Net Sharing Application using QR Code

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Abstract

Internet sharing in mobiles is something very popular and made use of by many mobile users today. The ability to share net with other users has proved to be very useful but indeed has its drawbacks. Users have to enter the required password each time they want to access the other person’s device. And at the same time, the provider of internet cannot set a limit or keep track of how much data is used. This app helps solve these above mentioned problems. In this application, QR codes are scanned from the device that is going to provide internet instead of typing the password for the hosted network. Along with that, the provider will be able to set a particular limit for the data about to be shared. Once the data being shared reaches its set limit the devices connected will be automatically disconnected from the sharing device.

Keywords: Hotspot, Tethering, QR Generation, QR Structure

I. INTRODUCTION

With higher data rates becoming reality, there are quite a few Internet sharing applications that are increasingly becoming popular on present day smart phones. These applications are very useful and are widely popular by names such as Mobile Hotspot, Tethering, and MiFi. Using these applications, multiple users (such as friends, family members and colleagues in a limited area) can share Internet from a single high speed wireless network link. Typically, a mobile device (smart phone) connects to backbone network using communication networks such as 4G/HSPA+ which provides high speed data link and mobile phone in turn acts as a local Internet access point for other devices using communication technologies like Wi-Fi/Bluetooth.

Internet is gaining increased popularity, especially for data offloading in mobiles and Internet access sharing. Specifically, several initiatives (e.g., FON, PAWS, and Virtual Public Networks) enable the sharing of home broadband connections with the public, taking advantage of the density of wireless access points in residential areas. Internet access sharing may be either offered for free (PAWS, Virtual Public Networks) or can be available only to subscribers (FON). Internet sharing in mobiles is something very popular and made use of by many mobile users today. The ability to share net with other users has proved to be very useful but indeed has its drawbacks. Users have to enter the required password each time they want to access the provider’s device. And at the same time, the users that provide net cannot set a limit or keep track of how much data is used by the users of the provided net.

Fig. 1: Architecture of a data sharing system.
A. **Tethering:**

Connecting one device to another is known as tethering. Tethering allows sharing the Internet connection of the phone or tablet with other devices such as laptops in the context of mobile devices. Phone or tablet connection with other devices can be done over Bluetooth or over wireless LAN or by physical connection using a cable. When tethering is done over WLAN, this may be branded as a mobile hotspot, and this allows the smartphone to serve as a portable router, where mobile hotspots are protected by a PIN or password. The Internet-connected mobile device can act as a portable wireless access point and router for device connected to it.

B. **Internet Connection Sharing:**

The use of a device with Internet access such as 3G cellular service, broadband via Ethernet, or other Internet gateway as an access point for other devices is known as Internet Connection Sharing. This was implemented by Microsoft as a feature of Windows OS in order to share a single Internet connection on one computer between other computers on the same local area network. DHCP and network address translation (NAT) are made use of.

II. **QR Code**

Quick Response Code is the brand for a type of matrix barcode (or two-dimensional barcode) first designed for an automotive industry in Japan. A barcode that contains information about the item to which it is attached and is a machine-readable optical label. A QR code uses four standardized way of encoding modes (numeric, alphanumeric, byte/binary, and kanji) to efficiently store the data, some extensions may also be used.

The QR Code system has fast readability and greater storage capacity compared to standard UPC barcodes and became popular outside the automotive industry. Applications are product tracking, item identification, time tracking, document management, and general marketing.

A QR code consists of black modules (square dots) that are arranged in a square grid on a white background, which can be read by any imaging device (such as a camera, scanner, etc.) and it is processed using Reed–Solomon error correction until the image can be correctly interpreted. The essential data are extracted from patterns that are present in both horizontal and vertical components of the image.

A. **Uses**

QR codes have been developed to help track parts in the developing process of vehicles. Today they have a lot of purposes, like transport ticketing, entertainment, commercial tracking, and product labeling/marketing. You can find QR codes used to send audiences to a website for browsing, to initiate phone calls, to bookmark a webpage, send short messages, produce links to web URL’s, send emails, start chats with blackberry users, connect to WI-FI networks, access information, get coupons, purchase items, process orders, advertise products, etc.

