JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY, NOIDA (U.P.)
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING AND INFORMATION

TECHNOLOGY

MINOR PROJECT I

AUGMENTED REALITY SHOPPING WEBSITE

AR-SHOP

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We also wish to extend our thanks to seniors and other classmates for their insightful comments and constructive suggestions to improve the quality of this project work.

Signature(s) of Students

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Enrollment No.: 9921103230

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Enrollment No: 9921103222

Name: RAHI AGARWAL

Enrollment No.: 9921103145

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and beliefs,it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma from a university or other institute of higher learning, except where due acknowledgment has been made in the text.

Place: NOIDA

Date:30/11/2023

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CERTIFICATE

This is to certify that the minor project report entitled, “ARShop E-Commerece Website” submitted by Priyanshu Agarwal, Adwitya mani Tripathi and Rahi Agarwal of B.Tech of Jaypee Institute of Information Technology, Noida has been carried out by them under my supervision and guidance. This work has not been submitted partially or wholly to any other University or Institute for the award of any other degree or diploma.

Signature of Supervisor

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ABSTRACT

This project introduces an exciting Augmented Reality (AR) shopping website, poised to redefine the way users engage with online retail. Departing from conventional e-commerce platforms, our website leverages the immersive capabilities of AR to create a more interactive and personalized shopping experience without relying on complex computer vision.By seamlessly integrating AR technology, users can visualize products in their own surroundings through the lens of their device, offering a real-world context for potential purchases. Whether previewing furniture in their living spaces, trying on clothing virtually, or exploring how tech gadgets seamlessly fit into their daily lives, customers can make more informed decisions, fostering confidence in their online shopping choices.Accessible through web browsers and dedicated mobile applications, our user-friendly interface prioritizes simplicity and intuitiveness, making the AR shopping experience enjoyable for a wide audience. Emphasizing ease of navigation, the website aims to enhance user satisfaction and engagement.This Augmented Reality Shopping Website stands as a testament to the fusion of convenience and innovation in online retail, offering users an immersive and personalized shopping adventure without relying on complex computer vision. As we unveil this novel approach, we anticipate not only meeting but surpassing the evolving expectations of modern consumers in the dynamic landscape of e-commerce.

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LIST OF ABBREVIATIONS

MERN	MongoDB, ExpressJs, ReactJs & NodeJs
HTML	HyperText Markup Language
CSS	Cascading Style Sheets
UI	User Interface
PHP	Hypertext Preprocessor
HTTP	Hypertext Transfer Protocol
API	Application Programming Interface
CRUD	Create, Read, Update & Delete
DB	Database
VS Code	Visual Studio Code

CHAPTER-1

INTRODUCTION

1.1 Web Programming

Web development, commonly known as web programming, is the process of creating and maintaining websites or web applications for the internet. It encompasses a multifaceted set of tasks and skills aimed at building the structure, design, and functionality of web pages. Developers use a variety of programming languages, frameworks, and tools to bring web projects to life.

In the realm of frontend development, HTML (Hypertext Markup Language), CSS (Cascading Style Sheets), and JavaScript are fundamental languages. HTML defines the structure of web content, CSS handles the visual presentation and layout, and JavaScript adds interactivity and dynamic features to web pages. Popular frontend frameworks like React.js, Angular, and Vue.js provide developers with pre-built components and structures, streamlining the development process.

On the server side, developers employ languages such as PHP, Python, Ruby, Node.js, and Java. These server-side languages enable the creation of dynamic web pages by processing user requests, interacting with databases, and managing application logic. Frameworks like Django (Python), Ruby on Rails, Express.js (JavaScript/Node.js), and Laravel (PHP) offer developers standardized structures and tools for backend development.

Databases play a crucial role in web development for storing and retrieving data. Commonly used databases include MySQL, PostgreSQL, MongoDB, and SQLite. Developers design and interact with databases to manage user information, content, and application data.

Web development involves the configuration and management of web servers to handle user requests and deliver web pages. Popular web servers like Apache, Nginx, and Microsoft IIS are configured to optimize performance and ensure secure communication.

Version control systems, with Git being a prominent example, help developers track changes in the codebase, collaborate effectively, and manage different versions of the application. This ensures a systematic approach to development and simplifies collaboration among team members.

Security is a paramount consideration in web development. Developers implement measures to protect against common threats such as cross-site scripting (XSS), SQL injection, and data breaches. This involves practices like input validation, data encryption, and adherence to secure coding practices.

Responsive design is a crucial aspect of web development to accommodate the diverse range of devices used to access the internet. Developers utilize CSS frameworks like Bootstrap and media queries to ensure that websites are visually appealing and functional on various screen sizes.

Testing and debugging are integral parts of the web development process. Developers employ tools such as Chrome DevTools and testing frameworks to identify and rectify bugs, ensuring the functionality, performance, and security of web applications.

Web development is a dynamic and evolving field that requires continuous learning to stay abreast of technological advancements and best practices. Successful web developers possess a diverse skill set and stay committed to delivering robust, user-friendly web experiences.

1.1.1 Overview

There are two broad divisions of web development – front-end development (also known as client-side development) and back-end development (also known as server-side development).

Frontend development, also known as client-side development, refers to the process of creating the user-facing portion of a website or web application. It involves designing, developing, and implementing the interface, which includes the layout, design, and functionality of a website or web application that users interact with directly.

Frontend development primarily involves working with three main technologies: HTML, CSS, and JavaScript. HTML is used to structure the content and layout of a website, while CSS is used to style thecontent, and JavaScript is used to add interactivity and dynamic functionality to the user interface. Popular frontend frameworks and libraries include React, Angular, Vue.js, and jQuery, among others.

Backend development, also known as server-side development, refers to the process of creating the non-visible portion of a website or web application. It involves developing and maintaining the server-side logic, database, and APIs that support the frontend interface and enable data processing, storage, and retrieval. Backend developers work with server-side programming languages such as PHP, Python, Ruby, and Java, as well as databases such as MySQL, MongoDB, and PostgreSQL.

1.1.2 Description

AR.js is an open-source JavaScript library for Augmented Reality (AR) that allows developers to create AR experiences on the web. Developed by Jerome Etienne, AR.js simplifies the integration of AR elements into web applications without the need for specialized plugins or applications. It is designed to be lightweight and easy to use, making it accessible for both beginners and experienced developers.

Key features of AR.js include marker-based and location-based AR experiences. Marker-based AR involves recognizing specific visual markers, usually images or patterns, to overlay digital content in the real world when viewed through a device's camera. Location-based AR, on the other hand, uses GPS and compass data to position virtual elements in the real world based on the user's physical location.

AR.js supports a variety of marker types, including barcode markers, image markers, and location-based markers. It works across different devices, supporting both smartphones and desktops, and is compatible with popular web browsers.

The library is built on top of WebGL and WebXR, harnessing the power of these technologies to provide a smooth and immersive AR experience. It also allows developers to create AR applications that run directly in the browser without the need for additional installations.

