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"A Review Paper on Augmented Reality for Virtual Perspective in Shopping & Architectural Design"

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Abstract - *Augmented Reality is an advanced technology that could simplify the execution of complex operations. Augmented reality(AR) describes the real-world interaction where digital information is superimposed in the real world environment with additional information. This concept can be used for online shopping to enhance the user experience.*

Key Words: Augmented reality, shopping, virtual world, virtual reality, Artificial Intelligence

1. INTRODUCTION

Before we all were known to online shopping we had to go to the store physically, look for the product you like from a limited designs and products available and select the product which we like and pay for it via cash or credit/debit card then we were introduced to online shopping and then there was no need to go to the store but we were able to view and purchase the products online, and now with augmented reality been introduced in online shopping it has become more easier for us to shop using online methods. With AR we will be able to imagine how the product will be when it will get delivered and most of our problems would be solved all thanks to AR.

As we know that today almost 22% of the shopping is done online with AR being introduced to us we will definitely add new dimensions to shopping experience and see an increase in these numbers.

A computational photographer Steve mann coined the word wearable computing in 1980, the word "virtual reality" was coined by Jaron Lainer in 1989 and the world "Augmented Reality" was coined by Thomas P Caudell in 1990. As Artificial Intelligence is developing rapidly it will exhibit a virtual mind similar to that of a human mind. Augmented reality can transfer from a virtual agent-centered framework to a human-centered framework.

This paper proposes the concept of Augmented reality which shows the relation between virtual world and physical world.

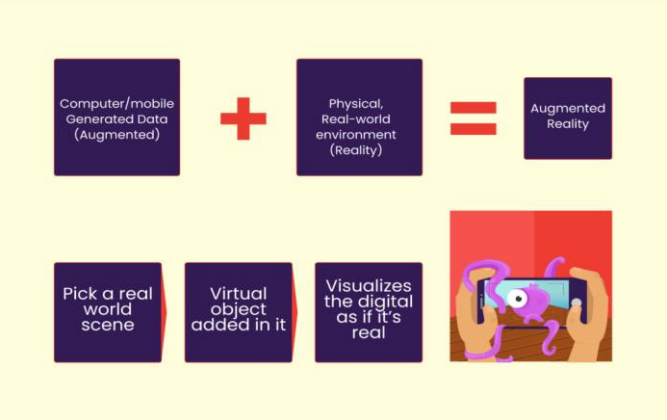

Fig1: Relation between the Physical world environment and Virtual world environment, where data generated along with the physical environment makes augmented reality.

1.1 Ease of use

1) Selecting a product

First, confirm that you have the correct product design according to your requirements. AR uses the virtual environment to help you visualize and select the product.

2) Maintaining the Integrity of the Specifications

The product which will be delivered to the user will be the same as it was shown by the AR. Various specifications such as colour, dimensions and quality will not be tampered with, and the product will completely meet users expectations.

1.2 Devices Required

If you are willing to use AR for shopping purposes you will need some devices. With the help of these devices the users experience of shopping using AR will be enhanced.

1) Camera

Camera will act as a primary interface device between the real world and the virtual world. Camera shows the real world environment on which AR content is placed. The AR capable devices are embedded with various technologies such as computer vision, complex image processing, and machine learning which are used to produce high quality images. Or we can say it as better the phone camera better will be the mapping and tracking of real world objects and surfaces and the AR objects will be more accurately overlaid on the surface.

2) Gyroscope

Nowadays most of the modern devices are equipped with gyroscopes in them. Measurement, maintenance and angular velocity is done by the gyroscope. It can sense the motion angularly that is in 360 degrees. The gyroscope sensor is also called an angular rate sensor or angular velocity sensor.

3) Accelerometer

A gyroscope accelerometer is also equipped in most of the modern devices. Accelerometer takes measurements in a three dimensional plane. Accelerometer takes linear measurements in x,y & z direction, that is it can detect motion in linear direction, which will help in locating the object we want in a specific location.

4) Display

As we know that whatever is being captured by the camera needs to be displayed somewhere, here display acts as an output device and without display it will not be possible to see the objects from the virtual environment. Displays in different devices available in various resolutions according to the quality required such as 2K,4K and 8K. The higher the resolution the better the output will be displayed.

2. LITERATURE SURVEY

From the papers that we have studied we have found out some facts and drew some conclusions. Some of the conclusions are mentioned below

1) Collections of meaningful data using sensors

The most important step in augmented reality is collection of data using various sensors such as the camera, gyroscope and the accelerometer and detecting the plain surface and the surrounding environment.

2) Visualization of objects on surfaces

The camera and various other sensors collect and process the collected data which is further used to visualise the object and then the result is projected on the display in the real world.

3. PROBLEM STATEMENT

To develop a windows/Android bases prototype for online shopping system using different softwares

OBJECTIVES:

1) To detect the surface.
2) To find out which is the best object for us.

4. MOTIVATION

1) Not a good experience with online furniture purchases.
2) Purchased product does not have an appropriate fit.
3) Same issue encountered by a lot of users.
4) Difficulty with the return and refund if not useful.

5. PROPOSED SYSTEM

Proposed system is an online shopping system using Augmented Reality. Online shopping is a boom to the shopping market which has reduced the efforts and maximized the profit of the sellers. Shopping using augmented is a process of detecting the surface/dimensions of the room and project where the object will be best fit for. The main focus is on reducing the errors which can be found if the shopping is not done using AR and increase the accuracy.

6. ALGORITHM

ARCore uses a technique called Concurrent Odometry and Mapping (COM) to understand where the smartphone is relative to the real environment around it. The first step the data coming from RGB camera sensor and motion data coming from accelerometer and gyroscope sensor is combined to give visual data to the smartphone to do Motion Tracking and to compute a point or mark of high contrast feature points using parallax formula. It gives information about the orientation and position of smartphone in six degree of freedom

The next step Scene Understanding is used to understand where feature points are coplanar. Which helps the smartphone to detect the plane

In the last step light estimation is used by the ARCore to detect the light intensity at the different position.

7. EXPECTED RESULT

1) Surface detection
2) Object projection using AR
3) Visual of objects virtually
4) Smart Recommendations for measurements

8. ADVANTAGES

1) Shopping becomes more easier and efficient using AR
2) We can get some digital information by viewing the object.
3) Visualization along with presentation becomes easier.
4) No need to visit the place and buy products.

9. DISADVANTAGES

1) Major disadvantage of shopping using AR is that it is expensive to develop and maintain by the retailer.
2) A 3D object of each item that the retailer wants in their products list is to be made by scanning the product.
3) Large items are harder to scan or the need to create.
4) If the object is not scanned properly the orientation and accuracy of the product will decrease.

10. METHODOLOGY

In this project we are using Augmented Reality for implementation of online shopping. Here the methodology of surface detection and object detection has been used. In surface detection and object detection the system analyses the surface/object and finds the dimensions of the object which will help in the projection of objects in the real-world environment.

11. CONCLUSIONS

This project will help us use the true potential of AR for improving the online shopping experience and also improve the architectural design process.

Augmented reality uses surface detection and image processing methods to detect the surfaces or objects to give us the desired output.

It helps Designers and Developers to minimise errors in their work and bring their work to perfection.

12. ACKNOWLEDGEMENT

The things which can be visualised by us but which were not able to express earlier can now be expressed using the concept of Augmented reality and virtualization.

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