B. **QR Code Generation**

- Select what type of content that you want your QR code to send to the consumer.
- Insert the content.
- Check out the preview and customize as desired.
- Test the QR code.
- In all the eagerness of creating your first QR code, don't forget to check to see whether the QR code “reads” correctly, and be sure to try more than just one reader.
- Track and analyze the performance.

C. **Structure of QR Code**

QR Code can be generated in 40 different versions. Each higher version has 4 additional modules per side (16 additional modules per version). Whilst version 1 contains 21x21 modules, version 40 comprises 177x177 modules. The structure is composed of the following components:

1) To provide an exact position and shape of the code to a scanner function patterns are used. The patterns are composed of the elements described below.
   1) 3 identical square blocks called Position Detection Patterns which are arranged at the upper left upper right and lower left corners of the symbol are a part of the Finder pattern. These allow the code to be scanned from any direction within a full 360 degrees with high reading speed.
   2) Timing Pattern is presented by black and white cells arranged alternatively. Timing Pattern is actually used for locating the code. The pattern is placed between the Position Detection Patterns.
3) Alignment Pattern was introduced in version 2 of the QR Code and it is positioned approximately at the lower right corner. It is used for correcting the distortion of the symbol when it is curved. A number of Alignment Pattern is increased in higher versions.

2) Encoding Region is used for data encoding purposes. The area includes the following parts.
1) Format Information section obtains Error Correction and Mask code. This is the first part to be read in a decoding process.
2) Version Information section stores the version of a QR Code which is represented by 2 rectangular patches - one is placed to left of the top-right corner Position Detection Pattern and the other is located on the top of the bottom-left-corner
3) Position Detection Pattern.
4) Data and Error Correction Codewords area consists of both data and error correction Codewords. Both are stored into row and column array. Data Codewords are firstly encoded and placed into data space, and then the correction Codewords will be stored consecutively.

III. HOTSPOT SHARING

With higher data rates becoming certainty, there are quite a few Internet sharing applications that are increasingly becoming popular on the present day smart phones. These applications are very useful and are widely popular by names such as Mobile Hotspot, MiFi and Tethering etc. Using these applications, multiple users (such as friends, colleagues, family members in a limited area) can share Internet from a single high speed wireless network link. Typically, in this method, a mobile device (smart phone) connects to backbone network using the communication networks such as 4G/HSPA+ etc. which usually provides high speed data link and mobile phone in turn acts as a local Internet access point for other devices using communication technologies like Wi-Fi/Bluetooth.

If you are hosting a Wi-Fi hotspot, you are giving your customers access to the high-speed wireless Internet. This gives you a right over competitors who don't offer a hotspot, as you're providing something extra. This could attract more customers to your business and will increase revenue. You also have the access to a private network that you and your employees can use it for personal and professional purposes.

A. Advantages of Hotspot Sharing:

Wherever and whenever you are able to get a mobile signal you can use mobile hotspots. This means that you can use it outdoors, on the bus, in the park, on the train, basically just about anywhere you choose.

If a family member or friend needs to get access to the Internet you can share using mobile hotspots. Almost all mobile hotspot devices can be connected between five and 10 different devices all at the same time, such as laptops, tablets, games consoles etc. Wi-fi on the go is provided by mobile hotspot. You can provide Wi-Fi for other devices as long as your smartphone has a cellular signal. Multiple connections, usually 5 or 10 of them are provided by most mobile hotspots.

B. Working:

Internet sharing in mobiles is something very popular and made use of by many mobile users today. The ability to share net with other users has proved to be very useful but indeed has its drawbacks. Users have to enter the required password each time they want to access the other person’s device. And at the same time, the users that provide internet cannot set a limit or keep track of how much data is used by the users of the provided internet. The proposed system helps solve these above mentioned problems. In this proposed system, QR codes are scanned from the device that is going to provide internet instead of typing the password for the hosted network. Along with that, the provider will be able to set a particular limit for the data about to be shared. Once the data being shared reaches its set limit the devices connected will be automatically disconnected from the sharing device.

In this system we implement an authentication scheme using QR codes and Internet connected smart phones to allow a user to quickly connect to a hosted without having to memorize or type in a username and password. The user only has to prove that they are in possession of their mobile phone.
C. Figures

![Flowchart of Net Sharing Application using QR Code](image)

Fig. 2: Overall System

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