SCANNING QR CODR USING AN AR METHOD TO DISCOVER PERSONAL INFORMATION

[1] Mrs. C. Gayathri, [2] J. Manoranjani, [3] V. Sandhiya Shree, [4] L. Ishwarya, [5] S. Aishwariya

[1] *Assistant Professor, Department of CSE, Mahendra Institute of Technology, India.*

[2,3,4,5] *Mahendra Institute of Technology, India.*

ABSTRACT

Large programs like virtual reality, augmented reality, and neural network-based programs can now be run quickly on smartphones thanks to advances in hardware technology, particularly in mobile devices. Using your device's camera, augmented reality adds sound, video, graphics, and other sensor-based inputs to real-world objects using computer vision-based recognition algorithms. It's a good way to render real-world data and make it interactive, making virtual objects feel like they belong in the real world. This paper has various sections, including alphabets, fruits, animals, human organs, tools, and a conversation section. A 3D character will be shown in the real world through a camera and will teach the user name of the object. For instance, if the user selects the fruit option, the character will begin by introducing the section and then displaying a 3D model of various fruits and uttering the names of each one. If, on the other hand, the user selects the conversation option, the character will engage in conversation with the user, acting as a waiter and asking questions like "what do you like to eat or drink?" This will assist the user in figuring out how to behave and speak at that moment. The design, modeling, and animation of models and characters are all part of the process described in this paper. Several software and frameworks, including Autodesk Maya, Unity3D, and augmented reality foundations, are used to accomplish this.

Keywords: Augmented Reality, AR foundations, Self-Learning, Unity3D, Autodesk Maya, and Animated Objects.

I INTRODUCTION

In the past ten years, our world has seen significant advancements, and the development of information technology has had a significant impact on the present. This cutting-edge technology has been used to educate students at educational institutions. In the beginning, education consisted solely of books, a blackboard, a choke, etc., which was sufficient to prepare students for the real world at the time. But the young generation of today lives in a very different reality because almost everything is based on technology. Because of this, it is very helpful to use advanced

technologies like augmented reality (AR) to help students focus and understand during classes. This made it easier for them to understand and visualize what they were learning. s. Although AR and VR were initially used in NASA x-38 aircraft and U.S. Air Force Research, they were not initially utilized by the general public. During his Ph.D. course in 1996, Christine M. Byrne created the virtual reality software Water on Tap, which was about creating an immersive virtual reality environment for chemistry education. AR is an innovation that mixes three-layered objects with the client's current circumstance continuously. In contrast to virtual reality, augmented reality creates a computer-generated environment for the user to experience. Whereas augmented reality (AR) is a user environment enhanced by computerized objects. Additionally, there is Mixed Reality, which combines the real and virtual worlds. The two worlds are "mixed" environments that are realistic.

II RELATED WORKS

In 1994, wave They are strictly referred to as matrix codes rather than barcodes because they hold information in two dimensions—horizontally and vertically. They can fit more information into a smaller space than a standard barcode. While information is only stored horizontally, barcodes are perceived as one-dimensional. QR codes can also be referred to as "2D" barcodes, and smartphone readers that have camera scanning capabilities can read them [1].

In his article, he talked about QR codes as a way to quickly get information from our smartphones. They were further described as able to store up to 4,296 alphanumeric characters and approximately 7,089 numeric characters, with an error correction capability of 7% to 30% for altered data [2].

Denso Wave owns the patent for QR codes, but they decided to make them available to the public through the ISO (International Standard Organization) international standard (ISO/IEC 18004:2000&2006). This means that the specifications of QR codes are available to the public worldwide and are renowned for their high storage and speed-reading capacities [3].

This contains every one of the utilitarian examples that empower simple perusing of information and has an information region where information is put away. "The finder pattern aids in the straightforward identification of the QR code's position, size, and inclination [4], while the alignment patterns, timing patterns, and quiet zone are also included.

Makes sense of the arrangement design as a remedy design that empowers the revision of twisted QR codes; When the QR code symbol is distorted, the timing pattern can identify and correct the central coordinate of the data cell using the black-and-white patterns, and the quiet zone is regarded as the margin space required for reading the QR code. And the data area is the area in the symbol where the encoded data is stored [5].

