

Chapter 8

JAMIOLAS 3.0: Supporting Japanese Mimicry and Onomatopoeia Learning Using Sensor Data

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ABSTRACT

In this article, the authors propose an improved context-aware system to support the learning of Japanese mimicry and onomatopoeia (MIO) using sensor data. In the authors' two previous studies, they proposed a context-aware language learning assistant system named JAMIOLAS (Japanese Mimicry and Onomatopoeia Learning Assistant System). The authors used wearable sensors and sensor networks, respectively, to support learning Japanese MIO. To address the disadvantages of the previous systems, the authors propose a new learning model that can support learning MIO, using sensor data and the sensor network to enable context-aware learning by either initiating the creation of context or detecting context automatically.

1. INTRODUCTION

Context-aware computing (Abowd & Mynatt, 2000) can assist the organization and mediation of social interactions wherever and whenever these contexts might occur (Fischer, 2001; Lyytinen & Yoo, 2002). Context-aware computing in the field

of language learning makes it possible to teach foreign language words while relating to people's response to context. With current developments in mobile technology, we can obtain the required contextual information from the environment around us (Ogata & Yano, 2003).

Computer Supported Ubiquitous Learning (CSUL) has integrated high mobility with embedded computing environments (Chen, Kao,

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Sheu, & Chiang, 2002; Ogata & Yano, 2004). With developing mobile technology, sensors will increasingly be integrated into each mobile device, so that while the learner is moving with such a device, a mobile system could dynamically support learning by communicating with embedded computers and sensors in the environment. In the future, with the help of sensors, ubiquitous environments will know our context well enough to help us solve various problems. At the centre of ubiquitous environments, sensors will become one of the key technologies of the 21st century.

The main characteristics of ubiquitous learning are as follows (Chen et al., 2002; Curtis et al., 2002):

1. **Permanency:** Learners never lose their work, unless it is purposely deleted. In addition, all their learning processes are recorded continuously every day.
2. **Accessibility:** Learners have access to their documents, data, or videos from anywhere. That information is provided based on their requests. Therefore, the learning involved in this system is self-directed.
3. **Immediacy:** Wherever learners are, they can get any information immediately. Thus, learners can solve problems quickly. Otherwise, the learner can record questions and look for answers later.
4. **Interactivity:** Learners can interact with experts, teachers, or peers in the form of synchronous or asynchronous communication. Hence, experts are more reachable and knowledge becomes more available.
5. **Situating of instructional activities:** The learning can be embedded in our daily lives. The problems encountered as well as the knowledge required are all presented in their natural and authentic forms. This helps learners by notifying them about contextual features of a problem and provides relevant actions.

We are focusing on applying CSUL to language learning and are investigating computer supported ubiquitous learning (Ogata & Yano, 2004). We have previously proposed a context-aware language learning assistant system called JAMIOLAS (Miyata, et al., 2008; Ogata et al., 2007; Ogata, Yin, & Yano, 2006) for learning Japanese mimicry and onomatopoeia (MIO) words. The previous two studies used wearable sensors and sensor networks respectively to detect the learner's context automatically, and achieved certain positive effects. However, these systems still cannot meet learner needs, because most of the words that could in theory be taught using context-aware learning cannot actually be supported by these previous systems. Therefore, in this article, we propose a web-based system named JAMIOLAS 3.0 that can support learning MIO by using sensor data from the Internet in order to implement context-aware learning. In addition, we use on-line media to support sensory learning.

2. JAPANESE MIMICRY AND ONOMATOPOEIA

Mimicry and onomatopoeia (MIO) are a very interesting language phenomenon. Mimicry words imitate situations and body movements, while onomatopoeia reflects the sound of something (Ogata et al., 2006). MIO is a widespread language phenomenon, but Japanese is very rich in it. According to the Japanese Onomatopoeia Dictionary (Ono, 2007), there are more than 4,500 MIO words in Japanese. The use of MIO has become a part of every aspect of Japanese life. Although MIO is so important, the traditional way of learning requires great effort to remember both the meanings and the usage. The result is usually unsatisfactory because learning Japanese MIO expressions includes the following difficulties (Flyxe, 2002; Inose, 2007):

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