Luxurious Creation:
Visualize Around Yourself in Application with AR

UNIVERSITY OF ENGINEERING
&
MANAGEMENT, JAIPUR

Luxurious Creation:

Visualize Around Yourself in Application with AR

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By

PULKIT KUMAR VERMA

University Roll No.: 12022002001131

University Registration no: 204202200200179

ARADHYA PANDEY

University Roll no: 12022002001044

University Registration no: 204202200200049

ANKITA YADAV

University Roll no: 12022002001085

University Registration no: 204202200200089

UNDER THE GUIDANCE OF

Dr. JYOTI KHANDELWAL

COMPUTER SCIENCE & ENGINEERING

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

APPROVAL CERTIFICATE

This is to certify that the project report entitled "**Luxurious Creation: Visualize Around Yourself in Application with AR"** submitted by **Pulkit Kumar Verma** (Roll: **12022002001131**), **Aradhya Pandey** (Roll: **12022002001044)** and **Ankita Yadav** (Roll: **12022002001085**) in partial fulfilment of the requirements of the degree of **Bachelor of Technology** in **Computer Science & Engineering** from **University of Engineering and Management, Jaipur** was carried out systematically and procedurally to the best of our knowledge. It is the bonafide work of the candidate and was carried out under our supervision and guidance during the academic session of 2022-2026.

_____

Dr. Jyoti Khandelwal

Project Guide, Associate Professor (CSE)

UEM, JAIPUR

_____

Prof. Dr. G Uma Devi

Associate Dean of Engineering

Head of the Department (CSE)

UEM, JAIPUR

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Pulkit Kumar Verma

Aradhya Pandey

Ankita Yadav

ABSTRACT

The goal of the "Luxurious Creation: Visualize Around Yourself in Application with AR" project is to use augmented reality (AR) technology to transform furniture purchasing apps. Before making a purchase, consumers will be able to see how different furniture items might fit and seem in their own living areas thanks to augmented reality. The project entails creating a cutting-edge program that smoothly incorporates augmented reality features, enabling real-time user interaction with virtual furniture. By bridging the gap between virtual shopping and real-world applications, augmented reality may have a huge influence on the furniture sector by giving customers a unique and immersive shopping experience and enabling them to make educated selections from the comfort of their homes.The initiative intends to transform online furniture buying, reduce returns, and increase consumer confidence and happiness. A user-friendly interface, smartphone adaptability, and augmented reality integration are among the project's main goals.

Keywords: Virtual integration, Online purchasing, and Augmented reality.

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1. CHAPTER 1

INTRODUCTION

1.1 AR Integrated App

Digital material and the actual world are combined when augmented reality is included in an application. The program uses the device's camera to detect its environment before superimposing 3D objects, animations, or data over the live view. For example, a furniture app may depict how a virtual sofa might seem in a living room, while educational software might display a 3D solar system on a desk. Adding AR makes apps more engaging, dynamic, and practical.

1.2 Advantage of Luxture

a **Interactive Product Visualization:** By using augmented reality (AR), furniture goods may be realistically placed in customers' living rooms, improving the online purchasing experience by giving them a realistic sample of how things would appear in their homes [1].

b **Engaging User Interface (UI):** Kotlin was used to create the AR Furniture Application's captivating and intuitive user experience. It has adaptable layouts, fluid animations, and interactive features like AR triggers and product cards. The user interface, which was created with efficiency and simplicity in mind, guarantees a smooth shopping experience that keeps users interested.

c **Easily Integrating 3D Models:** AR enables the app to easily incorporate 3D models of furniture, giving users the ability to examine detailed features and evaluate objects from various perspectives before making a purchase [4].

1.3 Technologies Used in Luxurious Creation

Luxurious creations often incorporate advanced technology to enhance their appeal and functionality. Some common technologies used in luxury products include:

a **Kotlin:** Kotlin is a contemporary, readable programming language created by JetBrains that Google formally supports for creating Android applications. Due to its complete compatibility with Java, both languages can be used in the same project. We can write less code, make apps safer by eliminating frequent problems like null pointer exceptions, and enhance overall app speed with Kotlin. Its ease of use, security, and robust features have made it the go-to language for developing Android apps. It is compatible with Android Studio.[9].

b **3D Models:** Three-dimensional models and sceneries are represented using the binary file format GLB. It is the binary form of the GL Transmission Format (glTF), which ensures that models maintain high-quality textures, animations, and geometry data while offering small and effective file sizes. Because of its mobility and fast load times, GLB is frequently utilized in augmented reality (AR) and virtual reality (VR) applications [4].

c **Authentication Service:** Firebase Authentication is a backend service that offers developers simple-to-integrate authentication capabilities for their apps. It supports several authentication techniques, such as anonymous authentication, social network logins (such as Facebook and Google), and email and password. By streamlining the management of user sign-ups, log-ins, and account security, Firebase Authentication contributes to a seamless and safe user experience.

d **AR SDK:** Google's framework for creating augmented reality apps for Android smartphones is called ARCore. With the use of computer vision, it combines virtual material with the physical world with capabilities including light estimation, motion tracking, and environmental comprehension. With ARCore, developers can create AR apps that are immersive by smoothly integrating digital things into the user's physical surroundings [9].

e **Development Environment:** Developers use tools like IDEs, version control, and testing frameworks to create, test, and improve software in a development environment. It offers a controlled structure for dependable code and is customized to the needs of the project. To ensure seamless transitions from development to deployment, modern systems make use of technologies like cloud platforms for collaboration and Docker for production-like circumstances [5].

f **XML:** XML (eXtensible Markup Language) is a text-based format used to store and transport data. It uses custom tags to represent data in a hierarchical structure, making it both human-readable and machine-readable. Unlike HTML, XML is designed for data representation rather than display, allowing users to define their tags for specific data types. It is commonly used for data exchange between systems, configuration files, and web services. XML ensures data integrity through well-formed and valid documents, and its extensible nature makes it adaptable for various applications. However, its verbosity can make XML files large and complex to parse.

