QR Codes

More Than Just JigSaw-like Images!

They may seem to be just ordinary images. But quick response codes are actually capable of packing lots of information into images—more than conventional bar codes.

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The author is founder and product manager, myMobilephone.in—a company that aspires to build technologies, applications and services for the common people of India, which are accessible on their mobile phones. His firm has developed an application to generate QR codes in Hindi and other regional languages, which is freely usable on the company website.

The next time you are handed a business card with an unusual drawing (as shown above) on it, do not think that it is part of the company logo. It is actually a QR (quick response) code. And as the card owner may tell you, if you just point at the picture with your phone camera, your phone could be directed to the website of the company.

Invented in Japan by the company Denso Wave in 1994, QR codes were originally used for conventional bar code applications like vehicle tracking but have become extremely popular with the advent of the phone camera. There are other two-dimensional bar codes, like Semacode, Datamatrix, and Aztec Code, but QR codes are the most popular. They became an ISO standard in 2000 and offer several levels of error correction, position and alignment standards; they can be of variable size and hence of variable data capacity and other settings. QR codes can be tiny, in which case they are called micro QR codes, or they can be quite large. They can sometimes contain designer art or a logo embedded into them.

Much more than bar codes

Just like bar codes, QR codes can store information—digital data like your company website, mailing address, and product details. Bar codes can only store small amounts of information—a byte or so. But being 2D, QR codes can store a lot more— up to 2 KB of data under the current ISO standards. QR codes can represent a large amount of information by making

The fortune cookie

With huge potential in advertising, marketing and information dissemination, QR codes are bound to gain popularity in the future. It's time to think of how you can tap their potential, or develop applications/ services/packages that use these codes!

It is not difficult to foresee a future in which mobile phones, QR code tags, RFID (radio-frequency identification) tags, and GPS coordinates, will all interact with each other constantly, delivering relevant and important information to users.

more ef cient use of the display space, apart from offering the convenience of reading and storing automatically.

QR codes can be read by modern bar code readers, but nowadays many phones equipped with a camera come with preinstalled software for reading QR codes. For example, if you have a Nokia N73, look into the Of ce folder — you are likely to f nd an application called Barcode Reader. If you don't have the software for your phone's model, it is easy to get it free from the Internet. You can just click on the QR code with your phone and access all the information into your phone, after which you may store it, edit it, paste it into another document or send it elsewhere over e-mail or SMS.

QR codes are very popular in Japan, and are gradually gaining popularity in the West. They are increasingly being spotted on billboards, behind buses, inside newspaper f yers, and on business cards, mail order catalogues, stickers, ID cards, and a host of other places. They can look pretty on a T-shirt and a coffee cup too. And in technophile Japan you may also f nd a QR code on your dinner plate, which will tell you what is special on the menu for the evening. In popular culture, QR codes are called 'Mobile Tagging'.

The Indian side of QR

QR codes—if promoted correctly—offer the potential of being very useful and popular in India too. India has a very large number of mobile phones users, many of whose instruments are also camera phones. This number is expected to increase in the future. Also, India is a country of many languages and owing to its diverse challenges, throws up interesting opportunities. Here are a few scenarios for developing some out-of-the-box applications using QR codes:

1. Hyderabad is a city where Telugu, Hindi, Urdu and English are all important languages. You may be looking at a poster at Ameerpet that is about an Ayurvedic Hospital somewhere in Andhra Pradesh. You may want to learn more about it, but are unable to do so as the text in the hoarding is in a language that you cannot read. But what if the bottom of the poster contained four distinct QR codes — one each for Hindi, Urdu, English and Tamil? Well, you would just need to point your phone towards the QR code and read the information in the language of your choice.
2. You are driving by and you suddenly spot a real estate project coming up in the city. There are some contact details that you may like to note down but cannot do so as you are driving. Well, if the board has QR codes, you can quickly point your phone towards the QR code and store the information, which you can read when you have the time.

3. The government pays a large amount to a newspaper for an advertisement about vacancies in the railways, which includes an application form. The advertiser can include QR codes that include an electronic application form in any language, because QR codes support binary data as well.

[In Japan and many other Western countries] QR Codes are increasingly being spotted on billboards, behind buses, inside newspaper flyers, and on business cards, mail order catalogues, stickers, ID cards, and a host of other places.

A QR code display on a billboard

4. You are looking at the classified section of a leading newspaper in Delhi and the interesting graphics grab your attention. The graphics also happen to be a QR code, enabling the advertiser to pack in far more product details into an advertisement for the cost of the same space.
5. Thanks to QR codes, you will be able to include a multimedia presentation about your business on the back of your business card, in the form of an image.
6. Murugan, an illiterate fisherman from Tamil Nadu, can neither read nor write. He points his phone at the QR code in a government notice in English on the wall of his block development office. The content is scanned into his phone, sent to a server, which translates it into Tamil and reads it out to him on his phone through voice synthesis.
7. Veena buys a movie ticket online and a QR code is delivered to her phone as an MMS/EMS, which is her ticket. She goes to the movie hall where she displays the QR code displayed on her phone and she is admitted in. The QR code included all the secure authentication and non repudiability that was required for this successful e-commerce transaction.

The power of error correction

Error correction in QR codes is important because you may take a picture of a QR code on a mutilated piece of paper, or under poor light.

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With error correction introduced (basically adding redundancy into the code) it would be possible to recover most of the data even if some of it is read incorrectly.

QR codes use Reed Solomon Error correction, a scheme that is used for robust error correction in many different digital applications including reading from CD-ROM drives and Internet connections over modems. Reed Solomon codes themselves are a special case of a larger class of codes called BCH codes, which incidentally were invented by two Indians—Raj Chandra Bose and Dwijendra Kumar Ray Chaudhuri in 1960.

Given the rate at which they are gaining popularity, it is not difficult to foresee a future in which mobile phones, QR code tags, RFID (radio-frequency identification) tags, and GPS coordinates, will all interact with each other constantly, delivering relevant and important information to users, irrespective of their backgrounds and geographical location. No wonder QR codes are being described as the hyperlinks of the physical world! IT