laboratory (ORNL) for their continued support, which allowed us to put together this workshop.
The workshop on computational models of place was held for the first time in the context of the ACM SIGSPATIAL conference series in 2013. A workshop with a similar focus (PLACE’08) was held before at GIScience 2008 in Park City. Recently it has become apparent that a workshop specifically dedicated to computational approaches to place is required in order to make progress on dealing with places in information technology.

Places are immensely useful referents for geocoding and interlinking other information, e.g. in terms of gazetteers. However, place related information still needs to be generated, linked, and curated in a mostly manual and time consuming fashion. This problem has become increasingly pressing in the age of Big Data, where the generation, provenance, curation, and quality of place related data is almost unmanageable and does not scale with the growth of other data in need of georeferencing.

Computational models of place, as understood by the organizers of the workshop, target the automation of place information extraction and place inference. How to address changes of place identity, such as disappearances and merging or splits? How can we compute a snapshot representing the region occupied by a place at a certain time? And how can we do this within traditional vector models given the vagueness of such a region? How do cognitive and common language uses of place map to computational models of place? From a computational viewpoint, the challenge lies in finding tractable procedures to infer places as well as their relations to other kinds of information. A new line of research should demonstrate this in the context of Linked Data.

The program of the workshop consisted of a keynote talk by Chris Jones, University of Cardiff about “Your Place or Mine: Modelling the Multiple Facets of Geographic Place”. In his talk, Chris gave an overview of the challenges of place modelling and identified one key technological challenge, namely how to account for different perspectives on place.

The workshop had ten regular presentations organized in two sessions:

1. **Place identification and localization.** In this session, presenters focused on inferring the existence of places as well as their location in spatial reference systems. Researchers from the University of Bremen, Media Informatics (Klaas Jordan, Jaroslav Sheptykin, Barbara Grueter and Heide-Rose Vatterrott), presented a method to infer structural landmarks using tracks from
players of a location-based game in a Park. Gennady Andrienko, Natalia Andrienko, Georg Fuchs, Ana-Maria Olteanu Raimond, Juergen Symanzik and Cezary Ziemlicki proposed a way how places can be inferred from temporal patterns of visits in POIs, such as restaurants, based on GPS trajectories. Simon Scheider and Ross Purves presented a statement of interest, outlining how place narratives in hiking literature could be semantically modelled and exploited for place localization. Christoph F. Eick, Fatih Akdag, Paul Amalaman and Aditya Tadakaluru proposed a place scoping method based on clustering of polygons. Chen Zhong, Xianfeng Huang, Stefan Mueller Arisone and Gerhard Schmitt presented a way to identify urban centers based on travel data. Motohiro Shirai, Masaharu Hirota, Hiroshi Ishikawa and Shohei Yokoyama presented a method of localizing shooting spots and areas of interest based on geo-tagged photos.

Figure 1: Elements of the place modelling process identified by workshop participants

2. Place models and place descriptions. In this session, presentations focused on models of places in the context of gazetteers, GIS and information retrieval. Song Gao, Krzysztof Janowicz, Grant Mckenzie and Linna Li suggested a way to compute with places in a GIS context, translating the well known GIS operations join and buffer to the domain of places. Lamia Belouaer, David Brosset and Christophe Claramunt suggested research which targets the mapping of verbal
route descriptions based on place localization with semantic rules and genetic algorithms. Gabriel Recchia and Max Louwerse presented a comparison of string similarity measures for toponyms. Arbaz Khan, Maria Vasardani and Stephan Winter suggested an NLP model for extracting and converting textual place descriptions to graphs.

The workshop also had one interactive session in the afternoon, in which the workshop participants identified some emerging research questions and started working on question 4 (compare Figure 1):

1. How can we model the purpose of place models (as it largely determines model characteristics and perspective)?

2. How to link between place and event models (as events can be constitutive for places)?

3. How to provide a place model repository with different (formal) definitions of place to choose from?

4. Is there a general procedure of place modelling (compare Figure 1)?

5. How to assess dark spots and representativity of place data sources? How to provide a gold standard for place model evaluation?

The workshop ended with a joined capstone session with the 7th ACM SIGSPATIAL Workshop on Geographic Information Retrieval, where participants of both workshops engaged in a lively discussion covering areas of common interest.
SCOPE AND SETUP

MapInteract 2013, the 1st ACM SIGSPATIAL Workshop on Interacting with Maps was dedicated to discussing systems, methods, algorithms, and studies related to map interaction and interactive maps, and to getting first-hand experiences with prototypes and demonstrations. The overall goal was thus to bring together researchers and practitioners interested in this area, and then to engage in a lively discussion about key challenges and the future of truly interactive maps. The call for contributions intentionally asked for a wide range of possible topics, and we accepted submissions in form of research papers as well as demonstrations of interactive systems. Overall, we received 20 submissions in total and accepted 17 (11 research papers, 6 demonstrations).