1.4 Flow Chart

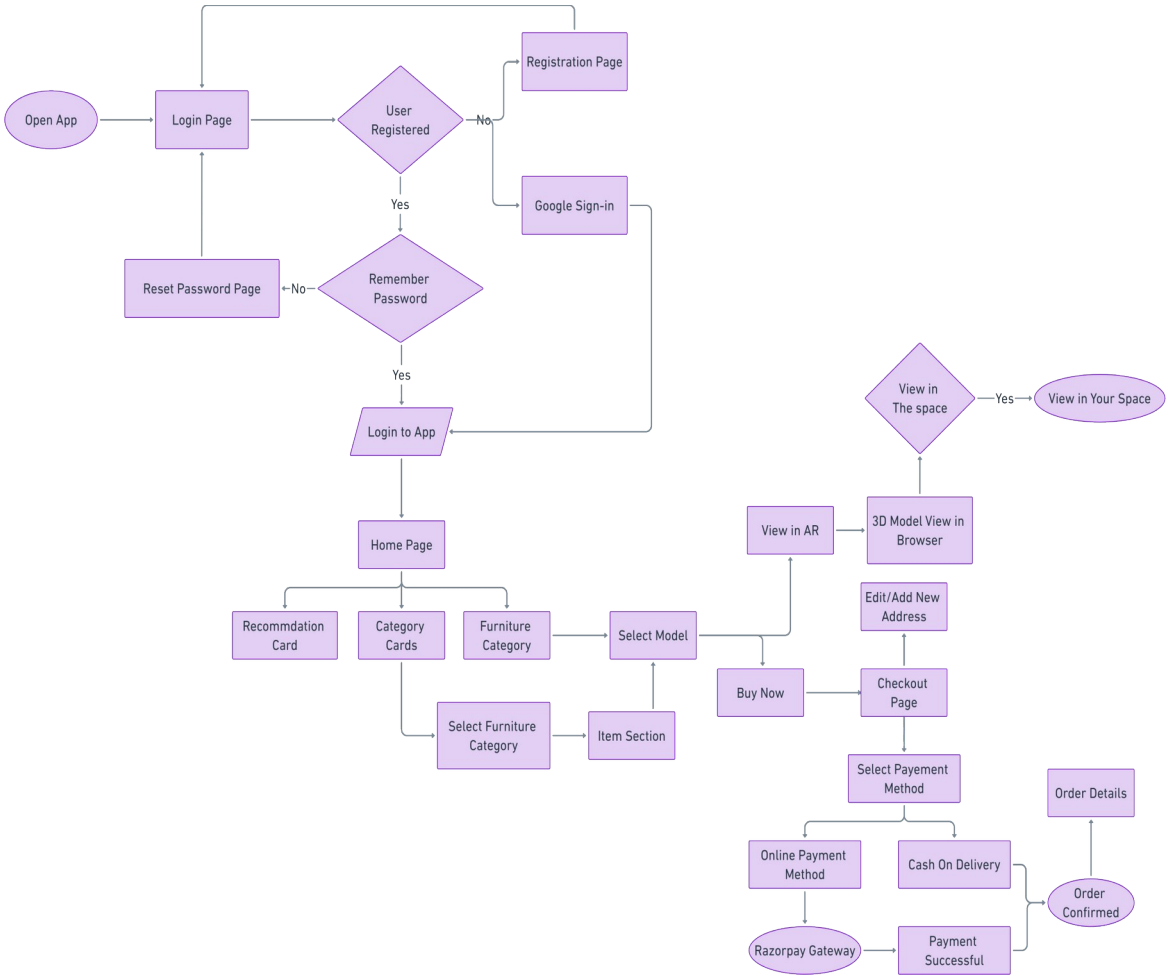

Figure 1.1 – Flow Chart of Luxture App

In Figure 1.1, The flowchart represents the user flow of an app, starting with the user opening the app and either logging in or registering via the Login or Registration page (with simple sign-in options like Google). A user has the option to reset their password if they forget it. Once logged in, the user navigates to the Home Page,and starts looking over the different furniture pieces. After choosing an item, the user can use Augmented Reality (AR) to see it in their actual surroundings, which helps them determine how well it fits in their setting. After being satisfied, the user hits the "Buy Now" button, causing Razorpay to receive a payment request. When the Razorpay screen appears, the customer has a variety of payment

options to select from, including UPI, cards, and online banking. Razorpay securely completes the transaction after the payment option has been chosen and verified. The application logs the order and shows a confirmation message if the payment was successful. An error message and the option to try again are displayed in the event that the payment is unsuccessful.The user receives a confirmation after the order is placed successfully, completing the easy shopping process.

CHAPTER 2

TECHNICAL OVERVIEW

2.1 Augmented Reality (AR) and Its Impact

2.1.1 Augmented Reality

An improved representation of the actual environment via the use of digital visuals, music, or other sensory inputs and technology is known as augmented reality (AR). It is a growing trend among businesses engaged in business apps and mobile computing. One of the main objectives of augmented reality in the era of growing data gathering and analysis is to draw attention to particular aspects of the actual world, enhance comprehension of those aspects, and provide intelligent and easily comprehensible insights that can be used in practical applications. Such big data can help inform a company's decision-making and gain insight into consumer spending habits, among others [1].

