MDM 2019

The 20th IEEE International Conference on Mobile Data Management

June 10-13, 2019, Hong Kong

CONTENTS

http://www.comp.hkbu.edu.hk/mdm2019/

Messages from General Chairs

Welcome to MDM 2019, the 20th IEEE International Conference on Mobile Data Management.

The MDM conference series, since its debut in 1999, has established itself as a high-quality forum for the exchange of innovative and significant research results in mobile data management. The conference provides unique opportunities for researchers, engineers, and practitioners to meet and exchange experiences and to explore new ideas, techniques, and tools.

This year marks the 20th anniversary of the MDM conference series. Indeed, MDM 2019 returns to Hong Kong, where the first MDM conference, called the First International Conference on Mobile Data Access, took place in 1999. MDM conferences have been held annually since 2001 under the current name.

MDM 2019 encompasses research, industry and demo tracks; special tracks on Mobile Data and AI and on Transport and Urban Analytics; a PhD forum; six workshops; and keynotes, early career distinguished lectures, invited seminars, and panels. These program elements cover a broad range of hot topics and emerging technologies, including Mobile Cloud, Internet of Things, Sensor Systems, Augmented Reality Systems, Intelligent Transportation Systems, Smart Spaces, Mobile Crowd-Sourcing and Crowd-Sensing, Mobile Data Analytics, Behavioral/Activity Sensing and Analytics, Mobile Location-Based Social Networks, Intelligent Mobile Services, Location and Trajectory Analytics, Security and Privacy in Mobile Systems, Transportation-As-A-Service, Mobility-As-A-Service, and Innovative Applications driven by Mobile Data.

We would like to take this opportunity to thank the entire team of organizers for their volunteer work and contributions. Although they have many demands on their time, they have all donated valuable time and insight and have been essential in making the conference happen.

Special thanks go to the program committee chairs, Mohamed F. Mokbel, Jianliang Xu, and Demetrios Zeinalipour-Yazti, and their team for putting together a high-quality technical program. In particular, we thank the special track chairs, Li Chen,

Weike Pan, Donggen Wang, and Yang Yue, the industry track chairs, Lei Chen, Rui Chen, and Xing Xie, the workshops chairs, Yunjun Gao, Takahiro Hara, and De-Nian Yang, the advanced seminar chairs, Muhammad Aamir Cheema and Haibo Hu, the demo and poster chairs, Mohamed Sarwat, Baihua Zheng, and Kevin Kai Zheng, the PhD forum chairs, Lu Chen, Raymong Wing, and Xike Xie, the proceedings chairs, Byron Choi and Man Lung Yiu, and the award committee chairs, Wang-Chien Lee, Vana Kalogeraki, and Xiaofang Zhou.

Next, we would like to extend our appreciation to honorary chair Jiming Liu, the publicity chairs, Xin Cao, Ahmed Eldawy, Yongxin Tong, and Karine Zeitouni, the student grant chair, Hua Lu, the steering committee liaison, Arkady Zaslavsky, the registration chairs, Reynold Cheng and Hong Va Leong, the finance chair, Xin Huang, the local organizing chairs, Hong Cheng, Jean Lai, and Cong Wang, and the web chair, Kenneth Cheng.

We hope that you will enjoy the rich technical program and the opportunities for discussion of research ideas and exchange of experiences.

Christian S. Jensen
MDM General Co-Chair
Aalborg University, Denmark

Dik Lee
MDM General Co-Chair
Hong Kong University of Science and Technology, Hong Kong

Ling Liu
MDM General Co-Chair
Georgia Institute of Technology, USA

Program at a Glance

June 10 Workshops/PhD Forum

June 11-13 Main Conference

Start	End	June 10 (Mon)					
08:30	09:00	Registration					
09:00	10:20	**Workshops/PhD Forum Joint Keynote 1 & 2** (WLB109)					
10:20	10:45	Coffee Break					
10:45	12:30	**PhD Forum 1** (WLB109)	**ALIAS 1** (WLB205)	**MUST 1** (WLB201)	**MDASC 1** (WLB202)	**MobiSocial** (WLB203)	**BlockApp 1** (WLB204)
12:30	14:00	Lunch (Renfrew Restaurant)					
14:00	15:30	**PhD Forum 2** (WLB109)	**ALIAS 2** (WLB205)	**MUST 2** (WLB201)	**MDASC 2** (WLB202)	**MLDQ** (WLB203)	**BlockApp 2** (WLB204)
15:30	16:00	Coffee Break					
16:00	17:30	**Panel Discussion: PhD Student's Job Hunting - Complementary Perspectives from both Employers and Young Researchers** (WLB109)					

List of Workshops:

- **Workshop on ALgorithms for Indoor Architectures and Systems (ALIAS 2019)**
  Venue: WLB 205
- **Workshop on Blockchain and Mobile Applications (BlockApp 2019)**
  Venue: WLB 204
- **Workshop on Machine Learning and Data Quality for Mobile Data Management (MLDQ 2019)**
  Venue: WLB 203
- **Workshop on Mobile Data Management, Mining, and Computing on Social Networks (MobiSocial 2019)**
  Venue: WLB 203
- **Workshop on Mobile Ubiquitous Systems and Technologies (MUST 2019)**
  Venue: WLB 201
- **Workshop on Mobility Data Analytics for Smart Cities (MDASC 2019)**
  Venue: WLB 202

Start	End	June 11 (Tue) (WLB103)	June 12 (Wed) (WLB103)	June 13 (Thur) (WLB103)
08:00	08:30	**Registration**		
08:30	08:50	**Welcome**	**Keynote 2**	**Keynote 3**
09:00	09:30	**Keynote 1**		
09:30	09:50		**Invited Seminar Talk 2**	**Research Session 5: Crowdsourcing & Privacy**
09:50	10:20	Coffee Break		
10:20	10:30	**Invited Seminar Talk 1**		
10:30	11:00		Coffee Break	Coffee Break
11:00	11:20		**Early Career Distinguished Lecture 2**	**Early Career Distinguished Lecture 3**
11:20	11:40	**Research Session 1: Localization**		
11:40	12:30		**Research Session 3: Road Networks**	**Research Session 6: Planning & Analysis**
12:30	12:50	Lunch (Renfrew Restaurant)		
12:50	14:00		Lunch (Renfrew Restaurant)	Lunch (Bistro Bon)
14:00	14:40	**Early Career Distinguished Lecture 1**	**Research Session 4: Queries**	**Invited Industry Talk 2**
14:40	15:00	**Research Session 2: Data Mining**		**Research Session 7: Prediction**
15:00	15:40		**Poster & Demo Session** (Exhibition Hall A & B)	
15:40	16:00			Coffee Break
16:00	16:15	Coffee Break		**Transport and Urban Analytics 1**
16:15	16:20		**MDM 20-Year Influential Paper Award**	
16:20	16:45	**Invited Industry Talk 1**		
16:45	17:00		**Panel: MDM 20 Years**	
17:00	17:45	**AI & Industry Session**		**Transport and Urban Analytics 2**
17:45	18:00			
18:00	18:20		**Banquet** (Victoria Harbour Supreme)	
18:30	20:30	**Reception** (Bistro Bon)		

Program Schedule

June 10 (Monday)

08:30-17:30 **Registration**

09:00-09:40 **Workshops/PhD Forum Joint Keynote 1**
Mobile Data Management Meets Deep Learning
Wang-Chien Lee (Pennsylvania State University)

Venue: WLB109
Chair: Demetrios Zeinalipour-Yazti

09:40-10:20 **Workshops/PhD Forum Joint Keynote 2**
Enabling Mobile Applications and Mobile Data Analytics with Privacy
Li Xiong (Emory University)

Venue: WLB109
Chair: Demetrios Zeinalipour-Yazti

10:20-10:45 **Coffee Break**

10:45-12:30 **Parallel Sessions of Workshops and PhD Forum**

- **PhD Forum**
  Venue: WLB109
  Chairs: Lu Chen, Raymond Wong, Xike Xie

- **International Workshop on ALgorithms for Indoor Architectures and Systems (ALIAS 2019)**
  Venue: WLB205
  Chairs: Dong-Soo Han, Andreas S. Panayides, Nacim Ramdani, Demetrios Zeinalipour-Yazti

- **International Workshop on Blockchain and Mobile Applications (BlockApp 2019)**
  Venue: WLB204
  Chairs: Xiaowen Chu, Bin Xiao, Jiang Xiao

- **International Workshop on Mobile Data Management, Mining, and Computing on Social Networks (MobiSocial 2019)**

