Development of a Chest X-ray Examination Support System for Foreigners Using a Personal Digital Assistant

Mitsuru Miyata[1,*], Chikamune Wada[1], and Masahiro Iinuma[2]

[1] Kyushu Institute of Technology, Graduate School of Life Science and Systems Engineering, Department of Biological Functions and Engineering, Japan
miyata-mitsuru@edu.life.kyutech.ac.jp,
wada@life.kyutech.ac.jp
[2] ITS-Japan Inc.
async.sync@gmail.com

Abstract. According to the report about inconvenient for foreigners, there are a lot of problems when communicating with medical staff in the medical service. Considering the spread of digital personal assistants and mobile phone, we proposed a communication support system using these devices for foreigners, which would be able to be easily used in medical service. In this paper, we developed the communication support system for X-ray examination, especially. From the experimental results, we concluded the effectiveness of our system because necessary time for X-ray examination was shortened when using our system.

Keywords: Quality of life and lifestyle, X-ray examination, Communication, PDA, Mobile phone.

1 Introduction

From the Ministry of Justice in Japan, the number of foreign registrants and the foreign immigrants are approximately 2,130,000 and 9,440,000, respectively in Japan. It was reported that most awkward place for foreign people was a hospital because they did not communicate well with medical staff in Japanese from the Agency for Cultural Affairs in Japan. However, there were few trials which could improve communication quality for foreign people in the medical activities.

Incidentally, most awkward place was a hospital too for the hearing impaired. We are developing a chest X-ray examination support system for the hearing impaired [1]. In our system, instructions for X-ray examination would be displayed on a screen of personal digital assistant (PDA) such as iPhone because the PDA became more popular recently in the world. Therefore we decided to develop a chest X-ray examination support system for foreigners by using the results for the hearing impaired.

* Corresponding author.

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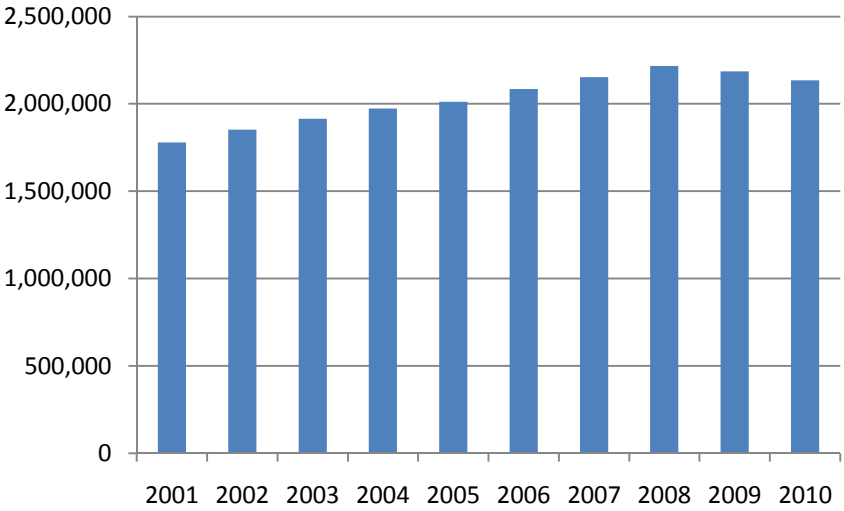