2.1.2 Impact of User Experience In AR

Several key factors influence the user experience in Luxurious Creation by the latest technology like AR:

a **Quality and Craftsmanship:** The attention to detail, precision, and the use of high-quality materials contribute to an invaluable experience.

b **Design and Aesthetics:** Wooden products often feature unique and visually appealing designs that enhance the user's perception of exclusivity and beauty.

c **Brand Reputation:** The reputation and heritage of the brand can significantly impact the user's perception of the product and its value.

d **Price:** The effective cost of furniture items can create a sense of exclusivity and set expectations for top-notch quality and service.

e **Exclusivity:** Limited edition or bespoke offerings can make users feel special and unique.

f **Category:** A category page groups furniture such as tables, lamps, chairs, and sofas to enhance the user experience. It facilitates speedy item discovery, easy option comparison, and a more seamless, well-organized purchasing experience.

g **Customer Service:** Exceptional customer service, including personalized experiences and after-sales support, can enhance the overall user experience.

h **Cultural and Social Significance:** Furniture products often carry cultural and social symbolism, which can affect how users feel about owning and using them.

i **Sustainability and Ethical Practices:** Some users may consider a brand's commitment to sustainability and ethical practices when evaluating the special experience.

j **Innovation and Technology:** The integration of innovative technologies in wooden furniture creations can provide a modern and sophisticated user experience.

The user's overall perception and satisfaction with the Luxurious Creation App by AR depend on a combination of these factors, each contributing to the overall experience of exclusivity, quality, and prestige.

2.2 3D Models and Its Use

2.2.1 3D Model

A 3D model in AR uses augmented reality technology to blend digital things with the physical world. Through the use of a device's camera, the model may be viewed, rotated, and explored in a real-world environment, offering a more engaging and dynamic experience that improves item visualization and comprehension [4].

2.2.2 How 3D Models Are Used:

a **E-commerce:** Allow customers to view products from multiple angles and zoom in for better details (e.g., furniture, clothing, electronics).

b **Augmented Reality (AR):** Users can visualize how products will look in their environment (e.g., placing furniture in a room using an AR app) [1].

c **Education & Training:** 3D models help simulate complex systems or environments for hands-on learning, such as medical procedures or mechanical systems.

d **Architecture & Design:** Architects use 3D models to present building designs and allow clients to explore spaces virtually.

2.2.3 How 3D Models Enhance UX:

a **Improved Visualization:** Provide users with realistic and interactive views, helping them make better decisions (e.g., visualizing furniture in a room).

b **Increased Engagement:** Users can manipulate models (rotate, zoom, colour changes), making the experience more dynamic and engaging.

c **Spatial Awareness:** Helps users understand the size, proportions, and relationships between objects, which is especially useful in AR.

d **Immersive Experience:** In VR or gaming, 3D models create an engaging, lifelike experience that enhances user involvement and enjoyment.

2.2.4 Importance of 3D Models:

a **Enhanced Interaction:** Provides a more engaging and tactile experience than static images or text.

b **Clear Communication:** Simplifies complex concepts or products, making it easier for users to understand or visualize.

c **Customization:** Allows users to interact with models, changing aspects like colour, size, or material in real-time (e.g., in product design or e-commerce).

d **Future-Proofing UX:** With the growth of AR, VR, and immersive experiences, 3D models are becoming essential for staying ahead in user experience design.

e **Better Decision-Making:** By offering interactive and realistic representations, 3D models enable users to make more informed choices, increasing satisfaction and reducing returns.

2.3 Role of Kotlin and Database in User Experience

a **Fluid and Adaptive User Interface:** Kotlin is a contemporary and expressive programming language that makes coders' work easier and more efficient. A

smoother user interface (UI) and improved performance result from this, which immediately improves how the user interacts with the application.

b **Kotlin Efficiency:** Development is accelerated by Kotlin's reduction of boilerplate code. Users gain from quicker issue fixes and feature releases, which enhances their experience in general.

c **Asynchronous Task Coroutines:** Kotlin's coroutines facilitate background operations (such as data retrieval) without causing the user interface to freeze. The user experience is smooth and responsive as a result.

d **Compatibility with Java:** Kotlin is compatible with pre-existing Java libraries, giving developers access to strong tools to enhance the usefulness and dependability of apps.

e **Customization:** User preferences, login information, history, etc. are stored in databases. This information aids in customizing the app experience for each user (e.g., displaying pertinent furniture items in an AR app).

f **Persistence of Data:** Every time they launch the app, users anticipate having access to their data (such as history, saved items, or cart contents). Databases make this possible by efficiently storing and retrieving data.

g **Quick Access to Information:** A well-designed database guarantees speedy data retrieval, which results in quicker load times and less user waiting.

h **Offline Capabilities:** Some elements of local databases, like as SQLite or Room, can function without internet access, making them more usable in places with poor connectivity.

2.4 Integration of Razorpay Payment Gateway

AA safe and effective payment gateway must be integrated into the AR furniture application in order to improve user experience and facilitate smooth transactions. For this, Razorpay, one of the top suppliers of payment solutions in India, is a great option. Razorpay gives customers choice and convenience by accepting a number of payment methods, such as credit/debit cards, net banking, UPI, and different digital wallets. This streamlines the purchasing process by enabling clients to buy furniture they preview using AR right away.

Benefits of Using Razorpay in the AR Application:

a. **Simple Integration:** Razorpay offers developer-friendly SDKs and APIs that are simple to incorporate into the iOS and Android operating systems.

b. **Secure Transactions:** User data is safeguarded during transactions thanks to its PCI DSS compliance and usage of industry-standard encryption.

c. **Real-Time Updates:** Users receive instant confirmation and their faith is bolstered by the real-time updates of transaction statuses.

d. **Customization:** To provide a consistent user experience, Razorpay's interface can be made to fit the branding of the augmented reality app.

By using Razorpay, the app not only shows furniture in authentic settings but also completes the purchasing experience with a dependable and quick payment method.