It was believed that the use of barcodes meant to speed up the processing of purchases and the tracking of inventory led to the adoption of QR codes. As a result, it is possible to say that QR codes are similar to barcodes but have a

unique feature that enables them to store a large amount of data in a matrix format. Accordingly, there are three primary reasons why the use of QR codes is growing in the United States [6].

He provided the following justifications: the U.S. was embracing a reciprocal innovation that empowered simple openness and reception of QR codes. Denso Wave's free creation and use of QR codes make them a versatile technology with a wide range of creative applications. However, this holds not only in the United States but also in other comparable nations (such as Asia and Europe) where technology is viewed as the driving force behind market expansion [7].

Because they are free to create and read, smartphones were viewed as the catalyst that will help accelerate the adoption of QR codes. Additionally, the quantity of information or advertising that can be done using QR codes can be said to be unlimited. It may appear that some businesses or groups of people have not benefited from the benefits of QR codes [8] despite the enormous rise in smartphone use worldwide.

If they use QR codes in their marketing, businesses whose market share is based on older (older) people are likely to fail because, especially because they are older, they rarely use smartphones. In a similar vein, certain market segments or businesses that do not rely on technology daily may also fail to implement QR codes [9]. However, depending on the company's strategic vision for the novel approach to using QR code technology, QR codes can provide value to businesses in many different ways.

The floor map of the store that shows the location of the product, the quantity of the product that is available, the product description, discounts, and promotions, as well as the various colors and sizes that the customer may require, are all revealed when the code is scanned. However, the customer will need a pre-installed code reader application and an internet connection to connect the device to the online catalog system of the retailer, allowing the user to access real-time information about a specific product [10].

III METHODOLOGY

Augmented Reality

- Augmented reality (AR) adds digital elements to a live view frequently by using a smartphone's camera.
- Research into augmented reality (AR) is expanding.

The goal of augmented reality (AR) is to improve both the virtual and real worlds. Argument reality is the process of using data and information from the real world to inform, defend, and support an argument. A way to deal with argumentation utilizes proof from the actual world that applies to the contention being made, as opposed to depending entirely on intelligent or philosophical thinking. Argument Reality is frequently used in academic, political, and legal contexts to support a point of view. It takes the form of research, investigation, and analysis.

The process by which individuals construct and utilize evidence to support their arguments is referred to as argument reality. It is based on the idea that different people interpret the same set of facts in different ways and that each person's argument is based on their perception of the world. Argument Reality inspires individuals to question their assumptions, exercise critical thinking, and investigate the evidence that backs up their viewpoints.

The idea that arguments can be used to understand and evaluate a situation's reality is called argument reality. This intends that by looking at a contention, we can more deeply study the real essence of a circumstance or issue. Contention reality includes grasping the ramifications of a contention, investigating the proof that upholds it, and taking into account the counterarguments that could be made against it. AR is a diverse setting.

Despite its convenience, augmented reality has the following limitations:

1. To track the relative position and direction between the camera and the tag, download the linked virtual object, and display it, the marker and virtual object must be registered and linked beforehand on the online platform. The marker and the object cannot change dynamically in this instance, limiting their effectiveness and immediateness significantly.

2. Keeping the web association is important to get to the AR framework and download virtual items continuously.

3. For the stability of the system to be maintained, certain conditions must be met regarding the content, card size, image feature points, or marker print size.

4. Marker patterns from various businesses cannot be swapped out, making it impossible to share sources and enable compatibility. Recent research indicates that the upcoming era of augmented reality (AR) will offer dynamic, real-time media and content that enable users to interact with a variety of virtual objects. As a result, overcoming the drawbacks of the marker-based augmented reality method is critical. The quick response barcode (QR code) and augmented reality (AR) can be used to address the aforementioned issues. In 1994, Denso-Wave developed the QR code, a two-dimensional matrix. A QR tag's data can be efficiently encoded and decoded using this approach. As a result, mobile augmented reality and QR codes have been the subject of increasing research.

Ken et al., for example, used an augmented reality (AR) marker with a QR code to map three-dimensional virtual objects to the QR marker and track the angle and positioning coordinates of the QR code. The same idea was used by Vision Lens, which created a QR code for each product. When mobile devices point at the product, the augmented reality virtual object and 3D animation will appear after the QR code has been scanned.

A link to a virtual object or a uniform resource locator (URL) can be the data content of the QR code.