Venue: WLB203
Chairs: Wang-Chien Lee, Hong-Han Shuai, Chih-Ya Shen

- **International Workshop on Mobile Ubiquitous Systems and Technologies (MUST 2019)**
  Venue: WLB201
  Chairs: Haibo Hu, Yafei Li

- **International Workshop on Mobility Data Analytics for Smart Cities (MDASC 2019)**
  Venue: WLB202
  Chairs: Chih-Chieh Hung, Wen-Chih Peng, Jianliang Xu

12:30-14:00 **Lunch**
Venue: Renfrew Restaurant

14:00-15:30 **Parallel Sessions of Workshops and PhD Forum**

- **PhD Forum**
  Venue: WLB109
  Chairs: Lu Chen, Raymond Wong, Xike Xie

- **International Workshop on ALgorithms for Indoor Architectures and Systems (ALIAS 2019)**
  Venue: WLB205
  Chairs: Dong-Soo Han, Andreas S. Panayides, Nacim Ramdani, Demetrios Zeinalipour-Yazti

- **International Workshop on Blockchain and Mobile Applications (BlockApp 2019)**
  Venue: WLB204
  Chairs: Xiaowen Chu, Bin Xiao, Jiang Xiao

- **International Workshop on Machine Learning and Data Quality for Mobile Data Management (MLDQ 2019)**
  Venue: WLB203
  Chairs: Yunjun Gao, Zhifeng Bao, Jianqiu Xu

- **International Workshop on Mobile Ubiquitous Systems and Technologies (MUST 2019)**
  Venue: WLB201
  Chairs: Haibo Hu, Yafei Li

- **International Workshop on Mobility Data Analytics for Smart Cities (MDASC 2019)**

Venue: WLB202
Chairs: Chih-Chieh Hung, Wen-Chih Peng, Jianliang Xu

15:30-16:00 **Coffee Break**

16:00-17:30 **Panel: PhD Student's Job Hunting - Complementary Perspectives from both Employers and Young Researchers**

Venue: WLB109

Panel Moderators:

- Raymond Chi-Wing Wong (Hong Kong University of Science and Technology)
- Xike Xie (University of Science and Technology of China)

Panellists:

- Christian S. Jensen (Aalborg University)
- Xing Xie (Microsoft Research Asia)
- Cheng Long (Nanyang Technological University)
- Jieming Shi (National University of Singapore)
- Victor Junqiu Wei (Huawei Noah's Ark Lab)
- Mingxuan Yuan (Huawei Noah's Ark Lab)

June 11 (Tuesday)

Venue: WLB103

08:00-17:30 **Registration**

08:30-08:50 **Welcome**
Chairs: Dik Lee, Jianliang Xu, Demetrios Zeinalipour-Yazti

08:50-09:50 **Keynote 1**

The Dos and Don'ts of Spatial+X Data Management: A "Systems Perspective"

Walid G. Aref (Purdue University)

Chair: Dik Lee

09:50-10:20 **Coffee Break**

10:20-11:20 **Invited Seminar Talk 1**

Geometric Top-k Processing: Updates since MDM'16

Kyriakos Mouratidis (Singapore Management University)
Chair: Haibo Hu

11:20-12:30 **Research Session 1: Localization**
Chair: Haibo Hu

Lighthouse: Enabling Landmark-based Accurate and Robust Next Generation Indoor LBSs on a Worldwide Scale (Regular)

Moustafa Youssef (Alexandria University and Google), Heba Abdelnasir (Alexandria University), Patrick Robertson (Google Inc.), Maria Puyol (Google Inc.), Etienne Le Grand (Google Inc.), Luigi Bruno (Google Inc.)

Automated Product Localization through Mobile Data Analysis (Regular)

Magnus K Oplenskedal (Norwegian University of Science and Technology), Amir Taherkordi (University of Oslo), Peter Herrmann (Norwegian University of Science and Technology)

MR-Cubes: On-the-fly Computation of Location Popularity from Check-in Data Streams (Regular)

Giorgos Constantinou (University of Southern California), Chrysovalantis Anastasiou (University of Southern California), Dimitris Stripelis (University of Southern California), Cyrus Shahabi (University of Southern California)

Scalable and Accurate Estimation of Room-Level People Counts from Multi-Modal Fusion of Perimeter Sensors and WiFi Trajectories (Short)

Fisayo Caleb Sangogboye (University of Southern Denmark), Mikkel Baun Kjaergaard (University of Southern Denmark)

12:30-14:00 **Lunch**

Venue: Renfrew Restaurant

14:00-14:40 **Early Career Distinguished Lecture 1**

AI-Native Database

Guoliang Li (Tsinghua University)
Chair: Xiaofang Zhou

14:40-16:00 **Research Session 2: Data Mining**
Chair: Xiaofang Zhou

A Martingale-based Approach for Flight Behavior Anomaly Detection (Regular)

Shen-Shyang Ho (Rowan University), Matthew Schofield (Rowan University), Bo Sun (Rowan University), Jason Snouffer (ASRC Federal Mission Solutions), Jean Kirschner (ASRC Federal Mission Solutions)

An Effective Approach on Mining Co-location Patterns from Spatial Databases with Rare Features (Regular)

Peizhong Yang (Yunnan University), Wang Lizhen (Yunnan University), Xiaoxuan Wang (Yunnan University)

Clustering Noisy Trajectories via Robust Deep Attention Auto-Encoders (Regular)

Rui Zhang (Wuhan University of Technology), Peng Xie (Wuhan University of Technology), Hongbo Jiang (Hunan University), Chen Wang (Huazhong University of Science and Technology), Zhu Xiao (Hunan University), Ling Liu (Georgia Institute of Technology)

MISCELA: Discovering Correlated Attribute Patterns in Time Series Sensor Data (Regular)

Kei Harada (Osaka University), Yuya Sasaki (Osaka University), Makoto Onizuka (Osaka University)

16:00-16:20 **Coffee Break**

16:20-17:00 **Invited Industry Talk 1**

Beyond Recommendation: A Composite Coupon Distribution System behind Fu-Card

Wenliang Zhong (Ant Financial Services Group)

Chair: Weike Pan

17:00-18:20 **AI & Industry Session**
Chair: Li Chen

Synchronization-Free GPS Spoofing Detection with Crowdsourced Air Traffic Control Data (Regular)

Gaoyang Liu (Huazhong University of Science and Technology), Rui Zhang (Wuhan University of Technology), Chen Wang (Huazhong University of Science and Technology), Ling Liu (Georgia Institute of Technology)

An Automated Framework for Explaining Facts Extracted From Mobility Datasets (Regular)

Anique Tahir (Arizona State University), Yuhan Sun (Arizona State University), Mohamed Sarwat (Arizona State University)

Sextant: Grab's Scalable In-Memory Spatial Data Store for Real-Time K-Nearest Neighbour Search (Regular)

Zhiyin Zhang (Grab), Xiaocheng Huang (Grab), Chaotang Sun (Grab), Shaolin Zheng (Grab), Bo Hu (Grab), Jagan Varadarajan (Grab), Yifang Yin (National University of Singapore), Roger Zimmermann (National University of Singapore), Guanfeng WANG (Grab)

DriveLaB: An Experimental Platform for Telematics (Regular)

Kasper Fromm Pedersen (Aalborg University), Kristian Torp (Aalborg University)

18:30-20:30 **Reception**

Venue: Bistro Bon

June 12 (Wednesday)

Venue: WLB103

08:30-09:30 **Keynote 2**

New Advances in Spatial Trajectory Analytics

Xiaofang Zhou (The University of Queensland)

Chair: Ling Liu

09:30-10:30 **Invited Seminar Talk 2**

Mobile Data Collection and Analysis with Local Differential Privacy

Ninghui Li (Purdue University), Qingqing Ye (Renmin University of China & Hong Kong Polytechnic University)

Chair: Ling Liu

10:30-11:00 **Coffee Break**

11:00-11:40 **Early Career Distinguished Lecture 2**

Optimizing Systems for Geolocation Data: The Works

Mohamed Sarwat (Arizona State University)

Chair: Sanjay Madria

11:40-12:50 **Research Session 3: Road Networks**

Chair: Sanjay Madria

KOLQ in a Road Network (Regular)

Zitong Chen (Chinese University of Hong Kong), Yubao Liu (Sun Yat-Sen University), Ada Wai-Chee Fu (Chinese University of Hong Kong), Raymond Chi-Wing Wong (Hong Kong University of Science and Technology), Genan Dai (Sun Yat-Sen University)

Toward System-Optimal Route Guidance (Regular)

Robert J Fitzgerald (University of Colorado Denver), Farnoush Banaei-Kashani (University of Colorado Denver)

Efficient Batch Processing of Shortest Path Queries in Road Networks (Short)

