HALAL BARCODE SCANNER PROTOTYPE IN ANDROID USING CLIENT SIDE PROCESSING WITH JSON TECHNOLOGY

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ABSTRACT : Halal industry has becoming a steady growth industry in Malaysia since people including Muslim and non-Muslim are already alert about this issue due to its hygienic production. However, consumers nowadays are facing few difficulties regarding Halal recognition status as the logo has been duplicated and contacting JAKIM directly via telephone call or browsing web portal is slow and tiring. In certain circumstances, the use of existing technology like Radio-frequency Identification (RFID) is expensive and unaffordable to local communities. Besides, reading the barcode itself will burden consumer as they need to remember all sorts of codes available in stores. Therefore, the usage of Smartphone, barcode scanner and camera will be tested to recognize and split information from a barcode. The results will be analysed by developing Halal Barcode Recognition Status using Android Smartphone by matching the scan barcode to the database. Client server architecture is used to migrate data stored in server database and save to local database. The information will be extracted to recognize its halal status. Based on the testing, the system is capable to recognize the Halal status; however it needs further research for commercial use.

KEYWORDS: Halal Barcode Scanner, Android, Client-side Processing, JSON Technology.

1.0   INTRODUCTION
Industry of "Halal" in Malaysia has been contributed by Department of Islamic Development Malaysia or also known as JAKIM. Its potential to generate economic growth among Malaysian citizen is likely to be successful in this country [1]. Smartphone adoption among Malaysian is expanding with the creation of Smartphone technology. The platforms used to develop mobile applications are as android, iPhone, iPad, RIM, Palm, Symbian, Blackberry and Windows Mobile. However, according to a study that was carried out by (State of the Apps Industry, 2010); users prefer to use android application compared to others.

The demand of material processing has led to the usage of barcode for easy products' identification and recognition [2]. As barcode has been widely used in most of the products' packaging, it is essential to understand the embedded unique number which enables people to identify its important information. Meanwhile, the growth of third generation technology would contribute to image capturing by using 3G Smartphone camera. The captured barcode image will be send to data processing center via 3G network and its information will be loaded [3].

2.0   CLIENT SERVER TECHNOLOGY
Client devices are typically PCs with network software applications installed that request and receive information over the network. Mobile devices as well as desktop computers can both function as clients. Basically, client will request messages from server via interconnected network. Then, it waits for server to respond and reply the requested messages and the process ends after server has given a feedback [4].

A server device typically stores files and databases including more complex applications like Web sites. Server devices often feature higher-powered central processors, more memory, and larger disk drives than clients. Unlike client, server is responsible in listening and replying client's
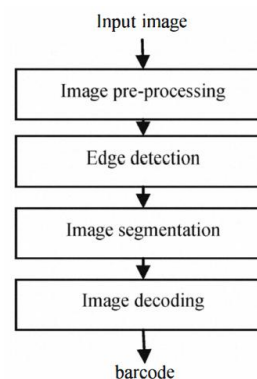

Figure 1: EAN-13 bar code (2)

Figure 2: Decoding Process
Source: Li & Li (2010)

request via network. After receiving a request, the server will perform searching function inside the database such as database query [4]. The server provides an environment for the client to upload information, to instantiate objects on the server, and to execute object methods remotely.

