

# A Development Of A Web-Based Application System Of QR Code Location Generator and Scanner named QR-Location

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**Abstract.** There are many other applications that use the QR code technology. This new web-based QR code location generator and scanner for smartphones shall allow user to send their location to someone by using QR Code instead of sending lengthy text of directions or address. Sometimes, we might not realize that we probably can be tracked down as soon as we share our location with other users. Therefore, in order to increase the security and privacy when sending location to other user, user can send his/her location by using QR Code which is safer. Apart from that, QR Code also can be incorporated into user's business and help with marketing. In addition, all the small traders can viral their business by sending their business location using QR Code. Thus, the goal of this project is to develop a web-based QR code generator and scanner to make it possible for users to generate and share the QR code of their current location to other user and directly import the image of QR code to be scanned and ready to be navigate by Google Maps app. In conclusion, there are lots of exciting and unique ways to use QR codes and it is so obvious that might not even come to mind by thinking of how QR codes can make our life easier especially when it comes to send location to people.

**Keywords:** QR Code, HTML, CSS, PHP, JavaScript.

## 1 Introduction

This project report describes an interactive web-based application called "QR Code Generator and Scanner" with the name of QR-Location which implemented the technology of QR Code. This new web-based QR code location generator and scanner for smartphones shall allow user to send their location to someone by using QR Code instead of sending lengthy text of directions or address. Sometimes, we might not realize that we probably can be tracked down as soon as we share our location with other users. Therefore, in order to increase the security and privacy when sending location to other user, user can send his/her location by using QR Code which is safer. Apart from that, QR Code also can be incorporated into user's business and help with marketing. In addition, all the small traders can viral their business by sending their business location using QR Code.

The goal of this project is to develop a web-based QR Code Location Generator and Scanner which can that helps user to send their current location and scan the QR Code

by importing the image of QR Code instead of using the smartphone camera. The objectives of the project are to get location using HTML Geolocation API from Google Maps, to generate QR Code using PHP QR Code library and to develop a prototype of QR-Location Generator and Scanner.

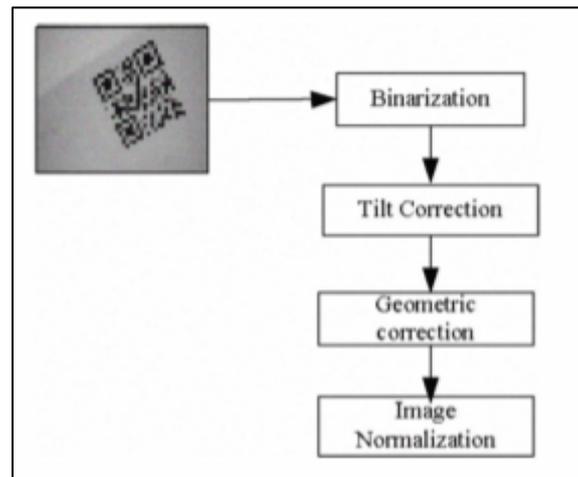
This project is limited for location on Google Maps and it is a web-based QR Code Generator and Scanner for sending location. In Addition, the image of the generated QR Code can be scanned by importing the image to the application. The main importance of this project is to enhance the location sharing between users and to improvise the current QR Code Scanner to make it more convenient to use by smartphone users. Since today generation are more inclined towards the use of advanced technologies such as smart phones and computers, with their smart phones with them all the time.

## **2 Literature Review**

### **2.1 QR Code Recognition Based on Image Processing**

In this section, a brief study of a paper by Yunhua Gu and Weixiang Zhang (2011) has been done. To solve the QR code recognition problem caused by ordinary camera collection, the recognition algorithm based on image processing is put forward in this paper. The process of image binarization, image tilt correction, image orientation, image geometric correction and image normalization allows images collected on different illumination conditions, different acquisition angles to be quickly identified.

In practical applications, there are few difficulties that will be encountered by barcode reading technology. Firstly, there are so much of information that is nothing to do with the bar code, the bar code symbols are printed on the packaging of commodities. The condition results in a complex barcode image background. Next, the changes in illumination affect uneven image brightness of the barcode. Thus, this will increase the difficulty of identification. Moreover, the barcode could be read due the acquisition in different angles and distances, coupled with the geometric distortion and flat distortion caused by image capture device, the image of the QR codes will be rotated, zoomed and stretched.



**Figure 1: Recognition Process (Source: Gu & Zhang, 2011)**

To solve the problems above, two-dimensional code image should have a series of image processing before adopting national standards for rapid response code decoding algorithm. Figure 1 shows the recognition process of the QR Code.

