ITUKALEIDOSCOPE
NANJING 2017
Challenges for a data-driven society

Wrap up Session

Summary of the ninth Kaleidoscope conference Panel with Session Chairs

Session Chair: Mostafa Hashem Sherif (AT&T, USA; Kaleidoscope Steering Committee member)

Nanjing, China
27-29 November 2017

S1.1 Legal challenges for data-driven society
Yongfei Xin (Vice Director, China Academy of Information and Communication Technology, CAICT)

S1.2 Open data & digital identity: Lessons for Aadhaar
Smriti Parsheera (National Institute of Public Finance and Policy, India); **Amba Kak** (Mozilla Foundation, India)

S1.3 Open data development of countries: Global status and trends
Esmeralda Florez Ramos (Technical University Berlin & Fraunhofer Institute for Open Communication Systems (FOKUS), Germany)

Session 1, Towards a universal, shared and integrated data ecosystem for the benefit of all
Mostafa Hashem Sherif, AT&T, USA; Kaleidoscope Steering Committee member

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Highlights from Paper 1
"Legal challenges for data-driven society"

- Legal protections are needed in a data-driven society for
  - Private data
  - On-line data exchanges
  - Cross-border data transfers
  - New problems need to be tracked timely

- Standardization and harmonization
  - Currently regulations are country or region-specific but not comprehensive
  - There is a gap between developed/developing countries
  - Rules are needed for harmonization at the international level, in particular, for the right to data

Highlights from Paper 2
"Open data & digital identity: Lessons for Aadhaar"

- Aadhaar is the largest biometric identification system in the world and is publicly funded

- Advantages
  - Increases government accountability
  - Bring efficiencies to service delivery and
  - Stimulates new research questions and ICT innovation

- Threats
  - Vulnerabilities of biometric data, linkages with other systems, etc.
  - Constitutionality of Aadhaar is still in doubt

- In the short term, the recommendation is to have an open data committee to supervise the implementation and operation of the system and the dissemination of information

Highlights from Paper 3
"Open data development of countries: Global status and trends"

- Readiness for open data is estimated from the Open Data Barometer (ODB) of the WWW Foundation (Oxford, UK) and secondary datasets

- "Open data" is correlated with the level of political freedom, transparency, ICT development

- One of the weaknesses of the ODB is that it relies on expert surveys

- The meaning of open data needs to be clearly defined (e.g. open meetings, due process, IPR, free access to data, etc.)

Conclusions/Recommendations

- Open data systems are being implemented and used in the absence of a legal framework for universal, shared and integrated data in a data-driven society =>
  - Harmonization of the various legal approaches is needed

- Available data suggests a positive relationship between open data and the development of new businesses but more studies are needed.

S2.1 A holistic approach to exploring the divided standards landscape in e-health research
Doyoung Eom, Yonsei University, Rep. of Korea

S2.2 Intellectual property licensing tensions in incorporating open source into formal standard setting context - The case of Apache V.2 in ETSI as a start
Jingze Li, Tilburg University, The Netherlands

S2.3 Governance within standards development organizations: Who owns the game?
Olia Kanevskaia,TILEC & Tilbury Law School, The Netherlands

S2.4 The standards revolution: Who will first put this new kid on the blockchain?
Ruizhi Liao, The Chinese University of Hong Kong, China

Session 2, Envisioning future standards development
Ken Krechmer, SIIT2017 Coordinator

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Highlights from Paper 1
"A holistic approach to exploring the divided standards landscape in e-health research"

- E-health is an application that impacts everyone.

- This study approach identifies the divided standardization of e-health records, equipment and systems.

- Continued use of this study approach will track these issues.

Highlights from Paper 2
"Intellectual property licensing tensions in incorporating open source into formal standard setting context - The case of Apache V.2 in ETSI as a start"

- Standardization based on software programs rather than specifications is one aspect of the interest in open source development.

- The tensions created by standardization based upon open source software are presented.

Highlights from Paper 3
"Governance within standards development organizations: Who owns the game?"

- Different Standards Setting Organizations (SSO) have different governance rules.

- This analysis and small survey identifies the need to better understand the impact of different SSO governance rules.

Highlights from Paper 4
"The standards revolution: Who will first put this new kid on the blockchain?"

- Block chain, an extensible set of proper supersets, makes possible systems for creating and controlling value.

- This paper proposes that block chain technology be used for distributed standardization and suggests that block chain standardization use block chain technology.

Conclusions/Recommendations

The technical aristocracy called standardization is evolving

- E-health personalizes the increasing need for standardization.
- Open source is not likely to minimize standardization.
- Block chains are not likely to open standardization.
- Standardization itself needs to be standardized.

New standardization models from ISOC and ICANN are emerging. Traditional SSOs will evolve or become less relevant.