2.5 Kotlin, AR, and 3D Models Work Together

a **Kotlin configures the Android application:** Kotlin is the primary programming language utilized in the creation of Android applications. It is in charge of configuring and managing the buttons, layout, and user interactions of the user

interface. Furthermore, Kotlin controls rights like storage and camera access, which are critical for the seamless operation of AR features. Additionally, Kotlin manages the AR session's lifecycle, making sure the application may begin, pause, resume, and end AR-related operations without errors or data loss.

b **Augmented reality is started by ARCore:** Google's augmented reality engine, ARCore, is included into the app to recognize and comprehend the user's physical surroundings. It continuously monitors the smartphone's position and motion and uses plane identification techniques to identify flat objects like floors or tables. Additionally, ARCore offers useful environmental data, such depth and lighting intensity, which aids the application in creating realistic virtual objects that blend in with the actual world.

c **Furniture is placed by the user tapping the screen:** The user can install a virtual piece of furniture by tapping on the smartphone screen once the program has identified a level surface. After capturing this tap input, Kotlin works with ARCore to determine the exact location of the tap in the actual world. The 'hit result' produced by this technique is used as a target location for the 3D model.

d **Kotlin loads the model of 3D furniture:** A 3D model of the chosen piece of furniture is loaded using Kotlin after the placement location has been determined. Texturing, animation, and effective rendering are supported by these models, which are usually in the.glb or.gltf format (or.sfb if using Sceneform). The models allow for flexibility and scalability by being retrieved dynamically from a remote server or packed with the application.

e **Attached to an anchor is the model:** The model is embedded into the AR scene using ARCore's AnchorNode and TransformableNode, which support dynamic transformations like rotation and scaling. The app fixes the virtual object onto the

real-world surface using an anchor, which guarantees that the furniture stays stable and doesn't float or shift as the user moves their phone.

f **SceneView renders the model in AR:** Sceneform or SceneView is in charge of producing the 3D model using the phone's camera feed once it has been anchored. Real-time rendering is made possible by these technologies, which handle ambient lighting, shadows, and textures. They also make it possible for the user to rotate, resize, or move the model, which gives the user complete control over how the furniture looks in the actual world.

g **The furniture is interactive for the user:** The program enables users to utilize touch gestures to interact with the simulated furnishings. They can transfer the item to a different spot, rotate it to try out other orientations, or scale it to match the available area. Users are better able to picture how the furniture will fit and seem in their real environments thanks to this interactivity, which also makes the experience more immersive.

h **Saving and sharing are handled by Kotlin:** Lastly, Kotlin also controls other functions like uploading a room plan, storing an AR snapshot, and adding the chosen furniture to a wishlist or cart. By bridging the gap between visualization and purchase, these features improve the user experience and make the app useful for in-person shopping situations.

3. CHAPTER 3

RESULTS & DISCUSSION

In Figure 3.1 and Figure 3.2, Users can log in to the app get convenience in ordering the product, and register a new account in case of new user.

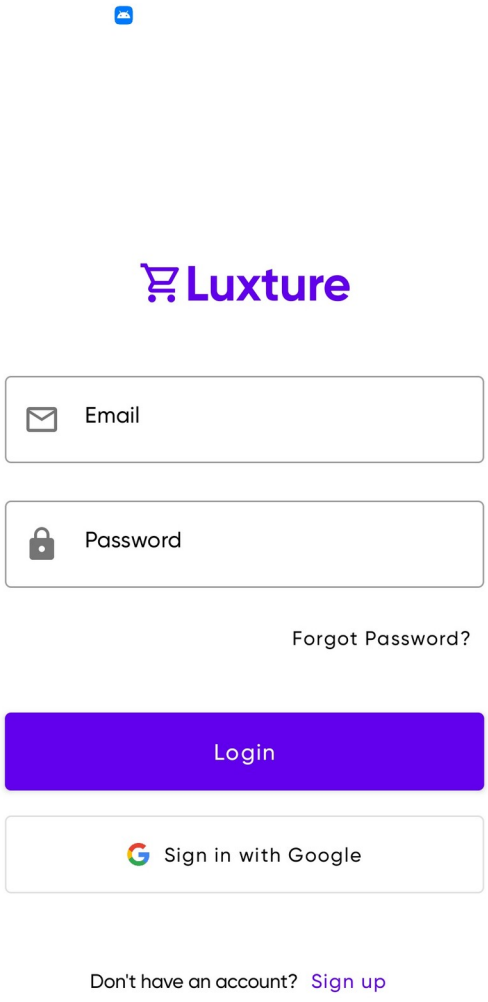

Figure 3.1 - Luxture/Login Page

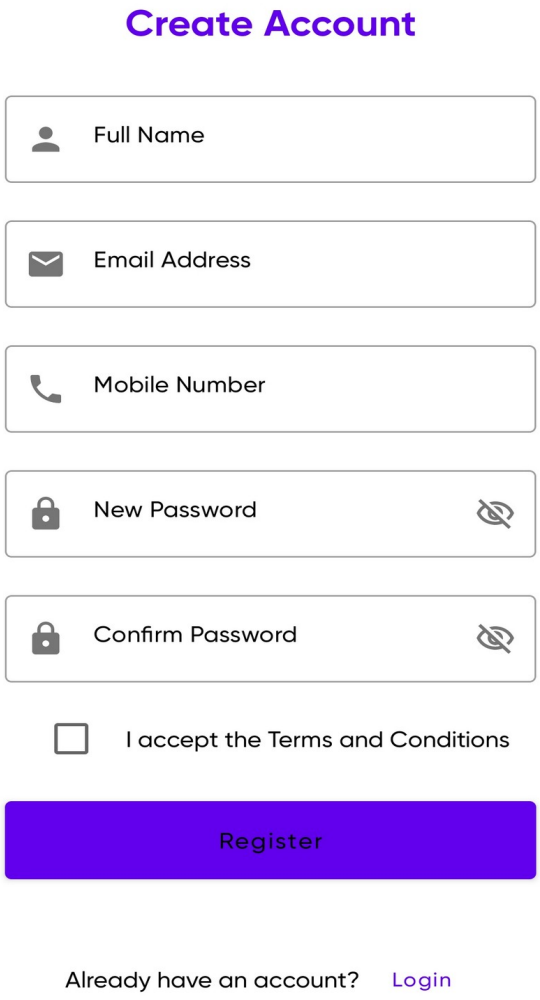

Figure 3.2 - Luxture/Registration Page

In Figures 3.3 and 3.4, if a user forgets their account password, they can reset it by email, as shown They can easily browse through app sections that offer a variety of furniture options for personalization and purchase. Users have an immersive buying experience when they can see furniture in their environment, making sure that every piece fits their wants and style.