As a result, the location information of the QR marker can be immediately estimated when the augmented reality system is activated, and the data content of the URL can be decoded to retrieve three-dimensional virtual objects. In addition, users are not required to pre-register for the AR system during this procedure. Sadly, current augmented reality (AR) designs align the same virtual object with the same marker. As a result, the AR system assigns the same role to all users who share the same maker. To put it another way, the augmented reality system can only show the same virtual content to different users. However, in real-world business applications, businesses frequently need to deliver distinct information to distinct target customers. To address this issue, we propose a novel augmented reality (AR) method for presenting distinct virtual objects to target users using the same QR marker. This strategy works and can handle a variety of situations.

Companies, for instance, can present basic virtual objects to general customers and advanced models, such as product recommendations or preferences, to joint members or VIPs. Additionally, the proposed strategy has the

potential to provide educationally relevant differentiated instruction, such as a variety of learning resources for students at various levels. As a result, a differentiating and adaptable AR system is developed in this paper.
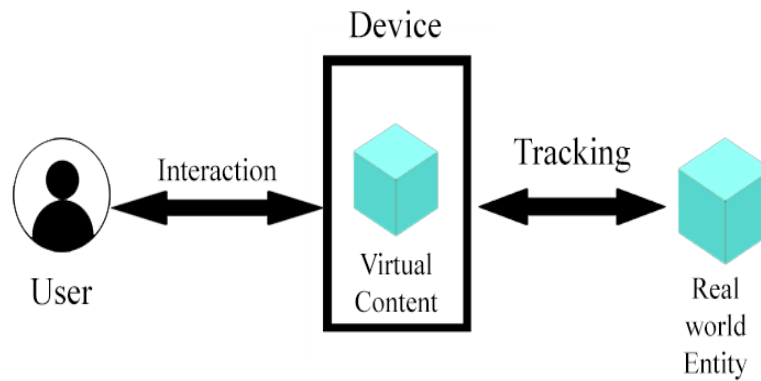
Augmented Reality Architecture

ISSUES IN AUGMENTED REALITY

- **Performance issues**

  Real-time processing of images can be a challenge and often can slow down augmented reality systems.

- **Interaction Issues**

  Users within a mixed environment because of augmented reality have difficulties interacting with the environment as normal.

- **Alignment Issues**

  People working in augmented reality are more sensitive to alignment errors **QR codes never went away** as their usage is now on the rise more than ever. With the increase in the implementation of contactless solutions for most business operations, QR Codes are proving to be very helpful.

These codes can be extended to solve complex business issues and are typically used for contactless payment, delivery, and even contactless retail. These codes are used by businesses due to their simplicity and ease of use with the majority of smartphone cameras. Investec Bank, Goldman Sachs, and Buick have all experienced QR Code failures. Don't worry if your QR Code doesn't work; you're not the only one.

A QR Code may not function for one of six main reasons:

1. Bad quality
2. Inverted colors
3. Small size
4. Poor contrast ratio
5. Wrong Placement
6. Overcrowded QR Code

6 reasons why your QR Code is not working + Troubleshooting tips
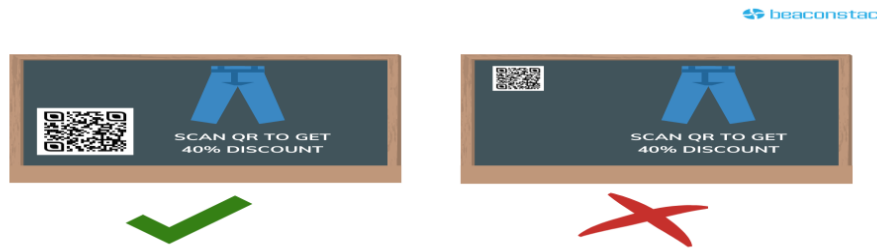
1. Quality of the QR Code
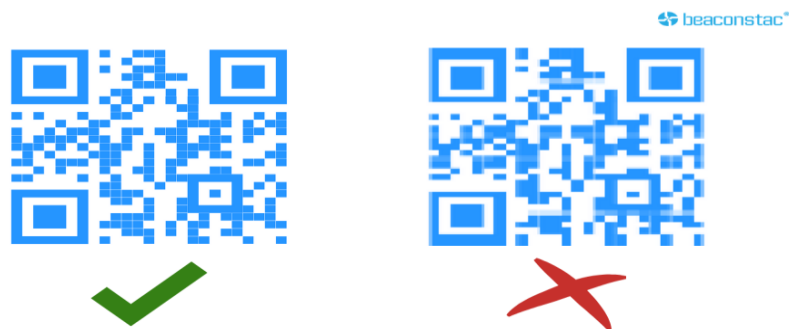
For your brain to correctly interpret the images, you may not appreciate looking at a hazy or distorted image as a perceiver. This suggests that your sensory organs place a high value on the quality of images. In a similar vein, a scanner might not correctly interpret an image of a low-quality QR Code. While a pixelated or foggy QR Code could in any case examine certain gadgets, it is prescribed to keep the nature of QR Codes upgraded. Therefore, always test the printed QR Code and substitute a QR Code of better quality.

