MANTECH Publications

Journal of Research in Computer Science and Engineering
Volume 7 Issue 2
ISSN- 2457-0818 (Online)

An Immersive Virtual Reality (Augmented Reality) Shopping App

Dr. Ayushman Patel[1], Riddhi Sarvaiya[2]

Associate Professor[1], Student[2]

Department of Computer Science and Engineering

C.K Pithawalla College of Engineering and Technology

Corresponding Author's Email: - *sarvaiyariddhi9@gmail.com*

Abstract

It is difficult to picture a world without the internet. Shopping, like everything else, has altered as a result of the internet. No one wants to acquire a product only to be unsatisfied later because of a tiny annoyance caused by anything that was not exposed when investigating the product owing to a lack of resources. The answer is to enter the realm of Augmented Reality (AR).

The consumer may visualise the thing he wants to buy via augmented reality. The consumer may ensure that the goods meet his expectations from every viewpoint. This can help the user avoid making poor judgments. To put the solution into action, the seller must submit facial photographs of the goods as well as the necessary measurements so that a model can be produced and displayed to the seller.

Keywords: *- Shopping, Augmented Reality, Products, Buyer, Seller, Visualizing, 3D*

INTRODUCTION

Online shopping has grown in popularity, making it easier for the average person to purchase. Shopping has never been so simple. Shopping is now at the tip of one's fingers.

This creates a slew of new issues. Humansrely heavily on their visual, auditory, somato sensory, olfactory, and gustatory systems involuntarily. Except for the visual system in online purchasing, all of these senses become dull. To compensate for the loss of the other four

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved

senses, the final sense must be greatly enhanced. This work is aided by augmented reality. A highly interactive environment that combines the virtual and physical worlds. The user may now view more than just an image. Augmented reality immerses the user in a sub-virtual environment in which he may fully utilise his visual system.

The feel of a material or the way a colour complements the background may all influence the buyer's decision. Because other aspects cannot yet be regulated owing to technological limitations in our time. We must concentrate on what we can do to increase the users' ability to use the visual assistance.

OBJECTIVE

When a customer purchases a product online, the need for the product to be returned due to dissatisfaction must be minimised. This is advantageous to both the customer and the seller. Because the client does not have to go through the inconvenience of returning the product and the merchant does not have to provide refunds to purchasers. Our goal is to provide the consumer with an immersive experience of the goods he wishes to purchase. This will assist them to determine whether the product is suitable for them.

SYSTEM ARCHITECTURE

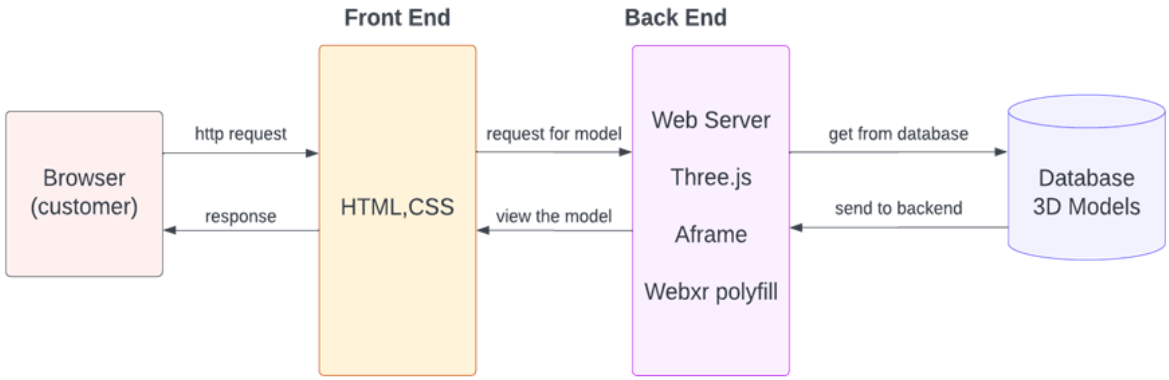


Fig 1: System Architecture

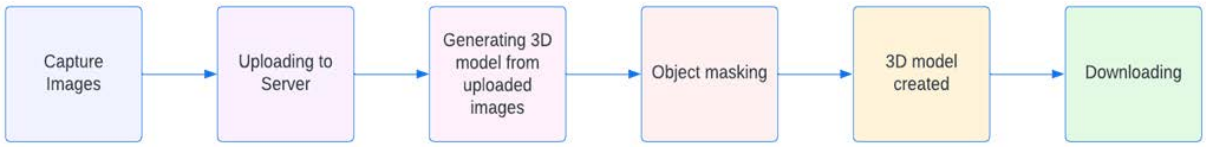


Fig 2: 3D Model Generation

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved

FEASIBILITY ANALYSIS

Technical Feasibility

This investigation focuses on the technology resources available to the company. It helps businesses determine whether their technical resources are enough for the project and whether their technical staff is capable of translating concepts into operational systems. A technical feasibility study investigates the intricacies of how you intend to provide a product or service to customers. It is your company's logistical or tactical plan for producing, storing, delivering, and tracking goods and services.

