

A WEB-BASED HOME WELFARE AND CARE SERVICES REQUEST SYSTEM USING A PEN TYPE IMAGE SENSOR

Hidekuni Ogawa Yoshiharu Yonezawa Hiromichi Maki Haruhiko Sato Ishio Ninomiya W. Morton Caldwell

INTRODUCTION

In Japan, Home Helpers are employed by hospitals, care companies or welfare offices to provide in-home care services for elderly persons. We recently reported the development of a web-based Home Helper support system [1, 2], which can send care reports directly from the elderly person's homes to the office server computer. However, the care items are often changed by request from the elderly person and the Home Helpers need to know these changes as soon as possible. In this study, we enhanced the home welfare and care services request system, using an Internet client computer having a pen type image sensor for handwritten care requests. Previously, the system was restricted to pre-printed request cards. This system automatically transfers the requests to the Home Helper's mobile phone LCD screen on a 24-hour basis.

SYSTEM DESCRIPTION

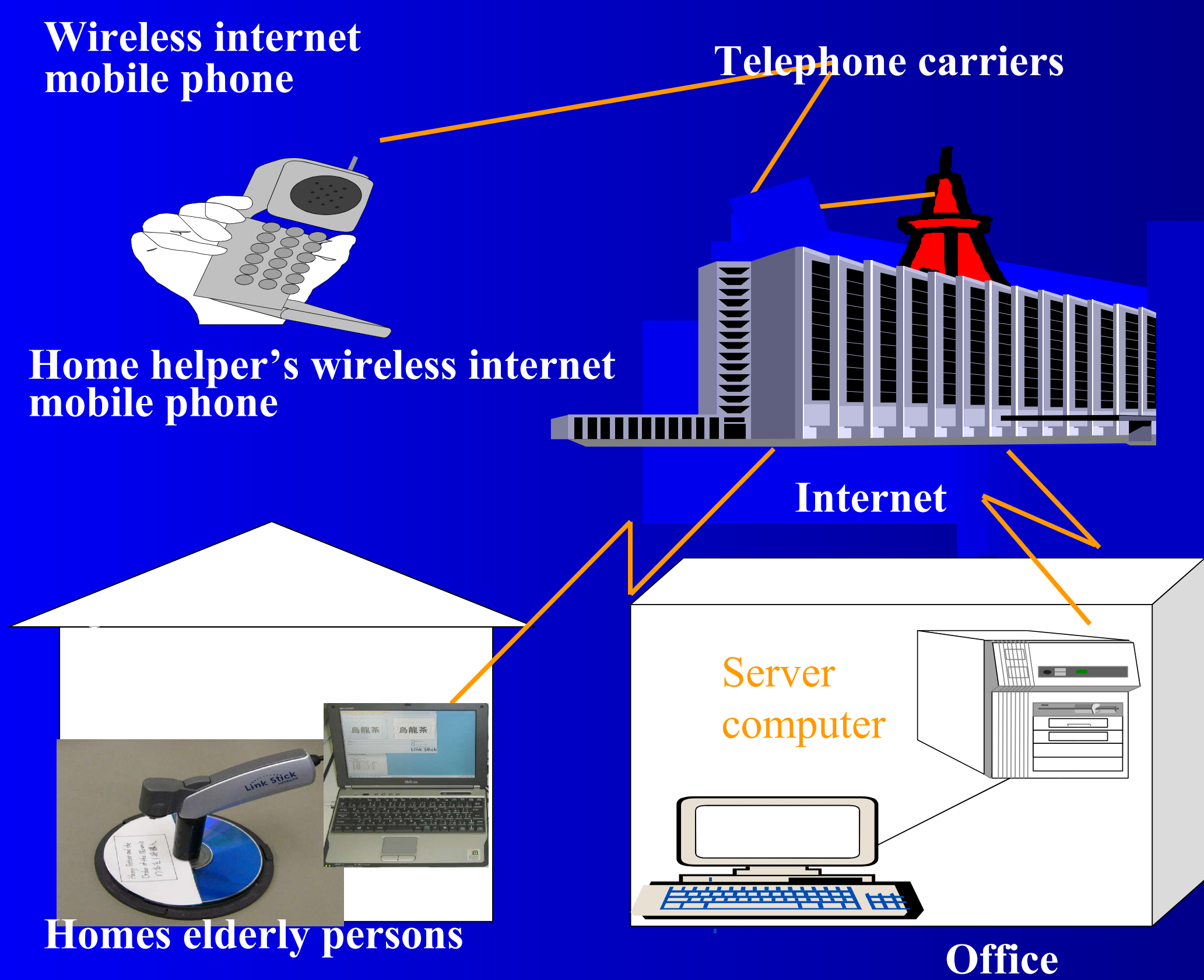


Figure 1. The schematic diagram of the web-based home care service support system.

The schematic diagram of the web-based home welfare and care services request system, which consists of Internet client laptop computers with a pen type image sensor, a central office desktop server computer and wireless Internet mobile phones.