Overall, AR.js has gained popularity for its simplicity and versatility, enabling developers to bring AR capabilities to the web without the complexity of native app development. It continues to be actively maintained and updated, contributing to the growing ecosystem of web-based AR development.

1.2 AUGMENTED REALITY WITH QR.

Augmented Reality (AR) with QR (Quick Response) codes combines the interactivity of AR technology with the simplicity and versatility of QR codes. QR codes are two-dimensional barcodes that can store various types of information, such as links, text, or other data. When integrated with AR, QR codes become a powerful tool for delivering immersive and interactive experiences.

Here's how AR with QR codes typically works:

Scanning QR Codes: Users scan QR codes using a mobile device's camera or a dedicated QR code scanner. These QR codes act as triggers for AR content.

Marker-Based AR: QR codes serve as markers for AR applications. Once scanned, the AR application recognizes the QR code and overlays digital content or information onto the real-world view captured by the device's camera.

Information Overlay: The digital content associated with the QR code can include 3D models, videos, animations, product details, or any other multimedia elements. This overlay enhances the user's perception of the physical environment by blending digital and real-world elements.

Interactive Experiences: AR with QR enables interactive experiences. Users can engage with the AR content by interacting with virtual objects, accessing additional information, or even triggering specific actions by interacting with the augmented elements.

Education and Marketing: This technology finds applications in various fields, including education and marketing. For example, QR codes on educational materials can trigger supplementary AR content, providing students with a more interactive and engaging learning experience. In marketing, QR codes on product packaging can unlock AR experiences, allowing customers to visualize products in their real-world context or access additional product information.

Accessibility and Convenience: AR with QR codes enhances accessibility and convenience. Users can easily access augmented content by scanning QR codes with their smartphones, eliminating the need for dedicated AR apps. This ease of use contributes to the widespread adoption of AR in various industries.
In summary, combining Augmented Reality with QR codes offers a seamless and user-friendly way to bridge the digital and physical worlds. This approach finds practical applications in education, marketing, and other domains, providing users with interactive and engaging experiences through the simple act of scanning QR codes.

1.1.2 Three.js Description

Three.js is a JavaScript library designed to simplify the process of creating 3D graphics for web development. Developed by Ricardo Cabello, also known as Mr.doob, it serves as a higher-level abstraction built on top of WebGL—a low-level JavaScript API for rendering 3D graphics in web browsers.

One of the primary advantages of Three.js is its ability to make 3D programming accessible to a wide range of developers, regardless of their experience level. By abstracting the complexities of working directly with WebGL, it allows users to create immersive 3D experiences without delving into the intricacies of low-level WebGL programming.

Three.js ensures cross-browser compatibility, enabling consistent performance and rendering of 3D graphics across different web browsers and platforms. The library abstracts fundamental 3D concepts, such as scenes, cameras, lights, and geometries, providing a user-friendly interface for developers to work with.

With a rich set of features, Three.js supports various 3D geometries, materials, textures, and animations. It also allows the integration of external models and assets in popular formats like OBJ, STL, and glTF.

Supported by an active and supportive community, Three.js benefits from a wealth of resources, tutorials, and documentation. This collaborative approach fosters a sense of community and provides developers with the assistance they need, whether troubleshooting issues or seeking guidance on specific features.

As an open-source project, Three.js encourages collaboration and contributions from the developer community. Its open nature allows developers to modify and extend the library based on their specific requirements.

In summary, Three.js empowers web developers to effortlessly incorporate 3D graphics and visualizations into their projects. Whether creating interactive websites, games, or data visualizations, Three.js has become a widely adopted tool for those seeking to enhance their web applications with engaging and dynamic 3D content.

1.1.3 Global advantage of AR

Real-world Context:
AR overlays digital information onto the real-world environment, offering contextual relevance and practical applications.

Improved Learning and Training:
AR enhances educational experiences by providing interactive and immersive learning environments. It is also valuable for training simulations in various industries.

Enhanced Marketing and Advertising:
AR campaigns create memorable and shareable experiences, making marketing content more captivating and increasing brand visibility.

Virtual Try-on and Product Visualization:
AR enables users to virtually try on products (e.g., clothing, accessories) and visualize items in their own spaces before making purchase decisions

CHAPTER – 2

LITERATURE SURVEY

2.1 Literature Survey

Research Paper	Year	Methodology	Pros	Cons
Hanfu AR: Digital Twins of Traditional Chinese Costumes for Augmented Reality Try-On Systems	2023	Web Ar	3d modelling and virtual try on.	Processing speed and accuracy limited.
Modern Augmented Reality: Applications, Trends, and Future Directions	2022	Unity modelling	Computer vision body tracker enhances AR experience.	Variety and dynamic nature of AR is limited

Fig 2.1 Literature Survey

CHAPTER – 3

REQUIREMENT ANALYSIS

3.1 Problem statement

In the rapidly evolving landscape of e-commerce, the traditional online shopping experience often lacks the immersive and personalized elements that consumers seek. Current web platforms struggle to provide users with a tangible understanding of how products will fit into their real-world spaces, leading to indecision and increased product returns. Additionally, the absence of a seamless and interactive environment often hinders user engagement and satisfaction, diminishing the overall online shopping experience.

Our project aims to address these challenges by implementing augmented reality (AR) technology into the e-commerce space. However, to achieve a successful integration, we need to overcome specific hurdles:

Lack of Immersive Visualization:
The current online shopping experience lacks a truly immersive visualization of products in users' real-world environments, contributing to a disconnect between the digital and physical realms.

User Interface Complexity:
Integrating AR into a web platform presents challenges in maintaining a user-friendly interface. Balancing advanced AR features with intuitive navigation is crucial to ensuring broad accessibility.

Limited Personalization:
Existing platforms struggle to deliver personalized shopping experiences. Augmenting user interactions based on preferences and behavior requires robust machine learning algorithms and intelligent recommendation systems.

Minimizing Returns and Increasing Confidence:
A significant issue in online retail is the high rate of product returns due to discrepancies between customer expectations and the delivered product. Implementing AR features should contribute to reducing returns by providing users with a more accurate preview of products in their real-world context.

Technical Compatibility:
Ensuring that the AR shopping experience is seamless across various devices and browsers poses technical challenges. Achieving cross-platform compatibility is essential for maximizing the reach of the AR features.
By addressing these challenges, our augmented reality shopping website aims to revolutionize online shopping, providing users with a highly immersive, personalized, and confidence-boosting experience.

3.1 Solution to problem statement

Our proposed solution for the challenges outlined in the problem statement is a comprehensive augmentation of the online shopping experience through the integration of augmented reality (AR) technology. This solution addresses the identified issues by implementing the following key features:

Immersive Visualization:

Implement AR features that allow users to visualize products in their real-world environments. This involves utilizing AR overlays to showcase how items like furniture, clothing, or gadgets fit into users' spaces.

User-Friendly Interface:

Design a streamlined and intuitive user interface that seamlessly integrates AR features without overwhelming the user. This includes straightforward navigation, clear calls-to-action, and a user-friendly AR interaction model.