Mengxuan Zhang (The University of Queensland), Lei Li (The University of Queensland), Wen Hua (The University of Queensland), Xiaofang Zhou (The University of Queensland)

Group Nearest Compact POI Set Queries in Road Networks (Short)

Sen Zhao (Emory University), Li Xiong (Emory University)

Safe Driving at Traffic Lights: An Image Recognition based Approach (Short)

Cuizhu Bao (Zhejiang Gongshang University), Chen Chen (East China Normal University), Hailin Kui (Jilin University), Xiaoyang Wang (Zhejiang Gongshang University)

12:50-14:00 **Lunch**

Venue: Renfrew Restaurant

14:00-15:00 **Research Session 4: Queries**

Chair: Cyrus Shahabi

Toward Efficient Processing of Spatio-temporal Workloads in a Distributed In-memory System (Regular)

Puya Memarzia (University of New Brunswick), Maria Patrou (University of New Brunswick), Md Mahbub Alam (University of New Brunswick), Suprio Ray (University of New Brunswick), Virendra Bhavsar (University of New Brunswick), Kenneth B. Kent (University of New Brunswick)

A Semantic Sequential Correlation based LSTM Model for Next POI Recommendation (Regular)

Guanhua Zhan (Hangzhou Dianzi University), Jian Xu (Hangzhou Dianzi University), Ming Xu (Hangzhou Dianzi University)

Time-Dependent Reachability Analysis: A Data-Driven Approach (Short)

Chrysovalantis Anastasiou (University of Southern California), Chao Huang (Tsinghua University), Seon Ho Kim (University of

Southern California), Cyrus Shahabi (University of Southern California)

Passenger Searching from Taxi Traces Using HITS-based Inference Model (Short)

Zhifeng Huang (Hangzhou Dianzi University), Jian Xu (Hangzhou Dianzi University), Liming Tu (Hangzhou Dianzi University), Ning Zheng (Hangzhou Dianzi University), Ning Zheng (Hangzhou Dianzi University), Guanhua Zhan (Hangzhou Dianzi University)

15:00-16:15 **Poster & Demo Session**

Venue: Exhibition Hall A & Hall B

Chairs: Mohamed Sarwat, Baihua Zheng, Kevin Kai Zheng

SCQ: Stage-based, Context-aware, QoE-driven Power Optimization for Interactive Applications on Mobile Devices (Poster)

ChiKai Ho (National Tsing Hua University), Chung-Ta King (National Tsing Hua University), Yung-Ju Chang (National Tsing Hua University)

Central Station Based Demand Prediction in a Bike Sharing System (Poster)

Jianbin Huang (Xidian University), Xiangyu Wang (Xidian University)

A Practical Delivery Route Planning System (Demo)

Asger Gitz-Johansen (Aalborg University), Mikkel E. Holm (Aalborg University), Laurids Vinther Kirkeby (Aalborg University), Dan Kristiansen (Aalborg University), Alexander Stoica Ostenfeld (Aalborg University), Morten Konggaard Schou (Aalborg University), Bin Yang (Aalborg University)

A Charging Scheduling System for Electric Vehicles using Vehicle-to-Grid (Demo)

Nicklas K. Breum (Aalborg University), Martin N. Jorgensen (Aalborg University), Christian A. Knudsen (Aalborg University), Laerke B. Kristensen (Aalborg University), Bin Yang (Aalborg University)

Computing and Visualizing the Shortest Path between Moving Objects on Road Networks (Demo)

Jianqiu Xu (Nanjing University of Aeronautics and Astronautics), Siyu Chen (Nanjing University of Aeronautics and Astronautics), Hengcai Zhang (Institute of Geographic Sciences and Natural Resources Research)

GDMS: A Geospatial Data Mining System for Abnormal Event Detection and Visualization (Demo)

Meihong Wang (Xiamen University), Linling Qiu (Xiamen University), Xiaoli Wang (Xiamen University)

ORSUP: Optimal Route Search with Users' Preferences (Demo)

Qun Jiang (Sun Yat-Sen University), Wei Teng (Sun Yat-Sen University), Yubao Liu (Sun Yat-Sen University)

LaCAVR: Load and Constraints Aware Vehicle Rerouting (Demo)

David Bis (Iowa State University), Noah Bix (Iowa State University), Benjamin Gruman (Iowa State University), Sam Guanette (Iowa State University), Adam Hauge (Iowa State University), Hanna Moser (Iowa State University), Jimmy Paul (Crafty), Goce Trajcevski (Iowa State University)

POLAr: Geographic Placement Optimization for Latency Sensitive Applications (Demo)
Vinicius Mointerio De Lira (National Research Council of Italy), Emanuele Carlini (National Research Council of Italy), Patrizio Dazzi (National Research Council of Italy)

SSVisual: Intelligent Start-Stop System (Demo)

Cuizhu Bao (Zhejiang Gongshang University), Chen Chen (East China Normal University), Hailin Kui (Jilin University), Xiaoyang Wang (Zhejiang Gongshang University)

TrajSense: Trajectory Prediction from Sparse and Missing External Sensor Data (Demo)

Lívia A Cruz (Federal University of Ceará), Karine Zeitouni (University of Versailles St Quentin), Jose Macedo (Federal University of Ceará), Igo Brilhante (Federal University of Ceará)

16:15-16:45 **MDM 20-Year Influential Paper Award**

Chair: Wang-Chien Lee

Award Talk: A Perspective on Sensor Database Systems

Philippe Bonnet (IT University of Copenhagen)

16:45-17:45 **Panel: MDM @ 20: Where We Have Been, Where Are We Now and Where Are We Heading?**

Panel Moderator:

- Arkady Zaslavsky (Deakin University, Australia)

Panellists:

- Prof Christian S. Jensen (Aarhus University, Denmark)
- Prof Panos K. Chrysanthis (University of Pittsburgh, USA)
- Prof Dik Lee (HKUST, Hong Kong)
- Prof Wang-Chien Lee (Penn State University, USA)
- Prof Karine Zeitouni (University of Versailles-St-Quentin, France)

18:00-20:30 **Banquet**

Venue: Victoria Harbour Supreme, Tsim Sha Tsui

June 13 (Thursday)

Venue: WLB103

08:30-09:30 **Keynote 3**

Future of Personalized Recommendation Systems

Xing Xie (Microsoft Research Asia)

Chair: Christian S. Jensen

09:30-10:30 **Research Session 5: Crowdsourcing & Privacy**

Chair: Reynold Cheng

Efficient Photo Crowdsourcing in Delay-tolerant Networks with Evolving POIs (Regular)

Shudip Datta (Missouri University of Science and Technology), Sanjay Kumar Madria (Missouri University of Science and Technology)

Publishing Sensitive Trajectory Data Under Enhanced l-Diversity Model (Regular)

Lin Yao (Dalian University of Technology), Xinyu Wang (Dalian University of Technology), Xin Wang (State of New York University at Stony Brook), Haibo Hu (Hong Kong Polytechnic University), Guowei Wu (Dalian University of Technology)

Detecting Mobile Crowdsensing Context in the Wild (Short)

Rachit Agarwal (Inria), Shaan Chopra (Inria), Vassilis Christophides (Inria), Nikolaos Georgantas (Inria), Valerie Issarny (Inria)

Optimizing Rebalance Scheme for Dock-less Bike Sharing Systems with Adaptive User Incentive (Short)

Yubin Duan (Temple University), Jie Wu (Temple University)

10:30-11:00 **Coffee Break**

11:00-11:40 **Early Career Distinguished Lecture 3**

Learning to Route

Bin Yang (Aalborg University)

Chair: Li Xiong

11:40-12:50 **Research Session 6: Planning & Analysis**
Chair: Li Xiong

Utility-time social event planning on EBSN (Regular)
Linlin Ding (Liaoning University), Hanlin Zhang (Liaoning University), Ze Chen (Liaoning University), Baoyan Song (Liaoning University)

k-Collective Influential Facility Placement over Moving Object (Regular)
Dan Li (Xidian University), Hui Li (Xidian University), Meng Wang (Xidian University), Jiangtao Cui (Xidian University)

A VLOS Compliance Solution to Ground/Aerial Parcel Delivery Problem (Regular)
Ji Zhang (Auburn University), Ting Shen (Auburn University), Wenlu Wang (Auburn University), Xunfei Jiang (Earlham College), Wei-Shinn Ku (Auburn University), MIn-Te Sun (National Central University), Yao-Yi Chiang (University of Southern California)

Mining Prevalent Co-location Patterns Based on Global Topological Relations (Short)
Jialong Wang (Yunnan University), Lizhen Wang (Yunnan University), Xiaoxu Wang (Yunnan University)

