

QFD and Knowledge Management

QFD Application on the Development of a Finger Vein Authentication Device

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This paper is available from: [2007 International Symposium on QFD](#)

Also see newsletter "[The case for adding Security Deployment to QFD](#)"

2. Finger Vein Authentication Device

2.1 Outline of the company

Hitachi Omron Terminal Solutions Co., Ltd., founded with capital of 8,500 million yen, employs 1,114 people, as of 31 March, 2006. Their main products include ATM machines for financial institutions, coin dispensers, and service counter support systems for bank branches.

2.2 Description of the Finger Vein Authentication Device

The finger vein authentication device uses a technology which transmits near-infrared light through a finger to generate vein patterns to conduct ID authentication. This revolutionary high-precision, high-speed technology is thought to provide the highest level advanced authentication method in the world. Among the many biometric authentication methods, it is the only type that uses the internal physiological characteristics that are invisible externally, making forgery very difficult. This next generation biometric authentication technology captures high-contrast maps of finger veins from an image obtained from light transmission, with the help of artificial intelligence, and matches them to the pre-registered vein patterns to authenticate the identity of an individual. Because the recognition is focused on the vein structure alone, it delivers a high level of authentication accuracy even if some irregularities might be present in the input image. Because it is converted into referencing image data and compared with the pre-registered data, it results in achieving highly accurate authentication.

2.3 The Objective of QFD Application

Finger vein authentication devices for the financial industry are used in the console pad of ATMs. This device for the financial industry features a high degree of authentication capability, high-speed processing that does not negatively affect existing transactions, a high level of security, a user friendly design, high reliability, and low cost.

The objective of using QFD was to understand the user needs from the company's medical field application and translate them into technical requirements, so that they could use the findings in the design and development of a new device. In other words, the company aimed to accelerate its business development in other security markets besides financial institutions, by developing a finger authentication device for medical use with the help of QFD.

The software development process involved a study of specifications, coding and debugging, and evaluation. The hardware development process involved a study of specifications, design, and evaluation. This paper reports the focused application of QFD in the specification study phase.

2.4 QFD Application Project

At a university hospital there are devices for patient check-in, electronic patient records, treatment systems, pharmacy systems, room access systems, and so forth, as well as a server that manages these systems. This QFD project involved development of the hardware and software for these existing systems. A total of 98 units of finger vein authentication devices will be delivered, including 6 for patient check-in, 30 for electronic patient records, another 30 for treatment systems, 1 for the pharmacy system, and 30 for controlling room access. Software will be delivered for a server, patient check-in, electronic patient records, treatment systems, pharmacy, and room access control.

[Notes]

- (1) Because the company was entering a new market in which they did not have know-how, the target market had to be clearly defined (market segmentation); we identified large medical institutions such as university hospitals as the target market for this project.
- (2) Because a finger vein authentication device is a brand new product and technology, it was important to clearly define how the device might be used. For example, the device may be used to register biometric information of a patient at the check-in counter or it may be used to authenticate the patient and nurse when dispensing medication.
- (3) Because this device is used in a system, it was important to clearly define the development scope.

2.5 QFD Application Workshop

This development project ran in parallel with the 7th QFD Application Workshop at Asahi University. Figure 2 outlines the workshop.