SYSTEM EXPERIMENTAL TRIAL

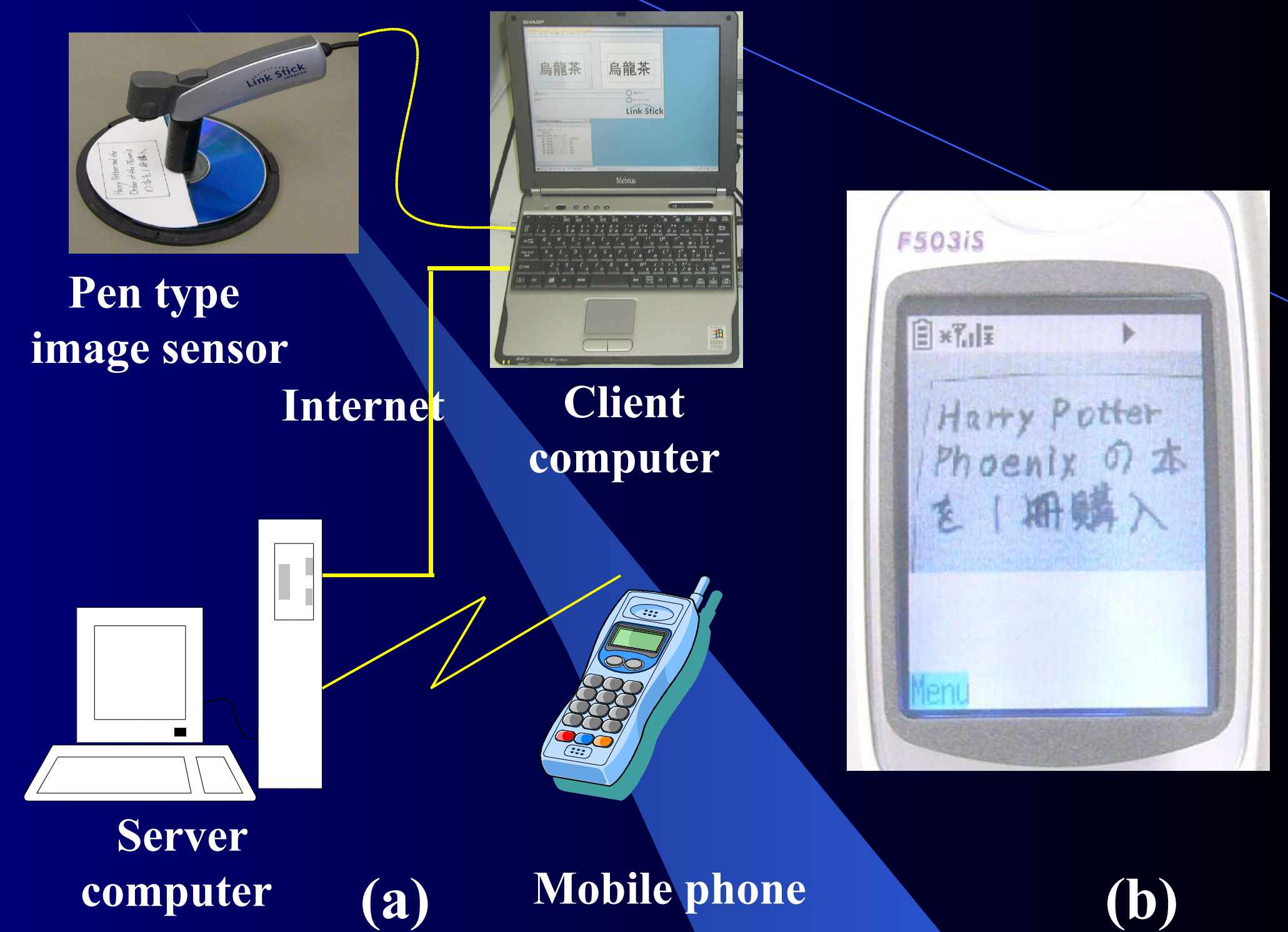


Figure 3. The trial experimental system. (a) Over view, (b) Displayed on the LCD of a mobile phone.

The experimental system for the performed character recognition tests. The system consists of a Crusoe 600 MHz Windows laptop client computer (PC-SX1-H1, SHARP), the pen type image sensor, a Pentium III 1 GHz Windows server computer and an Internet mobile phone (F503is, NTT Docomo Japan). The character recognition testing used handwritten kanji, Hiragana, Katakana, Numeral and Roman alphabet characters in approximately 20, 24, 28 and 32 point sizes. The character readings, from the mobile phone screens, were performed in each point size by 10 people.

RESULTS & CONCLUSION

Table 1
Character recognition at various sizes

	20point	24point	28point	32point
Numeral	95.5%	97.0%	100.0%	100.0%
Roman	85.4%	96.9%	98.1%	100.0%
Katakana	97.4%	97.2%	99.3%	99.7%
Hiragana	97.4%	99.1%	100.0%	100.0%
Kanji	95.0%	97.9%	100.0%	100.0%

The character recognition rates. At 28 or more points, all character recognition exceeded 98.1%. At 32 points, all characters except Katakana were 100%. These results indicate that handwriting at a large 32 point character size is most suitable for the request cards. However, Roman and Katakana generally employ sentences, and therefore the Home Helper can understand a request card described in 28 point even if one or more characters are not recognized. The maximum number of characters on the test cards were 24 in kanji, Hiragana, Katakana and 36 in Roman and numerals.

