11th Asia-Pacific Symposium on Internetware
Internetware 2019
Fukuoka, Japan, October 28-30, 2019

Internetware 2019
AWASE 2019
SFDI 2019+

Guide Book

October 28-30, 2019
Fukuoka, Japan

Message from the Chairs

On behalf of the organizing and program committees, we welcome you to the 11th Asia-Pacific Symposium on Internetware (Internetware 2019) held on November 28-30, 2019 in Fukuoka, Japan.

The Internet, not only of computers, but also of things and human users, has been rapidly and profoundly changing how software applications are constructed, deployed and used. To achieve their application goals, software systems on this Internet platform need to coordinate autonomous third-party services and resources, adapt to constant changes in the environment where they are situated and in the requirements they must satisfy, and continuously maintain for a level of service quality satisfactory to users. Thus an outstanding software engineering challenge posed by Internet computing is how to assist developers to manage these new dimensions of complexity.

The program of Internetware 2019 will continue to feature research papers with a wide range of topics, focusing on new and conventional computer and software technologies, providing an interactive forum where researchers and professionals from multiple disciplines and domains meet and exchange ideas to explore and address the challenges brought by Internetware.

We thank the members of the Program Committee for their important service to this community in soliciting quality papers, reviewing papers, participating in the program discussions and selecting papers for the final technical program. We thank the reviewers for their hard work in providing quality reviews for each paper. We also thank the keynote speakers and authors for their contributions to the exciting program in Internetware 2019.

Jianjun Zhao, Zhi Jin, and Xuandong Li
Internetware 2019 General Co-Chairs

Hausi Müller and Gang Huang
Internetware 2019 Program Co-Chairs

Internetware 2019 Committees

Steering Committee

Co-Chairs
Hong Mei, Beijing Institute of Technology/Peking University, China
Jian Lyu, Nanjing University, China

Members
Zhi Jin, Peking University, China
Tao Huang, Chinese Academy of Sciences, China
Daoxu Chen, Nanjing University, China
Jianmin Wang, Tsinghua University, China
Xuandong Li, Nanjing University, China

General Co-Chairs

Jianjun Zhao, Kyushu University, Japan
Zhi Jin, Peking University, China
Xuandong Li, Nanjing University, China

Program Committee
Co-Chairs
Hausi Müller, University of Victoria, Canada
Gang Huang, Peking University, China

Members
Yuting Chen, Shanghai Jiao Tong University, China
Shing-Chi Cheung, Hong Kong University of Technology, Hong Kong
William Cheng Chung Chu, Tunghai University, Taiwan
Fuyuki Ishikawa, National Institute of Informatics, Japan
He Jiang, Dalian University of Technology, China
Sy-Yen Kuo, National Taiwan University, Taiwan
Hui Liu, Beijing Institute of Technology, China
Yang Liu, Nanyang Technology University, Singapore
Marin Litoiu, York University, Canada
Lei Ma, Kyushu University, Japan
Xiaoxing Ma, Ninjing University, China
Hidehiko Masuhara, Tokyo Institute of Technology, Japan
Xin Peng, Fudan University, China
Ulrike Stege, University of Victoria, Canada
Kenji Tei, Waseda University / National Institute of Informatics, Japan
Hironori Washizaki, Waseda University, Japan
Song Wu, Huazhong University of Science and Technology, China
Tao Xie, University of Illinois at Urbana-Champaign, USA
Chang Xu, Nanjing University, China
Jifeng Xuan, Wuhan University, China
Shyan-Ming Yuan, National Chiao Tung University, Taiwan
Haiyan Zhao, Peking University, China
Minghui Zhou, Peking University, China

Local Arrangement Co-Chairs

Yaokai Feng, Kyushu University, Japan
Lei Ma, Kyushu University, Japan
Haibo Yu, Kyushu Sangyo University, Japan

AWASE 2019 Committees

General Co-Chairs

Jianjun Zhao, Kyushu University, Japan
Hong Mei, Peking University, China
Shinichi Honiden, Waseda University, Japan

Program Chairs

Zhenjiang Hu, Peking University/NII,
China/Japan
Zhi Jin, Peking University, China
Naoyasu Ubayashi, Kyushu University,
Japan