Minimizing Returns and Building Confidence:

Utilize AR to offer users a more accurate representation of products before purchase. Enable features such as virtual try-ons for clothing, furniture placement in living spaces, and detailed product visualizations to reduce discrepancies between expectations and reality, ultimately minimizing returns.

Technical Compatibility:

Develop the AR features to be compatible across a range of devices and browsers. This involves leveraging web-based AR technologies and frameworks that ensure a consistent and high-quality experience regardless of the user's chosen platform.

AR-Assisted Decision Making:

Introduce AR-assisted decision-making tools, such as virtual comparison of products, enabling users to make more informed choices. This can include features like side-by-side product visualizations and augmented product specifications.

Interactive Customer Support:

Implement AR-enhanced customer support features, allowing users to interact with virtual shopping assistants. This can include features like AR-based tutorials, demonstrations, and real-time assistance to enhance the overall customer experience.

3.2 Software and Hardware Requirements

I. **Software requirements**:

- Visual Code Studio (VS Code)
- Web browser
- Unity
- Blender

II. Hardware requirements

- PC/System

3.3 VS Code

VS Code, short for Visual Studio Code, is a free and open-source code editor developed by Microsoft. Itis used by developers for writing and editing code in various programming languages such as JavaScript, Python, and C++. VS Code provides a range of features that make it popular among developers.

3.4.1 VS Code UI

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.In the Stack Overflow 2021 Developer Survey, Visual Studio Code was ranked the most popular developer environment tool among 82,000 respondents, with 70% reporting that they use it.

VS Code adopts a common user interface and layout of an explorer on the left, showing all of the files and folders one has access to, and an editor on the right, showing the content of the files one has opened.The UI is divided into five areas i.e. Editors, Side bar, Status bar, activity bar and Panels. Below figure 3.2 shows the features that are included in the VS code editor. Below figure 3.2 shows the features that are included in the VS code editor.

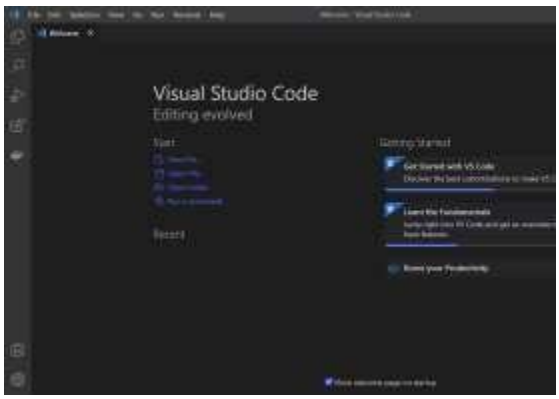


Fig 3.1 VS Code UI

Fig 3.2 VS Code Feature

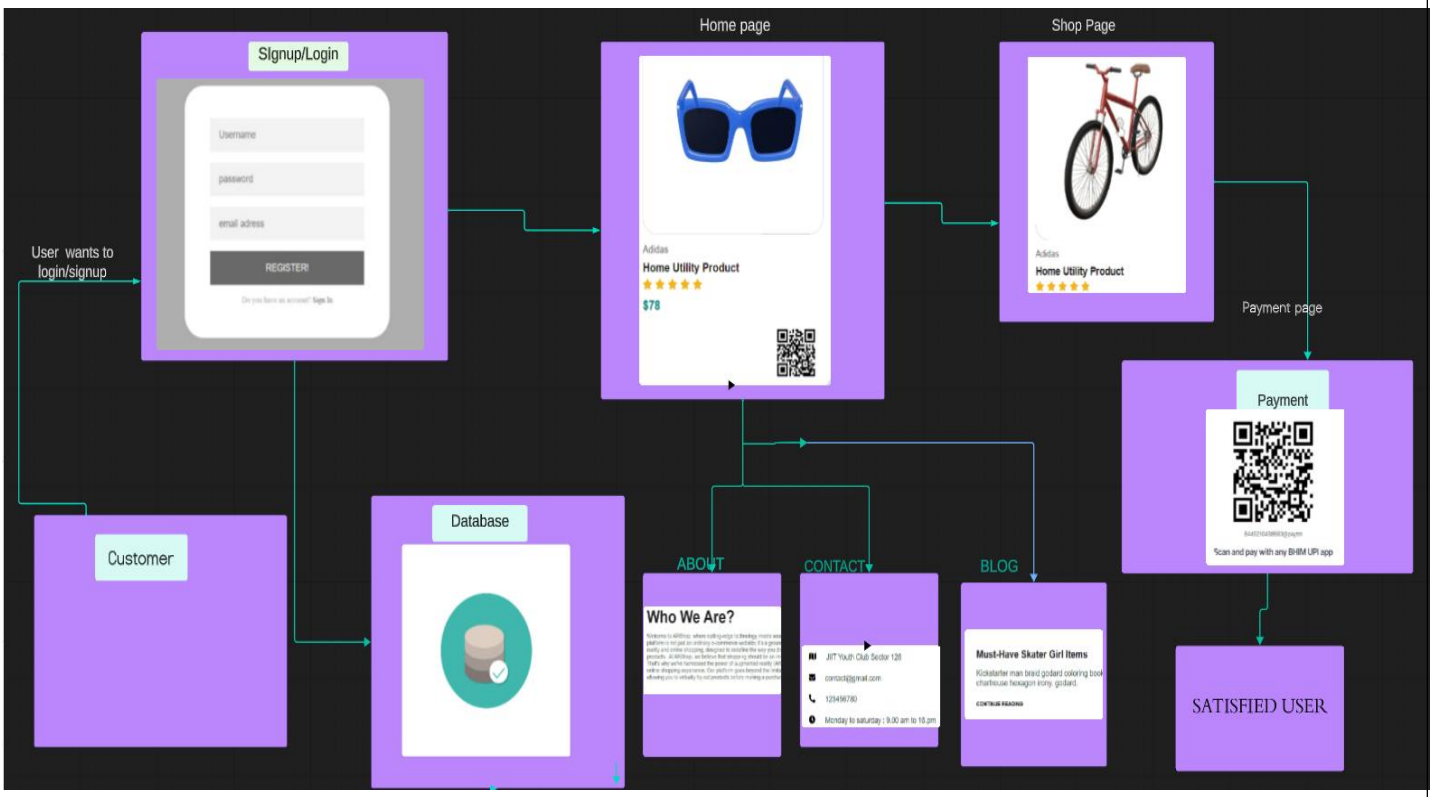
CHAPTER-4

DETAILED DESIGN

4.1 Architecture of the project

We have created an authentication page as the starting point for our website. The user has the option to signup when he/she first visits the website . Subsequently, he/she can login whenever he wishes to.On our home page, we have different product listings with prices mentioned for each product. We also have a qr code with each product, which on being scanned visualizes the product in AR. On the shopping page, we have the qr codes for payments, which on being scanned, directs user to payment page with exact amount as the item value.