2.1   EAN-13 Barcode
In figure 1, EAN-13 barcode is built with 13 number characters or digits. In order to define the country code, consumers may refer to the first two or three characters at the barcode. Usually, the length is depending on the code
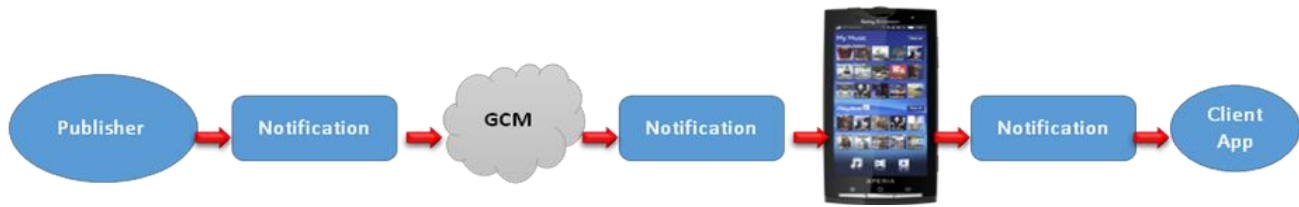
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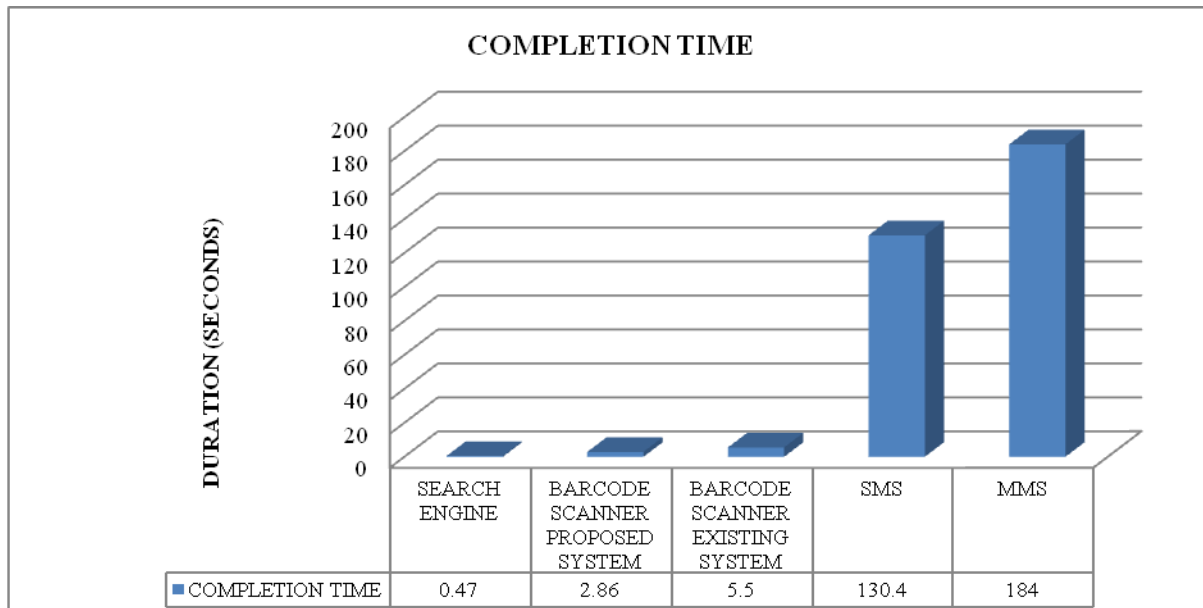
Figure 3: Google Cloud Messaging

Figure 4: Time Completion Graph of Existing vs. The Proposed System

itself because each country consisting of different unique codes. As for the next following lines, consumers can indicate manufacturer codes followed by product code embedded with nine or ten characters length. Check Digit is labelled after product code and it represent the thirteenth character of EAN-13 barcode [5].

The decoding process is needed to indicate the information from the black and white bar width. Image input will be pre-processed in order to define its threshold between black and white boundaries as shown in figure 2[6].

Next, the scanner will intelligently read the embedded code and match it with the information within the database. The database structure stores general product information such as product name, product ingredients and product id.

As for halal table, it stores certificate expiry dates correspond to the JAKIM confirmation as well as halal status. Hence, if any match occurs, it will return halal status to consumers, however, if the data did not match or the certificate has expired, it will return non-halal status.

2.2 Google Cloud Messaging (GSM) - Push Notification

Push notification (as shown in figure 3) allows communication between server and client. This technology provides a better way of data exchange in real time. It

requires an internet connection to establish sharing mechanism whereby the communication is

initiated by publisher or server and client will receive the information. Whenever there is new content available on the server, it will push alert message to notify user about the updates [7].

There are few characteristics of cloud messaging such as; it provides reliable services for business by the use of several sites and easy to manage recovery system. Besides, the maintenance is much easier as it does not require users to install it in their device. It also offers a large scale of users in the same network whereby they can share the same information at the same time. Furthermore, publisher or server can easily monitor their users because cloud messaging provides scalable features [8].The technology consists of two parts which are front end and back end. Front end is describes as what the user or client see on their device. Hence, back end includes the server and data storage which client is unable to see or also known as the cloud.

2.3 Results

The graph in figure 4 summarizes the difference between existing system and proposed system in term of completion time to search for one product information. The graph shows that the proposed system offers the shortest time for both

search engine and barcode scanner as compared to existing barcode scanner, SMS and MMS. It concludes that, local database is sufficient enough to provide user with fast data searched without the need of internet connection and JAKIM server. Besides, it is free of charge whereby they can use their handy mobile phone anytime and anywhere.

3.0   CONCLUSION

This project has contributed many advantages to consumers nowadays. It provides users with the ease of use to check for halal status in each product. Meanwhile, as Smartphone is handy and widely used for almost everyone in this country,
the development of this application will help them in many ways. This application provide users with an easy and quick way to check the validity of the product status by enabling the users to capture the barcode image of the product rather that type in the 13 digits barcode numbers. Furthermore, this application proposes the new technology by integrating both local and server database. However, the searching process is located in local database. This way, user can still search data in offline mode. After completing this development, they are several limitations found in this application. The limitations are; Halal Barcode Scanner is only compatible with Android Smartphone Platform; the data is not officially integrated with JAKIM database, therefore, the data is only for testing purpose and it is not real; and data storage should be brodenin order to support millions of data capacity. Based on Halal Barcode Scanner Application, future work could be suggested in order to enhance its functionality and ease of use. Firstly, the data must be integrated with real JAKIM database so that consumers will get real life information. Besides, the programming codes must be modified in order to run it in several platforms such as MAC OS and Windows. The system will include more application not only for product validation, but for other purpose of consumer industries.

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