Augmented reality (AR) is a digitally enhanced version of reality that uses digital visual components, audio, or other sensory stimuli.

AR is a technology that superimposes computer-generated material on top of the user's real-world environment. Thus, internal technical capabilities are critical.

Polycam, A-Frame, Three.js, and Visual Studio Code are the software tools used. A smartphone with a camera and an operating system is sufficient as part of the hardware to meet the criteria of our work.

Economic Feasibility

Economic feasibility is a sort of cost-benefit analysis of a project that assesses if it can be implemented. To assist decision-making, this term refers to the objective and reasonable evaluation of a project's strengths, weaknesses, opportunities, and risks, as well as the resources necessary to complete the project and an estimate of its chances of success.

This project necessitates the use of free source tools, and the data collection was created by the author rather than purchased. In our job, no specialised hardware or sensors are required. As a consequence, we may conclude that this method is financially feasible.

Implementation

We begin by gathering photographs of the product that the seller wishes to display. We capture over 20 photographs of the product from various height ranges and perspectives, attempting to cover all of the object's faces. A 3D model is built by merging all of the available photos. The generated 3D model may or may not require post-processing. The cleaned 3D model is then used to show the user the product.

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved



Fig 3: Uncleaned 3d model

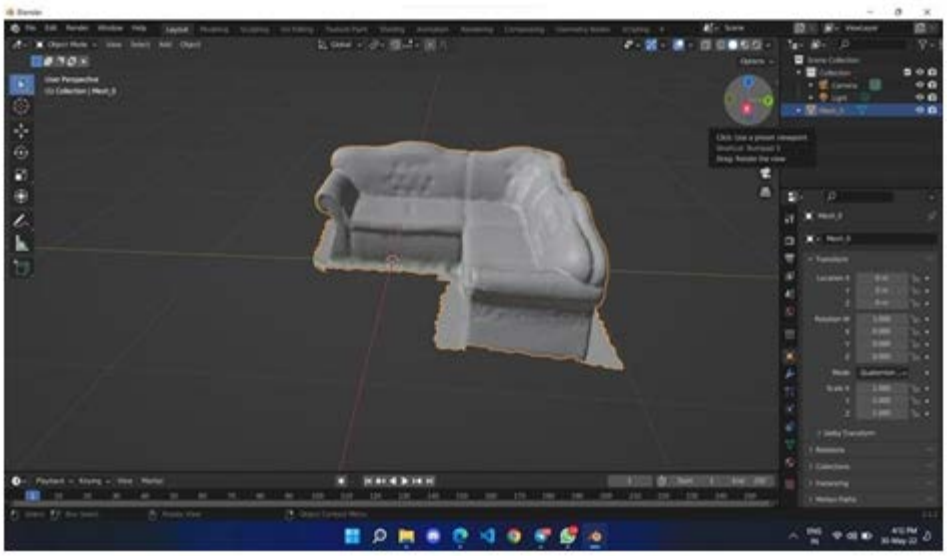


Fig 4: Cleaned 3d model

A web page is shown to the buyer who can choose what genre or class of product he wants. The buyer here can select from the available genre the products he wishes to see in Augmented Reality. The web page is mainly built under HTML and CSS. HTML, or Hypertext Markup Language, is the standard markup language for texts that are intended to be viewed on a web browser. Technologies such as Cascading Style Sheets (CSS) and programming languages like JavaScript can help. CSS stands for Cascading Style Sheets. CSS saves a lot of work as it can control the layout of multiple web pages all at once.