2. Inverting color is a strict no-no
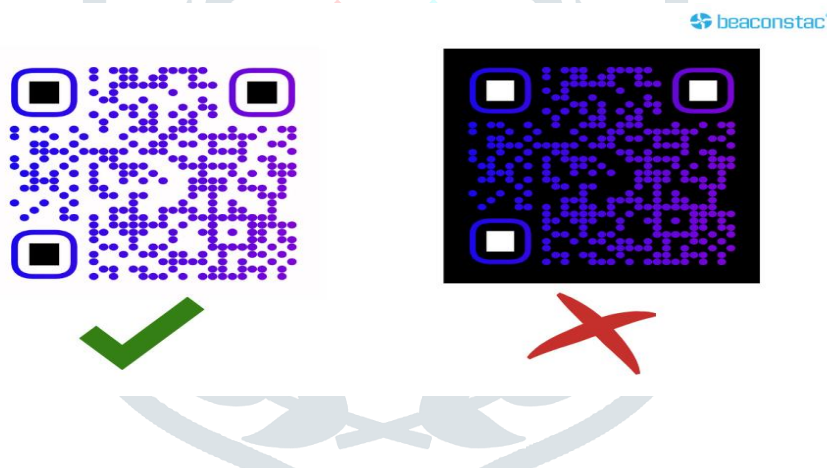
When creating a QR Code, this is one of the most common blunders. Style and design shouldn't take precedence over productivity and efficiency when it comes to QR codes because even if a code looks good, it might not work. A white background and a black foreground make up a typical QR Code. Colors would be inverted in the opposite direction. Does it aid in scanning? No, you might not want to scan a QR Code on a dark background. "I've seen people creating QR Codes with a black or dark background and a white or lighter foreground," says William Taylor, a Career Development Manager at Velvet Jobs. Although it looks great in some design scenarios, not all QR Code scanner apps can use it. Scannable QR codes with white foregrounds won't work for everyone because many apps expect the code to have a darker contrast with the background.

3. Size of the QR Code

QR Code size matters a lot for its readability and functionality. The minimum size of a QR Code should be,

Size of the QR Code = Distance/10 or, **2 x 2 inches**

For efficient use, please read the QR Code printing guidelines. The size of the QR Code is also important, especially if you want to find it in marketing materials. If the QR Code is small and in the corner, most people won't notice. A real-world illustration of an unnoticeable QR Code is Real Juice, which frequently uses tiny QR Codes on food packaging.


4. Be mindful of the contrast of the QR Code
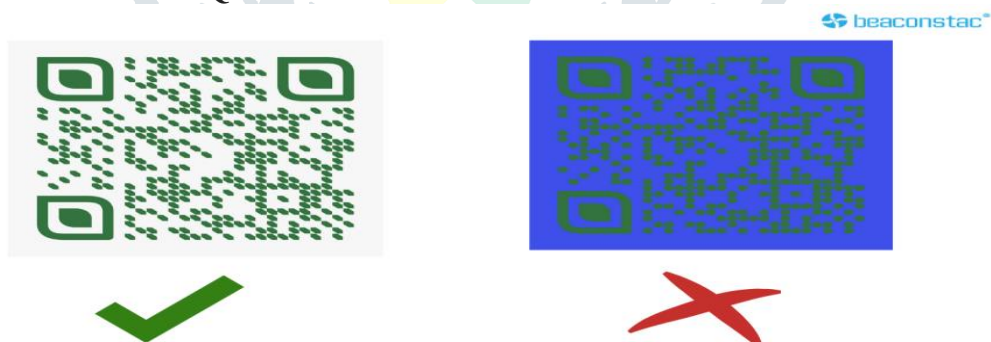
It might want to change the color of QR Codes to match the theme and color of a particular style. However, please do not do so! As long as you are doing it correctly, you can experiment with the colors. Colors that stand out will stand out even if they don't match the theme. Assuming that your varieties match the difference, it can get provoking for QR Code perusers to examine the QR Code. The founder of VPNMash.com, Tim Untenured, claims to have observed a malfunctioning wounded QR Code. Numerous QR Code scanners are unable to read QR Codes with numerous color schemes. The QR Code needs to appear sharp on a variety of screens and in print. A decent guideline