In this study, we developed a web-based welfare and care services request system consisting of conventional computers, pen type image sensors and standard Internet mobile phones. Elderly persons can easily input and send their handwritten care request cards by use of this system.

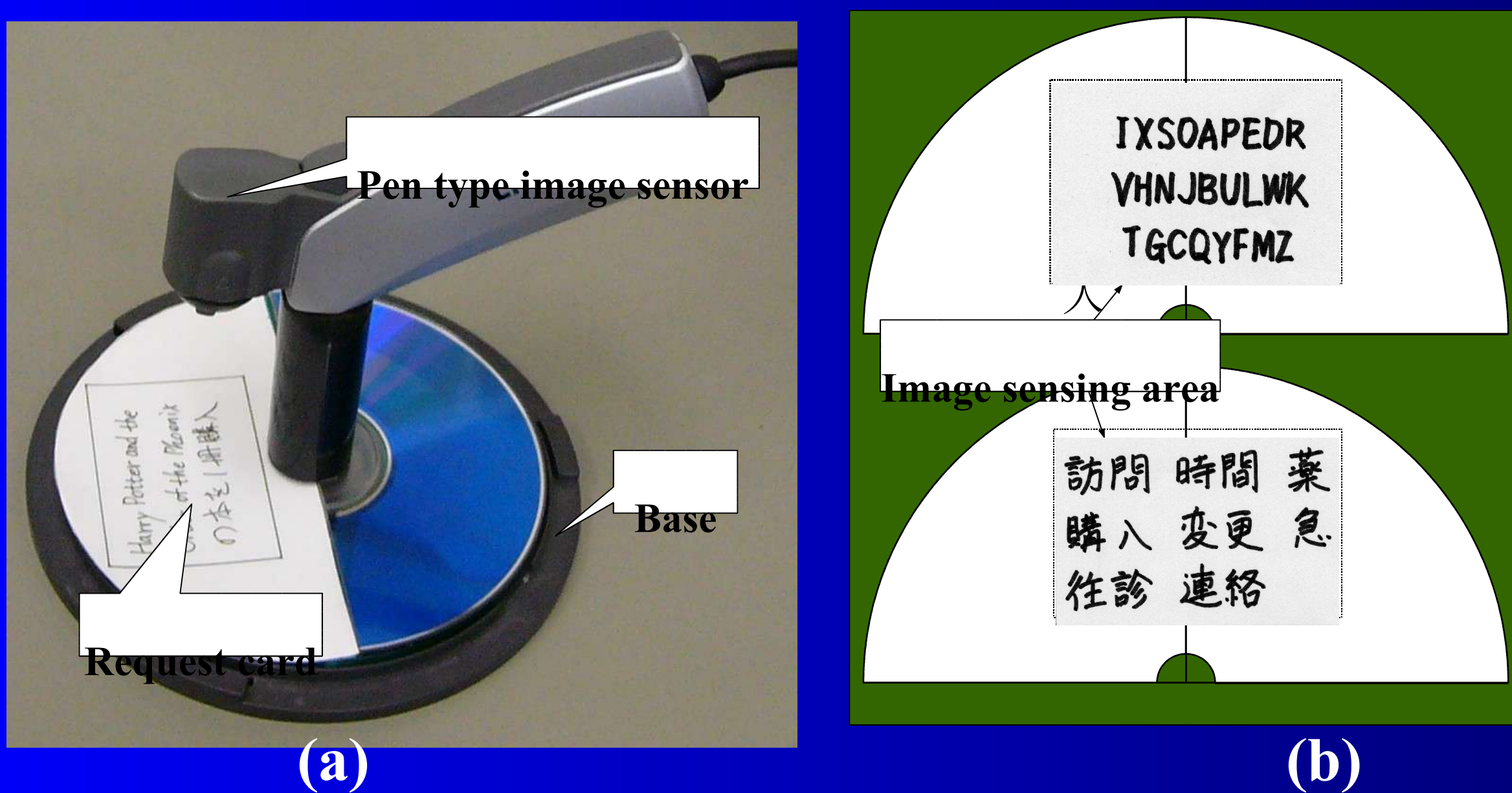


Figure 2. The pen type image sensor attached to the base and Request cards. (a) Over view, (b) Image sensing area.

The client laptop computer, which is placed in the elderly person's home, is used as the Internet link for the care request system. The pen type image sensor (LinkStick, HITACH) has 640x480 image elements, a F2.0 lens and a 37.5 mm-to-infinity focus range. It is mounted 70mm above a base plate, as shown in Figure 2(a). The image sensing area is 7.5 cm x 5 cm. The request card, shown in Figure 2(b), may be handwritten in Japanese Kanji, Hiragana, Katakana, Numeral or Roman alphabets. The card is put on the base plate and captured as an image by the client laptop computer.

The captured image is automatically sent via the office server computer to a Home Helper's mobile phone by e-mail.

