Implementing QR codes to revolutionise the monotonous buying and selling routine .

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ABSTRACT The motivation behind the idea was to devise a way that helped both the parties involved in the everyday buying and selling process i.e. customers and merchants. The aim was to implement the same by developing apps, it was therefore of paramount importance that two apps were developed – one for the customers and the other for merchants. Considering the indispensability and the impact of smartphones on our daily lives, the best approach was to develop apps that used QR codes to get the bill details and enabled customers to make payments directly through the app, thereby eliminating the need to carry cash or credit/debit cards effectively helping boon the businesses of small shopkeepers in a time where flipkart and amazon want it all.

INTRODUCTION
In today's world, technology seems to play a critical role in our lives, the indispensability of which can be realized with each passing day. From homes, to schools, colleges, office, hospitals, shops and so on we depend on one form of technology or another for the smooth functioning of our everyday lives. Considering the indispensability and the impact of smartphones in our daily lives, it was imperative that the idea be implemented through apps.

I. QR Codes
The principle functionality of the apps is based on the usage of 'QR' codes.
- A QR code is a two-dimensional code, this means it contains data not only in one dimension [e.g. horizontally from left to right like the barcodes on the regular products] but also in a second dimension [vertical, horizontal]. The acronym QR is short for "Quick Response"
- The QR code was invented by the automotive industry Toyota. Toyota asked their supplier Denso Wave to develop a barcode to safely and easily identify components. QR generators were originally used in industrial applications. Therefore, they had to be easily printable in form and size as well as staying legible when partially destroyed or dirty.
- Like other codes, the QR code symbol can be captured with imaging devices like a camera and then digitally processed. A software prepares the captured image data until it can be algorithmically processed according to the QR code standard, so the QR code content can be read. This process is assisted by the use of the Reed-Solomon error correction—which is also used for audio CDs to ensure that the data can still be read correctly even with small scratches on the surface.
- A QR code generator is a software which stores data into a QR code (for example a text or a website address).Just create a QR code by typing in your data in the software and download it as high resolution PNG or vector graphic (SVG, EPS). It can then be printed and used as per requirements.
- A barcode scanner (or a mobile phone with camera and an appropriate reader app) which supports the QR code standard is required to scan a QR code. QR code reader apps are made available by different manufacturers and for different mobile devices.
- There are many free QR code readers for Smartphones. However, they differ significantly in terms of usability, scanning speed and standards compliance .

- The merchant app will be used to generate the QR codes which will contain the list of the products bought by the customer.

II. The Customer App
- Customers will have the option to create their accounts free of charge by using their email ids or by logging in from social networking websites
- They'll have options to add their credit card information for payments
- Customers can scan the QR codes with the help of the camera of their smartphones, they'll get all the details of that product which would be added to their cart, and they'll be able to make the appropriate payment directly through the app
- They'll also be able to view the products they bought earlier .There will also be an option for adding new credit/debit cards. Customers can also keep record of all the previously used cards for payment
- It'll help them to avoid the monotonous payment methods, would be extremely secure, reliable, fast , cashless, all through the convenience of your phones

III. The Merchant App
- The merchant app will contain the list of all items that the customer can purchase. Once the customer has selected the products that he wishes to purchase , the merchant will have to generate a unique QR code for that particular customer using the app
- Upon scanning the QR code using the customer app, the customer will get all the details of the products that he wishes to purchase, and can make payment directly through the app
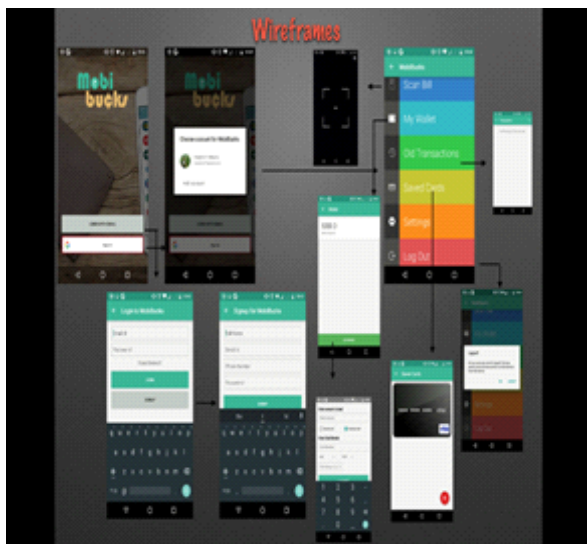
DESIGN AND IMPLEMENTATION
1) Wireframes
Wireframes are the first step when it comes to app development. . It is extremely important to get the wireframes right , aiming for simplicity of the user interface and at the same time ensuring to get the basics right, since the coding that is to follow is based extensively on the wireframes intended to be designed.

