Language Learning in a Shared Virtual Space

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0740

The Asian Conference on Society, Education and Technology 2013

Official Conference Proceedings 2013

Abstract

This paper is a preliminary report on the development of a language learning environment called "JaJan!". *JaJan!* is being developed based on a platform composed of a pair of networked PCs, Kinect depth cameras, and large display screens. It supports creative play in customized video environments for language learning purposes. First, we provide a high-level overview of the platform underlying the *JaJan!* application. Second, we discuss how *JaJan!* can support various aspects of language learning. In this paper, we focus on: (i) learning in context; (ii) personalization of learning materials; (iii) learning with cultural information; (iv) enacting language learning scenarios; and (v) supporting creativity and collaboration. Last, we present the roadmap of our future development plans. Although *JaJan!* is still in early development, we are confident that it will bring profound changes to the experience of language learning.

Related Topics; Virtual immersive language learning, remote collaboration; shared space; Kinect technology; augmented reality; creative learning;

1. Introduction

This paper presents a preliminary report on the development of a virtual language learning application called "*JaJan!*". *JaJan!* is being developed using the platform developed by the Fluid Interface Group at MIT Media Lab (http://fluid.media.mit.edu/). The platform of *JaJan!* is a creative telepresence system, and it was originally designed to facilitate geographically separated families to communicate in the same shared virtual space. *JaJan!* is currently being developed specifically for language learning purposes on top of this platform. In this paper, we specifically discuss how *JaJan!* can support the following aspects of language learning: (i) learning in context; (ii) personalization of learning materials; (iii) learning with cultural information; (iv) enacting language learning scenarios; and (v) supporting creativity and collaboration. Although *JaJan!* is still at an infant stage, we are confident that it will bring profound changes to the ways in which we experience language learning and can make a great contribution to the field of language education.

The outline of this paper is as follows: Section 2 provides a high-level overview of the platform system of *JaJan!* and its basic functionalities. Section 3 presents characteristic features of *JaJan!* relevant to language learning. Here, we discuss how *JaJan!* can support the aspects of language learning mentioned above. Section 4 provides a roadmap of our future plans and concluding remarks.

2. High-level Overview of the Platform

The platform of *JaJan!* is a video mediated communication (VMC) system designed to support creative play in customized environments.[1] This system is composed of a networked PC, a Kinect depth camera, and a HD TV (see Figure 1). Video, audio, user and scene data are streamed directly between clients via a peer-to-peer protocol, and the system can allow users to interact together in virtual environments composed of digital assets layered in 3D space.

[Figure 1] Conceptual Diagram: Remote participants are together in the same shared virtual space

The platform system differs profoundly from conventional video technologies such as Skype by introducing a shared space for interaction. Conventional VMC technologies provide a live window between remote spaces, but they do not support users who

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[1] The platform system is called "WaaZam". See
http://fluid.media.mit.edu/projects/waazam for more details on WaaZam.

want to have shared experiences in the same virtual space. In this respect, our platform is intrinsically much more interactive and engaging than conventional video medias.[2]

The system has several rendering modes (see Figure 2). *Object mode* tracks the objects in users' hands and only shows the objects on the screen. *Everywhere mode* tracks the user and supports scaling, transformation, and layering in the depth space. *Ghost mode* allows users to experiment with blending their bodies together and appearing and disappearing at a fixed depth boundary.

[Figure 2] Puppet mode, everywhere mode, transformation mode, and ghost mode (from top left).

This system supports conventional videoconferencing (I see your space and you see mine), a merged "magic mirror" mode (you can appear in my space or I can appear in your space), and constructed fictional environments (where we can be together in digital sets). Users can use gestures or the mouse to transform their video image in the environment. This allows users to step behind objects, hide from each other, and inhabit environment at different scales.
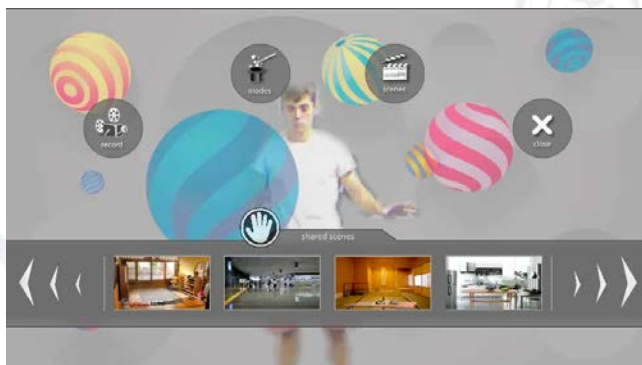
[Figure 3] Gestural Menu via the Kinect Technology

Users can select scenes during a networked session with others via a gestural menu (Figure 3). The menu is designed to allow users to switch between scenes and render-

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[2] Similar ideas have been explored in the past. See, for instance, Ledo et al. (2013), Brubaker et al. (2012), Yarosh, et al. (2010), Morikawa and Maesako (1998), Ishii and Arita (1994), among others.

ing modes (puppet, ghost, transform, or everywhere) during a play session. Users can also choose to record videos from the gestural menu. This feature is designed to allow users to share short videos of play episodes with friends and family.