S3.1 Capability maturity models towards improved quality of the Sustainable Development Goals indicators data
Ignacio Marcovecchio, United Nations University, Macao, China & National University of the South, Argentina and **Mamello Thinyane**, United Nations University, Macao, China

S3.2 Advanced data enrichment and data analysis in manufacturing industry by an example of laser drilling process
You Wang, RWTH Aachen University & Fraunhofer Institute for Laser Technology, Germany

S3.3 Small data and sustainable development - individuals at the center of data-driven societies
Mamello Thinyane, United Nations University, Macao, China

Session 3, Accelerating sustainable development through data
Mostafa Hashem Sherif, AT&T, USA; Kaleidoscope Steering Committee member

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Highlights from Paper 1
"Capability maturity models towards improved quality of the Sustainable Development Goals indicators data"

- Tracking social indicators for SDG is a huge task:
  - 230 indicators (2015–2030) vs. 48 in 2000–2015
  - Data from national statistical offices may be questionable
  - Changes in the methodology for long-term time series may affect the results

- Data collection techniques should focus on the processes as well as on the outcomes

- A capability maturity Model can assess the maturity of each national organization (the assumption is that the more mature the organization, the better the data)

Highlights from Paper 2
"Advanced data enrichment and data analysis in manufacturing industry by an example of laser drilling process"

- Relevant data for advanced manufacturing is not always available
    - Collecting data for laser drilling is a long process even using simulation
    - Simulations with partial differential equations yield one sample per 30 min.
    - With a ordinary differential equation for the asymptotic shape of the drilling hole, 10 K samples can be generated in 5 s.
- From the analysis, the optimum process parameters (laser powers, thickness and beam radius) can be defined
- No standardization in the horizon

Highlights from Paper 3
"Small data and sustainable development - individuals at the center of data-driven societies"

- Small data vs. big data vs. useful data
- Getting SDG indicators from individuals
- Willingness to share personal data is associated:
  - Usefulness to the individual
  - Community practice
- Ethical approach to the use of individual data

Conclusions/Recommendations

- United Nations University is a think tank funded by all UN members for development

- Collecting valid data the Sustainable Development Goals indicators is an important task
  - Capability maturity model helps identify which data sets can be reliable
  - Reliance on the individual should be investigate

- Special techniques are needed to enrich sparse data in advanced manufacturing

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S4.1 Fostering smart city development in developing nations: A crime series data analytics approach
Omowunmi Isafiade, University of the Western Cape, South Africa

S4.2 Toward the data-driven "smart" and "green" hospital-care
Vasileios (Basile) P. Spyropoulos, Technological Education Institute of Athens, Greece

S4.3 Socio-economics and educational case study with cost-effective IoT campus by the use of wearable, tablet, cloud and open e-learning services
Toshiki Ueda, Otani University, Japan

S4.4 Drone readiness index
Rene Kabagamba, Carnegie Mellon University Africa, Rwanda

Session 4, Smartening up society with data and new applications
Ved P. Kafle, National Institute of Information and Communications Technology (NICT), Japan

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Highlights from Paper 1
"Fostering smart city development in developing nations: A crime series data analytics approach"

- Background
  - Challenge of crime is magnified in resource constraint settings.
  - Police need to be empowered with context-aware and cost-effective technologies for effective policing.
  - Crime series detection is less explored in developing nations

- Proposal
  - CriClust serves to assist in crime series identification, using a dual threshold mechanism and geometric projection.
  - CriClust is not a panacea but can assist with underperformance in policing.

- CriClust is to be considered for deployment with the police, and there is an ongoing collaboration with an NGO on community policing.

Highlights from Paper 2
"Toward the data-driven "smart" and "green" hospital-care"

- Hospitals are the most complex and representative establishment of the society and nowadays, among the most costly ones.
- ICTs rationalize personnel-efforts and reduce energy and material-wasting, to enable health-care coverage, of unprivileged social-groups.
- The aim of the paper is to present the most effective and efficient means and tools, reducing unnecessary cost and matching medical-managerial needs with technical devices and software available, in the various Hospital Departments.
- Green-computing in wireless-networks are limiting people and material intra-hospital circulation, thus, requiring more environmentally friendly and smooth procedures.
- Standards, policies and regulations for green communications and computing are indispensable and ICTs enable optimization, solving energy- and material-waste problems, reducing overall operational-cost.

Highlights from Paper 3
"Socio-economics and educational case study with cost-effective IoT campus by the use of wearable, tablet, cloud and open e-learning services"

- Two implementations of educational systems on university campus
  - Tablet PCs with open courses distributed to students since 2011
    - Motivation for study more effectively with e-learning
    - Verified improvement of IT literacy
  - Wearable devices for maintaining student's physical conditions
    - Motivation to improve physical fitness by visualization of data
    - Verified improvement in health, addressed personal data handling

- Conclusion for standards on education with ICT
  - ITU Initiative to proliferate good practiced education in cost-effective manner

Highlights from Paper 4
"Drone readiness index"

- Developed a tool to gauge the preparedness of countries to use drones for non-military purposes.

