

WiiRemote Programming: development experiences of interactive techniques that can be applied to education for young engineers

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1 Education issues of computer interaction techniques at technical college

Programming education is very important in engineering education; however it is a challenge to find attractive issues for students that can motivate them. Students especially, need complex skills to develop new interactive projects that use noble devices. Kosaka, a lecturer of programming in the “Global Information Technology department at Kanazawa Technical College” which provides educations for game programming, application development project s and international language skills. Students’ skills are not high at the beginning. Nevertheless, they are not interested in a text-based programming assignment such as “Hello Worlds.” They are, however interested in the development of video games and software, but they are unmotivated to learn the fundamentals of basic C language and coding. To motivate students to learn codes they need more stimulating methods; standard of text-base teaching is no longer effective. To motivate students, Kosaka introduced them the WiiRemote, a game controller of Nintendo Wii, to learn C# with WiimoteLib. Students immediately took an interest and initiated dialog with the teacher, asking “How can I obtain the value of acceleration sensors?”

2 IVRC: Student contest around the world

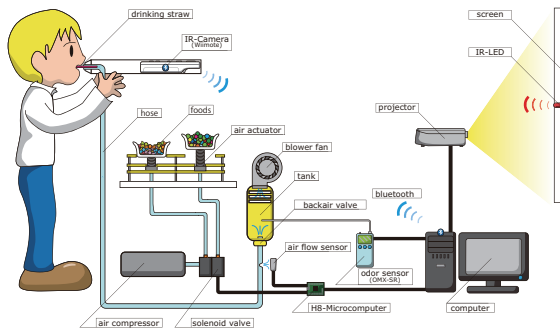


Figure 1: System of “La Flèche d’odeur” by Iwamoto et al..

Iwamoto (Kosaka’s student) and his team participated in an international competition “International Collegiate Virtual Reality Contest (IVRC)” with a project, “La Fl’èche d’odeur” a shooting game system which configured a smell sensor and WiiRemote (Fig.1). IVRC was established in 1993. It is a contest of interaction and virtual reality by fusing art and technology. Their team won at the 3rd place at IVRC 2008. The project also placed at Laval Virtual ReVolution 2009 in Laval France, SIGGRAPH 2009 Emerging Technologies

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in New Orleans, U.S.A. and Digital Contents Expo ConTEX 2009 in Tokyo, Japan. Finally, their education had been perfected with world-wide presentations by a WiiRemote project.

3 A textbook “WiiRemote Programming”

Akihiko Shirai studied the development of WiiRemote in PC environment for research of new interactive techniques. His experiments were archived as a book, WiiRemote programming with Kosaka, Kimura (a graduated software engineer from IVRC), and some Flash contents creators. The book was designed as a textbook to explain about mathematics, physics and programming essentials through WiiRemote developments in several language environments such as scripting of GlovePIE, processing, ActionScript, C++, C#.NET and XNA with fundamental hands-on examples. The book was aimed at high school or technical college students who have an interest in programming in Kosaka’s method. The book also described some latest application developments for higher educated readers to explore new interactive techniques using WiiRemote with the latest methods of human-centered interaction design. It tells that there is a continuing path of interactive techniques to learn programming with attractive motivations by innovative game controller for young engineering students.

4 Workshop developments

We had a few opportunities to teach our experiments of WiiRemote techniques to students at a university. These experiences had been redeveloped for the public as a workshop which gives opportunities to develop new interactive toys and games using consumer electronic devices. It was very effective for young students to learn about the importance of mathematics and physics include trigonometrical function and gravity to understand physical condition of WiiRemote by realtime sensor data. Some participants were retired video game developers who would like to find new challenges in entertainment system development. They also made connections with other participants. Unfortunately, the cost for preparing materials like PC, Bluetooth adapter (\$20) and WiiRemote (\$40) is expensive. But the noteworthy difference with other materials like electronic circuits is its stability of WiiRemote as a concrete consumer device.

5 Conclusion

This article reported a case study, challenges for IVRC, textbook and workshops for learning interactive techniques using WiiRemote, a very stable consumer video game controller. As a background in Japan, “measurement and controlling by programming” is introduced into a new compulsory education in middle schools in Japan. Programming education is very important in engineering. We hope our experiences will contribute to improvement and advancement of new interactive techniques especially to constructing educations with attractive methods for young students.