

Master's Thesis
Academic Year 2014

A Thesis Title

Graduate School of Media Design,
Keio University

Masa Inakage

A Master's Thesis
submitted to Graduate School of Media Design, Keio University
in partial fulfillment of the requirements for the degree of
MASTER of Media Design

Masa Inakage

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Abstract of Master's Thesis of Academic Year 2014

A Thesis Title

Category: Science / Engineering

Summary

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Keywords:

Network, KMD, Latex

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Chapter 1

Introduction

1.1. Background

Recently, thanks to the large diffusion of smartphones and tablets, mobile communication technologies have advanced rapidly. Mobile devices have gradually become a central terminal for each user to communicate with the cyber world and even the physical world. [14] Many mobile devices and applications have been developed, besides smartphones and tablets, there are also smart accessories such as Google Glass¹ and Pebble watch². As a result, our mobile devices have become a personal information center, like a portable Control Panel. People use them to collect and share information, also use them to control other devices that connected to the network.

Notes

1 <http://www.google.com/glass/start/>

2 <https://getpebble.com/>

Chapter 2

Overview of Appliances Controlling System

2.1. Intro

This chapter represented the basic structure and implementation approaches of Appliances Controlling System. As the base of this research, the current state of these information will help to find cues for directions of more possibilities. Such as the important factors of users need, merits of existing systems, also the appropriate approaches to make innovations.

Chapter 3

Limitations in Controlling Services

3.1. Implementation Approaches

Besides the basic structure, another important factor of appliances controlling system is how is it implemented. In general, to build a appliances controlling systems, there are mainly two approaches to implement. One is to build an integrated architecture for all appliances, the other one is to build an add-on module for existing appliances. Figure 3.1

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- cilis
- Vestibulum
- tincidunt



Figure 3.1: Evolvement of the appliances interface

Chapter 4

Related Works and Technology

4.1. Appliances Controllin

Many researches about Appliances Controlling System have been conducted [3], there are also some related products have been developed. In the following part of this chapter, several works are introduced. After understanding each work's point of view, advantage and disadvantage, the issues and expected solutions are discussed.

Notes

Chapter 5

Implementation and Evaluation

5.1. Related Technology

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5.1.1 Evaluation

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Chapter 6

Conclusion

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Acknowledgements

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References

- [1] AKIYAMA, M., SHIRAI, H., IOROI, S., TANAKA, H., and YAMAMOTO, F. Proposal and demonstration of home electronic appliances control platform using smartphone : Design and development of network remote control unit. *IEICE technical report 112*, 133 (jul 2012), 43–48.
- [2] Basu, D., Moretti, G., Gupta, G., and Marsland, S. Wireless sensor network based smart home: Sensor selection, deployment and monitoring. In *Sensors Applications Symposium (SAS), 2013 IEEE* (Feb 2013), 49–54.
- [3] Chan, M., Campo, E., Estve, D., and Fourniols, J.-Y. Smart homes current features and future perspectives. *Maturitas* 64, 2 (2009), 90 – 97.
- [4] Chung-Ming, HuangHao-Hsiang, K.-W. C. Design and Implementation of a Web 2.0 Service Platform for DPWS-Based Home-Appliances in the Cloud Environment. In *waina 2011* (Biopolis, Singapore, 2011), 159–163.
- [5] Consortium, E. Echonet specification. White paper, ECHONET Consortium, 2002.
- [6] Derthick, K., Scott, J., Villar, N., and Winkler, C. Exploring smartphone-based web user interfaces for appliances. In *Proceedings of the 15th International Conference on Human-computer Interaction with Mobile Devices and Services*, MobileHCI '13, ACM (New York, NY, USA, 2013), 227–236.
- [7] Gotschlich, M. Remote controls radio frequency or infrared. White paper, Infineon Technologies AG, Sep 2010.
- [8] Group, H. N. W. Home networking (homenet). Ietf-83 proceedings, IETF, Aug 2011.

- [9] IEEE. Arrival of smart appliances is a milestone on the path to the smart grid. Smart grid newsletter, IEEE Smart Grid, <http://www.digitaltvdesignline.com>, Oct 2011.
- [10] Isbell, Jr., C. L., Omojokun, O., and Pierce, J. S. From devices to tasks: Automatic task prediction for personalized appliance control. *Personal Ubiquitous Comput.* 8, 3-4 (July 2004), 146–153.
- [11] J. Arkko, Ericsson, A. B.-S. D. O. T. J. W. Home networking architecture for ipv6. Ietf internet draft, University of Southampton, Cisco Systems, Inc., Mar 2012.
- [12] Kenya, S., Akira, S., Shinya, M., and Hideki, S. A networked home appliance control method using augmented reality. . *EMB*, 2011, 30 (mar 2011), 1–6.
- [13] Layton, J. How remote controls work. <http://electronics.howstuffworks.com/remote-control.htm>, 2005.
- [14] Meeker, M. Internet trends 2014. <http://www.kpcb.com/internet-trends>, 2014.
- [15] Monk, S. *Raspberry Pi Cookbook*. O’Reilly Media, December 2013.
- [16] Nichols, J., and Myers, B. A. Controlling Home and Office Appliances with Smart Phones. *IEEE Pervasive Computing* 5, 3 (2006), 60–67.
- [17] Nichols, J., Myers, B. A., Higgins, M., Hughes, J., Harris, T. K., Rosenfeld, R., and Pignol, M. Generating remote control interfaces for complex appliances. In *Proceedings of the 15th Annual ACM Symposium on User Interface Software and Technology*, UIST ’02, ACM (New York, NY, USA, 2002), 161–170.
- [18] Research, A. More than 30 billion devices will wirelessly connect to the internet of everything in 2020. <https://www.abiresearch.com/press/more-than-30-billion-devices-will-wirelessly-conne>, 2013.
- [19] Schwartz, M. *Home Automation with Arduino: Automate your Home using Open-Source Hardware*. CreateSpace Independent Publishing Platform, July 2013.

- [20] Tam Van Nguyen, T., Lee, D. G., Seol, Y. H., Yu, M. H., and Choi, D. Ubiquitous access to home appliance control system using infrared ray and power line communication. In *Internet, 2007. ICI 2007. 3rd IEEE/IFIP International Conference in Central Asia on* (Sept 2007), 1–4.
- [21] Tan, L. The need for rf in remote controls. White paper, Cypress Semiconductor Corp, Jun 2007.
- [22] Wang, D., Murase, Y., and Sugiura, K. Design and implementation of user-centered home appliance controlling service environment. In *Proceedings of Workshop on Mobile Video Delivery, MoViD'14*, ACM (New York, NY, USA, 2013), 7:1–7:6.
- [23] Xiangyang Li, Weiqiang Zhang, H. Design of intelligent home appliance control system based on ARM and ZigBee . In *CECNet 2012* (Yichang, 2012), 260 – 263.
- [24] Yoshiki, T. Echonet lite communication technology for home energy management system. = *Toshiba review* 67, 11 (nov 2012), 37–40.
- [25] Young, C. Irlib: An arduino library for encoding and decoding ir remote control signals. <http://tech.cyborg5.com/irlib>, 2013.

Appendix

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