- Countries were assessed on several levels for the right environment (regulations, etc.), readiness (the needed infrastructure, etc.), usage (existing projects) and impact (perceptions on the ground).

- Compiled findings on selected countries on a website.

- Next steps include:
    - Collecting more data through crowd-sourcing.
    - Further improve the model by improving the scoring method.
    - Apply the index to more countries.

Conclusions/Recommendations (1/2)

- Paper 1:
    - Presented CriClust as an exemplary tool to analyze and identify crime series patterns and drastically improve city security situation.
    - Authors are advised to explore related work of other countries and in ITU.

- Paper 2:
    - Green and smart hospital management is very a important application of ICT. The authors are advised to explore the possibilities of standardization in ITU.

Conclusions/Recommendations (2/2)

- Paper 3:
  - Highly relevant with standards, advised to think about initiating new work items (e.g. in ITU-T SG16) on guidelines for e-learning and e-health practice and procedures
  - Further study on effective approaches to engage various stack holders, e.g. teachers, students, ICT platform, relevant regulations.

- Paper 4:
  - Relevant with standardization in term of specifying guidelines for the evaluation of a country's capability to utilize drones for non-military applications, e.g. emergency health care, rescue in disasters, wildlife protection, etc.

S5.1 Machine learning approach for quality adaptation of streaming video through 4G wireless network over HTTP
Dhananjay Kumar, Anna University, MIT Campus, India and Arun Raj Lakshminarayanan B.S.A Crescent University, Chennai, India

S5.2 Modeling and analysis of spatial inter-symbol interference for MIMO image sensors based visible light communication
Rongzhao Wu, North China Electric Power University, China

S5.3 Secrecy energy efficiency optimization for artificial noise aided physical-layer security in cognitive radio networks
Jiang Yuhan and **Yulong Zou**, Nanjing University of Posts and Telecommunications, China

S5.4 Data centric trust evaluation and prediction framework for IoT
Upul Jayasinghe, Liverpool John Moores University, United Kingdom

Session 5, Advancing network infrastructure and architecture for data
Subin Shen, Nanjing University of Posts and Telecommunications, China

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Highlights from Paper 1
"Machine learning approach for quality adaptation of streaming video through 4G wireless network over HTTP"

- Machine learning is a very useful technique for knowledge discovery, but it is also a very complex technique in telecommunication domain.

- This paper gives a very good idea on how to employ the machine learning technique in adaptation process for improving the quality of services by feedback quality loop in 4G wireless networks for video transmission.

- It is a very good idea for using No Reference (NR) metrics that are adopted from ITU-T G.1070, in order to provide better video quality during it transmitted in 4G wireless networks.

- It may be better if more general discussion is given on techniques of machine learning that are suitable in telecommunication domain.

Highlights from Paper 2
"Modeling and analysis of spatial inter-symbol interference for MIMO image sensors based visible light communication"

- Based on the presentation, VLC (Visible light Communication) is a very practical work in development of the future communication technologies. It has the advantages of saving the radio frequency resource and being harmless to human being.

- A MIMO-IS-VLC system is designed and optimized in this paper in the domain of optical wireless communication, indoor communication, etc. It is a very useful and good work.

- It may be better, if there is more description on the prototype of the MIMO-IS-VLC, and analysis on the practical experiment results of the prototype.

Highlights from Paper 3
"Secrecy energy efficiency optimization for artificial noise aided physical-layer security in cognitive radio networks"

- It is a good idea to combine the secrecy rate (SR) with energy efficiency (EE) in physical layer to propose the concept of the secrecy energy efficiency (SEE), which is defined as the ratio of the SR to the total power consumption.

- This paper gives an optimal solution to the formulated SEEM (SEE Maximization) problem as well as the corresponding iterative algorithm. It is a very good work.

- It may be better if some examples can be given to show possible practical applications of the proposed solution and algorithm.

Highlights from Paper 4
"Data centric trust evaluation and prediction framework for IoT"

- The existing method of assessing trust of the data in IoT applications is based on the trust of the data related end entities, such as its data source. If the data is separated for its related entity, it is very difficult for evaluating the trust of the data.

- This paper gives a trust framework and a possible design model for evaluating the trust of data without its related entities.

- It may be better if more discussion is given on how much availability and reliability can be achieved by the proposed trust framework and design model.

Conclusions/Recommendations

- More ICT standardization work or its related work is encouraged
- More general technique and mechanism besides the specific solutions and algorithms is suggested to be discussed
- More use cases and best practices are welcome.