12:50-14:00 **Lunch**
Venue: Bistro Bon

14:00-14:40 **Invited Industry Talk 2**
Recommender System for Real Mobile Applications: Two Case Studies
Zhenhua Dong (Huawei Noah's Ark Lab)
Chair: Li Chen

14:40-15:40 **Research Session 7: Prediction**
Chair: Jieming Shi

TTDM: A Travel Time Difference Model for Next Location Prediction (Regular)
Qingjie Liu (Shandong University), Yixuan Zuo (Shandong Jianzhu University), Xiaohui Yu (York University), Meng Chen (Shandong University)

STCNN: A Spatio-Temporal Convolutional Neural Network for Long-Term Traffic Prediction (Regular)
Zhixiang He (City University of Hong Kong), Chi-Yin Chow (City University of Hong Kong), Jia-Dong Zhang (City University of Hong Kong)

Temporal Graph Convolutional Networks for Traffic Speed Prediction Considering External Factors (Regular)
Liang Ge (Chongqing University), Hang Li (Chongqing University), Junling Liu (Chongqing University), Aoli Zhou (Chongqing University)

15:40-16:00 **Coffee Break**

16:00-17:00 **Transport and Urban Analytics 1**
Chair: Donggen Wang

MapReuse: Recycling routing API queries (Regular)
Rade Stanojevic (Qatar Computing Research Institute), Sofiane Abbar (Qatar Computing Research Institute), Mohamed F. Mokbel (University of Minnesota - Twin Cities)

Road Intersection Detection Based on Direction Ratio Statistics Analysis (Regular)
Min Pu (East China Normal University), Jiali Mao (East China Normal University), Yuntao Du (East China Normal University), Yibin Shen (East China Normal University), Cheqing Jin (East China Normal University)

Traffic Congestion Prediction by Spatiotemporal Propagation Patterns (Short)
Xiaolei Di (Tongji University), Qinpei Zhao (Tongji University), Weixiong Rao (Tongji University)

STAR: A Concise Deep Learning Framework for Citywide Human Mobility Prediction (Short)
Hongnian Wang (Sichuan Normal University), Han Su (Sichuan Normal University)

17:00-18:00 **Transport and Urban Analytics 2**
Chair: Yang Yue

Trajectory Prediction from a Mass of Sparse and Missing External Sensor Data (Regular)

Lívia A Cruz (Federal University of Ceará), Karine Zeitouni (University of Versailles St Quentin), Jose Macedo Macedo (Federal University of Ceara)

Building a Large-Scale Microscopic Road Network Traffic Simulator in

Apache Spark (Regular)

Zishan Fu (Arizona State University), Jia Yu (Arizona State University), Mohamed Sarwat (Arizona State University)

A Personal Location Prediction Method to Solve the Problem of Sparse Trajectory Data (Short)

Fan Li (Shenzhen University), Qingquan Li (Shenzhen University), Zhen Li (Shenzhen University), Zhao Huang (Shenzhen University), Xiaomeng Chang (Shenzhen University), Jizhe Xia (Shenzhen University)

Deep Learning-Based Spatial Analytics for Disaster-Related Tweets: An Experimental Study (Short)

Shayan Shams (Louisiana State University), Sayan Goswami (Louisiana State University), Kisung Lee (Louisiana State University)

Keynotes

The Dos and Don'ts of Spatial+X Data Management: A "Systems Perspective"

Prof. Walid G. Aref

Purdue University

Abstract: Spatial and location data are often associated with other data types, e.g., text data, relational data, temporal data, and graph topology data. This results in rich Spatial+X data, e.g., spatial-keyword data (X is text), spatio-temporal data (X is time), and annotated graph data (X is the graph topology and the annotations). Spatial+X data is very challenging to manage in real-time and at scale. Many research efforts have been conducted in support of data management and query processing over Spatial+X data types. However, not all these efforts are useful from a systems perspective. In this talk, I will use several examples drawn from annotated graph data management, spatio-keyword query processing, and indexing to highlight important shortcomings of these efforts, and demonstrate alternative approaches that are well suited from a systems perspective.

Bio: Professor Walid G. Aref is a professor of computer science at Purdue. His research interests are in extending the functionality of database systems in support of emerging applications, e.g., spatial, spatio-temporal, graph, biological, and sensor databases. He is also interested in query processing, indexing, data streaming, and geographic information systems (GIS). Walid's research has been supported by the National Science Foundation, the National Institute of Health, Purdue Research Foundation, CERIAS, Panasonic, and Microsoft Corp. In 2001, he received the CAREER Award from the National Science Foundation and in 2004, he received a Purdue University Faculty Scholar award. Walid is a member of Purdue's CERIAS. He is the Editor-in-Chief of the ACM Transactions of Spatial Algorithms and Systems (ACM TSAS), an editorial board member of the Journal of Spatial Information Science (JOSIS), and has served as an editor of the VLDB Journal and the ACM Transactions of Database Systems (ACM TODS). Walid has won several best paper awards including the 2016 VLDB ten-year best paper award. He is a Fellow of the IEEE, and a member of the ACM. Between 2011 and 2014, Walid has served as the chair of the ACM Special Interest Group on Spatial Information (SIGSPATIAL).

New Advances in Spatial Trajectory Analytics

Prof. Xiaofang Zhou

The University of Queensland

Abstract: Spatial trajectory analytics involves a wide range of research topics including data management, query processing, data mining and recommendation systems. It can find many applications in intelligent transport systems, location-based systems, urban planning and smart city. New opportunities arise with massive and rapidly increasing volumes of high quality spatiotemporal data from many sources such as GPS devices, mobile phones and social network applications, together with more powerful computing platforms and machine learning algorithms. Managing large-scale trajectory data and making sense from it become critically important for many enterprises. In this talk we will discuss new research problems and new approaches for trajectory computing research.

Bio: Professor Xiaofang Zhou is a Professor of Computer Science at The University of Queensland, leading the Data Science Research Group at UQ. His research focus is to find effective and efficient solutions for managing, integrating and analyzing very large amount of complex data for business, scientific and personal applications. He has been working in the area of spatial and multimedia databases, data quality, high performance database systems, data mining, streaming data analytics and recommendation systems. He is a Program Committee Chair for VLDB 2020, SSTD 2017, CIKM 2016, ICDE 2013, and a General Chair of MDM 2018 and ACM Multimedia 2015. He has been an Associate Editor of The VLDB Journal, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Cloud Computing, World Wide Web Journal, Distributed and Parallel Databases, and IEEE Data Engineering Bulletin. He was the Chair of IEEE Technical Committee on Data Engineering (2015-2018), and a Fellow of IEEE.

Future of Personalized Recommendation Systems

Dr. Xing Xie

Microsoft Research Asia

Abstract: Information overload has become a huge challenge for online users, especially for mobile users, due to the small screen size and uncomfortable inputting methods. In order to alleviate this problem, recommendation systems play an increasingly important role in Internet services, and is a constant hot topic in industry and academia. At the same time, with the rapid development of positioning, mobile and sensing technologies, large quantities of human behavioral data are now available. They reflect various aspects of human activities in the physical word, greatly improving the performance of personalized recommendation systems. In this talk, I will introduce the history of personalized recommendation systems and the challenges that are currently encountered, including the heterogeneity, sparsity, and lack of interpretability of human behavioral data. I will present how we improve the recommendation performance by leveraging the recent progress in deep learning, natural language understanding, and knowledge graph. We believe that personalized recommendation systems will continue to develop in various directions, including effectiveness, diversity, computational efficiency, and interpretability, ultimately addressing the problem of information overload.

Bio: Dr. Xing Xie is currently a principal research manager in Microsoft Research Asia, and a guest Ph.D advisor for the University of Science and Technology of China. He received his B.S. and Ph.D. degrees in Computer Science from the University of Science and Technology of China in 1996 and 2001, respectively. He joined Microsoft Research Asia in July 2001, working on data mining, social computing and ubiquitous computing. During the past years, he has published over 250 referred journal and conference papers. He has more than 50 patents filed or granted. He has been invited to give keynote speeches at HHME 2018, ASONAM 2017, MobiQuitous 2016, SocInfo 2015, Socialinformatics 2015, GbR 2015, W2GIS 2011, HotDB 2012, SRSM 2012, etc. He currently serves on the editorial boards of ACM Transactions on Social Computing (TSC), ACM Transactions on Intelligent Systems and Technology (TIST), Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Springer GeoInformatica, Elsevier Pervasive and Mobile Computing, CCF Transactions on Pervasive Computing and Interaction (CCF TPCI). In recent years, he was involved in the program or organizing committees of over 70 conferences and workshops. Especially, he served as program co-chair of ACM Ubicomp 2011, the 8th Chinese Pervasive Computing Conference (PCC 2012), the 12th IEEE International Conference on Ubiquitous Intelligence and Computing (UIC 2015), and the 6th National Conference on Social Media Processing (SMP 2017). In Oct. 2009, he founded the SIGSPATIAL China chapter which was the first regional chapter of ACM SIGSPATIAL. He is a senior member of ACM and the IEEE, and a distinguished member of China Computer Federation (CCF).