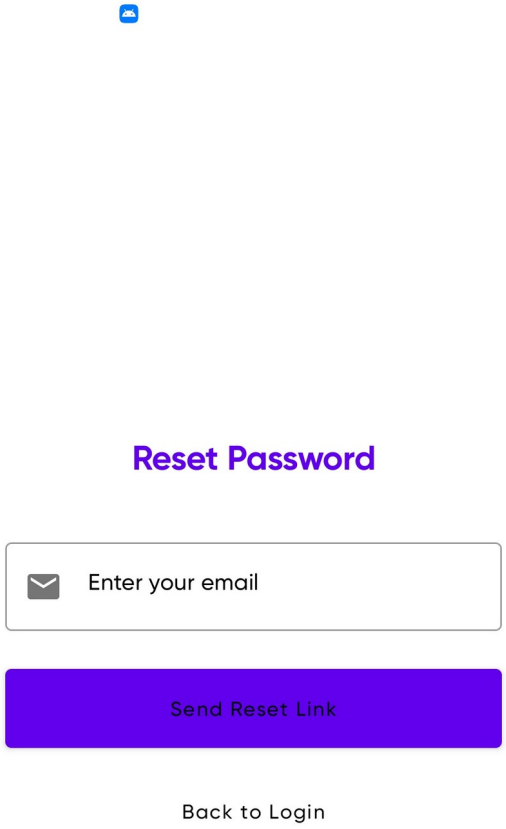

Figure 3.3 - Luxture/Reset password

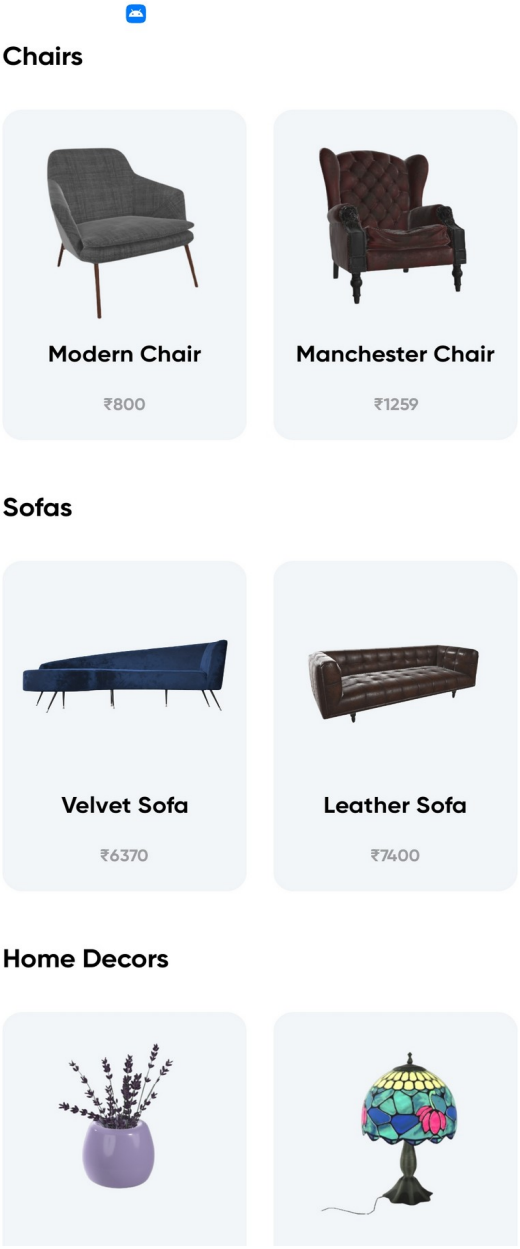

Figure 3.4 - Luxture/Home Page

In Figure 3.5 and Figure 3.6 , Users can find detailed info about each furniture alongside lifelike 3D models. They can examine every detail, see how the chair fits in their space, and admire its craftsmanship, ensuring a stylish addition to their home that matches their taste.