CONTENT AND PROGRAM

Map interaction is a highly interdisciplinary area, drawing on different research areas such as psychology, human-computer interaction (HCI), geovisualisation and GIS. The program we assembled thus covered several key areas of relevance: perceptual and cognitive aspects, interacting with geo-visualizations, and algorithms for interactive maps. The topics of the selected contributions ranged from interaction with indoor and outdoor maps, multidimensional map-based information visualization, interactive routing, to algorithmic approaches for dynamic and task-specific maps. The authors presented their work in four sessions of which three where research paper sessions dedicated to

- Perceptual and Cognitive Aspects
- Interacting with Geo-Visualisations
- Algorithms for Interactive Maps
- Demo session
During the demo session all demonstrations were run in parallel, which created a highly interactive and inspiring fair-like atmosphere of ideas. In addition to the submitted demos, other participants spontaneously jumped in and presented demonstrations of their ongoing work. Again a broad range of research areas was covered including audiotactile maps for the blind, interactive geovisualisation toolkits, interactive scale models, and interactive mapping systems specifically targeted at mobile platforms.

**BEST PAPER AWARD**

The best paper award was won by Mauricio Giraldo Arteaga for his paper “Historical map polygon and feature extractor”, which reported on a working system that has already been very successfully deployed. His work on crowdsourcing corrections of historic maps of the New York Public Library combined automatic polygon extraction from scanned maps with a clever interaction mechanism. The approach includes an algorithm for automatic polygon extraction from historical maps of city blocks of New York, which may still lead to incorrectly extracted polygons. Crowdsourcing is used to correct or detect these errors, and the interactive mechanism combines game-like elements with an easy-to-use and enticing user interface. In addition to having been very successfully deployed, the approach also triggered lively discussion at the workshop.

**CONCLUSION**

MapInteract was organized at ACM GIS 2013 with the intention of raising awareness for this HCI related topic in the GIS community. With MapInteract we made an important step towards achieving this goal, and it became obvious that interaction with maps still has many open research questions, both from a conceptual and algorithmic perspective. For example, there is no common vocabulary or set of concepts that allows for the precise description of various actions users can perform on and with a map. While other disciplines such as HCI have some tools to offer (e.g. keystroke-level models), more work is needed to account for the specific properties of maps (and other geovisualisations). Consequently, a follow-up workshop is in the works to address some of the remaining research questions.
Highlights from ACM SIGSPATIAL China Chapter in 2013

Guangzhong Sun
University of Science and Technology of China
(Secretary, SIGSPATIAL China Chapter)

In order to promote ACM SIGSPATIAL and corresponding research area in China, and encourage collaboration between SIGSPATIAL researchers in China and researchers worldwide, in Oct. 2009, we established ACM SIGSPATIAL China chapter, with the strong support of SIGSPATIAL executive committee.

In total, there are more than 30 professional members in SIGSPATIAL China since the forming of this chapter. They come from Chinese universities such as Shenzhen University, Renmin University, Chinese Academy of Sciences, University of Science and Technology of China, and industry labs such as Microsoft Research Asia. More information about the chapter and future activity announcement can be found at our website (http://www.sigspatial.org.cn).

The current chapter officers are:

- Honorary chair: Prof. Qingquan Li, Shenzhen University.
  Prof. Xiaofeng Meng, Renmin University.
- Chair: Dr. Xing Xie, Microsoft Research Asia.
- Vice chair: Dr. Feng Lu, Chinese Academy of Sciences.
  Dr. Zhiming Ding, Chinese Academy of Sciences.
- Secretary: Dr. Yang Yue, Shenzhen University.
  Dr. Guangzhong Sun, University of Science and Technology of China.

We have held a workshop in Shenzhen University on Nov. 25, 2012. This workshop focused on user understanding in the big data era. There were four topics covered in the workshop: the social network and understanding of group behavior, individual data understanding, privacy protection and public safety, computing support of user understanding. The workshop was committed to truly develop academic discussion and communication, which brought members a chance to exchange their views and ideas.
In Mar. 2013, the 2013 Symposium on Big Data and User Understanding was jointly organized by ACM SIGSPATIAL China and Technical Committee on Pervasive Computing of China Computer Federation (CCF). It was held in University of Science and Technology of China, Hefei, China. Many researchers had a broad and in-depth communication around the big data and user understanding.

In Dec. 2013, with the support of Advanced Data Analytics Laboratory of Suzhou University, a workshop on Understanding Big Data in Ubiquitous Environment had been held in Suzhou University, Suzhou, China. We invited more than forty scholars in wide variety of research field to attend the workshop. They introduced the latest progress and communicated their research in depth with other participants. This workshop will eventually benefit all researchers in related fields.
The ACM Special Interest Group on Spatial Information (SIGSPATIAL) addresses issues related to the acquisition, management, and processing of spatially-related information with a focus on algorithmic, geometric, and visual considerations. The scope includes, but is not limited to, geographic information systems (GIS).

The Association for Computing Machinery (ACM) is an educational and scientific computing society which works to advance computing as a science and a profession. Benefits include subscriptions to Communications of the ACM, MemberNet, TechNews and CareerNews, plus full access to the Guide to Computing Literature, full and unlimited access to thousands of online courses and books, discounts on conferences and the option to subscribe to the ACM Digital Library.

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