Fig. 1. Annual number of foreign residents in Japan

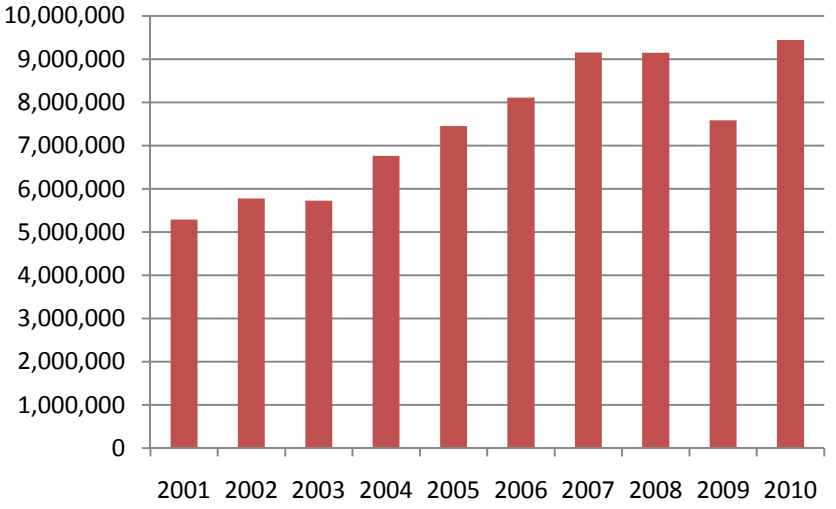

Fig. 2. Annual number of foreign visitors in Japan

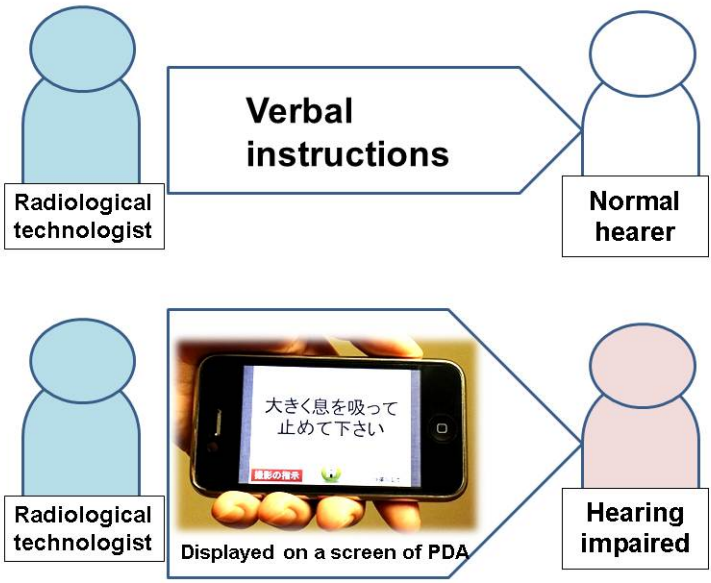

Fig. 3. Overview of our system for the hearing impaired

2 Outline of Our System

When hospitals or medical staff did not prepare communication method with foreign patients, if the foreign patients had their own PDAs which could display examination instructions, the patients would take medical examination by following the instructions of medical staff.

Figure 1 shows the outline of our system. Our system would have the following steps: (1)making presentation data in foreign language and data includes phrase/sentence list which are used in the chest X-ray examination in Japan, (2)uploading the data to our Web page, (3)letting the foreign patient download/install the data to his/her own PDA, (4)asking the foreign patient to bring his/her PDA to the hospital, (5)to hand the PDA to a medical staff(radiological technologist), (6)displaying an examination instruction on a PDA screen by medical staff in a hospital, (7)the foreign patient should obey the instruction which is displayed on his/her PDA.