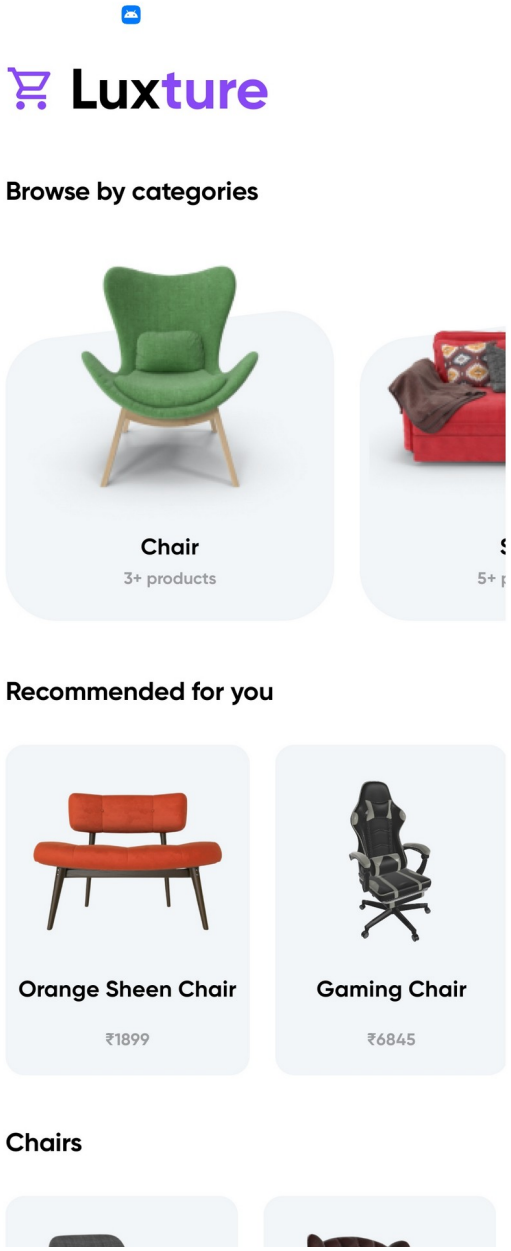

Figure 3.5 – Luxture/Chair Set Category

Figure 3.6 – Luxture/Furniture Detail

Figure 3.7 And Figure 3.8, user may view a clear order summary and quickly enter or modify their shipping information, guaranteeing a simple and easy shopping experience.

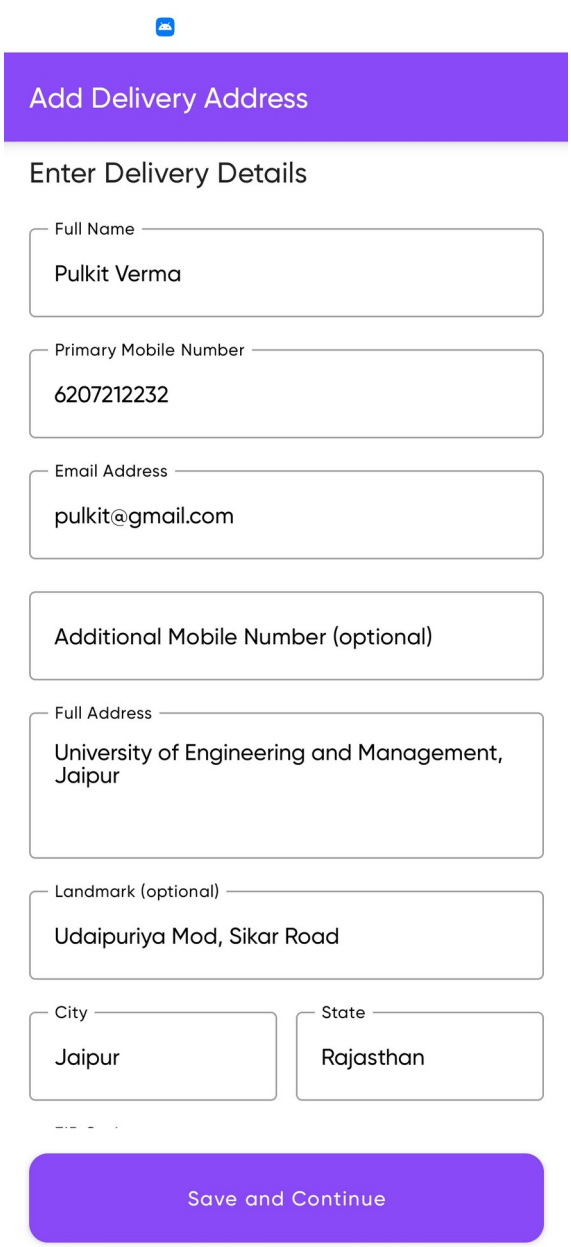

Figure 3.7 - Luxture/User Delivery Address

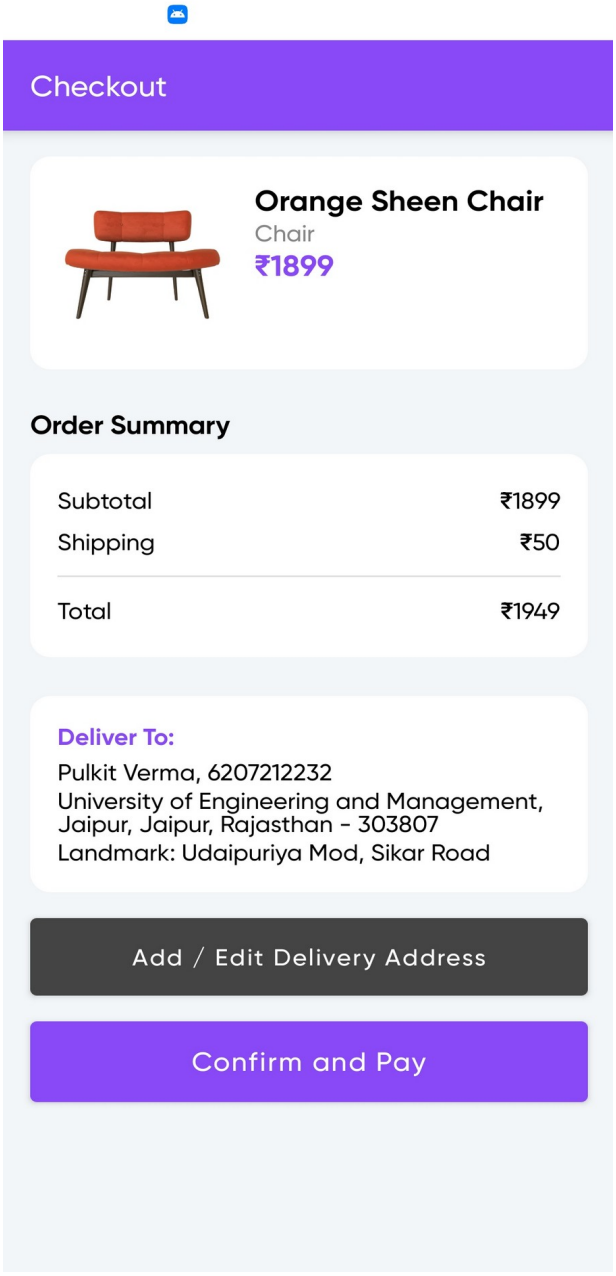

Figure 3.8 - Luxture/Checkout Page

Figure 3.9 and Figure 3.10, show an easy-to-use payment interface that accepts a variety of payment methods, including cards, net banking, wallets, and pay later choices. Convenience is guaranteed by this flexibility, which enables consumers to swiftly and conveniently execute transactions using their preferred manner.hanges, the user may save the revised data to make sure their profile reflects the modifications.