Workshops/PhD Forum Joint Keynotes

Mobile Data Management Meets Deep Learning

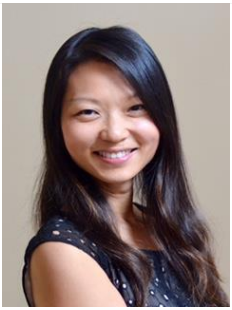
Prof. Wang-Chien Lee

Pennsylvania State University

Abstract: While celebrating the 20th anniversary of MDM in Hong Kong, we have witnessed the growth of mobile computing and enjoyed the ubiquitous convenience of mobile applications. Over the years, the research agenda in the MDM community has expanded and evolved from accessing mobile data access, managing mobile data, to now smartening mobile applications. The availability of ever-growing mobile big data presents tremendous promises in supporting various smart mobile applications and systems. However, despite an abundance of mobile data and potential applications, the component that brings the intelligence required to make mobile applications smart is still in need. Timely, the recent breakthrough in deep learning technology brings promises to fill the gap. In this talk, I will discuss research challenges and on-going efforts in developing deep learning models for some areas of mobile applications and systems, including location based social networks and intelligent transportation systems.

Bio: Wang-Chien Lee is an Associate Professor of Computer Science and Engineering at Pennsylvania State University, where he leads the Intelligent Pervasive Data Access (iPDA) Research Group to pursue cross-area research in big data management, pervasive/mobile computing, and networking. He is particularly interested in developing data management techniques (including learning, mining, accessing, retrieving, indexing, caching, aggregation, routing, dissemination, and query processing) for supporting complex queries and location-based services in a wide spectrum of networking and mobile environments such as Internet, peer-to-peer networks, mobile ad-hoc networks, wireless sensor networks, and wireless broadcast systems. Meanwhile, he also works on social network data analytics, information integration/retrieval, and object-oriented databases. Recently his research is focusing on applying machine learning techniques for representation learning. He has published more than 280 technical papers on these topics in many prestigious international conferences.

Enabling Mobile Applications and Mobile Data Analytics with Privacy



Prof. Li Xiong

Emory University

Abstract: Mobile applications and artificial intelligence powered by mobile data are increasingly transforming our lives. Yet the massive collection and usage of personal location and trajectory data by service providers and other third parties could lead to disclosure of sensitive information and raise privacy concerns. In this talk, I will review the privacy challenges and present privacy notions and mechanisms extending the local differential privacy framework (such as those adopted by Google and Apple) for location and spatiotemporal event protection on the mobile device side, while enabling mobile applications for individual users and large scale mobile data analytics for service providers and third parties.

Bio: Li Xiong is a Professor of Computer Science and Biomedical Informatics at Emory University. She held a Winship Distinguished Research Professorship from 2015-2018. She has a Ph.D. from Georgia Institute of Technology, an MS from Johns Hopkins University, and a BS from the University of Science and Technology of China, all in Computer Science. She and her research lab, Assured Information Management and Sharing (AIMS), conduct research on algorithms and methods for big data management, data privacy and security, in the context of spatiotemporal and health data. She has published over 120 papers and received five best paper awards. She currently serves as associate editor for IEEE Transactions on Knowledge and Data Engineering (TKDE), program co-chair for ACM SIGSPATIAL 2018 and 2020, program vice-chair for IEEE International Conference on Data Engineering (ICDE) 2020, and on many program committees for data science and data security conferences. Her research is supported by National Science Foundation (NSF), AFOSR (Air Force Office of Scientific Research), National Institute of Health (NIH), and Patient-Centered Outcomes Research Institute (PCORI). She is also a recipient of Google Research Award, IBM Smarter Healthcare Faculty Innovation Award, Cisco Research Award, AT&T Research Gift, and Woodrow Wilson Career Enhancement Fellowship.

Early Career Distinguished Lectures

AI-Native Database

Prof. Guoliang Li

Tsinghua University

Abstract: In big data era, database systems face three challenges. Firstly, the traditional heuristics-based optimization techniques (e.g., cost estimation, join order selection, knob tuning) cannot meet the high-performance requirement for large-scale data, various applications and diversified data. We can design learning-based techniques to make database more intelligent. Secondly, many database applications require to use AI algorithms, e.g., image search in database. We can embed AI algorithms into database, utilize database techniques to accelerate AI algorithms, and provide AI capability inside databases. Thirdly, traditional databases focus on using general hardware (e.g., CPU), but cannot fully utilize new hardware (e.g., ARM, AI chips). Moreover, besides relational model, we can utilize tensor model to accelerate AI operations. Thus, we need to design new techniques to make full use of new hardware.

To address these challenges, we design an AI-native database. On one hand, we integrate AI techniques into databases to provide self-configuring, self-optimizing, self-healing, self-protecting and self-inspecting capabilities for databases. On the other hand, we can enable databases to provide AI capabilities using declarative languages, in order to lower the barrier of using AI.

In this talk, I will introduce the five levels of AI-native databases and provide the open challenges of designing an AI-native database. I will also take automatic database knob tuning, deep reinforcement learning based optimizer, machine-learning based cardinality estimation, automatic index/view advisor as examples to showcase the superiority of AI-native databases.

Bio: Guoliang Li is a tenured full Professor of Department of Computer Science, Tsinghua University, Beijing, China. His research interests include AI-native database, big data analytics and mining, crowdsourced data management, big spatio-temporal data analytics, large-scale data cleaning and integration. He has published more than 100 papers in premier conferences and journals, such as SIGMOD, VLDB, ICDE, SIGKDD, SIGIR, TODS, VLDB Journal, and TKDE. He is a PC co-chair of DASFAA 2019, WAIM 2014, WebDB 2014, and NDBC 2016. He servers as associate editor for IEEE Transactions and Data Engineering, VLDB Journal, ACM Transaction on Data Science, IEEE Data Engineering Bulletin. He has regularly served as the (senior) PC members of many premier conferences, such as SIGMOD, VLDB, KDD, ICDE, WWW, IJCAI, and AAAI. His papers have been cited more than 6000 times. He got several best paper awards in top conferences, such as CIKM 2017 best paper award, ICDE 2018 best paper candidate, KDD 2018 best paper candidate, DASFAA 2014 best paper runner-up, APWeb 2014 best paper award, etc. He received VLDB Early Research Contribution Award 2017, IEEE TCDE Early Career Award 2014, The National Youth Talent Support Program 2017, ChangJiang Young Scholar 2016, NSFC Excellent Young Scholars Award 2014, CCF Young Scientist 2014.

Optimizing Systems for Geolocation Data - The Works!

Dr. Mohamed Sarwat

Arizona State University

Abstract: Today, we use our mobile devices to interact with friends, search for interesting places to visit, purchase groceries on-the-go, and ask for a ride to the airport. As a result, almost everything we do leaves breadcrumbs of geo-located digital traces in the places we visit. Such unprecedented ubiquity of geolocation data calls for designing systems that can inherently understand and deal with its properties. In this lecture, I will present the various approaches that can be used to incorporate the geolocation aspect in de-facto software systems. Building upon that, I will first present my team's effort in providing support for geospatial data in the Apache Spark distributed data processing engine. I will more specifically focus on a system we built in-house, namely GeoSpark, that can efficiently process massive geolocation data. More specifically, I will describe how GeoSpark can partition and index hundreds of billions of spatial objects as well as efficiently run major spatial query processing operations in a computer cluster. I will then give an overview of Spindra; a system that adds geospatial computation capabilities to a graph database management system. I will show how Spindra can efficiently execute queries on geo-tagged graph data at scale. In the end, I will shed light on the geolocation data-related challenges and opportunities the Internet of Things (IoT) brings to the table and how the IEEE MDM community can significantly contribute to the solution.