The intention of these structured drawings is to focus mainly on what the screen does, and not exactly what it looks like. Wireframes are supposed to lack colour, graphics, or

typographic styles; they are not meant to be viewed as final designs and are certainly intended to be a part of an iterative process. Mobile application design could be a long process, and wireframes play a key role in defining the structural foundation of the product, making it easier to understand and refine in the long run. XML(extensible markup language) is used to design the same.

As seen above the customer app gives users the add debit/credit card information as well as gives them the freedom to even use cash if need be. Access to the camera enables them to scan the generated QR codes. They even have their bills stored right in the app. Bills are saved automatically from the first purchase that the customer makes. QR codes are scanned quickly and efficiently.

1) The activities

The login, signup, bill, QR code generator activities were coded in java. An activity represents a single screen with a user interface just like window or frame of Java.Android activity is the subclass of contexthemewrapper class.

The signup activity

Figure 2

The bill activity

Figure 3

QR code generation activity

Figure 4

QR code scan activity

Figure 5

Software Testing

- Testing the apps was an integral part of the app development process. A systematic scheduled was followed in this case to ensure that bugs were detected in their initial stages and dealt with accordingly rather than detecting them at a later(crucial) stage which takes a lot of time and effort.
- Testing allows you to analyse and evaluate the usability and utility of your app before it is released for the people to use.
- Usability testing, performance testing, device testing and bug testing/fixing were done at appropriate intervals during the development period.

Software Development Cycle

Figure 6

Conclusion and future scope

Independence is everything. Power to the people was the primary motto since the day we started working on this project. The vision was to design something new and innovative which would help the everyday man. A fair thought was given to the current process of buying everyday commodities, shopping etc. and realized that it hasn't changed much, not for the better even after the availability of extensive alternative payment options such as credit cards and debit cards which promised to make the entire process cashless and hassle free. It is true that the same has been successful to a certain extent, especially in dealing with the liability of carrying cash everywhere you go but why stop here.

Progress is in the DNA of every human. We live to make progress. This was the motivation to do something different, something better. QR codes were being used to store information since a long time and to use that to store product information, bill details allowing customers to make payments and merchants to manage their businesses from their phones.

We live in a world were smartphones have replaced humans as our constant companions. Rich or poor, young or old, majority of the people today happen to own one smartphone or the other. Placing calls or staying in touch with friends and family is perhaps the very least a smartphone can do for you. From browsing the internet, to managing our social life, to literally anything and everything, a smartphone is capable of doing that for you and it would only get better if one was able to make everyday purchases using the convenience of a phone.

That was successfully implemented. Users that create their accounts can store their debit card information securely and can make payments directly through the app. All they need to do is scan the QR code generated by the merchant or the seller from his app and they'll be able to see the details of the items he wishes to purchase. Thereafter they can make payment directly through the app. Customers have the option which enables them to access the camera directly from the app, thereby helping him to scan the QR code Merchants can easily generate unique QR codes containing the details of the products that the customer wishes to purchase, instantly using the app. There is no need to do the same using online QR code generators. It's all within the convenience of one app and the app promises to help all small merchants and boost their business revenue.

The future scope of QR codes in this scenario is full of exciting possibilities. QR codes play a crucial role in the database management systems since they contain all kinds of information.

Smartphones have become a common affair, and will continue to play more significant roles in our everyday lives, which in turn means more number of users. Online shopping has already boosted the entire e-commerce industry, which has sadly affected the retail shopkeepers. The designed apps promise to change things for them to a certain extent. Merchants can keep an entire database of the products they're selling, customers can inform them about the products they wish to purchase and the generated QR code can be emailed to the customer. Scanning the same would result in the customer having all the details and can make payments, directly through the app, anytime and anywhere. Goods can later be delivered at the doorstep of the customer.

Small businesses have small budgets, and this will help them flourish, with reduced costs of hiring employees for various jobs such as the ones working at cash counters in shopping malls. It also has the tendency to attract people's attention since this is something new, innovative and precognitive. This is what makes the apps standout from the millions available on the app store and play store.

Under the right guidance and vision this can actually shape the way we go about our everyday routine of buying basic commodities and not only expensive materialistic goods.

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