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved

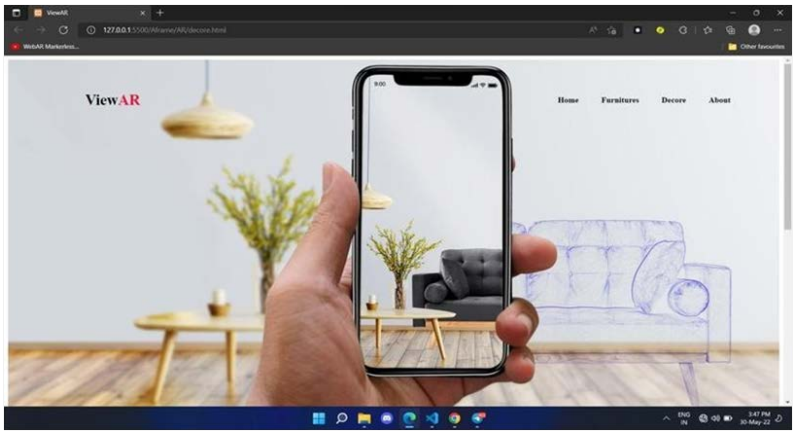


Fig 5: Webpage desktop view



Fig 6: Furniture category

Web browsers receive HTML documents from a web server or locally stored files and convert them to multimedia web pages. HTML originally featured cues for the document's look and described the structure of a web page logically.

To incorporate the 3D model developed before into the web page created afterward, the A-Frame was used. A-Frame is a web framework for creating virtual reality (VR) experiences that is open-source. It is maintained by

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved

Supermedium (Diego Marcos, Kevin Ngo) and Google developers (Don McCurdy).

A-Frame is a Three.js entity component system framework that allows developers to use HTML to construct 3D and WebVR environments. HTML gives web developers and designers a familiar authoring tool while also including a popular game development framework used by engines like Unity.

Using port forwarding features to launch the web server temporarily into the mobile device. Web servers, FTP servers, e- mail servers, and other specialized Internet applications can all be set up using port forwarding on your network. The router will pass these requests to the proper computer when users send this type of request to your network via the Internet. When customers are unable to connect to a Linksys router-connected FTP server, the FTP ports must be forwarded to the server in order for the request to be recognized. If you're using a server PC or a game server, this is set up on the router.

AR Core plays a huge role in the implementation or displaying of the 3D model in the augmented reality world. ARCore, previously known as Google Play Services for AR, is a Google software development kit that allows developers to create augmented reality apps.

To merge virtual information with the real world as seen through the camera of a smartphone or tablet, ARCore employs three main technologies.

- The phone can understand and track its position in relation to the rest of the world thanks to its six degrees of freedom.

- The phone can determine the size and location of flat horizontal surfaces such as the ground or a coffee table thanks to its environmental awareness.



Fig 7: Preplacement view

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved



Fig 8: Placed view in different angles

CONCLUSION AND FUTURE WORKS

In this study, we presented a hybrid technique to visually assisting and improving a buyer's online purchasing experience. Making a 3D object out of photographs that cover at least half of the preceding image. This allows the photos to be combined to form a 3D model. The obtained 3D model is displayed in the real world using A-Frame and AR-Core via a mobile phone.

In the future, we hope to expand the work by integrating automated model cleaning. In addition, we would want to develop a 3D model of the product in a more faster and real-time setting.

REFERENCES

1. Hong Qin, BabjideOsatuyi, Lu xu, “How mobile augmented reality applications affect continuous use and purchase intentions: A cognition-affect-donation perspective”, Journal of Retailing and Consumer Services, Vol.63, November 2021, 102680.

2. Andreea Blaga, Cristian Militaru, Ady Daniel Mezei, Levente Tamas, “Augmented reality integration into MES for connected workers”, Augmented reality integration into MES for connected workers, Vol.68, April 2021

3. D. Matveichev and D. -T. Lin, "Mobile Augmented Reality: Fast, Precise, and Smooth Planar Object Tracking," 2020 25th International Conference on Pattern Recognition (ICPR), 2021.

4. L. Chen, Y. Chen, H. Ling, X. Tian, and Y. Tian, "Learning Robust Features for Planar Object

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved

Tracking," in IEEE Access, vol. 7, pp. 90398- 90411, 2019.

5. Yong Wu,WeitaoChe,andBihui Huang “An Improved 3D Registration Method of Mobile Augmented Reality for Urban Built Environment”, International Journal of Computer Games Technology Volume 2021, Article ID 8810991, 2021.

6. M. SushmaSri ”Object Detection and Tracking using KLT Algorithm”, IJEDR Volume 7, Issue 2,ISSN: 2321-9939, 2019

Page 111-118 © MANTECH PUBLICATIONS 2022. All Rights Reserved