Fig 4.1 Architecture of the Project



CHAPTER 5

IMPLEMENTATION

5.1 Frontend development

We designed a basic frontend to interact with our Web application and test the functionality. We made the frontend using html, css and javascript.

```
    <title>Ecommerce Website</title>
    <link rel="stylesheet" href="https://pro.fontawesome.com/releases/v5.10.0/css/all.css" />

    <link rel="stylesheet" href="style.css" />
</head>

<body>
    <section id="header">
        <a href="#"><img src="img/logo.png" class="logo" alt="" /></a>
        <div>
            <ul id="navbar">

                <li><a class="active" href="index.html">Home</a></li>
                <li><a href="shop.html">Shop</a></li>
                <li><a href="blog.html">Blog</a></li>
                <li><a href="about.html">About</a></li>
                <li><a href="contact.html">Contact</a></li>
                    <a href="cart.html"><i class="far fa-shopping-bag"></i></a>
                </li>
            </ul>
        </div>
        <div id="mobile">
            <a href="cart.html"><i class="far fa-shopping-bag"></i></a>
            <i id="bar" class="fas fa-outdent"></i>
        </div>
    </section>

    <section id="hero">
        <h4>Trade-in-offer</h4>
        <h2>Super value deals</h2>
        <h1>on all products</h1>
        <p>Save more with coupons & up to 70% off!</p>
```

5.2 Mongo-db

Backend functionality for user login and signup is implemented via Mongo-Db.

```
head>
   <title>Website With login & registration</title>
   <link rel="stylesheet" href="style.css">
/head>
body>
   <div id="login">
      <header>
         <img class="logo" src="img/logo.png" alt="" />
         <nav class="navigation">
            <button class="btnLogin-popup">Login</button>
         </nav>
      </header>

      <div class="wrapper">
         <div class="form-box login">
            <h2>Login</h2>
            <form action="#">
               <div class="input-box">
                  <span class="icon"><ion-icon name="mail"></ion-icon></span>
                  <input type="email" required>
                  <label>Email</label>
               </div>
               <div class="input-box">
                  <span class="icon"><ion-icon name="lock-closed"></ion-icon></span>
                  <input type="password" required>
                  <label>Password</label>
               </div>
               <div class="remember-forgot">
                  <label><input type="checkbox"> Remember me</label>
                  <a href="#">Forgot Password?</a>
               </div>
               <button type="submit" class="btn">Login</button>
               <div class="login-register">
                  <p>Don't have an account? <a href="#" class="register-link">Register</a></p>
               </div>
            </form>
0
```

5.2.1 AR. JS

We have used Ar.js to implement AR functionality in our website. We have generated the qr code which upon scanning helps us to see in AR. We have used a-frame and a-scene to smoothly load the AR experience into our website.

```
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1
    <script src="path/to/ar.js"></script>
</head>
<body>
    <script>
        AFRAME.registerComponent('markerhandler', {
            init: function () {
                this.el.sceneEl.addEventListener('markerFound', () => {
                    console.log('Marker Found!');
                });

                this.el.sceneEl.addEventListener('markerLost', () => {
                    console.log('Marker Lost!');
                });
            }
        });
    </script>
```

Code to generate qr for AR:

```
    <meta name="viewport" content="width=device-width, initial-scale=1
    <title>AR QR Code</title>
    <script src="path/to/qrcode.min.js"></script>
/head>
body>
    <script>
        document.addEventListener('DOMContentLoaded', function () {
            const modelUrl = 'https://example.com/path/to/your/3d-mode
            function generateQRCode(url) {
                const qrCodeElement = document.getElementById('qrcode'
                qrCodeElement.innerHTML = '';
                const qrCode = new QRCode(qrCodeElement, {
                    text: url,
                    width: 128,
                    height: 128,
                });
            }
            generateQRCode(modelUrl);
        });
    </script>
```

Code to generate qr for payments:

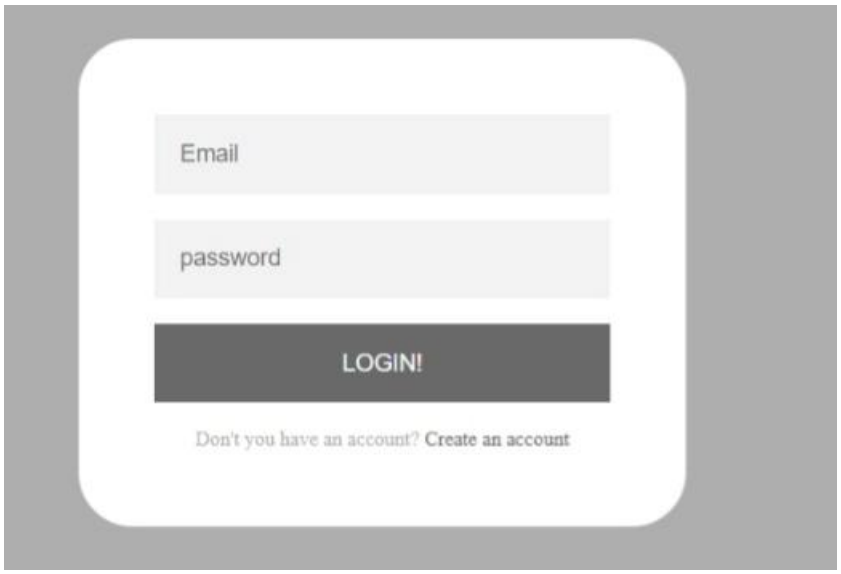
```
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.
    <title>Payment QR Code</title>
</head>
<body>
    <script>
        document.addEventListener('DOMContentLoaded', function () {
            const paymentAmount = '1000';
            const payeeVpa = 'example@upi';

            const upiUrl = `upi://pay?pa=${payeeVpa}&pn=PayeeName&mc=01

            function generateQRCode(url) {
                const qrCodeElement = document.getElementById('qrcode')
                qrCodeElement.innerHTML = '';
                const qrCode = new QRCode(qrCodeElement, {
                    text: url,
                    width: 128,
```