Users can create their own scene via the scene-maker, which is composed of an asset menu, layout canvas, asset management windows, and scene management windows (Figure 4).

[Figure 4] Scene-Maker User Interface

3. Characteristics and Features of *JaJan!*

As mentioned above, *JaJan!* is being developed specifically for language learning purposes. This section discusses the features of *JaJan!* that contribute to language learning.

3.1. Learning in Context

Language learning requires context(s) where the target language (the language that a learner is learning) is being used. In the best of scenarios these interactions happen with a native speaker of that target language. In this respect, 'studying-abroad' is the best way for learning a new language. However, sending all your students abroad is not always feasible and it is not possible for language teachers to facilitate.

JaJan! provides a real-time environment in which users can simulate the experience of studying abroad by enacting scenarios with each other. With *JaJan!*, we can design our learning environments to feel like real situations, so that both users have the experience of being in a real context. For instance, Figure 5 is a screenshot of *JaJan!* where two users practice meeting for the first time in the Narita Airport. One user could be physically located in Japan and the other in the US, but both participants will be able to virtually meet together in customized video spaces.

[Figure 5] *JaJan!* with the scene Narita Airport

3.2. Personalization of Learning Materials

As mentioned above, the platform system allows users to create their own scenes using a user interface called the scene-maker. (see Figure 4 above). This aspect of the application is a great asset to *JaJan!*, especially in terms of customization of learning materials because people learn a new language for different reasons. Accordingly, learning materials should differ depending on learners' needs. For example, if you are learning a new language for traveling purposes, you may want to focus on expressions related to traveling (e.g., how to ask directions; how to order food; how to purchase train tickets; etc.). The fact that you can customize your learning materials inside *JaJan!* is a powerful feature for effective language learning because it make the environment more flexible to the individual needs of each learner.

3.3. Learning with Cultural Information

Languages are inseparable from the culture in which they originated, and it is important to learn a new language together with the customs of native speakers. For instance, the gesture of bowing plays a critical role in interacting with Japanese people, and it is imperative to teach how to bow or when to bow in addition to teaching actual greeting expressions. Learning various customs of the target culture is also very important. For instance, "taking off shoes at the entrance of a Japanese house" and "how to use chopsticks", should be introduced in a Japanese language class. *JaJan!* provides an interface that allows users to demonstrate non-verbal cultural information and body language.

3.4. Enacting Scenarios

Unlike conventional language textbooks, *JaJan!* requires users to "act scenarios out" inside a shared space using the target language. This encourages users of *JaJan!* to be active learners (as opposed to passive learners) and to re-enforce their communicative skills in the target language. Further, "acting things out" is more engaging and immersive, which is critical to holding the attention of young learners.

3.5. Creativity and Collaboration

One of the unique characteristics of *JaJan!* is that it can foster learners' creativity and collaboration skills. For instance, we can ask students to create a story in the target language; play it using the scene(s) they create; and video-record the interaction in-

side *JaJan!* to create videos for presentation to other students. Students can do this type of activity collaboratively as well as on an individual basis. The focus on shared experiences and customization within *JaJan!* has a great potential to unleash learners' imagination and creativity. We see the platform as a space for generative possibilities where learners can develop new ways to learn by collaborating at a distance and use the web to share videos that illustrate their learning process.

4. Roadmap and Concluding Remarks

As mentioned at the outset of the paper, *JaJan!* is still at an early stage. It is designed in an open ended way so that it can develop - both technically (in terms of the network protocol) and conceptually (from a user experience standpoint). Currently, we plan to focus on implementing key experiential features.[3] First, we would like to explore methods of making the environment more interactive and intuitive for learners. One feature that could help to this end is to give objects in the scene renderer "interactive capabilities"; for example, if we can move around objects inside JaJan!, "enacting" would become more realistic and natural. We plan to add this feature to JaJan!. Second, we would like to make the feature of personalization more fluid and user-friendly. The current user interface of the scene-maker allows users to customize their own scenes and props but it has not been user tested and is not generalizable to all audiences. We plan to make the whole customization experience more cohesive and seamless. Our third focus is to examine how users would use JaJan! and what types of features they want to have for language learning. To this end, we plan to conduct user interviews after studying how people interact with the user interface and interact with each other for language learning with *JaJan!* in the future.

Our ultimate objective is practical; we would like to extend *JaJan!* by developing network technologies that will enable it to be used in real classrooms and integrated into existing language curricula. We are confident that *JaJan!* will be an innovative language learning environment for users from all over the world to participate, interact, and collaborate together virtually in a immersive and engaging environment.

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[3] In terms of engineering, we would like to focus on the question of how we can design the framework in an extendable - cross platform way that will allow others to extend it - and possibly start an open source project for peer to peer learning environments.

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