Local Organization Chairs

Yaokai Feng, Kyushu University, Japan
Lei Ma, Kyushu University, Japan
Haibo Yu, Kyushu Sangyo University,
Japan

Steering Committee

Jin-Song Dong, Griffith University and
NUS, Australia
Hong Mei, Peking University, China
Shinichi Honiden, NII, Japan
Zhenjiang Hu, Peking University/NII,
China/Japan
Zhi Jin, Peking University, China
Bashar Nuseibeh, The Open University, UK

SFDI 2019+ Committees

Organizing Committee:

Soichiro Hidaka (Hosei University)
Yasunori Ishihara (Nanzan University)
Zachary G. Ives (University of
Pennsylvania)

Program Committee:

Yasuhito Asano (Toyo University)
Torsten Grust (Universität Tübingen)
Zhenjiang Hu (Peking University / NII)

Hiroyuki Kato (NII)
Alexander Löser (Beuth University of
Applied Sciences Berlin)
Sebastian Maneth (Universität Bremen)
Keisuke Nakano (Tohoku University)
Makoto Onizuka (Osaka University)
Chuan Xiao (Osaka University)
Masatoshi Yoshikawa (Kyoto University)

◆ Keynote Speakers

Toward Sustainable Information Infrastructure Platform for Smart Mobility

Akira Fukuda (Kyushu University, Japan)

Abstract

Smart mobility systems, which include Intelligent Transportation System (ITS) and smart energy systems, become more and more important. There is, however, lack of systematical platform studies. This talk introduces a sustainable information infrastructure project for smart mobility systems. The project pursues issues that establish an information infrastructure architecture and seamless development method chain for it. The project has mainly two features: 1) applying life-cycle-oriented methods, which are a cycle from system development to operations, to the real world, and 2) dealing with uncertainties when a system begins to be designed. This talk describes an overview of the project.

Biography

Prof. Akira Fukuda received the BEng, MEng, and PhD degrees in computer science and communication engineering from Kyushu University, Japan, in 1977, 1979, and 1985, respectively. From 1977 to 1981, he worked for the Nippon Telegraph and Telephone Corporation, where he engaged in research on performance evaluation of computer systems and the queueing theory. From 1981 to 1991 and from 1991 to 1993, he worked for the Department of Information Systems and the Department of Computer Science and Communication Engineering, Kyushu University, Japan, respectively. In 1994, he joined Nara Institute of Science and Technology, Japan, as a professor. Since 2001, 2008, and 2016, he has been a professor of Graduate School of Information Science and Electrical Engineering, and director of System LSI Research Center, and director of R&D Center for Smart Mobility, Kyushu University, Japan, respectively. Since 2015, he has been a distinguished professor of Kyushu University. His research interests include embedded systems, ubiquitous computing, system software (operating systems, compiler, and run-time systems), parallel and distributed systems, and performance evaluation. He is an IPSJ fellow. He is a member of the ACM, the IEEE Computer Society, the IEICE, the IPSJ, and the Operations Research Society of Japan.

Are SE Techniques Right for AI Systems?

Sun Jun (Singapore Management University, Singapore)