CHAPTER 6

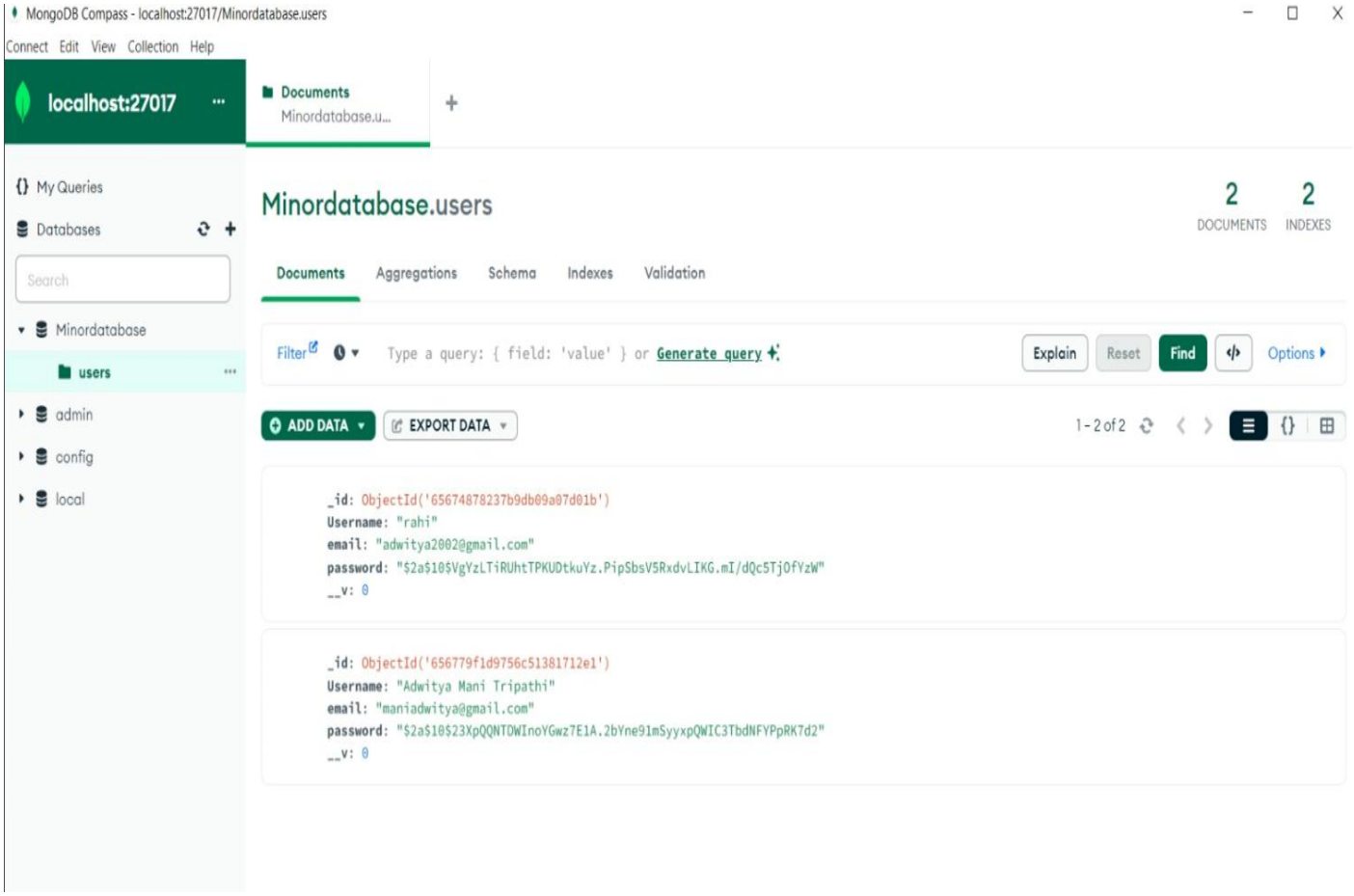
EXPERIMENTAL RESULTS AND ANALYSIS

6.1Authentication Page

This page of our website has essentials required for login and signup

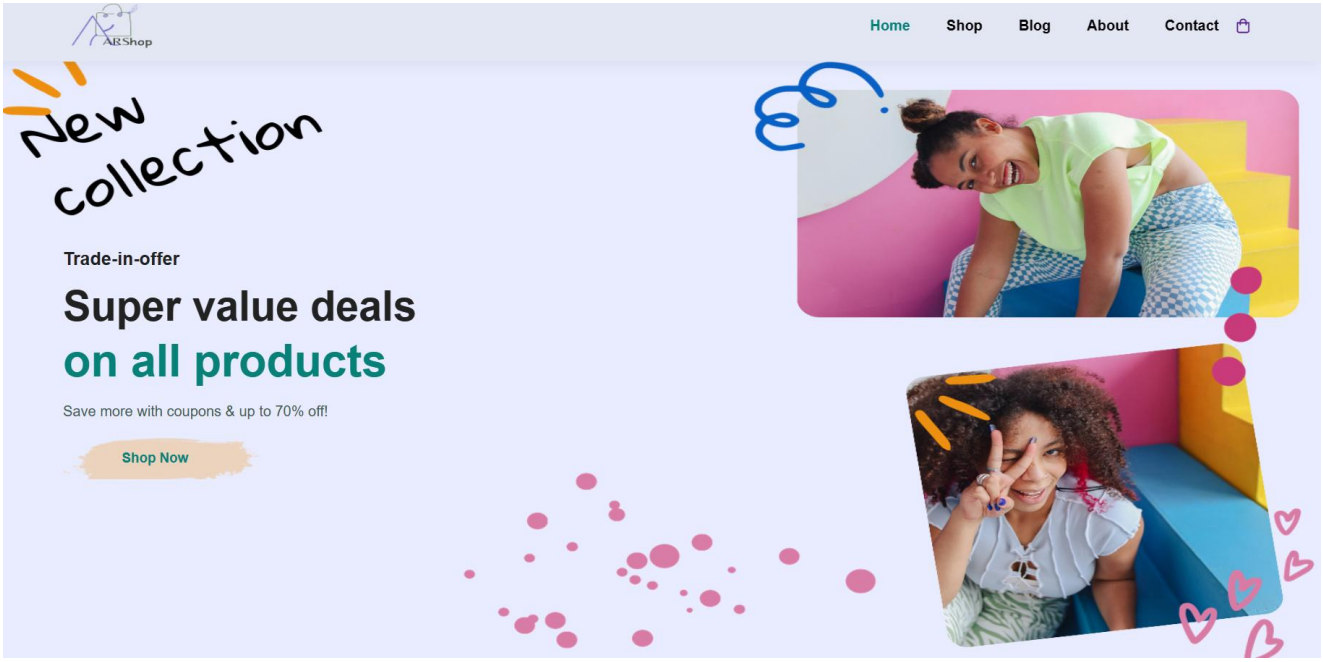


BACKEND WITH MONGO-DB:



HOMEPAGE:

It contains different product lisitings along with their price ans qr codes for viewing them in AR.



