

A Communication Model to Support Continuous Indoor Golf Simulator Games

KeeHyun Park and Seunghyeon Lim

¹ Department of Computer Engineering, Keimyung University, Daegu, Korea.
{khp, burningwing}@kmu.ac.kr

Abstract. Recently, the indoor golf simulator has become one of hottest game products for golf players to enjoy their golf games indoors. However, with the existing indoor golf simulators, a player must finish his game without a break. In this paper, a communication model which supports a continuous indoor golf games is proposed. The communication model allows a player to pause his game anytime he wants and to resume his game anyplace afterwards, by applying data synchronization techniques. The communication model consists of PC consoles, a proxy server and a player data server.

Keywords: indoor golf simulator, communication model, data synchronization.

1 Introduction

An indoor golf simulator is one of an augmented game simulator consists of a screen, a sensor system, a projector and a PC [1-3]. Since an indoor golf simulator can be installed easily in indoor golf practice places, fitness centers, offices, and residential houses, it has become one of hottest game products for golf players to enjoy their golf games indoors.

In this paper, a communication model which supports a continuous indoor golf games is proposed. The communication model allows a player to pause his game anytime he wants and to resume his game anyplace afterwards, by applying data synchronization techniques. The rest of the paper is organized as follows: Section 2 describes the related studies. Section 3 explains a communication model which supports a continuous indoor golf games in detail. Finally, Section 4 draws conclusions and discusses some future research direction.

2 Background

2.1 Indoor Golf Simulator

An indoor golf simulator is one of an augmented game simulator consists of a screen, a sensor system, a projector and a PC. The simulator displays 2D or 3D images of real golf courses on the screen using the projector and PC console. The sensor system

(analyzes the strokes a player takes in order to measure such the movement of the ball he hit as ball speed, direction, angle and distance, etc. Based on the information of the ball transmitted from the sensor system, the PC console generates the images of ball movements on the screen.

2.2 Data Synchronization

Data Synchronization (DS) is the technology used to keep all of the data replicas up-to-date and consistent under distributed or networked environments. Because of mobility of mobile devices, users can access their data anytime anywhere. To keep the data up-to-date and consistent, the data changes should be reflected on each device. Currently, there are several DS protocols for the mobile environment, such as Palm’s HotSync [4], Microsoft’s ActiveSync [5] and OMA DS [6-9].

3 Communication Model

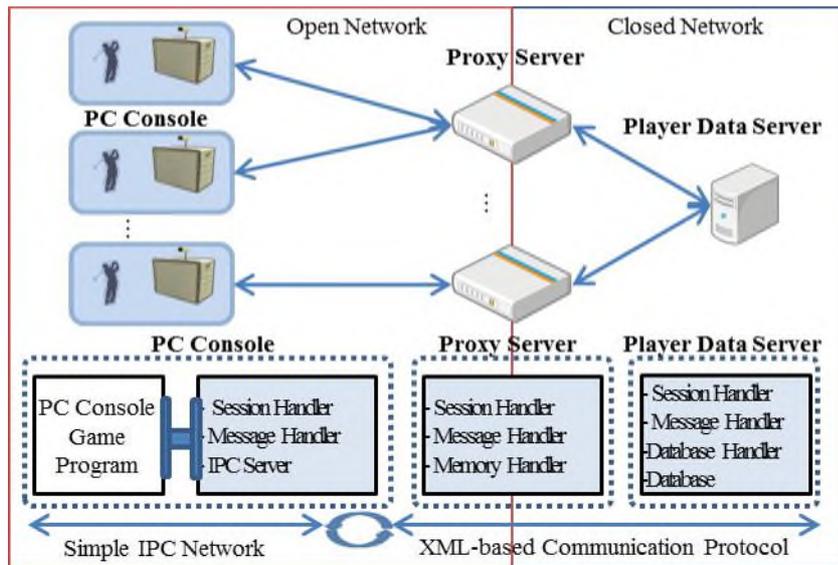


Fig. 1. The structure of the communication model

3.1 System Structure

The communication model proposed in this paper for a continuous golf simulator game consists of PC consoles, a proxy server, a player data server and a XML-based communication protocol, as shown in Fig. 1. The most of the existing indoor golf game simulators have PC consoles only. However, in the golf game simulators proposed in this paper, a PC console is nothing but the nearest device to a player

A Communication Model to Support Continuous Indoor Golf Simulator Games

among devices which are responsible for a golf simulator game in which the player is involved. In addition to the PC consoles, a proxy server and a player data server exist in order to support the continuity of indoor golf games. The PC console client, installed in a PC console, communicates with the proxy server. The proxy server is responsible for data communication and session management between the PC console client and the player data server. All of the data related to the game in which the player has been involved are stored in the player data server for later use. In order to resume his golf game afterwards, some game information can be downloaded to the PC console client, which is not necessarily the same PC console as one where the player paused his game.