Abstract

Deep neural networks can be regarded as "universally" applicable programs, which build upon not logic but data and optimization. While they are incredibly powerful, they suffer many of the same problems of software systems, e.g., bugs, and back-doors. Recently, there is a trend on applying software engineering techniques to AI systems. In this talk, I will present two such attempts from our group and, more importantly, ask the question on whether such approaches are always justified.
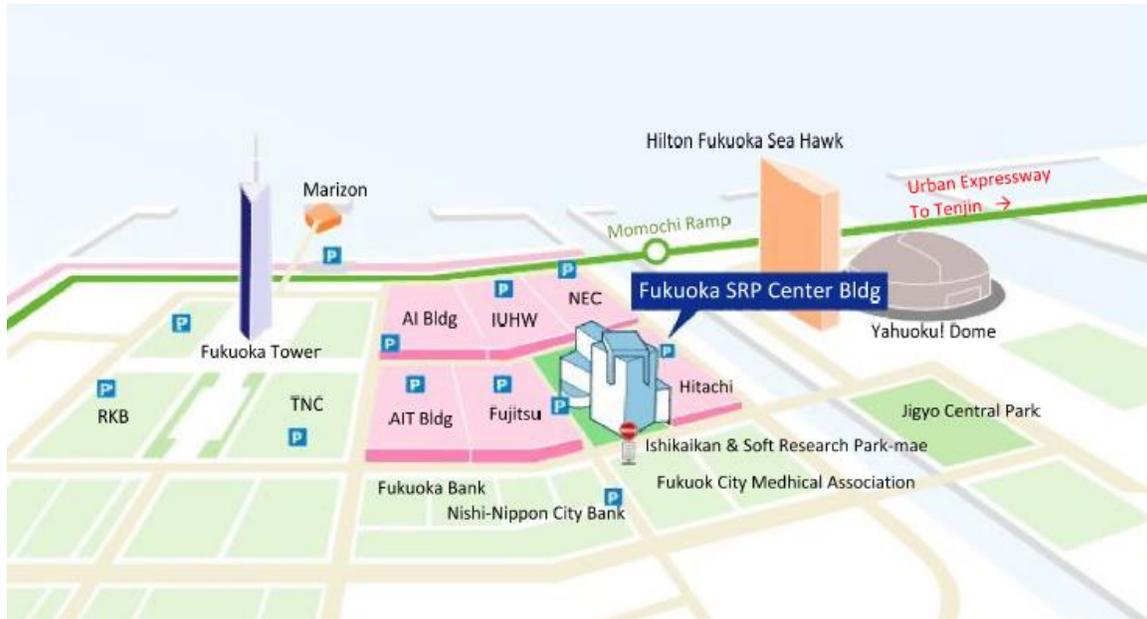
Biography

Prof. SUN, Jun is currently an associate professor at Singapore Management University (SMU). He received Bachelor and PhD degrees in computing science from National University of Singapore (NUS) in 2002 and 2006. In 2007, he received the prestigious LEE KUAN YEW postdoctoral fellowship. He has been a faculty member since 2010 and was a visiting scholar at MIT from 2011-2012. Jun's research interests include software engineering, cyber-security and formal methods. He is the co-founder of the PAT model checker. He serves a technical consultant/scientist for multiple companies.

◆ Conference Venue in Map

Internetware 2019 will be held at Fukuoka SRP Center Building.
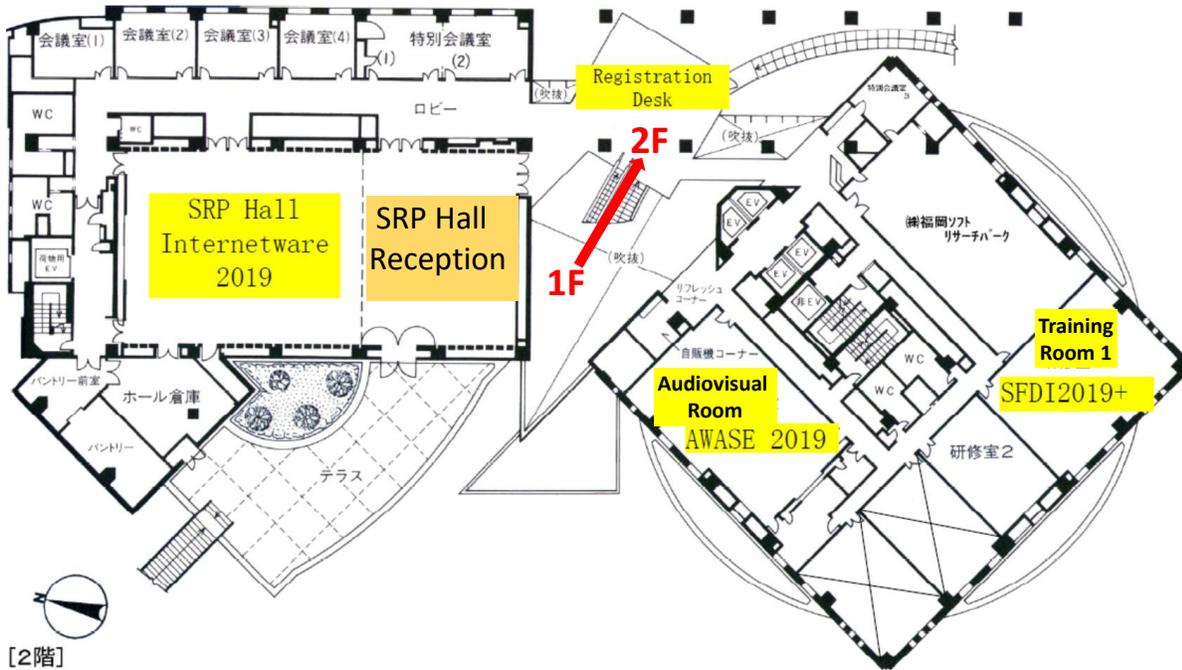Address: 2-1-22, Momochihama, Sawara-ku, Fukuoka 814-0001, Japan
About 16 minutes on foot from the subway station Nishijin, Exit No.7.