is to keep the closer view 40% more obscure than the foundation while making a QR Code.

5. Placement of the QR Code
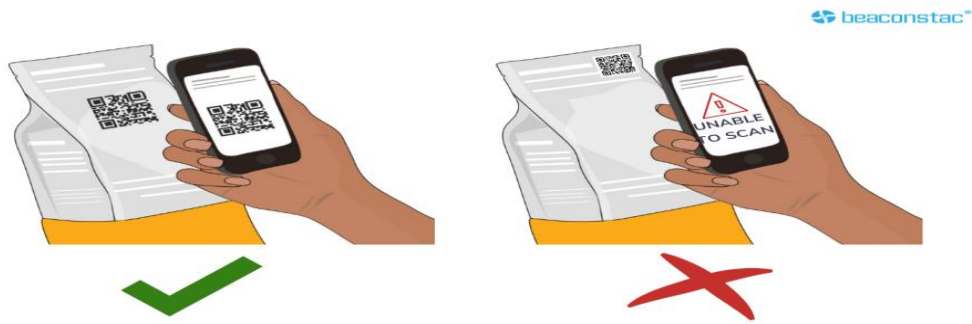
A QR Code's location is frequently overlooked. Users will be more likely to click on a QR Code if it is placed in the right spot. A QR Code's success is determined by its scanning speed and placement, according to numerous QR Code experts and marketers. Overall, successfully scanning a QR Code shouldn't take more than a few seconds. Let's examine the QR Code placement aspect now.

1. Make sure the QR Code is visible to users at eye level. No one will notice the QR Code if it is too low or within 20 inches of the ground. No one will scan it even if they do.
2. Continuously ensure that the QR Code is adequately huge to be perceptible, yet additionally, have the option to filter with next to no blunders.
3. A crucial piece of advice for establishments that use QR codes on their menus is to avoid placing them behind a reflective surface, such as a glass-topped table or a restaurant window.

6. Overcrowding the QR Code
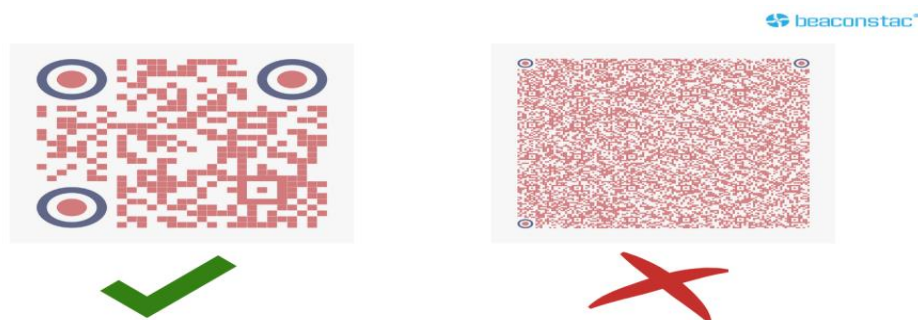
The QR Code's entire purpose is undermined by overcrowding it with content. Take a look at the QR codes up top. The one on the left is clean and clear, so it will scan more quickly. The one on the right seems crowded and busy. This simply indicates that scanning the one with more pixels takes longer and carries more content. With QR Codes, a lot of content can cause a lot of problems in different situations. A lot of content, for example, can make the quiet space and the corners smaller. A ton of scanners are reliant upon those corners, and in this way, they will most likely be unable to work accurately.