In the process of binarization, the image of QR Code collected will go through the grey-scaled process by using the Threshold Algorithm. According to Gu and Zhang, the strategy for positioning and rotation need to be done in order to solve the tilt correction. Firstly it needs to extract the QR code symbol, and then capture the image region to ensure that the center of the QR code is the center of the new image, this step eliminates the surrounding noise information. Then the rotation angle should be determined, and finally the rotation is carried on with bilinear interpolation (Gu & Zhang, 2011).

The image geometric distortion will emerge because of the shooting angle, image rotation and other issues. QR code geometric distortion will bring great recognition errors and reduce the recognition rate. In general, the QR code image distortion is linear distortion. As a result, QR codes can be used to correct for the characteristics of being a square. Lastly, after the geometric correction process is done, the QR code image is the normalized. The process of normalization that proposed by Gu and Zhang was firstly is to make sure the version number of the QR code based on the decoding algorithm given in the national standard and symbol structures of QR code itself. Then divide equally the QR image into  $n \times n$  small grids according the version number, re-sample the center of each grid as the sampling point and get the normalized QR code symbol. After that, decode the standard QR code symbol according the National Standard Method of Quick Response Code after image re-sampling.

## 2.4 Summary

From the results, the paper concluded the first step in identifying is very important. The image binarization method has a large impact on the bar code identification system,

and hence the issue how to select an appropriate algorithm to binarize. With the further development in the of the industry, two-dimensional code recognition technology based on image processing image dedicated in reader reading applications will have broad application prospects, the article have a certain significance on the promotion and development of QR codes (Gu & Zhang, 2011).

### **3 Methodology**

In order to construct the generating and scanning technique for the QR Code generator and scanner, there are several phases of project development planned, which are:

#### **Phase 1. Preliminary investigation and data collection of generating and scanning QR Code technique.**

In this phase, project is focused on exploring, approaches of the QR Code library that can be used to generate the QR Code based on the input of user's location. Furthermore, in this phase the image processing techniques that provide for QR Code recognition that can be used for decoding the image of QR Code also being explored. In addition, QR Code recognition process can be applied on the QR Code image to obtain information encoded to the QR Code which in this case the user's location.

#### **Phase 2. Design the QR Code generator and Scanner for sending location.**

Based on the information gathered in previous phase, a design phase for generating and scanning QR Code, help to overcome the problem addressed in sending location using QR Code. The main challenge in this this phase is that to ensure that the user's location can be obtained in order to generate the QR Code and process of scanning the QR Code is well functioned in order for user to view the location sent.

#### **Phase 3. Develop QR Code Generator and Scanner in web-based environment.**

Subsequently by completing the design phase, the framework of QR Code Generator and Scanner is setting up. The prototype which applying the generating and scanning QR Code technique is being developed in this phase.

#### **Phase 4. Integrate QR Code Generator and Scanner with the generating and scanning QR Code technique in web-based.**

After the development phase is completed, the generating and scanning QR Code technique will be implemented to make sure that user be able to generate QR Code and scan QR Code by uploading the QR Code image to the application and get the location sent.

### Phase 5. Evaluation.

The evaluation phase is carried out in order to determine whether the QR Code Generator and Scanner is working well. The results will be analysed and observed to make additional improvement if needed.

## 4 Design Implementation

This section will show the Graphical User Interface that has been designed for QR Code Generator and Scanner for location web-based application. Currently, the working title for this web-based application is QR-Location. The main page and interface of the application is shown in Figure 2. The system has two main function: Generate QR Code and Upload and Scan QR Code. The function details described in the next section.

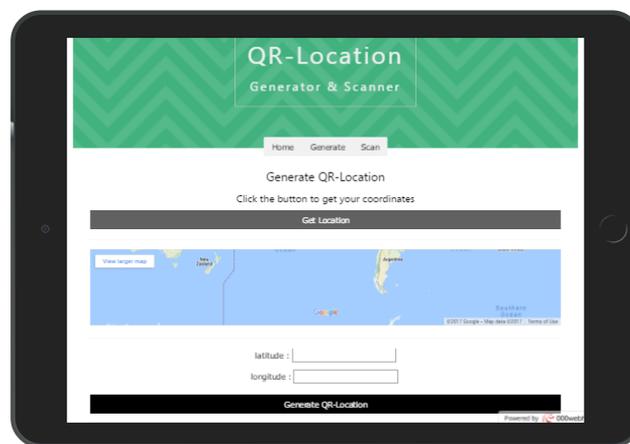
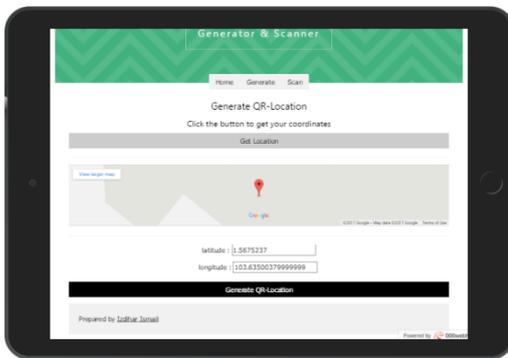