Access to the conference venue

From	Fukuoka Airport	JR Hakata Sta. Area	Tenjin Area	Subway Fujisaki Sta.	Subway Nishijin Sta.
Departure bus stop	Go to Hakata (JR Hakata Sta.) or Tenjin by subway line and transfer to the bus service (see right).	Hakata Bus Terminal	Tenjin Bus Center-mae(A1) or Tenjin-kita	Fujisaki Bus Terminal	Nishijin Palace-mae
Bus numbers		306, 312	302, W1, W2	1,1-5,2,2-9,40, 200,305,306	10,15,25
Time required	Total (to SRP) 45 min.	25 min.	20 min.	8 min.	8 min.
Route	Subway Fukuoka Airport Sta. ↓ Hakata (JR Hakata Sta.) or Tenjin ↓ Transfer to the bus service (see right). ↓	Hakata Bus Terminal ↓ Urban expressway ↓ Yahuoku! Dome ↓	Tenjin Bus Center-mae ↓ Tenjin-kita ↓ Urban expressway ↓ Yahuoku! Dome ↓	Fujisaki Bus Terminal ↓ Fukuoka Tower Minami-guchi ↓	Nishijin Palace-mae ↓ Yahuoku! Dome ↓
Arrival bus stop	Ishikaikan & Soft Research Park-mae	Ishikaikan & Soft Research Park-mae	Ishikaikan & Soft Research Park-mae	Ishikaikan & Soft Research Park-mae	Ishikaikan & Soft Research Park-mae
Fare	Total (to SRP) ¥470	¥230	¥230	¥170	¥190

◆ Map of the 2nd floor of the conference building

会議室(1) 会議室(2) 会議室(3) 会議室(4) 特別会議室(1)(2)
WC
ロビー
Registration Desk
2F
1F
WC
SRP Hall Internetware 2019
SRP Hall Reception
(吹抜)
(㈱福岡ソフトリサーチパーク)
EV
Training Room 1
Audiovisual Room
AWASE 2019
SFDI2019+
研修室2
ホール倉庫
テラス
[2階]

◆ Reception

Start time: 18:30 on 28 Oct.
Place: The SRP Hall on the same floor of the conference (see the above figure).

◆ Banquet

Restaurant: 博多百年蔵 https://www.ishikura-shuzou.co.jp/banquet

Date: 29 Oct.
Transportation: two pick-up buses.
After the banquet, return to the conference venue with two buses.
Meeting place:
Let's meet at the hall on the first floor of the conference building **by 18:30.**
Departure time: 18:30

◆ Internetware 2019 Program

Date: 28 Oct. ~29 Oct.