3 other QR Code scanning problems + Tips to fix them
IV RESULT AND DISCUSSIONS

The product information interface (see figure 3), where new product information is uploaded and stored in the system's database, and the code generator page (see figure 4) where an individual QR code for each product is generated, were designed and tested successfully for the system prototype. MySql data set was utilized as the backend instrument, which was facilitated on a space site to uncover constant item data each time the item code was checked.

Scan the QR code with a smartphone or tablet equipped with the code reader application to decode the encoded data, as shown in Figure 5, as was to be expected. After examination, the gadget was diverted to the internet-based data set which filled in as the web-based list for the retail location in this manner uncovering ongoing item data. At this point, the customer can check out by adding a scanned product item to their cart. Finally, each time a product code is scanned, the database is automatically updated to ensure that the information is accurate and reliable.

As mentioned earlier, this procedure has proven to resolve several shopping-related issues. The embedded uniform resource locator (URL) connects the mobile device to the online catalog, where real-time product information is displayed when a customer scans a product code. The customer has the opportunity to see the product in a variety of colors, sizes, or dimensions, and he or she can make the choices he or she wants without having to go to the pick-up location.

The catalog also contains promotional codes, discount vouchers, and other details about the product. In addition, by checking the number of products that are currently in stock, the customer ensures that his or her purchase will be quick and easy.

Second, the system can provide customers with floor directions via mobile phones to the pick-up location of the products they want. Products can also be added to the online shopping cart, and the checkout process can eventually be integrated. Because of this, shopping generally takes less time because choices are easier to make and products are easier to find.

Figure 1. The interface of the proposed system for uploading product information
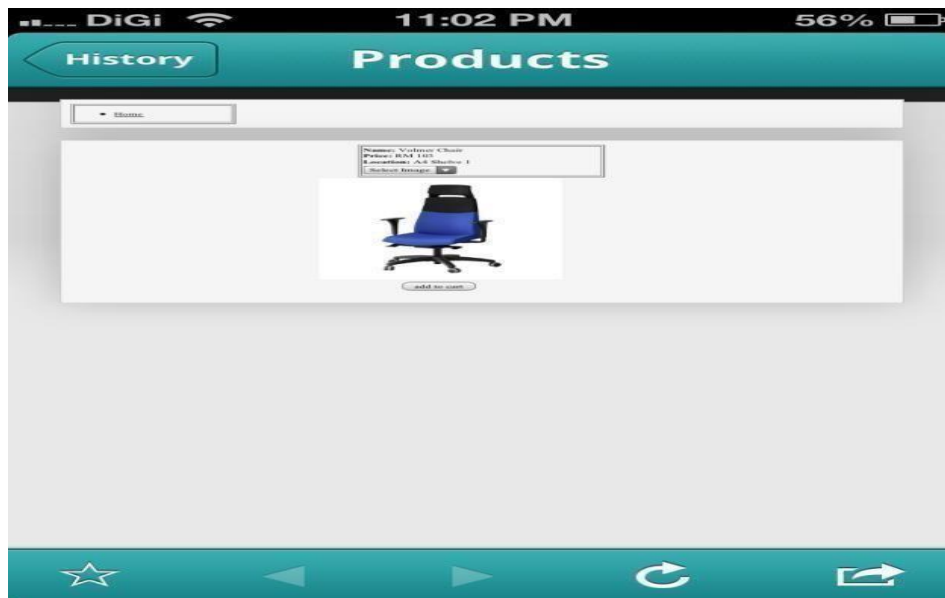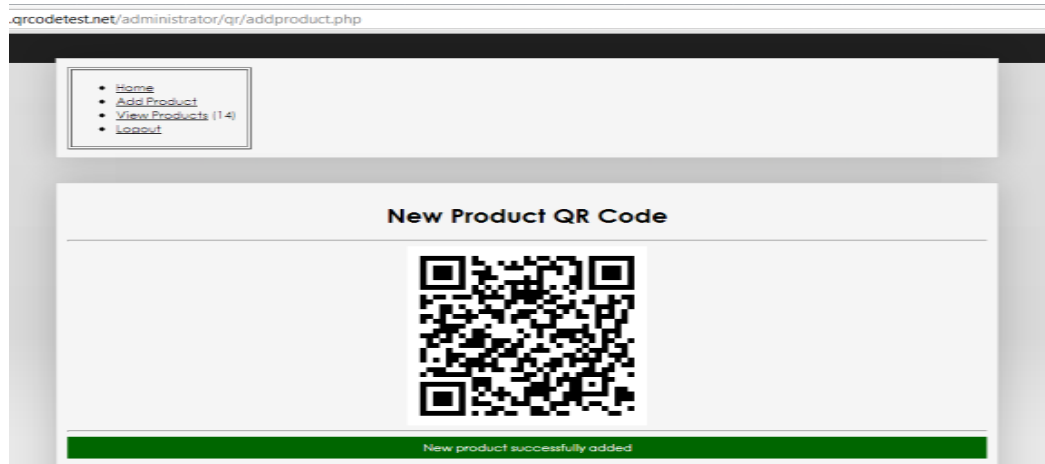
Figure 3. QR Code of the encoded product details