Bio: Mohamed Sarwat is an assistant professor of computer science and the director of the Data Systems (DataSys) lab at Arizona State University. Dr. Sarwat is a recipient of the 2014 University of Minnesota Doctoral Dissertation Fellowship and the 2019 National Science Foundation CAREER award. His general research interest lies in developing robust data systems that improve life in cities. The outcome of his research has been recognized by two best research paper awards in MDM 2015 and SSTD 2011, a best of conference citation in ICDE 2012 as well as a best vision paper award (3rd place) in SSTD 2017. Besides impact through scientific publications, Mohamed is also the co-architect of several software artifacts, which include GeoSpark (a scalable system for processing big geospatial data) that is being used by major tech companies such as Uber, Facebook, and MoBike. Dr. Sarwat spent the summers of 2011 and 2012 at NEC laboratories and Microsoft Research Redmond, respectively. He is an associate editor for the GeoInformatica journal and has served as an organizer / reviewer / program committee member for major data systems venues.

Learning to Route

Prof. Bin Yang

Aalborg University

Abstract: As part of the continued society-wide digitization, more and more data is becoming available in the form of trajectories that capture the movements of vehicles. This data offers a foundation for improving vehicular transportation, including routing. Learning to route aims at extracting knowledge from trajectory data to enhance routing quality. This talk covers three categories of learning to route techniques: extracting time-varying and uncertain travel costs from trajectories, learning routing preferences from trajectories, and data-intensive routing.

Bio: Bin Yang is a Professor in Department of Computer Science at Aalborg University, Denmark. He was previously at Aarhus University, Denmark and at Max Planck Institute for Informatics, Germany. He received the Ph.D. degree from Fudan University, China. His research interests include data management and machine learning. He received the Sapere Aude Starting Grant from the Independent Research Fund Denmark, the Distinguished Scholar award from Aalborg University, and the best paper and best demo awards at IEEE MDM 2013. He was a PC co-chair of IEEE MDM 2018.

Invited Seminar Talks

Geometric Top-k Processing: Updates since MDM'16

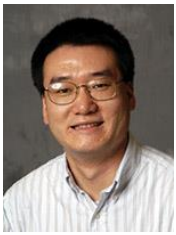
Prof. Kyriakos Mouratidis

Singapore Management University

Abstract: The top-k query has been studied extensively, and is considered the norm for multi-criteria decision making in large databases. In recent years, research has considered several complementary operators to the traditional top-k query, drawing inspiration (both in terms of problem formulation and solution design) from the geometric nature of the top-k processing model. In this seminar, we will present advances in that stream of work, focusing on updates since the preliminary seminar on the same topic in MDM'16.

Bio: Kyriakos Mouratidis holds a B.Sc. in Computer Science from Aristotle University of Thessaloniki (AUTH), and a Ph.D. in Computer Science and Engineering from Hong Kong University of Science and Technology (HKUST). He is an Associate Professor and Lee Kong Chian Fellow at the School of Information Systems of Singapore Management University (SMU). His main research area is spatial databases, with a focus on continuous query processing, road network databases, and spatial optimization problems. His work in the last 7 years has concentrated on complementary features to top-k queries. A complete CV and publication list can be found at: http://www.mysmu.edu/faculty/kyriakos/

Mobile Data Collection and Analysis with Local Differential Privacy



Prof. Ninghui Li

Purdue University

Miss Qingqing Ye

Renmin University of China

Abstract: Local Differential Privacy (LDP), where each user perturbs her data locally before sending to an untrusted party, is a new and promising privacy-preserving model for mobile data collection and analysis. LDP has been deployed in many real products recently by several major software and Internet companies, including Google, Apple and Microsoft. This seminar talk first introduces the rationale of LDP model behind these deployed systems to collect and analyze usage data privately, then surveys the current research landscape in LDP, and finally identifies several open problems and research directions in this community.

Bio: Ninghui Li is a Professor of Computer Science at Purdue University. His research interests are in security and privacy. Prof. Li is Chair of ACM Special Interest Group on Security, Audit and Control (SIGSAC), and is serving on the editorial boards of ACM Transactions on Privacy and Security (TOPS), Journal of Computer Security (JCS), and ACM Transactions on Internet Technology. He has also served as Program Chair for 2014 and 2015 ACM Conference on Computer and Communications Security (CCS), ACM's flagship conference in the field of security and privacy.

Qingqing Ye is a PhD candidate in School of Information, Renmin University of China and a research assistant in the Hong Kong Polytechnic University. Her research interests include data privacy and security, with a focus on local differential privacy.

MDM 20-Year Influential Paper Award

MDM 20-Year Influential Paper

Towards Sensor Database Systems (MDM 2001)

Authors: Philippe Bonnet, Johannes Gehrke, Praveen Seshadri

Citation: This seminal paper modeled sensor databases as mixtures of stored data represented as relations and sensor data represented as time series. A sensor query formulated over a sensor database defines a persistent view, which is maintained and long-running during a specified time interval. This paper, describing the design and implementation of the COUGAR sensor database system, significantly influenced subsequent work on sensor data management. It has more than 1,000 citations from top conference/journals and top researchers.

Award Talk

A Perspective on Sensor Database Systems

Prof. Philippe Bonnet

IT University of Copenhagen

Abstract: In the COUGAR project, we explored how database technology could provide flexible and scalable access to large collections of sensor data. In this talk, we discuss the evolution of sensor data management in the last twenty years. We revisit our assumptions and design choices. We also identify remaining and new challenges.

Bio: Philippe Bonnet is professor at the IT University of Copenhagen. He is a Marie Curie fellow with a track record of successful research projects under DARPA, NSF (while a research associate at Cornell University), EU and Danish funding (first at U.Copenhagen and since 2009 at ITU). Philippe is an experimental computer scientist with a background in database management. For twenty years, he has explored the design, implementation and evaluation of database systems in the context of successive generations of computer classes in particular wireless sensor networks and cloud computing. In 2011-15, Philippe managed the CLyDE project that promoted open-channel SSDs and resulted in two contributions to the Linux kernel and two patents. Currently, Philippe's research focuses on computational storage. Philippe is co-author of a reference book on database tuning together with Dennis Shasha from New York University.

Invited Industry Talks

Beyond Recommendation: A Composite Coupon Distribution System behind Fu-Card

Dr. Wenliang Zhong

Ant Financial Services

Abstract: Five Fu-cards Collection' is an extremely popular game hosted by the APP `Alipay' during Chinese Spring Festival, attracting 0.45 billion participants in 2019. Besides for collections, each Fu-card offers a lucky draw based on a coupon distribution system, which admits several features beyond recommendation. To balance users' preference, marketing purpose and mobility limits, it has to simultaneously handle numerous factors, e.g. click-through-rate/conversion-rate, inventory of coupons, campaign pacing, as well as other commerce constraints. In this talk, Dr. Zhong will introduce three key components of this system, i.e. the smart ad-copy robot for title generation, the recommender system for ranking and the online constrained optimisation mechanism for pacing and inventory control.

Bio: Wenliang Zhong is a staff algorithm engineer in Ant Financial Services Group. Dr. Zhong received his B.Sc./M. Phil. degree in computer science from Sun Yat-sen University, and Ph. D. degree from Hong Kong University of Science and Technology. Then he joined Alibaba Group and later transferred to Ant Financial, working in building recommender systems for large scale applications.

Recommender System for Real Mobile Applications: Two Case Studies

Dr. Zhenhua Dong

Huawei Noah's Ark Lab

Abstract: Recommender system is one of the most successful technologies in industry. It has been widely used in different kinds of internet-based products, such as video, music, e-Commerce, news, social network, LBS, advertising. In the past 5 years, I have been working on building recommender system for several applications, such as Huawei App store, instant service suggestion, news feed and advertising. In this talk, firstly, I will summarize the brief history of recommender system research. Then, I will share several practical experiences about how to build recommender systems for products through two cases. In our first case study, I will describe how to build recommender system with big data on the cloud; for the second one, I will present how to use small data to build local recommender system on the mobile terminal. I will briefly introduce a novel cloud and terminal collaboration technology, which can not only protect the users' privacy, but also improve the accuracy and efficiency of recommendation. Finally, several practical lessons will be summarized.

Bio: Dr. Zhenhua Dong is a principal researcher of Huawei Noah's Ark Lab, where he is leading a research team focused on recommender system and mobile computing. His team has launched significant improvements of recommender systems for Huawei App store and Huawei phone's inside applications, such as news feeds, instant services and advertising. With 18 patents (including 5 granted) and 20 research articles, he is known for research on recommender system and social computing. He received the BEng degree from Tianjin University in 2006 and the PhD degree from Nankai University in 2012. He was a research assistant at GroupLens lab in the University of Minnesota during 2010-2011.