Room: SRP Hall

October 28th (Monday)	
Morning	
08:00 - 11:00	**Registration**
08:45 - 09:00	**Opening**
	Welcome from the Chairs
09:00 - 10:00	**Session I: Keynote I** **(Chair: Hausi Müller, University of Victoria, Canada)**
	Toward Sustainable Information Infrastructure Platform for Smart Mobility Akira Fukuda (Kyushu University, Japan)
10:00 - 10:30	**Break**
10:30 - 12:00	**Session II: Mobile Software Systems** **(Chair: Guangdong Bai, The University of Queensland, Australia)**
	Understanding Quality of Experiences on Different Mobile Browsers Deyu Tian and Yun Ma (Peking University)
	Extracting Mapping Relations for Mobile User Interface Transformation Ruihua Ji, Junyu Pei (Nanjing University), Wenhua Yang (Nanjing University of Aeronautics and Astronautics), Juan Zhai, Minxue Pan and Tian Zhang (Nanjing University)
	TransDroid: Automatic Client-based Service Evolving in Android Apps Shuhui Zhang (Beijing Institute of Technology), Huaqian Cai and Ying Zhang (Peking University)
12:00 - 13:30	**Lunch**
Afternoon	
13:30 - 15:00	**Session III: Software Testing** **(Chair: Chun Cao, Nanjing University, China)**
	A Time Window based Reinforcement Learning Reward for Test Case Prioritization in Continuous Integration

	Zhaolin Wu, Yang Yang, Zheng Li and Ruilian Zhao (Beijing University of Chemical Technology)
	Generating Environmental Models for Testing Self-adaptive Systems Zhengchuan Liang and Yi Qin (Nanjing University)
	Writing Tests for This Higher-Order Function First: Automatically Identifying Future Callings to Assist Testers Yisen Xu, Xiangyang Jia and Jifeng Xuan (Wuhan University)
15:00 - 15:30	**Break**
15:30 - 17:30	**Session IV: Open Source Software** **(Chair: Xin Peng, Fudan University, China)**
	Exploring the Relationship Between Developer Activities and Profile Images on GitHub Yiwen Wu, Yang Zhang, Tao Wang and Huaimin Wang (National University of Defense Technology)
	Duplicate Pull Request Detection: When Time Matters Qingye Wang (Zhejiang University), Bowen Xu (Singapore Management University), Xin Xia (Monash University), Ting Wang and Shanping Li (Zhejiang University)
	Extracting Code-relevant Description Sentences Based on Structural Similarity Yingkui Cao, Yanzhen Zou and Bing Xie (Peking University)
	The Evolution of Open-Source Blockchain Systems: An Empirical Study Jiawei Cao, Xingya Wang, Zixin Li, Qiqi Gu and Zhenyu Chen (Nanjing University)
18:30 - 20:30	**Reception (The SRP Hall on the same floor of the conference)**
October 29th (Tuesday)	
Morning	
09:00 - 10:00	**Session V: Keynote II** **(Chair: Zhenjiang Hu, Peking University/NII, China/Japan)**
	Are SE Techniques Right for AI Systems? Sun Jun (Singapore Management University)
10:00 - 10:30	**Break**

10:30 - 12:00	**Session VI: Software Engineering and Artificial Intelligence (Chair: Lei Ma, Kyushu University, Japan)**
	Fast Robustness Prediction for Deep Neural Network Yuehuan Wang, Zenan Li, Jingwei Xu, Ping Yu and Xiaoxing Ma (Nanjing University)
	A Neural-Network based Code Summarization Approach by Using Source Code and its Call Dependencies Bohong Liu, Tao Wang, Xunhui Zhang, Qiang Fan, Gang Yin and Jinsheng Deng (National University of Defense Technology)
	An Approach to Helping Developers Learn Open Source Projects Based on Machine Learning Zhiyu Sun, Fang Peng, Junrui Guan and Yanchun Sun (Peking University)
12:00 - 13:30	**Lunch**
Afternoon	
13:30 - 15:00	**Session VII: Software Automation and Adaptation (Chair: Bixin Li, Southeast University, China)**
	Speedup Automatic Program Repair Using Dynamic Software Updating: An Empirical Study Rongxun Guo (Nanjing University), Tianxiao Gu (Alibaba Group), Yuan Yao, Feng Xu and Xiaoxing Ma (Nanjing University)
	Migrating Deprecated API to Documented Replacement: Patterns and Tool Yaoguo Xi, Liwei Shen, Yukun Gui and Wenyun Zhao (Fudan University)
	JLLAR: A Logging Recommendation Plug-in Tool for Java Jing Zhu, Guoping Rong, Guocheng Huang, Shenghui Gu, He Zhang and Dong Shao (Nanjing University)
15:00 - 15:30	**Break**
15:30 - 17:30	**Session VIII: Software Modeling and Quality (Chair: Yuting Chen, Shanghai Jiao Tong University, China)**
	Modeling and Reasoning Event-B Models Based on Mathematica Guoteng Pan, Mengjun Li and Guodong Ou (National University of Defense Technology)