V CONCLUSION AND FUTURE ENHANCEMENT

Because it has the potential to make our lives safer and more hassle-free, the entire world is eagerly anticipating the augmented reality of the future. The impossible can be made possible with AR. Exploration and invention have always been methods by which humans have sought to advance themselves. This inherent quality of humans can be seen in augmented reality. By allowing customers to access online real-time information (the online catalog system) about products by simply scanning the product QR codes, this paper establishes that the use of QR codes in shopping malls can significantly influence customers' speedy and efficient shopping. The system's floor directions, also help customers become more familiar with the shopping mall. In addition, the shopping mall's accurate statistical data reports and dependable data mining on consumer and product information will be made possible by the system. Customers are also permitted to investigate their smartphones' capabilities.

However, this study will investigate a variety of strategies for enhancing the customer experience. To begin, a checkout system will need to be incorporated into the developed prototype to provide customers with an entirely new shopping experience from choosing products to locating them and checking out to avoid long lines and thus

improve their retail concept. Lastly, add a more secure security feature to the QR codes so that customers can scan them safely and easily use their mobile phones to make financial transactions.

REFERENCES

1. AZUMA, R. T. 1997. A survey of augmented reality. In Teleoperators and Virtual Environments, 355–385. CHEN, F.-C. 2007. Designing a Personalized Mobile Shopping System for Cell Phones by QR Code. Master's thesis, Tatung University.

2. CHRISTIAN CHRISTIAN DOPPLER LABORATORY, 2003. ARToolKit Plus. http://studierstube.icg.tu-graz.ac.at/handheld.

3. DENSO WAVE CORPORATION, 2000. QR Code features. http://www.qrcode.com. FIALA, M., 2004. AR Tag. http://www.artag.net.

4. FIALA, M. 2007. Webtag: A worldwide internet-based AR system. In 6th International Symposium of Mixed and Augmented Reality.

5. KATO, H., AND BILLINGHURST, M., 1999. ARToolKit. http://www.hitl.washington.edu/artoolkit.

6. LIU, T.-Y., TAN, T.-H., AND CHU, Y.-L. 2007. 2D barcode and augmented reality supported English learning system. In 6th IEEE/ACIS International Conference on Computer and Information Science. METAIO, 2003. metaio Unifeye software platform. http://www.metaio.com.

7. PARIKH, T. S., AND LAZOWSKA, E. D. 2006. Designing an architecture for delivering mobile information services to the rural developing world. In Proceedings of the Seventh IEEE Workshop on Mobile Computing Systems and Applications, vol. 21, 31–33. PSYTEC INC., 1999. Psytec Inc. QR Code Editor. http://www.psytec.co.jp.

8. REKIMOTO, J., AND AYATSUKA, Y. 2000. CyberCode: Designing augmented reality environments with visual tags. In Proceedings of DARE 2000 on Designing augmented reality environments.

9. SEINO, K., KUWABARA, S., MIKAMI, S., TAKAHASHI, Y., YOSHIKAWA, M., NARUMI, H., KOGANEZAKI, K., WAKABAYASHI, T., AND NAGANO, A. 2004. Development of the traceability system which secures the safety of fishery products using the QR Code and a digital signature. In Proceedings of Marine Technology Society/IEEE TECHNO-OCEAN, vol. 1, 476– 481.

10. TAKAO, N., 2007. libdecodeqr. http://trac.koka-in.org/libdecodeqr. TATENO, K., KITAHARA, I., AND OHTA, Y. 2007. A nested marker for augmented reality. In Proceedings of IEEE Virtual Reality Conference (VR '07), 259–262.