Panels

PhD Student's Job Hunting - Complementary Perspectives from both Employers and Young Researchers

Panel Moderators:

- Raymond Chi-Wing Wong (Hong Kong University of Science and Technology)
- Xike Xie (University of Science and Technology of China)

Panellists:

- Christian S. Jensen (Aalborg University)
- Xing Xie (Microsoft Research Asia)
- Cheng Long (Nanyang Technological University)
- Jieming Shi (National University of Singapore)
- Victor Junqiu Wei (Huawei Noah's Ark Lab)
- Mingxuan Yuan (Huawei Noah's Ark Lab)

Panel description:

The theme of this panel is "PhD Student's Job Hunting - Complementary Perspectives from both Employers and Young Researchers". The objective of this panel is

1. to invite employers to share their view and experience about recruiting fresh PhD graduates and young researchers
2. to invite young researchers to share their view and experience about their PhD life and their job hunting

Obtaining experience sharing from both employers and young researchers could provide a comprehensive picture of job hunting. Invited employers have different background, namely university background and research lab background. Invited young researchers have different backgrounds as follows, resulting in diverse experience sharing in the panel discussion.

1. a young researcher working as an assistant professor
2. a young researcher working as a PostDoc
3. a young researcher working in an industry/research lab related to database
4. a young researcher working in an industry/research lab related to AI

Panel: MDM @ 20: Where We Have Been, Where Are We Now and Where Are We Heading?

Panel Moderators:

- Arkady Zaslavsky (Deakin University, Australia)

Panellists:

- Prof Christian S. Jensen (Aarhus University, Denmark)
- Prof Panos K. Chrysanthis (University of Pittsburgh, USA)
- Prof Dik Lee (HKUST, Hong Kong)
- Prof Wang-Chien Lee (Penn State University, USA)
- Prof Karine Zeitouni (University of Versailles-St-Quentin, France)

Panel description:

MDM2019 is a celebration of 20 years of research in mobile data management and related challenges. 20 years is a long time for such a dynamic and rapidly developing discipline as mobile computing which has seen and contributed to five generations of mobile communications, emergence of sensor networks, mobile objects, location-based services, data stream mining, apps development for smart phones and the like. Our MDM research community made considerable contribution to pervasive and ubiquitous computing, cyber-physical systems and culminating in the Internet of Things as an eminent disruptive technology and major focus of R&D for many years ahead. Our research has also has significant impact on emergence of diverse commercial mobile services, applications and systems which are used on a wide scale everywhere in the world. This panel will look at past, present and future of mobile data management. Panel members are eminent and internationally recognized researchers in the field and they will be asked to comment on the following questions:

- How did MDM evolve over last 20 years ?
- What were the drivers ?
- What did we do right as a community and what could we have done better ?
- What are the challenges ahead and what do we need to do to survive & prosper as an MDM community ?
- What were the milestones and what could be considered as impactful success stories ?
- Where do you see major contributions of MDM ?

We will be looking forward to an exciting, insightful and constructive panel discussion as well as active participation of the audience in challenging the panel with great questions.

Each panel member will be given 5 minutes to take on those questions and present their insights. The rest of the session will be Q&A and (hopefully a lively) discussion with the audience.

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Markus Schneider (University of Florida)

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Chih-Ya Shen (National Tsing Hua University)

Rade Stanojevic (Qatar Computing Research Institute)

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Kian-Lee Tan (National University of Singapore)

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Dongxiang Zhang (University of Electronic Science and Technology of China)

Baihua Zheng (Singapore Management University)

Kai Zheng (University of Electronic Science and Technology of China)

Yongluan Zhou (University of Copenhagen)

Xiaofang Zhou (University of Queensland)

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Gergely Acs (Budapest University of Technology and Economics)

Qian Chen (Google, China)

Li Li (Samsung Research America, USA)

Yin Lou (Airbnb, USA)

Shuo Shang (KAUST, Saudi Arabia)

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Changtao Zhong (Twitter, UK)

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Jie Bao (JD Finance, China)

Bin Cao (Zhejiang University of Technology, China)

Aamir Cheema (Monash University, Australia)

Lu Chen (Aalborg University, Denmark)

Oshin Chih-Chieh Hung (Tamkang University, Taiwan)

Thivya Kandappu (Singapore Management University, Singapore)

Guanfeng Liu (Macquarie University, Australia)

Amr Magdy (University of California Riverside, USA)

Ahmed Mahmood (Google)

Martin Werner (DLR (German Aeorospace Center))

Bolong Zheng (Huazhong University of Science and Technology, China)

Venue

Lam Woo International Conference Centre, Shaw Campus, Hong Kong Baptist University (HKBU), Hong Kong

Chinese: 九龍塘聯福道 34 號香港浸會大學 逸夫校園 林護國際會議中心

Transportation Guide

http://www.comp.hkbu.edu.hk/mdm2019/transportation.php

Location

June 10 Workshops / PhD Forum

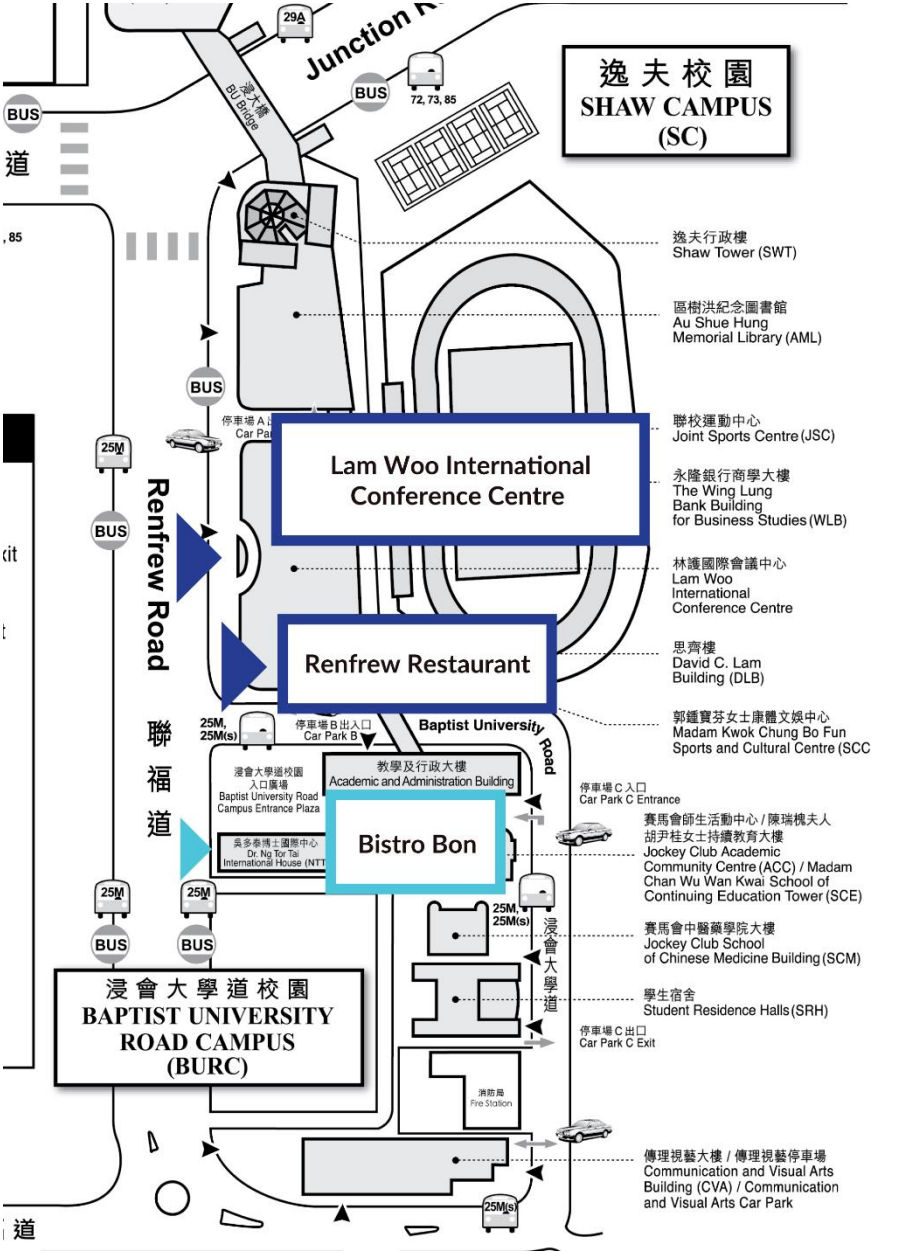
Registration	:	Outside WLB 109
Keynotes, PhD Forum & Panel	:	WLB 109
Workshops	:	WLB 201-205
Lunch	:	Renfrew Restaurant