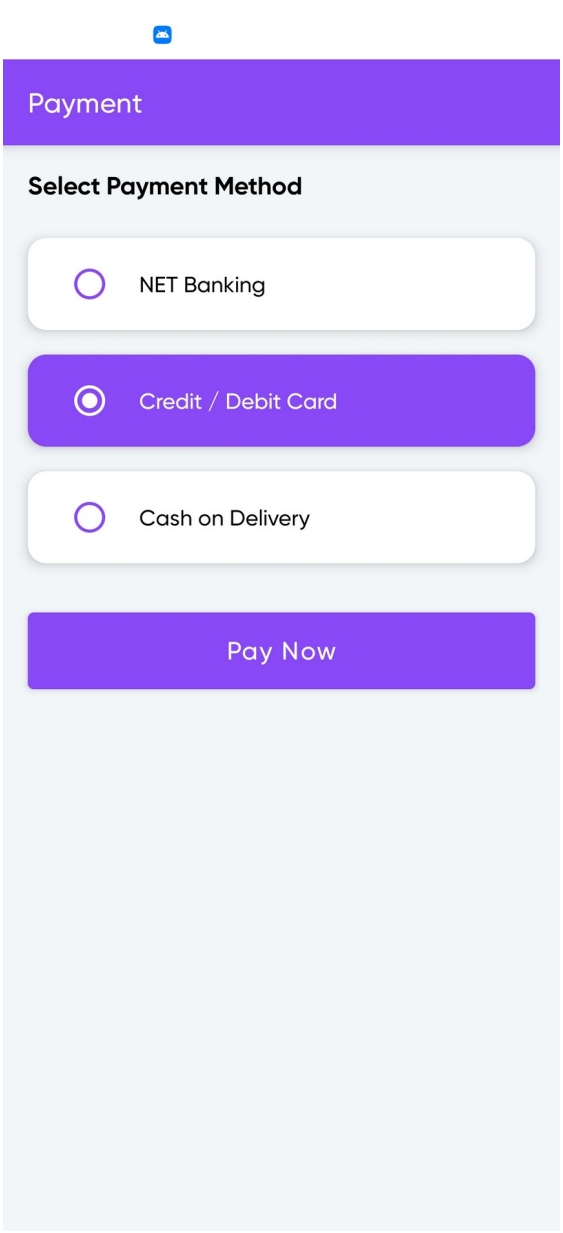

Figure 3.9 - Luxture/Payment method

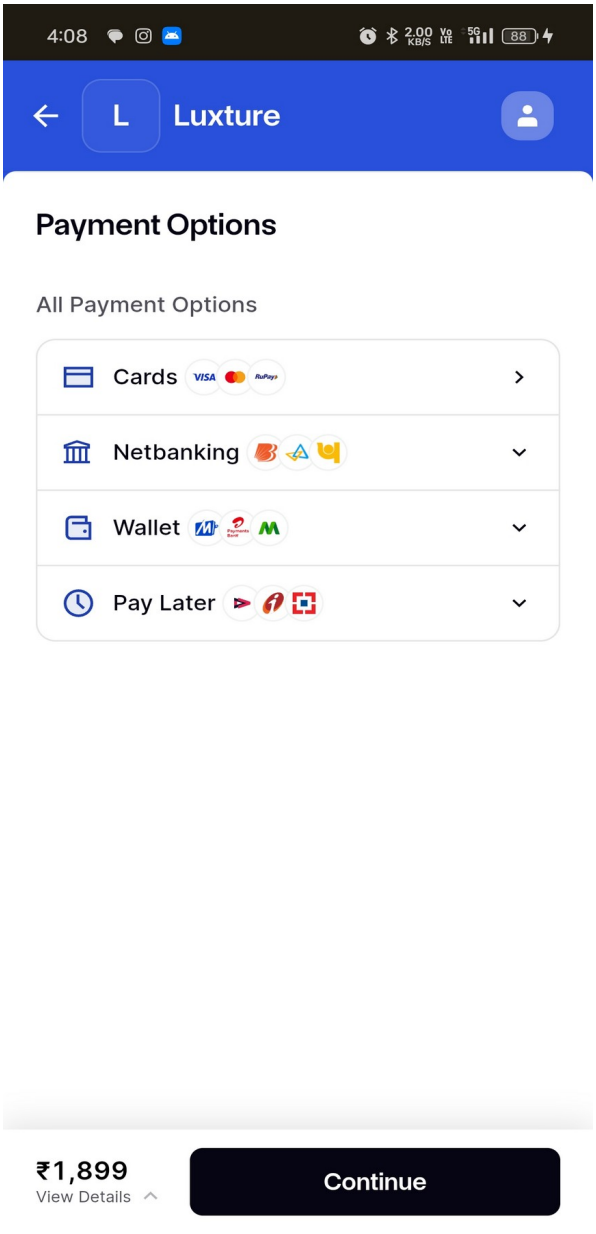

Figure3.10 - Luxture/Payment option

Figure 3.11 and 3.12, From a user experience depict a seamless payment and order confirmation process. Users can safely enter their card information in Figure and offers a thorough order summary that reassures customers that their transaction was accomplished and that all relevant information is displayed.

