

ICT Enabling Technologies for Smart Cities

Dzung Van DINH*, Byeong-Nam YOON**, Hung Ngoc LE***, Uy Quoc NGUYEN****,
Khoa Dang PHAN*, Lam Dinh PHAM*

*Information Technology Institute, Vietnam National University (VNU), Vietnam

**Global IT Research Institute (GIRI), Korea

***VKX Ltd. (Viet Nam Korea Exchange Joint Venture Company), Vietnam

****PTIT (Posts and Telecommunications Institute of Technology), Vietnam

dzung.dinh@vnu.edu.vn, tomavoon@hotmail.com, lnhung@vnx.com.vn,
nguyenquocuy2008@gmail.com, khoapd@vnu.edu.vn, phamdinhlam@vnu.edu.vn

Abstract— A smart city adjusts its social, business, and natural needs, improving the assets it has accessible. Information and Communications Technology (ICT) for shrewd urban areas is to give city answers for encourage an improvement and manageability of a city for the advantage of its population, its economy, and the greater ecosystem in the city. It is to gauge a keen city as far as the enhancements in personal satisfaction and monetary prosperity that are accomplished through applying ICT innovations to design, outline, fabricate, and work the city foundation. In smart city applications, the initial phase in the information's voyage through the application is its gathering by the diverse advancements conveyed all through the city. This paper surveys data acquisition technologies such as Sensor Networks, MANETs, Unmanned Aerial Vehicles (UAVs), Vehicular Ad hoc Networks (VANETs), Internet of Things (IoT), Software-Defined Networking (SDN), Network Functions Virtualization (NFV), 5G. Next, it demonstrates information processing technologies, for example, Cloud Platform, IoT Platform, Big Data Platform, Machine Learning, Deep Learning, and IoT Analytics. Encouraging data spread between various nodes is vital to savvy city acknowledgment. Last, because of the presence of various types of end users (e.g., residents, organizations, government offices, and so forth.) requiring distinctive levels of nature of management, the paper exhibits a proposed testbed solution and recent associated experiments.

Keywords— IoT, SDN, NFV, 5G, Cloud Platform, IoT Platform, Big Data Platform, IoT Analytics



Dzung Van DINH - He is a Fulbright Scholar at New York University, USA. He has obtained his Ph.D. from the Post and Telecoms Institute of Technology, Vietnam, the M.E. degree from University of Technology, Sydney, Australia, B.E. degree from the Odessa Institute of Telecommunications, the former Soviet Union. He led many national research projects, acted as a principle member of international projects at RisTI (Indonesia), NTT, NICT (Japan), LG, ETRI (Korea), and NYU (USA). He was the ICT project leader, trainer, and consultant for VNPT, Saigon Postel, EVNTelecoms, VNU HCM City, Thailand Telecoms, and AIT. He actively contributes to International Telecoms Union (ITU) and APT activities in the roles of Vice-Rapporteur, Vice-chairman of ITU-D Study Group 2. He has been the Deputy Director of Research Institute of Post and Telecoms and the Assistant Director of Vietnam Branch - Korea Information and Communications Society (KICS). Dr. Dzung is the Deputy Director of Information Technology Institute - Vietnam National University, Hanoi (VNU). He has been appointed as an Adjunct Professor at the University of Technology, Sydney.



Byeongnam Yoon (M'97) He became a Member of IEEE in 1997. He was born in Seoul Korea 15 November 1949. He got the PhD in computer science, Chungnam National University, Dejon city, Korea, 1997. He worked for the Sperryrand UNIVAC as a Computer Specialist 1974 -1978, Samsung as a Manager of Telecommunications Section 1978 -1982, Electronics & Telecommunications Research Institute (ETRI) as a Principal Researcher 1982 - 1999, National Information society Agency (NIA) as a Senior Executive Director General 1999 - 2010, Kyonggi University as an Associate Professor Faculty of Computer Science 2010 - 2016. Global IT Research Institute GIRI) as a President 1999 - current. His research area includes a Telecommunications, Internet, Software, Web programming & security, e-Government, Enterprise Architecture, Work Flow, Information Control Nets.



Le Ngoc Hung received the B.E in computer engineering from Hanoi university of science and technologies, Hanoi, Vietnam, in 1992 and the M.E in computer science from Hanoi national university, Hanoi, Vietnam, in 2000. His research interests are decision making, mobility management, computational modeling methods. He is currently working toward Ph.D degree at Post and Telecommunication Institute of Technology (PTIT), Vietnam.



Lam Dinh, PHAM He was born in Vietnam 5 December 1986. He got the MSc in computer science, Thai Nguyen University, Thainguyn, Vietnam, 2010. He worked for Thainguyn University 2008-2016, Information Technology Institute, Vietnam national University, Hanoi, 2016-current as Deputy head of Science, Technology and Training Department. His research area includes Business Processing Management, Work Flow, Information Control Nets, Artificial Intelligence.