QR Code

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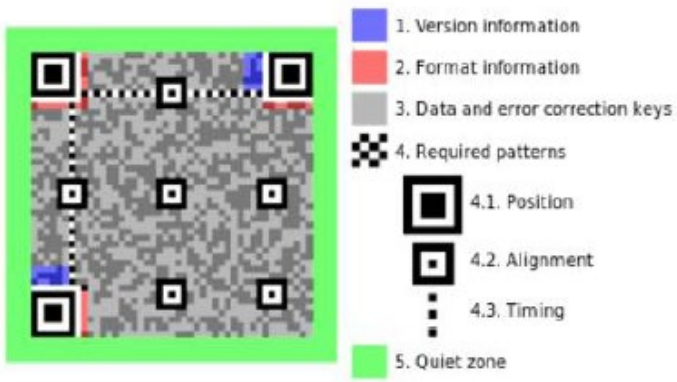
1. Introduction

A barcode is an optical machine-readable representation of data relating to the object to which it is attached. Originally barcodes systematically represented data by varying the widths and spacing of parallel lines, and may be referred to as linear or one-dimensional (1D). Later two-dimensional (2D) codes were developed, using rectangles, dots, hexagons and other geometric patterns in two dimensions, usually called barcodes although they do not use bars as such. Barcodes originally were scanned by special optical scanners called barcode readers. Later applications software became available for devices that could read images, such as smartphones with cameras.

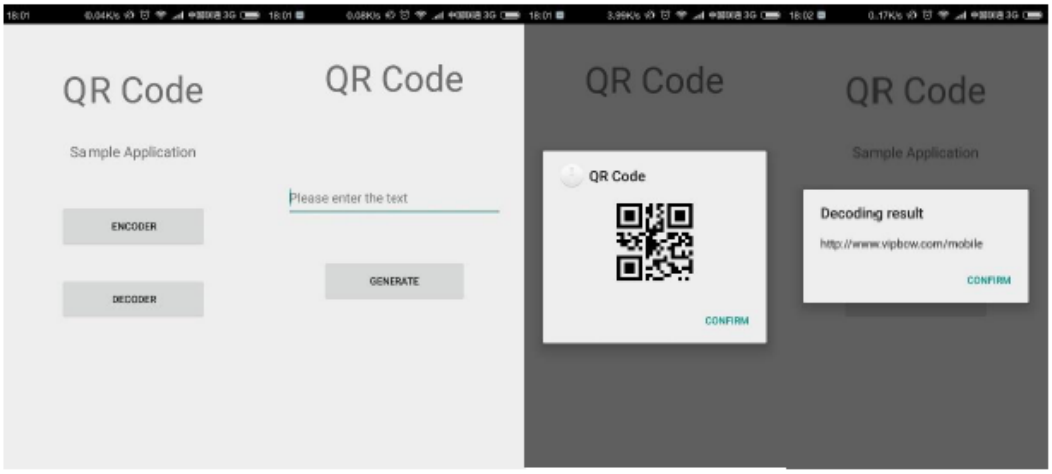
Nowadays the most applied barcode is QR code, integrated in applications like Wechat, Paypal, Alipay etc. QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional barcode) first designed for the automotive industry in Japan. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to efficiently store data; extensions may also be used. The QR Code system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing. A QR code consists of black modules (square dots) arranged in a square grid on a white background, which can be read by an imaging device (such as a camera, scanner, etc.) and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data are then extracted from patterns that are present in both horizontal and vertical components of the image.



The above figure is a representation of the structure of QR code.

2. The Tasks

In this experiment, you need to develop an application with the capability of QR code encoding and decoding. The expected application is show as below:



Main activity Encoder Encoding result Decoding result

The opensource library can be downloaded from https://github.com/zxing/zxing (which is also available at https://jbox.sjtu.edu.cn/l/2nfih0, for your convenience). You need to add these .jar files into your project. You can also create new packages in the project to manage these files more easily.

You may need to paste all the needed files into the project first, where the files needed are listed as follows: