

Development of a virtual aquarium system interacting with a smart device

Jinho Park · Jin Choi · Yong-Ho Seo

Received: 28 January 2013 / Accepted: 11 June 2013
© Springer-Verlag Berlin Heidelberg 2013

Abstract New applications of smart devices interacting with other computing devices are recently providing interesting and feasible solutions in ubiquitous computing environments. In this study, we propose an interactive virtual aquarium system that interacts with a smart device as a user interface. We developed a virtual aquarium graphic system and a remote interaction application of a smart device for building an interactive virtual aquarium system. We performed an experiment that demonstrates the feasibility and the effectiveness of the proposed system as an example of a new type of interactive application of a smart display, where a smart device serves as a remote user interface.

Keywords Interactive virtual system · Remote sensory system · Smart device · Real-time fluid dynamics · Human–computer interaction

1 Introduction

Smart devices are new computing devices that use diverse contents. Examples include smart phones, smart books, and smart TVs. A smart book is a portable device that has

advantages of a smart phone and a tablet PC. Smart phones have dominated the market recently, replacing feature phones. Smart books are also becoming a popular medium for using various multimedia contents including e-books. Smart TVs are similarly attracting attention for use in the home [1].

In ubiquitous environments with a seamless wireless connection, smart devices are becoming major user interfaces and hub devices in the upcoming personal cloud computing environment. We also anticipate that smart devices will play an important role in ubiquitous computing environments as a kind of wearable computer. Specifically, this medium, which interacts with public media devices as a proxy for a user, will act as a service agent to reduce the burden of frequent interactions with each device, despite that such media devices will be increasingly more intelligent [2]. Today, smart devices are becoming a new medium for u-Home Service and service robots and smart displays such as IPTV with a seamless wireless connection in a ubiquitous environment, as illustrated in Fig. 1.

In the personal cloud computing environment, integrating both ubiquitous computing and wearable computing will be necessary to overcome the disadvantages of each form of computing, as summarized in Table 1.

In consideration of this recent trend in computing technologies together with the rapid deployment of smart devices, we expect that the interconnection of a smart device and interactive media devices such as Kiosk or Smart wall, which we can refer to as smart displays, will provide synergy in the application domain and smart devices will play an important role as a kind of wearable computer in realizing ubiquitous computing environments.

Based on this background, we developed an interactive virtual aquarium system as a prototype of a smart display

J. Park
Global School of Media, Soongsil University,
Seoul, Republic of Korea

J. Choi
Mobile Communication, Samsung Electronics Co., Ltd,
Suwon, Republic of Korea

Y.-H. Seo (✉)
Department of Intelligent Robot Engineering, Mokwon
University, Daejeon, Republic of Korea
e-mail: yhseo@mokwon.ac.kr