June 11-13 Main Conference

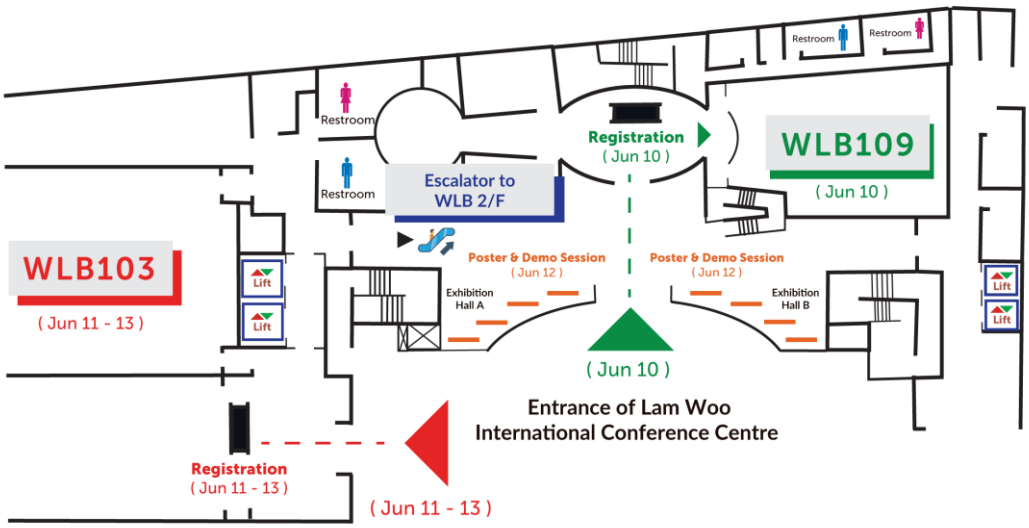
Registration	:	Outside WLB 103
Main Conference	:	WLB 103
Lunch	:	Renfrew Restaurant (Jun 11 – 12)
		Bistro Bon (Jun 13)
Reception (Jun 11)	:	Bistro Bon
Poster & Demo (Jun 12)	:	Exhibition Hall A & B
Banquet (Jun 12)	:	Victoria Harbour Supreme
		9/F, 1 Peking Road, Tsim Sha Tsui, Kowloon

Map

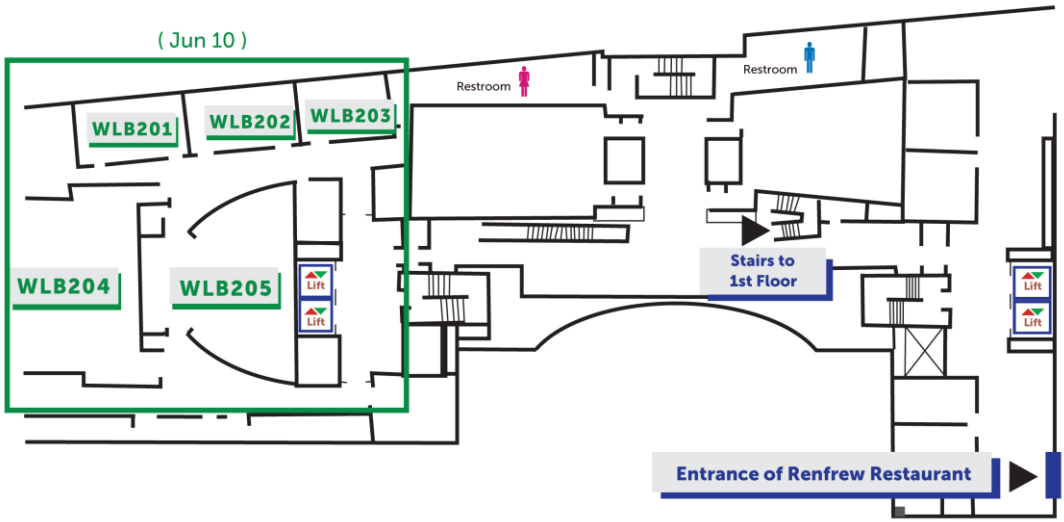
Campus Map



Conference Venue 1/F



Conference Venue 2/F



Social Activities

June 11 Lion Dance Performance

Lion Dance is a form of traditional dance in Chinese culture and other Asian countries in which performers mimic a lion's movements in a lion costume to bring good luck and fortune. A Lion Dance Performance will be held at 18:30 on 11 June before the reception dinner near Bistro Bon, the dining venue.

June 12 Tsim Sha Tsui Promenade

The banquet venue is located at Tsim Sha Tsui, which is famous for its iconic view of the city's harbour. After banquet, you may walk towards the harbour (South) to reach the Tsim Sha Tsui Promenade.

STAR FERRY

Star Ferry has been plying the waters between Kowloon and Central on Hong Kong Island since the late 1800's. This is still the best way to see the Hong Kong skyline, offering uninterrupted views of the skyscrapers clustered around Victoria Harbour.

You may consider taking the star ferry between Tsim Sha Tsui and Central / Wan Chai at the Star Ferry Pier. A single trip takes about 15 - 20 minutes. Note that the last ferry departs around 11pm.

Refer to http://www.starferry.com.hk/en/service for schedule.

Refer to Page 50 for Map

AVENUE OF STARS

You may consider a stroll along the Tsim Sha Tsui Promenade, which is close to the colonial-era Clock Tower, the Hong Kong Cultural Centre and the Hong Kong Space Museum. If you walk towards east, you will arrive the Avenue of Stars, a promenade with handprints and plaques honoring Hong Kong film stars, plus a Bruce Lee statue.

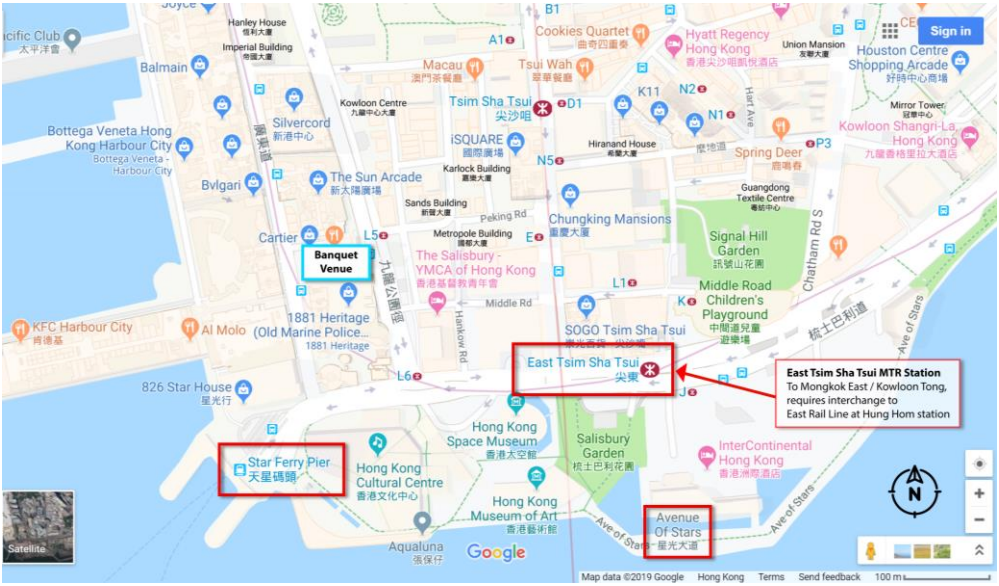
For more information about Hong Kong Tourist Attractions, please visit

http://www.discoverhongkong.com/

Reference:

http://www.discoverhongkong.com/eng/see-do/highlight-attractions/top-10/tsim-sha-tsui-promenade.jsp

Photo Credits: http://www.discoverhongkong.com/


Banquet Venue
East Tsim Sha Tsui MTR Station
To Mongkok East / Kowloon Tong, requires interchange to East Rail Line at Hung Hom station
Star Ferry Pier
天星碼頭
East Tsim Sha Tsui
尖東
Avenue Of Stars
星光大道
Hong Kong Cultural Centre
香港文化中心
Hong Kong Space Museum
香港太空館
Hong Kong Museum of Art
香港藝術館
Salisbury Garden
梳士巴利花園
Tsim Sha Tsui
尖沙咀
Chungking Mansions
重慶大廈
The Salisbury - YMCA of Hong Kong
香港基督教青年會
Middle Road Children's Playground
中間道兒童遊樂場
Signal Hill Garden
訊號山花園
Spring Deer
鹿鳴春
Kowloon Shangri-La, Hong Kong
九龍香格里拉大酒店
InterContinental Hong Kong
香港洲際酒店
Houston Centre Shopping Arcade
好時中心商場
Hyatt Regency Hong Kong
香港尖沙咀凱悅酒店
Cookies Quartet
曲奇四重奏
Macau
澳門茶餐廳
Tsui Wah
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