3.2 Communication Protocol

Fig. 2 illustrates the flow of the communication protocol proposed in this paper. The protocol performs data synchronization operations between PC console programs and a player data server. The communication protocol makes it possible for game information to be consistent between the PC console programs and a player data server by reflecting any changes on game information stored in the PC console program in the player data server via the proxy server, whenever game information is stored or updated in the PC console.

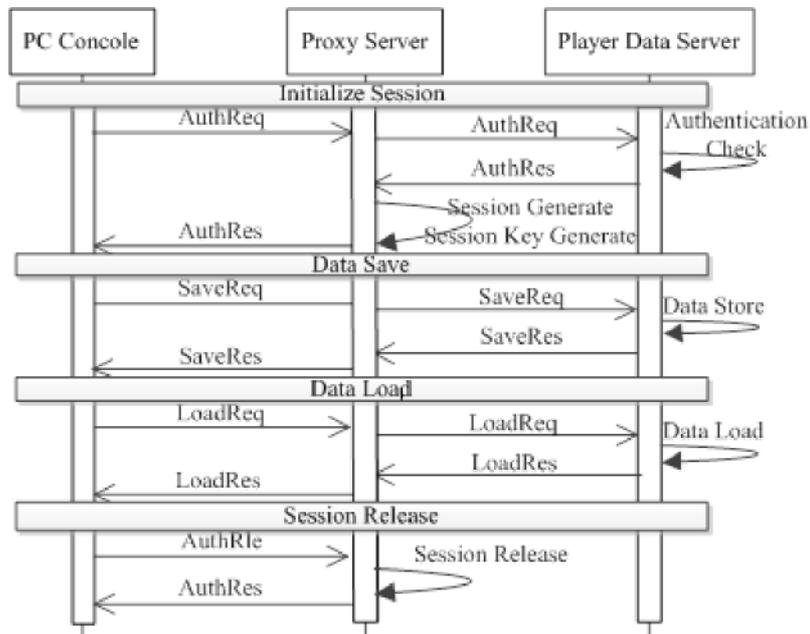


Fig. 2. Flow of the communication protocol

The communication protocol consists of 4 phases - session initialization, data load, data save and session release. The session initialization phase, the data load phase and the session release phase are executed only once, while the data save phase can be executed more than one time according to the times to store game information. The data load phase is executed when a game resumption is requested.

4 Conclusion

In this paper, a communication model which supports a continuous indoor golf games is proposed. The communication model allows a player to pause his game anytime he wants and to resume his game anyplace afterwards, by applying DS protocols. With the communication model, a golf player can suspend his game and then resume the game afterwards anytime anyplace. Due to the XML-based DS protocol, the protocol upgrades and updates can be performed easily. Putting a proxy server between a PC console and a player data server makes it easy to authenticate players.

Currently, a network system with which an indoor golf game simulator can support a continuous indoor golf game is being developed. More efficient communication protocols will be studied afterwards.

Acknowledgements. This work (Grants No. 0002985) was supported by Business for Academic-industrial Cooperative establishments funded Korea Small and Medium Business Administration in 2012.

References

- 1.Su-Ik Lee.: The effect of motivation of virtual reality sports and service factors on leisure satisfaction. Sejong University, Master's Thesis (2011)
- 2.Sang-Hyuk Ahn.: Development of a simulator for Interactive 3D Golf Game. Hallym University, Master's Thesis (2007)
- 3.Byeon-min Moon.: The Study of Screen Golf's fun factors on exercise immersion experience, participating satisfaction and exercise continuation behavior. Silla University, Master's Thesis (2010)
- 4.HotSync, <http://www.accessdevnet.com/docs/conduit/win>
- 5.D, Boling.: Programming Microsoft Windows [cs.net](http://www.cs.net), Microsoft Press(2004)
- 6.OMA DS Protocol Specification Version 1.2, <http://www.openmobilealliance.org>
- 7.We Hansmann, Riku Mettala, Apratim Purakayastha, Peter Thompson.: SyncML Synchronizing and Managing Your Mobile Data. Prentice Hall Pub. Co., pp. 21--24(2003)
- 8.Ju-Geon Pak, Keehyun Park.: Construction and Validation of a Data Synchronization Server upporting OMA DS Standards. Journal of the Korea society of computer and information, ol. 16, No. 5, pp. 79-91(2011)
- 9.KeeHyun Park, Ju-Geon Pak.: Efficient Transmission Method for Mobile Data Synchronization Based on Data Characteristics. Lecture Notes in Electrical Engineering, Vol. 120, pp. 253-266(2011)