An In-home Medication Management Solution Based on Intelligent Packaging and Ubiquitous Sensing

Zhibo Pang\textsuperscript{ab}, Qiang Chen\textsuperscript{b}, Lirong Zheng\textsuperscript{b}, Elena Dubrova\textsuperscript{b}
\textsuperscript{a}Corporate Research, ABB AB, Västerås, Sweden
\textsuperscript{b}ICT School, Royal Institute of Technology (KTH), Stockholm, Sweden

pang.zhibo@se.abb.com

\textit{Abstract}—A healthcare solution for medication noncompliance problem would help to save $177 billion annually in the United States. In addition, an in-home healthcare station (IHHS) is needed to meet the rapidly increasing demands for daily monitoring with on-site diagnosis and prognosis. In this paper, an intelligent medication management system is proposed based on intelligent package and ubiquitous sensing technologies. Preventive medication management is enabled by an intelligent package sealed by Controlled Delamination Material (CDM) and controlled by RFID link. Various vital parameters are collected by wearable biomedical sensors through the short range wireless link. Onsite diagnosis and prognosis based on these health parameters are supported by the scalable architecture. Additionally, friendly human-machine interface is emphasized to make it convenient for the elderly or disabled patients. A prototype system including the hardware, embedded software, user interface, database and some intelligent packages is implemented to verify the concepts.

\textit{Keyword}—In-Home Healthcare Station; Medication Noncompliance; Wireless Sensor Network; Controlled Delamination Material; Radio Frequency Identification

Dr. Zhibo Pang is a research scientist at ABB Corporate Research, Sweden, and a Ph.D. candidate at Royal Institute of Technology (KTH), Stockholm, Sweden. He received his B.Eng. degree in electronics engineering from Zhejiang University in 2002, and MBA in Innovation and Growth from University of Turku in 2012. Before joined KTH and ABB, he worked as technical manager in semiconductor industry, designing base-band and application processors for consumer smart devices. His current research interests include the Internet-of-Things, radio frequency identification, wireless sensor network, industrial communication, real time embedded system, enterprise information systems, system-on-chip, and network-on-chip. He has 14 patents in these areas. He is also working on the business-technology joint research such as business model design, value chain formulation, strategy, and entrepreneurship/intrapreneurship. He was awarded the National Great Invention Award by the Ministry of Information Industry of China in 2005, and won the First Place Prize of the RFID Nordic EXPO in 2008.