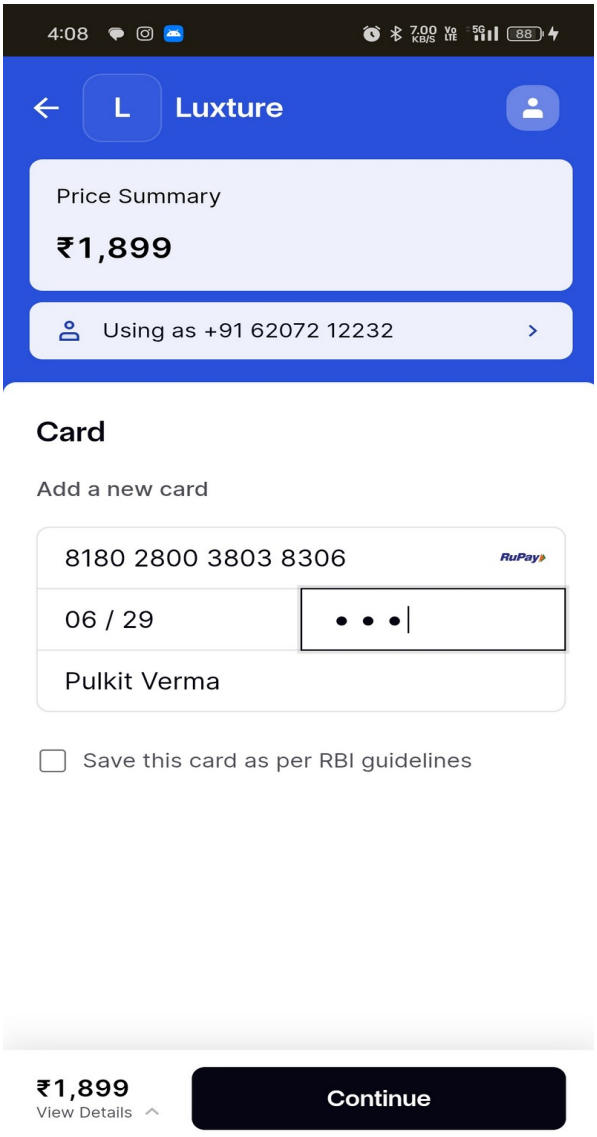

Figure 3.11 - Luxture/Card option

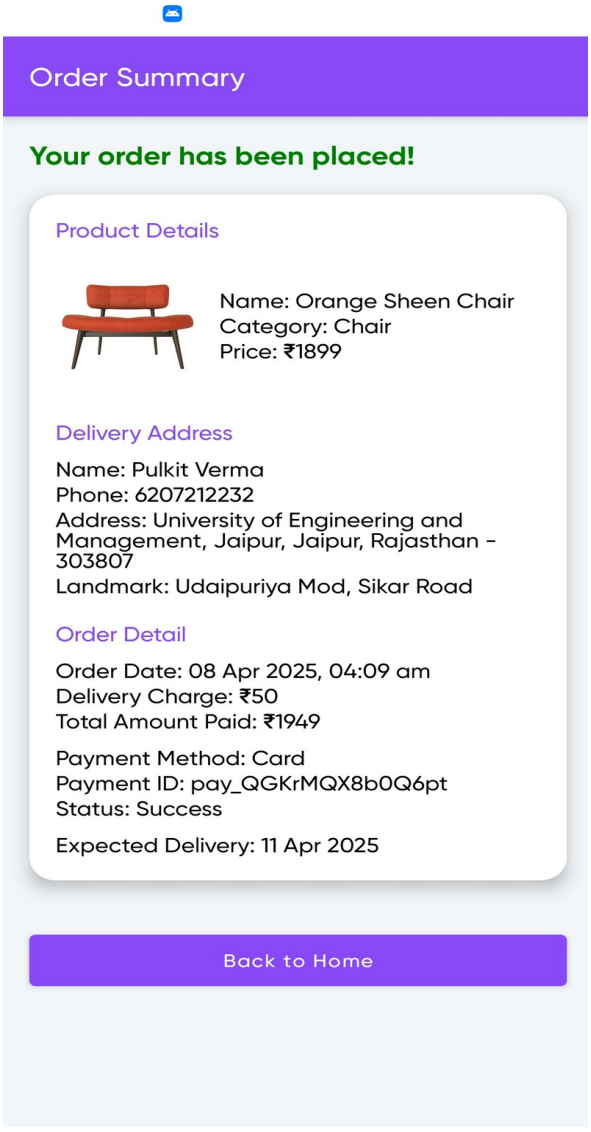

Figure 3.12 - Luxture/Confirm order

CONCLUSION & FUTURE SCOPE

Luxurious Creation: Visualize Around Yourself with AR transforms furniture shopping through augmented reality, allowing users to visualize furniture in their spaces with real-time 3D models powered by ARCore. Secure user access is ensured via Firebase Authentication, making the platform reliable and user-friendly. Already a leader in the online luxury furniture industry, Luxurious Creation stands out for its innovative technology and fine craftsmanship, reshaping how customers interact with high-end furniture. Future updates aim to expand the app’s capabilities, enhancing customization and streamlining the shopping journey for an even more engaging experience.

Expanding the model library with diverse styles like modern, vintage, and minimalist, along with categories such as appliances and home décor, could enrich the app's offerings. Real-time customization options for size, colour, materials, and finishes would elevate user interaction. Integrating AI-powered recommendations for furniture combinations and supporting multiple platforms, including iOS, would broaden its appeal. Additionally, enabling in-app purchases would streamline the process from visualization to purchase, making the shopping experience more seamless and intuitive.

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