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RESEARCH ARTICLE

DIGITAL MENU FOR BARS AND RESTAURANTS USING AUGMENTED REALITY WITH THE AIM OF CREATING AN INTERACTIVE EXPERIENCE WITH CUSTOMER

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Abstract

AR offers immense marketing and advertising opportunities. In the right hands, AR can boost your salespeople. AR can be used in flyers, print ads, billboards, newspapers, etc. By providing a potential customer with just one QR code, you can attract multiple customers to your business. AR was used to create a digital menu for restaurants and cafeterias, so the AR application allows your customers to view the menu in a projected 3d way. Choose your favorite dish from the menu in no time with such applications. Upon entering the restaurant, the customer can open the application and check the entire menu in 3d.

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Introduction:-

Virtual and augmented reality is a field of computing that studies real-world perception using computer-generated information and data. This new technology has gained a position since the development of information technology. It has been noted that augmented reality with the help of computers and robotics expands the perception of the five senses and represents more than the real state of things.

In fact, technology has made it possible to experience other worlds. With Sensorama, the first example of virtual reality (and one of the first steps towards augmented reality), it was possible to design an individual walking through Manhattan. Augmented reality is a world of possibilities. Its applications are vast and limited only by your imagination. This technology seems to be an ally of the industry and has progressed significantly with it, but today it is found in almost every field of interest, from medicine to entertainment, and traverses' areas as diverse as design, education, or architecture.

Augmented reality allows the user to perceive a real environment that is "augmented" with some virtual objects, that is. created by computer; our goal is to improve our understanding of the real world. (LIMA et al.; 2019) Focuses on the concept of augmented reality and explains the technology behind it (including some limitations) and some of the areas where it was most evident. However, the main point of the article is the creation of a menu using augmented reality, applying this technology in restaurants and snack bars.

Theoretical Reference

This topic seeks to present the main milestones of Augmented Reality. We start by clarifying the concept of Augmented Reality and then present other items necessary for the understanding of the article.

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Augmented Reality

Augmented Reality (A.R.) uses multisensory technology based on multimedia features that allow you to create partially artificial environments. These features reinforce the natural physical limits of users and enrich the manipulation of information. To perform these actions, augmented reality uses a variety of conventional and unconventional inputs/outputs to make interactions as real and natural as possible. Augmented reality is a technological tool derived from virtual reality(LEE, 2016).Figure 1 represents an image of a digital menu in a restaurant using the application installed on a cell phone.

Figure 1:- Menu in 3D and Augmented Reality.



Source: MapMkt, 2020.

Segundo Kirner (2015):

[...] Augmented reality can be defined as the enrichment of the real world with virtual information (dynamic images, spatial sounds, naptic sensations) generated by computer in real time and properly positioned in 3D space, perceived through technological devices.

Framework

A framework is a common code abstraction in multiple software projects that provides common functionality. It can achieve a specific function by configuring the application during programming. A structure, or conceptual structure, is a set of concepts used to solve a problem in each field. A conceptual framework is not executable software, but a domain knowledge model. A software framework consists of classes implemented in a specific programming language that are used as a tool for software development. A framework works where multiple applications share functionality, but this requires applications to have something in common that is large enough to be used by multiple applications.

Software design patterns should not be confused with frameworks because patterns have a higher level of abstraction. Unlike a design template, a framework contains code. Frameworks can be modeled with different design patterns and always have a specific application domain that is not present in the design and software standards.

Interaction With The User

The user can interact with augmented reality systems in several ways: gesture recognition (touch interface), gesture recognition through vision (visual interface), eye recognition (eye tracking), voice recognition (oral user interface), and text recognition (text). (AZUMA; 2017) (KREVELIN and POELMAN; 2018).

Limitations

Although AR is a long-born technology, AR has only been introduced into society today. Augmented reality is entering people's lives every day through mobile phones, entertainment games and even tablets(METZGE, 2016). Ergonomics, design, weight, energy consumption and costs are constantly studied. But even though augmented

reality has extensive applications in everyday life, it still has many obstacles to overcome, both technically and socially (SCHUCH, 2018).

The main limitations of this technology are portability for internal and external use, calibration, and storage. (AZUMA; 2017).

Materials And Methods:-

Using an entirely new technology for the first time can be a challenge. But if you divide knowledge into manageable parts and practice frequently, you'll quickly master the new skill. To create an augmented reality application, you should carefully consider the following factors.

Materials:-

Select the option that best suits your experience, price, and time commitment. For example, if you want to use Vuforia, Wikitude, and ARToolKit, you should have extensive knowledge of C++, Java, or C#. If you don't like working with programming languages, choose a more direct option. Programming tools like Aurasma are ideal for beginners.

Methods:-

You'll need a smartphone or tablet with an app to "read" your augmented reality code. There are several of these apps in the operating system stores, feel free to choose.

Then you need an application to create the reality images increased that you will use and at the same time link these images to what you want to "increase" (a 3D animation, videos, a 3D object, etc). Platforms that can help you with this are: Layar, Vuforia, Total Immersion, and ARTool Kit. These tools are free and limited, it is worth remembering, in purchase of paid versions of tools and development of augmented reality.