	From Data Quality to Model Quality: an Exploratory Study on Deep Learning Tianxing He, Shengcheng Yu (Nanjing University), Ziyuan Wang (Nanjing University of Posts and Telecommunications), Jieqiong Li and Zhenyu Chen (Nanjing University)
	Deep Semantic-Based Feature Envy Identification Xueliang Guo, Chongyang Shi and He Jiang (Beijing Institute of Technology)
	A Preliminary Study on Data Augmentation of Deep Learning for Image Classification Cheng Lei, Benlin Hu, Dong Wang, Shu Zhang and Zhenyu Chen (Nanjing University)
17:30 - 17:45	**Closing**
18:30 - 21:30	**Banquet (18:30 departure from the conference place)**

◆ AWASE 2019 Program

Date: 29 Oct. ~ 30 Oct.

Room: Audiovisual Room

October 28th (Monday)	
18:30 - 20:30	**Reception (The SRP Hall on the same floor of the conference)**
October 29th (Tuesday)	
Morning	
08:50 - 09:00	**Opening** **(Shinichi Honiden & Hong Mei & Jianjun Zhao)**
09:00 - 10:00	**Invited Talk (Room: SRP Hall)** **(Chair: Zhenjiang Hu)**
	Are SE Techniques Right for AI Systems? Sun Jun (Singapore Management University)
10:00 - 10:15	**Coffee Break**
10:15 - 11::00	**Session 1: Code Analysis** **(Chair: Zhi Jin)**
	Automated Large-scale Multi-language Dynamic Program Analysis in Public Code Repositories Walter Binder (University of Lugano)
	Code-to-Code Search Based on Deep Neural Network and Code Mutation Norihiro Yoshida (Nagoya University)
	Stability Analysis for Safety of Automotive Multi-Product Lines: A Search-Based Approach Paolo Arcaini (National Institute of Informatics)
11:00 - 11:15	**Coffee Break**
11:15 - 12:15	**Session 2: Software Testing** **(Chair: Jin Song Dong)**
	A Prioritization Method for SPL Pairwise Testing utilizing Feature Selection Probabilities Tomoji Kishi (Waseda University)
	Assessing the Relation Between Hazards and Variability in Automotive Systems Xiaoyi Zhang (National Institute of Informatics))

	Combining Test Case Generation and System Parameter Optimization Using a Search-Based Approach Alessandro Calò (Technical University Munich/National Institute of Informatics)
	CTOS: Compiler Testing for Optimization Sequences He Jiang (Dalian University of Technology)
12:15 - 13:30	**Lunch Break**
Afternoon	
13:30 - 14:15	**Session 3: Software Adaptation (Chair: Nuseibeh Bashar)**
	Leveraging Test Logs for Effective Self-adaptation in Autonomous Driving Systems Kun Liu (Peking University/National Institute of Informatics)
	An Algorithm for Discrete Controller Synthesis at Runtime based on Difference Information of Changed Environment Takanori Hirano (Waseda University)
	Analysis Space Reduction Method with Decomposing Control Problem Takuto Yamauchi (Waseda University)
14:15 - 14:30	**Coffee Break**
14:30 - 15:15	**Session 4: Open Source and Application (Chair: Shinichi Honiden)**
	AIOT in sport science and medicine William Cheng Chung Chu (Tunghai University)
	Sustaining open source ecosystem Minghui Zhou, Peking University
	Knowledge Transfer in Crowdsensing Leye Wang (Peking University)
15:15 - 15:30	**Coffee Break**
15:30 - 16:15	**Session 5: Security (Chair: Kenji Tei)**
	Towards Interpretable Web Page Finerprinting Guangdong Bai (University of Queensland)

