# The Design for the Universal Lift Monitoring and Control System based on Android Framework

Woon-Yong Kim[1], SoonGohn Kim[2]

[1] Department of Computer & Internet Technique, Gangwon Provincial College,
115 Gyohang-ro, Jumunjin-eup, Gangneung-shi, Gangwon-do, 210-804, Korea
wykim@gw.ac.kr
[2] Division of Computer and Game Science, Joongbu University,
101 Daehakro, Chubu-Meon, GumsanGun, Chungnam, 312-702, Korea
[2] Corresponding Author: sgkim@joongbu.ac.kr

**Abstract.** The convergence technologies in the IT industry have applied quickly to the elevator industry. The core of the convergence technologies may be the effective control and maintenance of the machine. In this paper, we propose the integration monitoring and control system for the various lift models. We use the monitoring and control system based on the Android framework that is rapidly expanding technology in the embedded environment, and we propose the design approach for the integration of variety of lift devices so that it provide a more efficient and stable service environment. In this way, we could integrate various device models of an elevator for the management and maintenance effectively and quickly.

**Keywords:** Lift Control, Monitoring System, Universal Integration, Android System, Remote Management System, Software Design, Bind Service.

## 1 Introduction

The lift industry lies as an essential part of life with the advancement of the building. The lift industry has a long history and has created a various and heterogeneous environment of lift. These situations make difficulties to the convergence in the lift and information technique. Currently, in a variety of fields, the elevator system has built with own brand and machinery and operate the system for management and control individually. Such an environment, person that is responsible for the maintenance of each system has excessive work due to the need to understand the operating manual of the each system. In addition, it makes difficult the integration of the various elevator models. To solve this problem, in this paper, we propose the integration monitoring and control system for the various lift models. We use the monitoring and control system based on the Android framework that is rapidly expanding technology in the embedded environment, and we propose the design approach for the integration of variety of lift devices so that it provide a more efficient and stable service environment. In this way, we could integrate various device models of an elevator for the management and maintenance effectively and quickly.

The remaining parts of the paper are organized as follows, In Section 2, we discuss the related technology for the convergence techniques of the lift system. In Section 3, we propose the system model that is universal management and control system of the lift and Section 4 concludes this paper.

## 2    The convergence of information technology with the lift system

Recently, the convergence of IT technology with the lift system can be summarized as the CCTV, digital signage, remote control and emergency direct call system. And these convergence technologies associated with the lift safety and the purpose of providing convenience to the user. CCTV has operated for the safety and security of the passengers mandatory. And also the emergency direct call system has operated to ensure call connectivity when the absence of the administrator occurs [1][2]. The remote control system has operated by self-produced by the lift manufacturer. And the technology has been increasing for the safety elements [3]. In addition, the fields of digital signage has utilized for the convenience of customers and a means of passing information, it is emerging as an advanced elements of the lift [4]. However, because the each convergence technologies are operated independently, these methods of the integrated utilize are insufficient.

## 3    The Design of the Universal Lift Monitoring and Control System based on Android Framework

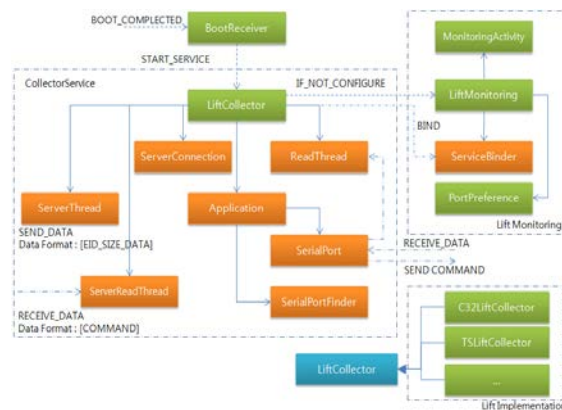Android-based conceptual flow diagram of the control system is shown in Figure 1.



**Fig.1.** Android based conceptual lift control system flow diagram

The Android-based control systems use Service and Bind Technique in order to provide the service of sending and receiving control signals. And also it use Broadcast Receiver to perform the service at the start time. In this Picture, LiftCollector has

configuration abstraction structure for the implementation model that has each protocol for each lift. This model can make to add the specific model dynamically. Figure 2 shows the class diagram of the lift controller to provide a system flow suggested above.
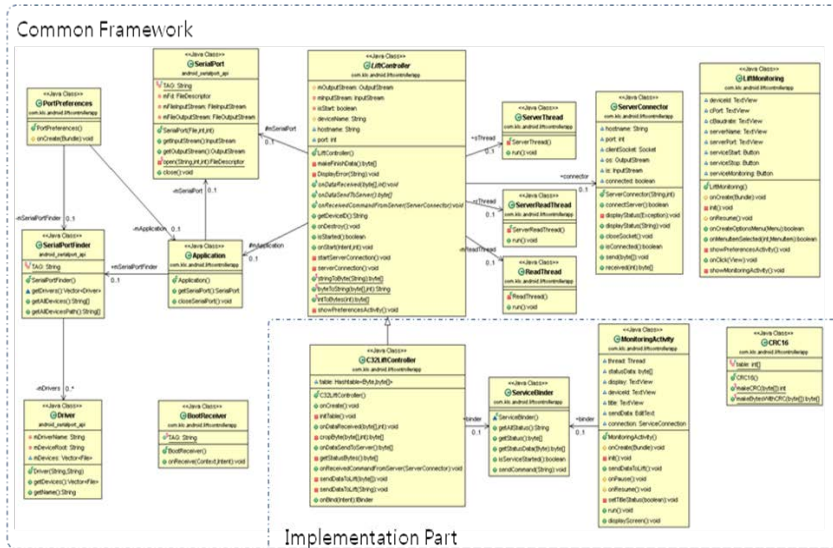


**Fig.2.** The Class diagram for the lift control based on Android framework

The class diagram is divided the Common Framework that is process common process such as in and out process and control parts and Implementation part. The Implementation Part that made from inheritance of the LiftController can be included in the process of adding the parts needed for a particular device. It has a structure that can include a variety of devices.

# 4    Conclusions

In this paper, we proposed the integration monitoring and control system for the various lift models. We used the Android framework for the configuration of the system. And also we proposed the design approach for the integration of variety of lift devices so that it provide a more efficient and stable service environment. In this way, It could be make effective management and maintenance for the various device models by integrating the devices.

## References

1. Yong-Hui Lee, Hyun-Gi Kim, "A Study on Combined wire-wireless Service System for Emergency Warning Call", Korea Information Processing Society Spring Conference, Vol.17, No.1, 2010
2. Okazaki, Shintaro, "What is SMS advertising and why do multinationals adopt it? Answers from an empirical study in European markets" Journal of Business Research, Vol. 61 Issue 9, 2008
3. Yeon-Suk Choi, Byoung-Tae Park, Yong-Ju Choi, "Design and implementation of Location Based Silver Town u-Service System", Journal of Korean Society for Internet Information, Vol.11, No.3, 2010
4. Jinmo Jang, "Elevators of the latest technology trends", The Korean Society for elevator engineering, December 2004