In the app, you'll link an image (a square filled by several smaller black and white squares) to the purpose of your augmented reality experience. This image should be printed. Then just open the augmented reality app on your smartphone or tablet, aim for the image, and that's it: you'll have your augmented reality! It's a lot simpler than a lot of people can make it look like.

Results:-

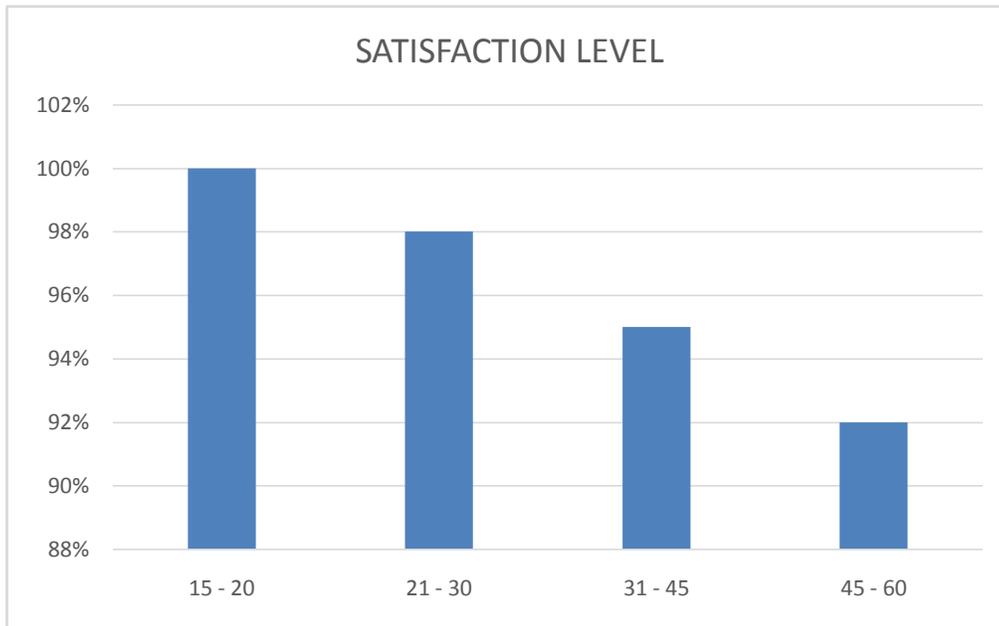
Augmented reality is still a new technology that some companies are gradually adopting. Despite all the advantages, it is important that experiments are carried out before the technology is finally implemented.

Level Of Satisfaction With Augmented Reality

AR is a technology that integrates the physical and virtual world to provide more complete and interactive experiences in real time. It offers greater practicality, efficiency, and accuracy of information in the use and digital menus for attendants as well as for end users (customers).

Therefore, its use in restaurants and cafeterias has become very popular in recent years, especially since 2020, when the Pandemic was at peak. Graph 1 presents a test conducted in a restaurant among customers of different ages on the use of increased reality as in menus.

Graph 1:- Level of satisfaction among audiences of different ages.



Source: Authors, 2022.

Agility Of Choice And Satisfaction

The level of agility becomes 1/4 faster with the use of Augmented Reality in the attendance on menus with this the level of complaints is small reaching in some cases do not exist due to the satisfaction of the technology. Customers have the overall view of their food as it was somehow already present at the table. We will see in tables 1 and 2 a quantity of 200 customers being served in subsequent weeks, and in the first week the level of dissatisfaction with the dish was high, as it always was in the restaurant. After the implementation of Reality Increases the customer would already know what they would receive had as not being sad about the food because he had already visualized the same before arriving at his table. The power was not changed, that is, improved only if applied to Augmented Reality.

Table 1:- Care Without the Use of Augmented Reality.

Food Choice Time Without Augmented Reality		
Number of people served	Average time of choice	Complaints regarding the dish
200	20 minutes	High

Source: Authors, 2022.

Table 1 presented the number of 200 customers served in the first week of testing performed in the restaurant where augmented reality technology would be implemented in the menus. And he had a very high number of dissatisfactions.

Table 2:- Attendance with the use of Augmented Reality.

Food Choice Time Without Augmented Reality		
Number of people served	Average time of choice	Complaints regarding the dish
200	5 minutes	Low

Source: Authors, 2022

Table 2 presented the number of 200 customers attended in the second week of testing performed in the restaurant where augmented reality technology was implemented in the menus. And he had a very low number of dissatisfactions.

Final Considerations

The use of technology has benefited several business sectors, such as food. That's why it's so important that companies invest in delivering the best digital experience for their consumers. By using augmented reality technologies in your marketing services and strategies, your company will stand out from digital competition. Augmented reality provides a complete and unique interaction with products before purchase, increasing the added value of your brand and increasing sales. However, to take advantage of augmented reality, it is important to work with a partner who has proven and reliable solutions to ensure that applications work as best they can.

It was thought that the augmented reality menu design was developed using simple techniques and presenting a virtual meal to the customer, taking different images of meals from different angles, combining all these images, and creating 3D models of food with measurements. The menu has real dishes, whose appearance and size the customer can estimate before ordering.

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