	Towards Software Compliance with Data Protection Regulations Liliana Pasquale (University College Dublin)
	Forensic `Big Code' Analytics for Secure Software Engineering Yijun Yu (Open University)
16:15 - 16:30	**Coffee Break**
16:30 - 17:15	**Session 6: Formal Method (Chair: Yang Liu)**
	Testing-Based Formal Verification - A Unified Method Shaoying Liu (Hosei University)
	Interpolation-based Program Verification Shang-Wei Lin (Nanyang Technological University)
	Strengthening invariants of formal specifications through abstraction and mutation analysis Tsutomu Kobayashi (JST/National Institute of Informatics)
18:30 - 21:30	**Banquet (18:30 departure from the conference place)**
October 30th (Wednesday)	
Morning	
09:15 - 10:00	**Session 7: Safety and Security (Chair: Naoyasu Ubayashi)**
	Combining Higher-order Model Checking with Refinement Type Inference Ryosuke Sato (Kyushu University)
	Analysis of changed game space for ensuring safety properties at runtime Jialong Li (Waseda University)
	Toward identifying safety properties guaranteed simultaneously with a liveness property at runtime Kazuya Aizawa (Waseda University)
10:00 - 10:15	**Coffee Break**
10:15 - 11:00	**Session 8 AI and Software Engineering (Chair: Yijun Yu)**
	AI and Software Engineering Tetsuo Tamai (Japan)

	Attribute-based Granular Evaluation for Performance of Machine Learning Models Henri Trenquier (INP-ENSEEIHT / National Institute of Informatics)
	Trusted Decision Making and Dependable Intelligence Jin Song Dong (National University of Singapore)
11:00 - 11:15	**Coffee Break**
11:15 - 12:00	**Session 9 Robust Machine Learning Systems (Chair: Jianjun Zhao)**
	Towards Dependable Machine Learning-based Systems Fuyuki Ishikawa (National Institute of Informatics)
	Towards Quality and Reliability Engineering of Deep Learning Systems Lei Ma (Kyushu University)
	Towards Secure and Robust Stateful Deep Learning System with Model-Based Analysis Yang Liu (Nanyang Technological University)
12:00 - 12:10	**Closing (Hong Mei & Shinichi Honiden)**

◆ SFDI 2019+ Program

Date: 28 Oct.

Room: Training Room 1

October 28th (Monday)	
Morning	
10:30 - 10:35	**Opening**
10:35 - 11:35	**Quantitative Information Flow – An Introduction** Hiroyuki Seki (Nagoya University)
11:35 - 12:00	**Trading Location Data with Bounded Personalized Privacy Loss** Shuyuan Zheng (Kyoto University), Yang Cao (Kyoto University), and Masatoshi Yoshikawa (Kyoto University)
12:00 - 13:30	**Lunch Break**
Afternoon	
13:30 - 14:30	**Update Propagation Over a Network: Multi-ary Delta Lenses, Tiles, and Categories** Zinovy Diskin (McMaster University)
14:30 - 15:00	**Towards a Complete Picture of Lens Laws** Keisuke Nakano (Tohoku University)
15:00 - 15:30	**Break**
15:30 - 15:55	**Complexity Results on Register Pushdown Automata** Ryoma Senda (Nagoya University), Yoshiaki Takata (Kochi University of Technology), and Hiroyuki Seki (Nagoya University)
15:55 - 16:20	**Analyzing Trade-offs in Reversible Linear and Binary Search Algorithms** Hiroki Masuda (Nanzan University) and Tetsuo Yokoyama (Nanzan University)
16:20 - 16:45	**Toward a view-based data cleaning architecture** Toshiyuki Shimizu (Kyoto University), Hiroki Omori (Kyoto University), and Masatoshi Yoshikawa (Kyoto University)
16:45 - 17:10	**Toward Co-existing Database Schemas based on Bidirectional Transformation** Jumpei Tanaka (SOKENDAI), Van-Dang Tran (SOKENDAI / National Institute of Informatics), Hiroyuki Kato (National

	Institute of Informatics), and Zhenjiang Hu (Peking University / National Institute of Informatics)
17:10 - 17:35	**Distributed transaction management for P2P-based update propagation** Makoto Onizuka (Osaka University), Yusuke Wakuta (Osaka University), Yuya Sasaki (Osaka University),and Chuan Xiao (Osaka University)
17:35 - 17:40	**Closing**
	(Reception of Internetware 2019)