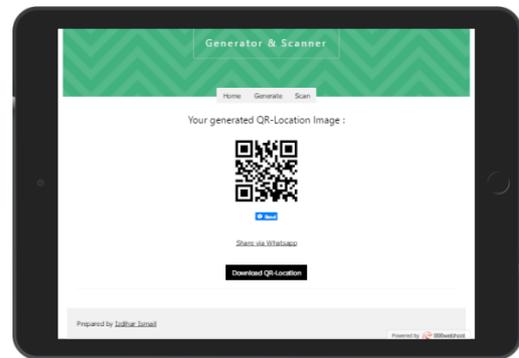
Figure 2: Main Interface

### 4.1 Generate QR Code

As the title suggest, Generate QR Code only can proceed once the application obtained the user's location coordinates of longitude and latitude. Therefore, the user permission to access the location need to be allowed by user. The location coordinates can simply be obtained once user click on the "Get Location" button. Based on Figure 3, the location is successfully obtained and the location coordinates is shown on the Google Maps embedded on the webpage of the application as well as the longitude and latitude value of the location coordinates.



**Figure 3: Get Location**  
Code

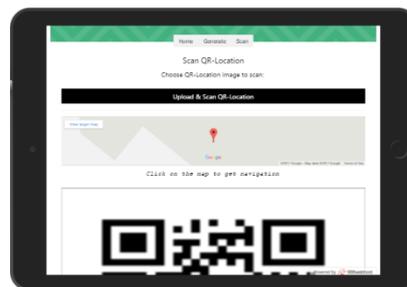


**Figure 4: Generated QR**

Figure 4 above shows the result when user clicked on the “Generate QR-Location” button. When user click on the “Download QR-Location” button, the image of the QR Code will be downloaded and saved. While when user click on the “Share via” WhatsApp link, the application will pop up the permission to access the WhatsApp application installed in user’s smartphone and same goes to the share button via Facebook Messenger.

## 4.2 Upload and Scan QR Code

The application required user to upload the QR Code image by clicking the “Upload and Scan QR-Location” button. Once the QR Code is uploaded to the application, the result of the user’s location from scanning QR Code process will be shown on the Google Maps as well as the image of QR Code that has been successfully uploaded as shown in Figure 5. User can click on the map to get direction from Google Maps.



**Figure 5: Upload and Scan QR Code**

## 5 Testing

This section describe the evaluation results based on the user acceptance conducted to the user through Black Box testing. This testing is a method to examine the functionality of the application based on the user acceptance to the usability of the system. Table 5.1 shows the Black Box result for user acceptance testing.

**Table 1:** Black Box Result

<b>Event</b>	<b>Expected Result</b>	<b>Actual Result</b>
<b>Executing the system</b>	All elements are loaded	Correctly loaded
<b>User click get location button</b>	Location is obtained and display on Google Maps. Location coordinates (Longitude and Latitude) value display on webpage.	Successfully obtained user location. The location coordinates displayed on Google Maps and webpage correctly
<b>User click Generate QR-Location button</b>	QR Code image display on webpage	QR Code image displayed correctly
<b>User executing the uploading image when click Upload and Scan QR-Location button</b>	Image uploaded appear on specified place. The location display on Google Maps	Input image uploaded correctly on canvas area. The location displayed on Google Maps correctly
<b>User click Download QR-Location button</b>	Generated QR Code saved as output	Successfully saved QR Code
<b>User open QR Code image output</b>	View image output	Correctly saved output with correct location data
<b>User executing the share button both via WhatsApp and Facebook Messenger</b>	QR Code image is sent via WhatsApp or Facebook Messenger	QR Code image sent correctly

## 6 Conclusion

During the system planning phase, there are several limitation that have been identified. Firstly, this application only generate the QR code that stored location coordinates of longitude and latitude only based on users location. User unable to modify the value of the coordinates or search for places on the Google Maps. Moreover, even though the objective of generating QR Code from location obtained is achieved, the process that took place before sending the location is much complicated compared to send location directly for example from WhatsApp and any other application. In spite of that, in term of security of sending location is much more secured compared to the typical way of sending location. Last but not least, this application design is limited to web-based only but it is still compatible with other gadgets such as tablets and smartphones instead of laptop and desktop.

There are several enhancement that can be made for QR-Location, web-based QR Code Location Generator and Scanner. First, to make the webpage more interesting with more attractive design and add more interesting features to make it better from other QR Code generator and scanner. Secondly, it would be nice if this system can store more information other than latitude and longitude, such as name and address of the location so that user can get more information from other user apart from the location. Hopefully based on all the suggestions for improvements of this application will make the better QR-Location.

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