

Steganography - Code Recognition Technology

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Abstract

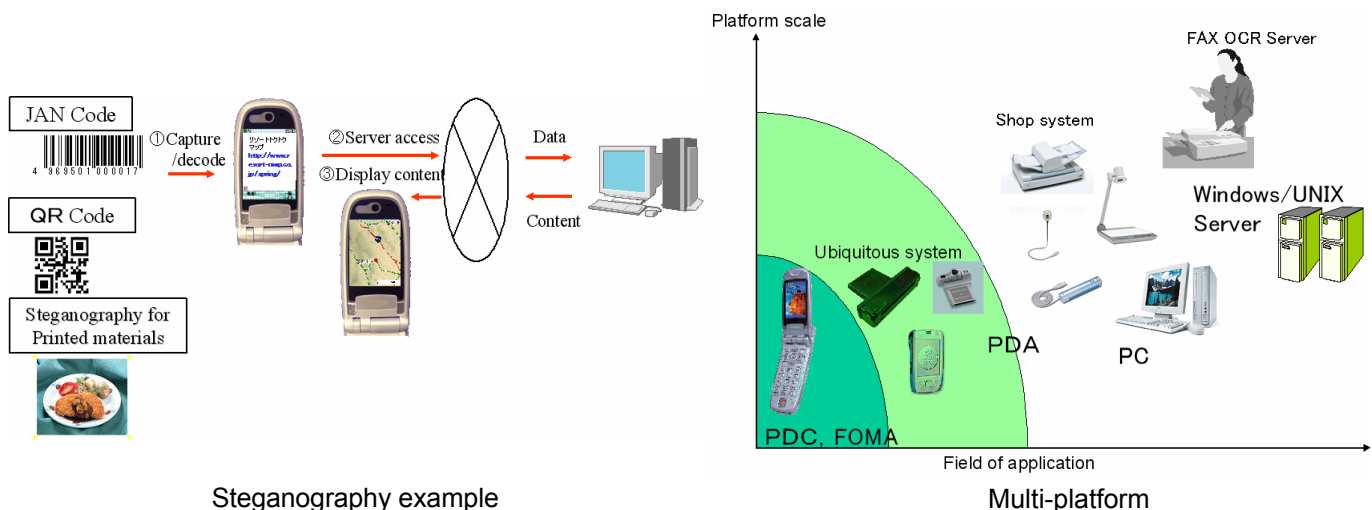
We have developed a new user interface that interlinks printed media (real space), humans, and electronic information (virtual space). Electronic information can be accessed by using portable equipment to read the visible codes (one-dimensional [JAN]/two-dimensional [QR] codes), and invisible codes (steganography for printed materials) printed on paper. This technology, and its recognition, can be incorporated into multiple platforms such as cellular phones, PDAs, and PC/UNIX servers. Potentially, this technology can be applied to a wide ranges of applications, both personal and corporate.

Technology

- **Code recognition and automatic code extraction:** We have developed a high-speed code recognition function that offers stable performance in many environments, even in the dark. It can be applied to multiple platforms including cellular phones, PDAs, PCs, and UNIX servers. The processing time is less than one second, even on a cellular phone or PDA. Users can thus use these devices to capture encoded data.
- **Invisible data embedding:** Twelve-digit numerical data that is equivalent to the JAN code can be embedded in a printed color image. This technology embeds data by leveraging the characteristics of the human eye, which exhibits variations in its sensitivity to color and size. This makes it possible to avoid any degradation in image quality, like that which occurs when digital watermarking is used. This enables users to access information from a printed image that exhibits no degradation.

Application Examples

- **Prescriptions:** The use of QR code recognition allows slip processing to be processed quickly and accurately. The code is printed as a part of the prescription when issued by a hospital, and then read with a scanner or a general-purpose camera at a pharmacy.
- **Information magazines, pamphlets:** Invisible data is embedded in an image of a location, etc., published in a magazine. Detailed information such as a map or event information can be obtained simply by reading the image with a cell phone camera.
- **Traceability:** Invisible data is embedded in a printed image of a product (e.g. a food product) on the package or point-of-sale card. By using a cell phone camera to read the printed picture, product-related information (e.g. raw materials, the producer, and the place of production) can easily be obtained.



Steganography example

Multi-platform