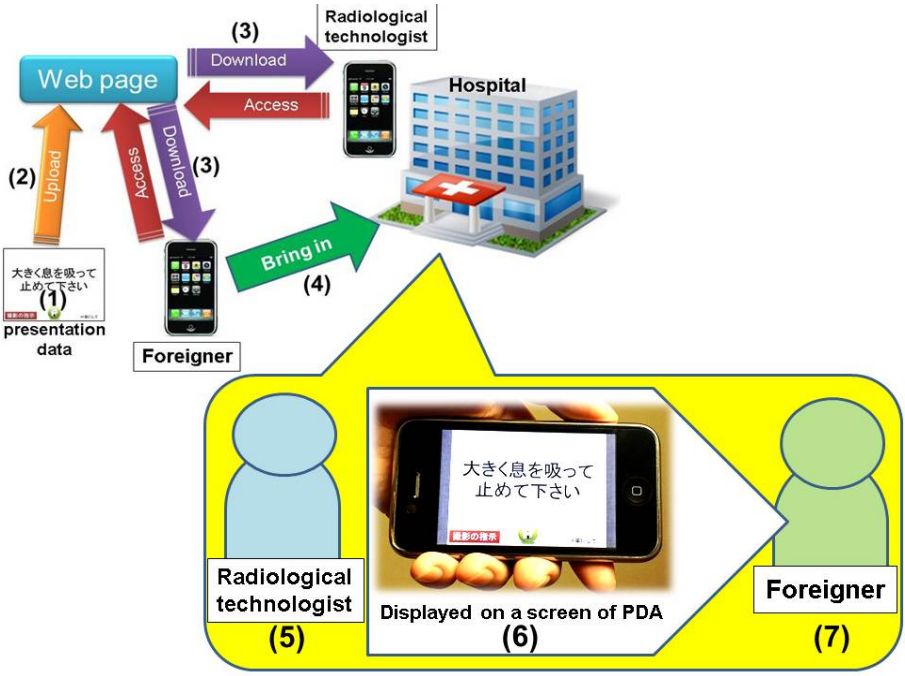

Fig. 4. Overview of our system for foreigners

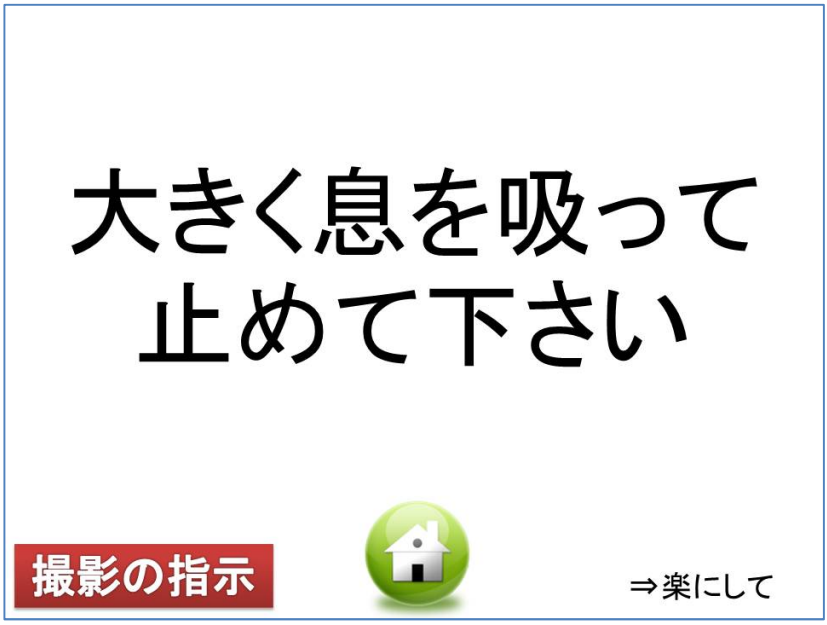

Fig. 5. An example of display data in Japanese

Fig. 6. An example of display data in English

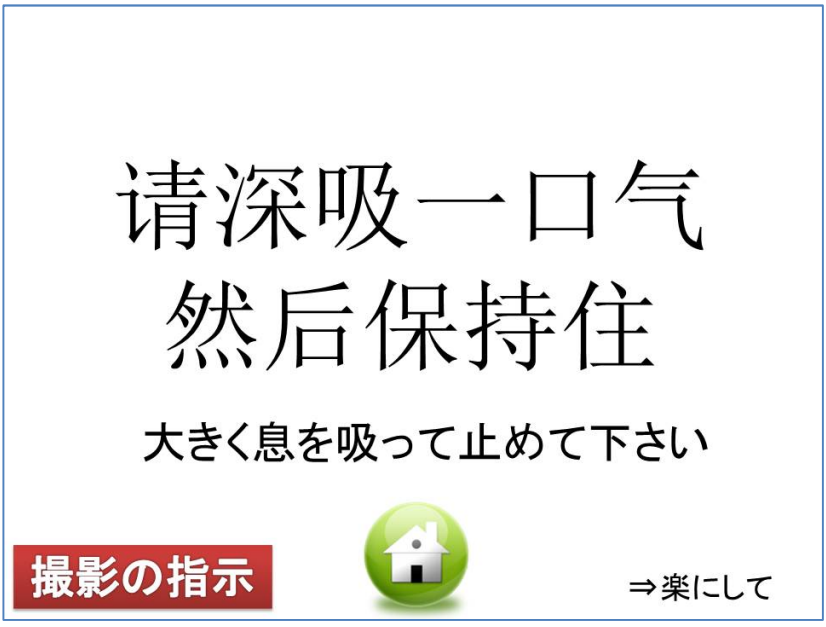

Fig. 7. An example of display data in Chinese

3 Expected Advantage of Our System

1. The examination instructions are almost same in a medical examination. Then, if one example of presentation data is completed, our system would be available after modifying small correction in order to adjust to the different instruments or different examinations
2. The hospitals or medical staffs do not need preparation for foreigners because PDA is brought by the foreign patients themselves.
3. The PDA is small size and light weight. Also, the instructions are easily legible because of back light if examination room is dark.

4 A Future Plan

We are developing this system and evaluation experiment to effectiveness of our system will be executed. Then, in the oral presentation, we are going to reveal usefulness of our system for the foreigners from the experimental results.

Reference

1. Miyata, M., Wada, C., Iinuma, M.: The usefulness of the X-ray examination support system for hearing-impaired person using the personal digital assistant. In: Proceedings of the Human Interface Symposium 2012, pp. 297–304 (2012) (in Japanese)