Featured Products

New Modern Design

Adidas

Home Utility Product

$78

Adidas

Home Utility Product

$78

Adidas

Home Utility Product

$78

Adidas

Home Utility Product

$78

New Arrivals

New Modern Design

Adidas

Home Utility Product

$78

Adidas

Home Utility Product

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Adidas

Home Utility Product

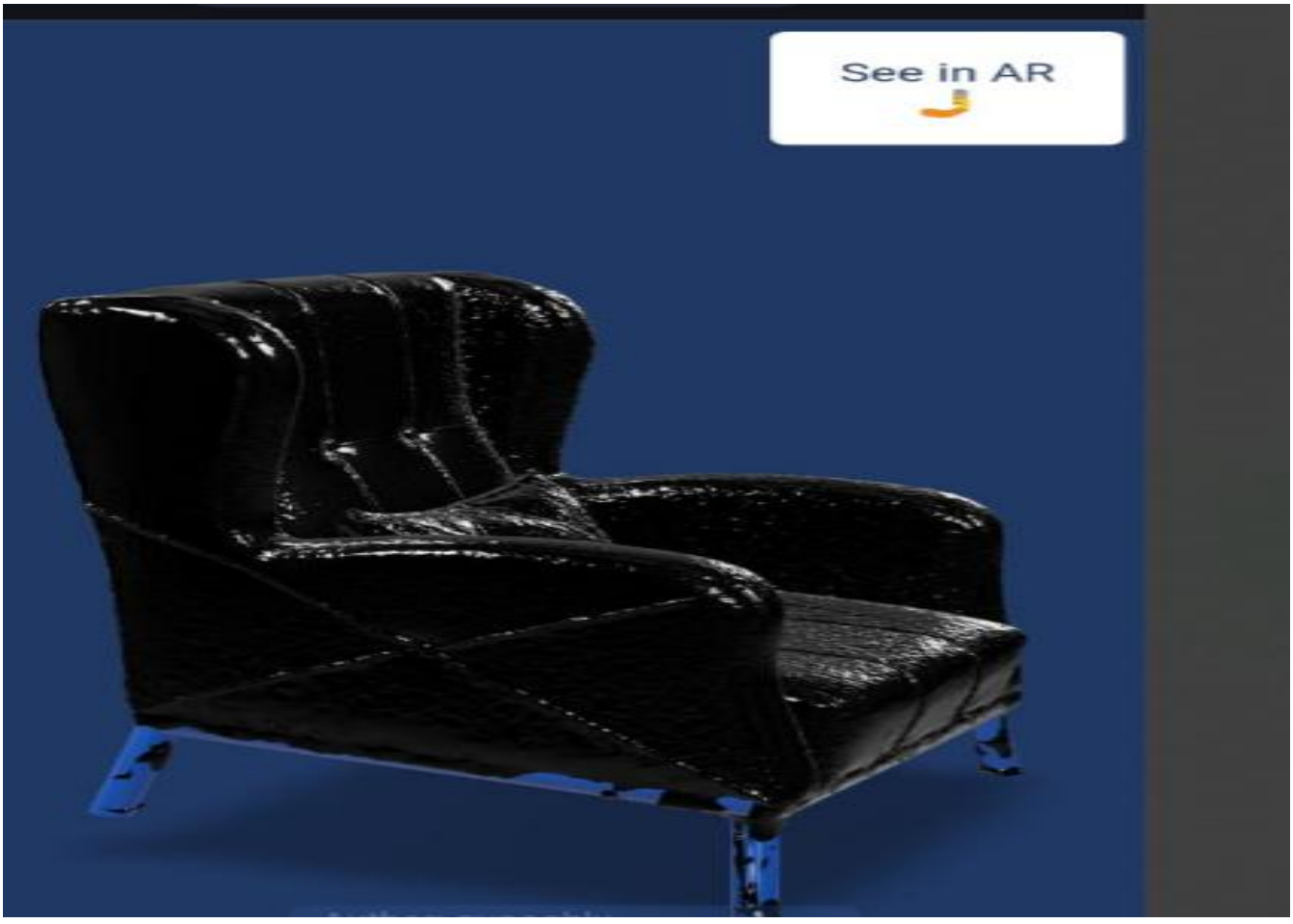
$78

Adidas

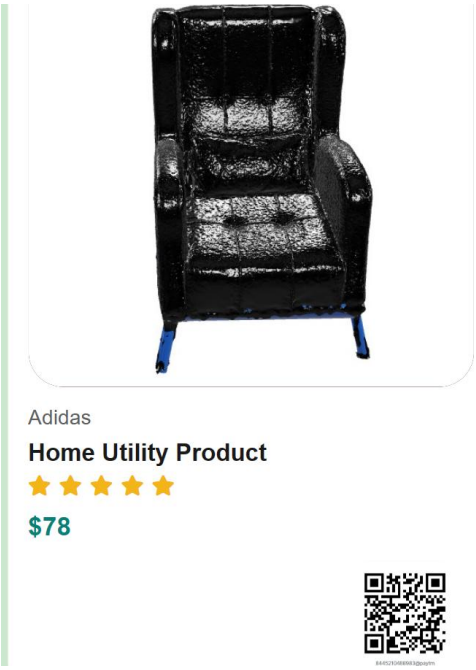
Home Utility Product

$78

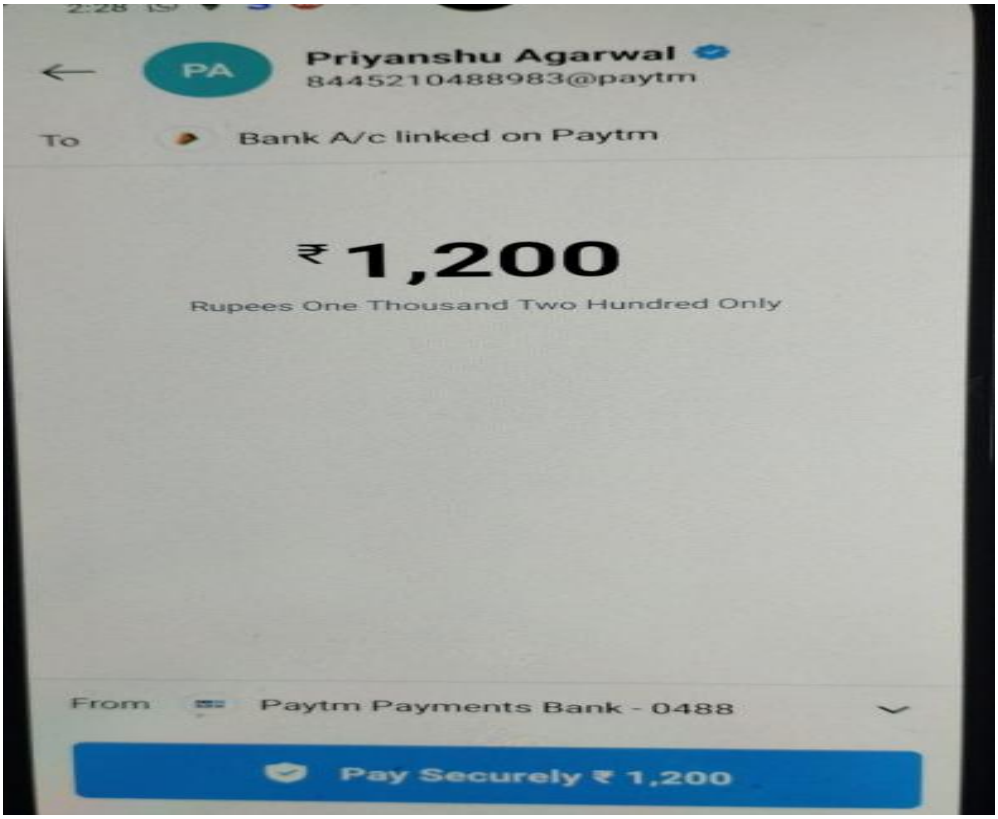
AR VISUALISATION:



