

# Chapter IX

## Q-R Code Combined with Designed Mark

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### ABSTRACT

*The mobile Internet has been used widely in Japan. If we use a cellular phone with the Quick Response (Q-R) code reader function (a two-dimensional code developed by Denso-Wave Corporation), we can very easily access a Web site. However, though the existence of Q-R code reader function in the cellular phone is well-known, not many people use the function. The reason is that the Q-R code is not intuitive because it was developed to be read by machines. Our idea to solve the problem is to combine the Q-R code with a designed particular picture or graphic. We propose a method to produce the designed Q-R code and we develop its production system. This chapter describes the proposed method, the production system, and evaluation results using some designed Q-R codes produced by the system.*

### INTRODUCTION

Internet users are in large number, and users using Web access by mobile phone have been increasing rapidly. Web accessibility is discussed widely, and the guidelines have appeared generally (Loiacono,

2003). Social mobile applications and search technology by mobile phone are described in some articles (Dailey Paulson, 2005; Smith, 2005). Ubiquitous society computing systems are used everywhere and by everyone; it will be important to develop a new technology for easy access to and

understanding about Web sites for mobile phone (Hong, 2005).

In recent times, a 2D (two dimensional) code such as Quick Response (Q-R) (Q-R code, 2006), code developed by Denso-Wave Corporation, has been a popular way to access a Web site using a cellularphone. We proposed and developed a reliable and useful information distribution system named "Kuchicomi Network," which was reported in the 15<sup>th</sup> European-Japanese Conference on Information Modelling and Knowledge Bases (15<sup>th</sup>-EJC 2005) (Sasaki, Yoneda, & Funyu, 2005; Sasaki, et al., 2006). In this system, Q-R code, which includes the uniform resource locator (URL) of the Kuchikomi site, is used to access the site easily for a user.

Although about 90% of people know about 2D code in Japan (Mitsubishi Research Institute, Inc. Report, 2005), only about 40% are real users. As the two-dimensional code was developed to be read only by machines, there are no easily recognised characteristics for humans to see. With this in mind, we have developed a designed two-dimensional code that is more recognisable so that more people will be able to use it (Sasaki, et al., 2006).

The designed 2D code is produced by combining a 2D code with a particular picture or graphic of a character or mark. We propose its production method and a system to develop and to evaluate it. After experimental evaluation on the designed two-dimensional code produced by the system, we can obtain a good effect on the human feeling about the two-dimensional code.

## **BACKGROUND**

When we use a credit card in a real shop or an Internet shop, our privacy information is transferred to the financial company by using the secure electronic transaction (SET) protocol to keep the information secure (Mastercard & Visa, 1997).

Much research has reported privacy technologies such as privacy enhancing technology (PET) for the Internet user (Goldberg, Wanger, &

Brewer, 1997; Rezgul & Bouguettaya, 2003). An advanced protocol named 3-D Secure<sup>TM</sup>, where a password is needed to input, has been used more than SET (Visa, 2002).

Recently, as Ubiquitous Society has been come, we can access everywhere using mobile devices. More enhanced technologies are required. Tamaru et al. (Tamaru, Nakazawa, Takashio, & Tokuda, 2003) proposed a privacy profile negotiation protocol (PPNP) for services in public spaces. The proposal is related with an access control technology to access private information according to a privacy policy. Furthermore, the World Wide Web Consortium (W3C) provides platform for privacy preferences (P3P) as a privacy policy of Web application service (W3C, 2006).

There are some kinds of certification technologies, for example, by password, by hardware token such as ID cards or USB key, or by Vaio Metrics, which is a certification method by using human characteristics such as fingerprint or iris. These technologies are compared and evaluated logically by many researchers (O'Gorman, 2003). Password is the most popular method to make a certification to access a Web site. But, disadvantages of password certification method are described, while a two-method combination by password and hardware token and Vaio Metrics are proposed in some papers (Kun, 2004). There is a different method than password. Rachna proposed that a user selects the before registered image picture in many given image pictures (Rachna & Dphamiji, 2000). Though this method would be more reliable than using password, it would be a little complicated because it is also using a human's memory.

On the other hand, secure communication is an important issue, as well as the certification function to realize a high-secure information system. There is a standard activity to make a secure communication by using security code such as secure socket layer (SSL)/transport layer security (TLS) (Housley, Polk, Ford, & Solo, 2002). Further, new problems occur such as phishing, which

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