AVSML: An XML-Based Markup Language for Web Information Integration in 3D Virtual Space

Yasuhiko Kitamura[1], Yatsuho Shibata[2], Keisuke Tokuda[2], Kazuki Kobayashi[2], and Noriko Nagata[1]

[1] School of Science and Technology, Kwansei Gakuin University
[2] Graduate School of Science and Technology, Kwansei Gakuin University
2-1 Gakuen, Sanda, Hyogo 669-1337, Japan
{ykitamura,scbc1030,tokuda,kby,nagata}@ksc.kwansei.ac.jp

3D virtual space can visually represent the spatial structure to users and it has been applied to many fields such as city planning, navigation, education, entertainment and so on. In the 3D virtual space, an agent can navigate a user in an interactive manner [5]. Various platforms to build a 3D virtual space and languages to control the agents have been proposed [1,2,3,4]. For example, VKSC (Virtual Kobe Sanda Campus) is a 3D virtual space of Kobe Sanda Campus, Kwansei Gakuin University [1]. In VKSC, an agent called Suzie guides a user in the campus upon his/her request.

3D virtual space gets more reality by integrating the real-world information such as the time, weather and the corresponding information of objects in it. Various sensor data can be used to represent the real-world information, but the Web information also can be used though it may be indirect and incomplete real-world information. If the virtual space is tightly connected to the corresponding Web information, it gets more reality [1]. Web information suppliers can inform the latest information to the users through the 3D virtual space and the users experience it in the virtual space.

How to integrate a 3D virtual space and the corresponding Web information is an interesting research issue. It is not good to hard-code the integration process but the process should be open in order that anybody can be involved in the integration. We are developing an XML-based markup language called AVSML (Agent and Virtual Space Markup Language) to integrate Web information that is distributed in a number of Web sites in a 3D virtual space. When a 3D virtual space is tightly connected to the Web information, it changes depending on the update. This means that an agent that inhabits in the space should be adaptive to the change. We are developing a guide agent that autonomously adapts to changes of the 3D virtual space.

We assume that 3D virtual space is composed of objects and agents. Objects are passive entities like buildings, gates and the background. Agents are active entities that can move in the virtual space and interact with the user through chatting. In our work, the Web information related to the objects in the virtual space is integrated as shown in Fig. 1. Some Web information can be visually represented in the virtual space. For example, a gate of building in the virtual space can be open or closed according to the Web information about the building and the background changes depending on the weather information from the Web. The other information may not be represented visually, but it can be presented by an agent. For example, an agent can explain that the School of Science and Technology is located in the building.

C. Pelachaud et al. (Eds.): IVA 2007, LNAI 4722, pp. 385–386, 2007.

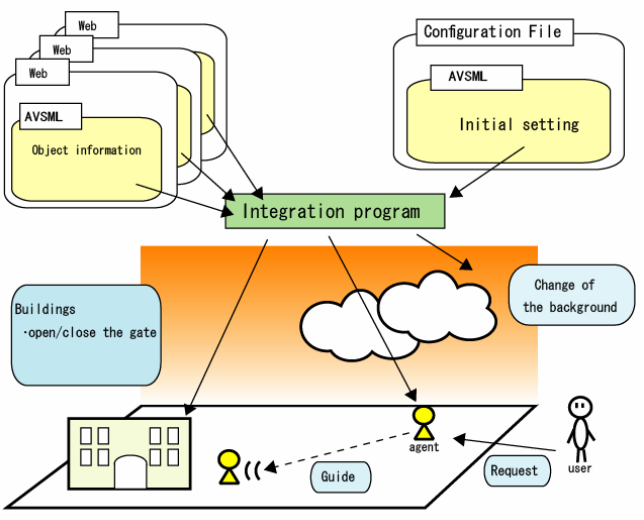

Fig. 1. Integrating Web information in 3D virtual space

As shown in Fig. 1, the integration program collects the related Web and reflects it in the 3D virtual space. If a user gives a request to an agent, the agent guides him/her in the virtual space.

To integrate the Web information in a virtual space, we need a language to describe that. It is not good to hard-code the process by using a programming language such as Java, because it is not easy to maintain the relation between the virtual space and the Web information. We are so developing an XML-based markup language called AVSML. XML is easy to be understood by human and easy to be attached to Web pages. Agents move around in the 3D virtual space and guide a user. If the virtual space changes according to the Web information, the agents need to adapt to the change. We can describe agent behavior as rules in AVSML to cope with this problem. For example, if a gate is closed on the way to a destination, the agent can choose an alternative route that is written in rules.

References

1. Kitamura, Y., et al.: Toward Web Information Integration on 3D Virtual Space. In: Kishino, F., Kitamura, Y., Kato, H., Nagata, N. (eds.) ICEC 2005. LNCS, vol. 3711, pp. 445–455. Springer, Heidelberg (2005)
2. Nischt, M., et al.: MPML3D: A Reactive Framework for the Multimodal Presentation Markup Language. In: Gratch, J., Young, M., Aylett, R., Ballin, D., Olivier, P. (eds.) IVA 2006. LNCS (LNAI), vol. 4133, pp. 218–229. Springer, Heidelberg (2006)
3. T.Ishida, Q.: Description Language for Interactive Agents. IEEE Computer 35(11), 42–47 (2002)
4. Ishida, T.: Digital City Kyoto: Social Information Infrastructure for Everyday Life. CACM 45(7), 76–81 (2002)
5. Prendinger, H., Ishizuka, M. (eds.): Life-Like Characters: Tools, Affective Functions, and Applications. Springer, Heidelberg (2004)