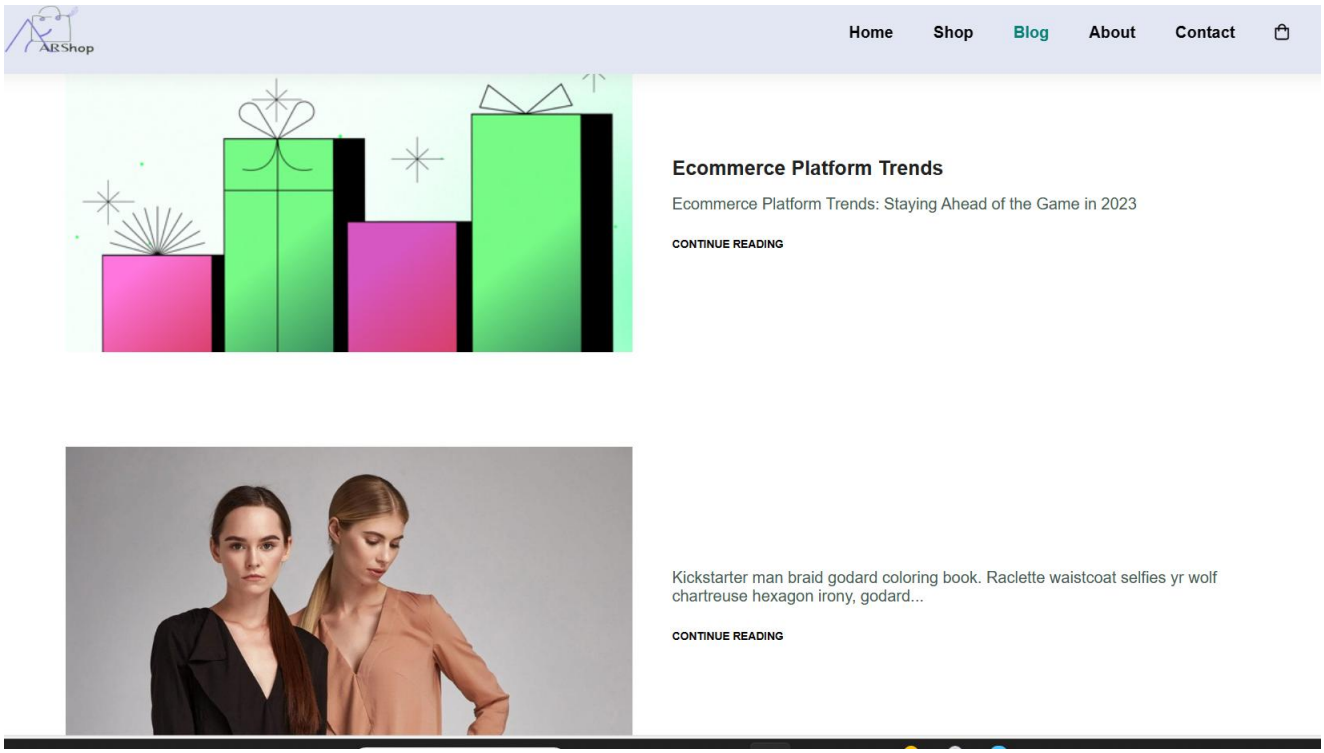
Shop page:



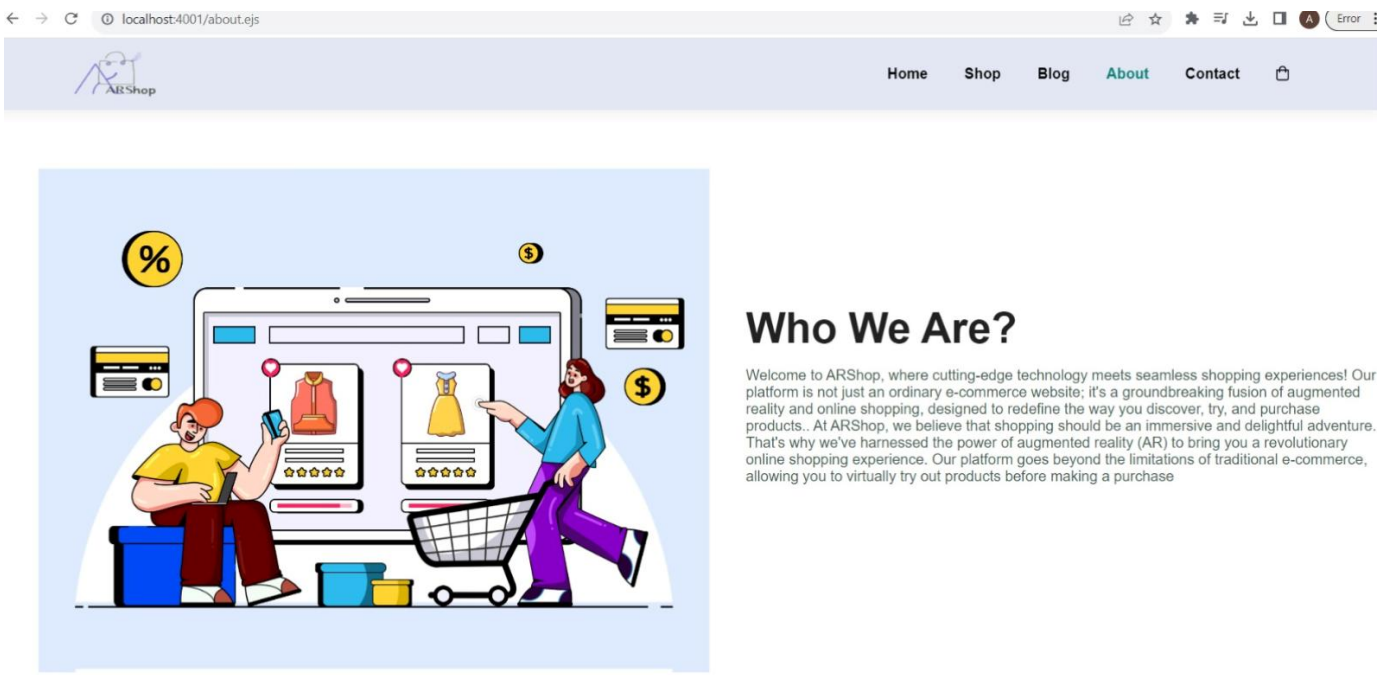
Suppose we want to buy this product. Now we will scan the qr code next to it and it will direct us to payment like this:



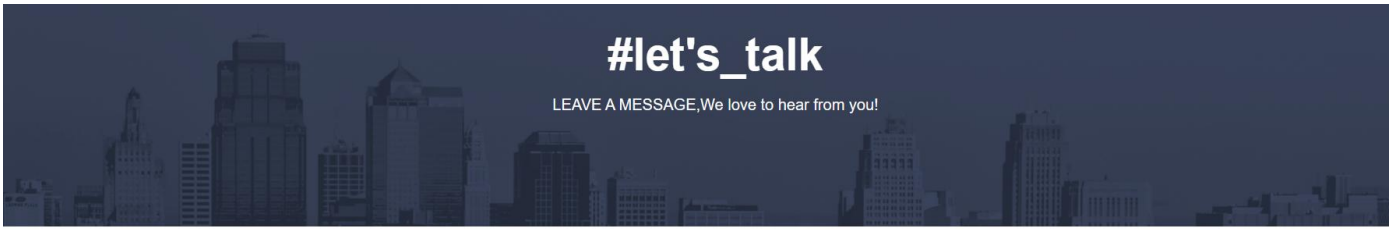
BLOG PAGE:



