EDITORIAL

SPECIAL ISSUE: Living Lab

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Living Lab refers to a user-centered, open-innovation ecosystem or a systematic approach, co-created by users, integrating research and innovation processes. The philosophy of Living Lab is to invite users to participate in the value creation of innovation process, including the exploration of user behavior and emerging scenarios, the co-creation of breakthrough ideas and innovative concepts, the experimentation of artifacts and services, and the evaluation of new concepts, artifacts or services in real life settings. As such, Living Labs are expected to develop products or services that are feasible, viable, and desirable. Today, there are many organizations or programs devoted to establish and realize the Living Lab concepts, such as the Framework Programme of the European Union, European Network of Living Labs (ENoLL), TRIAL (Translating Research and Innovation Lab) in the United Kingdom, and the Living Lab Global in Denmark, providing collaboration platforms and connecting international project partners. The aim of this Special Issue of the International Journal of Automation and Smart Technology is to present several types of Living Labs targeting broad research areas, each sharing its unique research method, strategies of implementation, and the benefits for the industry and communities.

Many leading research institutions in Taiwan have recognized the emerging trends and started to study the Living Lab methodology. Several Living Labs were set up

accordingly. The paper entitled “**Initiation of the Suan-Lien Living Lab – a Living Lab with an Elderly Welfare Focus,**” authored by Shih-Chung Kang, presents the first long-term Living Lab built in an elderly-care center in Taiwan. The key steps to launch the Living Lab and the research projects run in the Lab are introduced. It also highlights the key success factors of this Living Lab, namely, high involvement of users, versatile forms of communication, effective conversion of tacit knowledge, the building of a multi-disciplinary team, and cohesion of stakeholders.

The paper entitled “**Application of the Living Lab Concept: Empirical Validation in Taiwan's Minsheng Community,**” introduces the Minsheng Community Living Lab established by the Institute for Information Industry in Taiwan. Five projects have been conducted in the community, namely, Future Classroom, Green Life Ecological Tourguide, ComCare, In-Snergy, and inMedia_Kiosks. The paper discusses in depth the implementation, management, results and implications of each project.

The paper entitled “**The Transformation of Users in Living Lab Construction: The Case of Eco-City Living Lab,**” co-authored by Wen-Yuan Lin et al., reports the strategies in the making of a community-based Living Lab in Hsinchu, Taiwan. The practical mechanisms built in the community environment and the methods to facilitate user innovation are introduced. The discussion is focused

on the dynamics between living lab construction and the transformation of the users.

The paper entitled **“TOUCH Doctor — A Nutrition Control Service System Developed under Living Lab Methodology,”** co-authored by Chi-Kun Lin et al., introduces a nutrition control service, called TOUCH Doctor. The user-driven innovation procedure of the TOUCH Doctor services are discussed in detail, including idea generation, concept evaluation, product development, and final product launch.

The setting of a Living Lab is not necessarily confined to a physical space. The paper entitled **“First Come, First Served: Enhancing the Convenience Store Service Experience,”** co-authored by Yuan-Ling Chiao et al., presents research conducted in a convenience store chain. The research explored the work environments and provides suggestions for in-store technological enhancements to ease the physical, mental and emotional strains of the convenience store employees.

The paper entitled **“The City of the Future Living Lab,”** co-authored by Sauro Vicini et al., presents a Living Lab in the city scale, the San Raffaele Hospital’s (OSR) City of the Future Living Lab in Milan. The Living Lab involves a university, laboratories, a hospital, offices, shops, a supermarket, post-offices, streets, parks, a shuttle and bus service. All stakeholders are engaged to work together and co-create e-Services. This paper explores and discusses how the Living Lab concept can be extended to the understanding, studying and measuring of the interaction among users and ICT

(information and communication technology) based services via the co-creation process.

Applying the Living Lab method can help the industry to establish an ecosystem of innovative services. In this regard, the paper entitled **“Developing an Engineering Data Bank Service for the Precision Machinery Industry Cluster Using the Living Lab Concept,”** introduces an industrial park Living Lab established by the Industrial Technology Research Institute in Taiwan. In addition to constructing an engineering data bank, several services were developed in the precision machinery industrial park, including the creation of the intelligent park cluster, intelligent energy monitoring and saving, intelligent traffic monitoring, and vehicle tracking. More than 400 small and medium enterprises are involved in this project.

Although Living Labs provide a means to develop promising products and services, the construction and operation are difficult and costly. Each case is unique, and there is no standard procedure that fits all cases. Hence, sharing of knowledge and experience is extremely important. In this special issue, the papers address the four main activities in their Living Labs, namely, exploration, co-creation, experimentation, and evaluation. Furthermore, they present issues involved in the building of ecosystems and multidisciplinary research teams. Their experiences provide invaluable guidance and insight for future research and implementation of Living Labs. 🦉

Pei-Ling Liu received her Ph.D. degree in civil engineering from the University of California, Berkeley. She joined the faculty of the Institute of Applied Mechanics, National Taiwan University in the same year. She took directorship of the Institute from 2003 to 2006. She is currently the Director General of the Center of Innovation and Synergy for Intelligent Home and Living Technology (INSIGHT Center), National Taiwan University. Her major research interests include structural reliability analysis and structural health monitoring. She has developed several reliability methods and nondestructive testing methods for concrete structures. In 2006, she won a grant from the National Science Council, Taiwan to conduct the Smart Sustainable Human-Centric Home Project. The objective of the project was to foster interaction between humanities and technology to create a future smart home. The research team was formed by over 30 professors from diverse backgrounds, including mechanical engineering, electrical engineering, civil engineering, medical engineering, computer science, material science, geology, psychology, sociology, social work, medical school, education, history, architecture, and design. In 2008, this project grew into a regional research center of smart living technologies, the INSIGHT Center. Nearly 170 professors from thirty universities are affiliated with this center. Other than conducting multidisciplinary research on smart living technology, the Center runs two living labs: Smart Convenient Store and Smart Elderly Center. INSIGHT Center now focuses on innovation based on user experience.