ABOUT PAGE



CONTACT PAGE:



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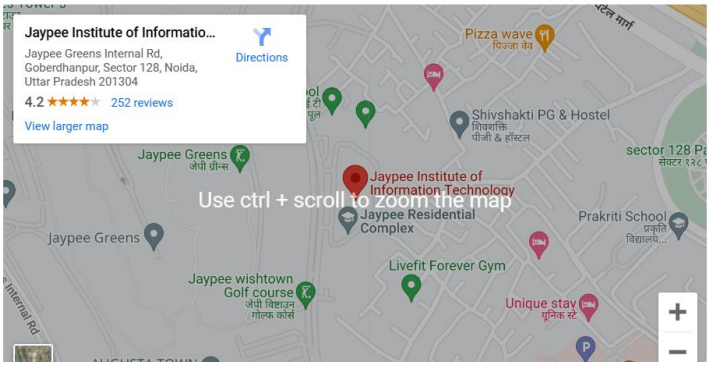
- 123456789
- Monday to saturday : 9.00 am to 16.pm



CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Conclusion

In conclusion, our vision for the augmented reality shopping website represents a groundbreaking leap forward in the realm of online retail. By systematically addressing the challenges inherent in traditional e-commerce, our proposed solution harnesses the transformative power of augmented reality (AR) technology to elevate the user experience.

The immersive visualization capabilities of AR redefine how users interact with products, allowing them to virtually place items in their own spaces and witness firsthand how each purchase integrates into their lives. This not only bridges the gap between the digital and physical worlds but also instills a new level of confidence in online shopping decisions, reducing the likelihood of product returns.

A user-friendly interface serves as the cornerstone of our solution, ensuring that the integration of AR features is seamless and accessible to a broad audience. The personalized shopping experience, powered by sophisticated machine learning algorithms, creates an environment where users receive tailored product recommendations, enhancing engagement and satisfaction.

Crucially, our solution is designed to be technically compatible across various devices and browsers, enabling users to access the augmented reality shopping experience effortlessly. This inclusivity ensures that the benefits of AR technology are extended to a wide demographic, enhancing the overall reach and impact of the platform.

In embracing augmented reality-assisted decision-making tools and interactive customer support features, our solution not only transforms the act of online shopping but also envisions a dynamic and personalized retail landscape where users actively engage with products and brands in ways previously unattainable.

In essence, our augmented reality shopping website is not just a platform for transactions; it is a revolution in how users perceive, experience, and engage with online retail. By seamlessly merging the virtual and physical realms, we strive to redefine the future of e-commerce, setting a new standard for user-centric, immersive, and confidence-inspiring online shopping experiences.

7.1 Future Scope

The future prospects for our augmented reality shopping website project are promising, with opportunities for continued innovation and expansion into new frontiers. Here are key areas of future development and enhancement:

Advanced Machine Learning Integration:

Expand the machine learning capabilities to further refine user preferences and offer even more personalized recommendations. Implement advanced algorithms that continuously adapt to evolving user behavior, creating a dynamic and highly tailored shopping experience.

Computer Vision Enhancements:
Explore advancements in computer vision to enhance the accuracy and realism of augmented product visualizations. Incorporate features such as improved object recognition, better lighting simulations, and refined virtual try-on experiences for clothing and accessories.

Integration of AR in Social Commerce:
Capitalize on the rising trend of social commerce by integrating AR features into social media platforms. Enable users to share augmented shopping experiences with their social networks, fostering a sense of community and influencing purchasing decisions.

Enhanced Virtual Try-On Experiences:
Evolve virtual try-on capabilities by incorporating real-time clothing simulations, allowing users to see how fabrics move and fit on their bodies. Utilize computer vision to accurately map clothing items onto users, enhancing the realism of the virtual try-on experience.

Interactive Product Customization:
Introduce interactive product customization features using AR. Allow users to personalize products in real-time, such as adjusting color, size, and design elements, providing a unique and engaging shopping experience.

Augmented Reality in Marketing Campaigns:
Extend the use of AR beyond the shopping interface to marketing campaigns. Develop AR-powered advertisements and promotional content that users can engage with, further blurring the lines between marketing and immersive experiences.

Collaborations with Brands and Retailers:
Foster collaborations with brands and retailers to integrate their product catalogs seamlessly into the AR shopping experience. Explore partnerships that leverage AR for exclusive product launches and virtual brand experiences.

Integration of Augmented Reality Payments:

Explore the integration of augmented reality into the payment process. Develop secure and user-friendly AR payment methods that enhance the overall transaction experience within the augmented reality environment.

Gamification and Rewards:

Implement gamification elements within the AR shopping experience, introducing rewards, challenges, and loyalty programs. Enhance user engagement by turning the shopping process into an interactive and enjoyable activity.

Cross-Platform Augmented Reality:

Develop cross-platform AR experiences that seamlessly transition between web browsers and dedicated mobile applications. Ensure a consistent and high-quality AR experience across a variety of devices, catering to the diverse preferences of users.

REFERENCES

Book

1."Augmented Reality: Principles and Practice" by Dieter Schmalstieg and Tobias Hollerer.

2."Augmented Reality for Developers: Build practical augmented reality applications with Unity, ARCore, ARKit, and Vuforia" by Jonathan Linowes.

3."Augmented Reality: An Emerging Technologies Guide to AR" by Greg Kipper and Joseph Rampolla.

Journal Article

"Augmented Reality in Education" site:scholar.google.com.

Online Courses

The Net Ninja - Augmented Reality with AR.js:

AR.js Course - The Net Ninja provides a series on creating AR experiences using AR.js, a lightweight library for augmented reality on the web.

ARCore & ARKit Course:
ARCore & ARKit Tutorial - Academind offers tutorials on AR development using ARCore and ARKit.

Work Distribution

1. All of us explored the basics of the technologies mentioned.
2. All of us explored research papers.Priyanshu explored ikeashop for ecommerce AR, Rahi explored hanfu_ar twins research paper and Adwitya read a book on modern augmented reality .
3. All of us brainstormed together to come up with potential features. Priyanshu proposed that we should have QR codes for AR visualisation. Adwitya proposed a method for payment integration and Rahi proposed the different features like newsletter, blogs ,maps and contact section which made our website more pleasing. and interactive.
4. All of us discussed with some of our classmates and decided to use mongodb for our login purpose.
5. Rahi worked on designing the user interface that includes designing of logo and UI page using canvas..He led the frontend part of our project and continued improve user interface , updating and maintaining the project with new ideas.
6. Adwitya led the backend part and worked on the login and signup page, integrating it with MongoDB.
7. Priyanshu worked on AR functionality, writing ar,js script for ar visualization and generating qr codes through a python script. He also added payment functionality to the website.
8. All of us tested our application, refactored the code and prepared the final report and presentationfor final evaluation and submission.