

Interior Design Application Based on Augmented Reality

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Abstract:- The innovative Augmented Reality Interior Design App represents a state-of-the-art mobile solution that aims to redefine the approach to envisioning and customizing living spaces. Unlike traditional interior design methods, which rely on static images and imagination, this app addresses the uncertainties and dissatisfaction often encountered during implementation. By leveraging augmented reality, the application offers users a dynamic and immersive experience, seamlessly merging the virtual and real worlds. In the ever-evolving landscape of modern interior design, technology, particularly Augmented Reality (AR), emerges as a transformative tool. This abstract introduces a groundbreaking AR-based interior design application poised to transform the interior design experience. Through the utilization of AR capabilities, users can engage in real-time visualization and interaction with virtual furniture, decor, and layouts, seamlessly integrating digital elements into their physical surroundings.

Keywords:- Augmented Reality ,System Design ,Virtual Reality.

I. INTRODUCTION

Augmented Reality (AR) systems for placing furniture provide users with the capability to virtually position furniture in their physical surroundings. These systems enable individuals to preview the appearance of a room with new furnishings without the need to make actual purchases or physically relocate items. Unlike traditional AR systems that offer a limited viewpoint (specifically for the camera),

hindering a comprehensive understanding of the overall look of a space, our approach eliminates the necessity for users to physically enter the room each time they wish to view it from a different angle. Various proposals have been made to seamlessly switch between Augmented Reality (AR) and Virtual Reality (VR) modes, enabling users to navigate and explore the environment in VR mode. Our augmented reality technology specifically focuses on marker-free AR, and the project is developed as a mobile application for Android. This application is designed to be compatible with all current and future Android phone versions. Users simply need to install and run the application on their Android phone or tablet, place markers in the desired locations on the floor, and activate the camera through the application.

Upon detection of the marker, the system calculates its coordinates and dynamically generates three-dimensional objects above the marker. Visualizing how a specific object will appear in a room before decorating presents a significant challenge for users. Consequently, the end-user experiences the real environment augmented with physical objects, offering an interactive experience. In a broader context, this augmented reality is often referred to as mixed reality, encompassing various fields such as Virtual Reality (VR), Augmented Reality (AR), telepresence, and related technologies. Its applications span across diverse fields, including repair, medicine, telerobotics, manufacturing, robotics, maintenance, engineering design, education, and military applications. Augmented reality applications are typically categorized as either marker-based or markerless, with markerless applications detecting real-world objects, such as trees, instead of predefined images.

II. LITERATURE SURVEY

Table 1 Literature Survey

Title of paper	Method/ Techniques used	Analysis and Observation
"IoT Based Automated Smart Waste Management System"	IoT-based smart dustbin with automated lid opening via human clap detection,	Proposed sensor-based smart dustbin for efficient, monitored garbage management.
<i>International Journal of Scientific</i>	ultrasonic	

<i>Research in Science, Engineering and Technology 2023 and Reviews, 2020.</i>	sensor for garbage level measurement, and GSM communication for remote monitoring and alerts	
“AZIGBEE GARBAGE BIN MONITORING SYSTEM WITH IoT” <i>E3S Web Conf. Volume 399, 2023 International Conference on Newer Engineering Concepts and Technology (ICONNECT-2023)</i>	The real-time monitoring system is used.	It contributes to improving operational efficiency, and a safer, cleaner, hygienic environment while lowering the management budget.
“Smart Garbage Management System” <i>International Journal of Scientific & Technology Research 2022</i>	Proposed the ultrasonic sensor for detection of garbage level.	This smart dustbin gives proper service to all without delay and reduces the time
“SMART DUSTBIN USING ARDUINO NANO” <i>NIET Journal of Engineering & Technology (NIETJET) 2022</i>	The proposed method for the smart dustbin is the use of a GSM module.	Detect the level of garbage, using sensors
“Smart Trash Bin”, <i>International Journal of Scientific Research in Computer Science, Engineering and Information Technology, 2021</i>	Internet of Things (IoT) based smart trash bins for efficient waste management in urban areas.	Created IoT smart bins with sensors, improving waste management and real-time monitoring.
“IoT-based Smart Garbage Monitoring” <i>Journal of Computing Research and Innovation (JCRINN) 2021</i>	IoT-based system: Arduino, Blynk, ultrasonic sensors for real-time garbage level monitoring, email alerts,	IoT system using Arduino, Blynk, and sensors optimizes university garbage collection by tracking bin levels and

	user testing	conditions
<i>“IoT Based Smart Dustbin” International Journal of Scientific & Technology Research 2020</i>	We are using Arduino Nano to execute the code to open the lid and wait while using an ultrasonic sensor for sensing.	Developed a software name Blynk to control the operation
<i>“Smart dustbin based on IOT” International Journal of Engineering & Technology 2018</i>	The ultrasonic sensors are used to identify the rubbish level in clean canister and dustbin level data.	Used multiple sensors to detect garbage level and display on led
<i>“Garbage Management System for Smart City” International Journal of Engineering Research & Technology (IJERT) 2017</i>	The ultrasonic sensors are used to identify the rubbish level in clean canister and dustbin level data.	Developed an application which updates the level of garbage and sends a notification to the garbage collector
<i>“Garbage management of smart city using IoT” International Journal of Research in Science & Engineering 2017</i>	IoT technology, ultrasonic sensors, and Wi-Fi modules for garbage level monitoring and notifying officials.	The sensors are used which monitor fake reports to reduce corruption.

Text fields, background images, and virtual objects for the application. Subsequently, 3D models are crafted using Autodesk Maya and then imported into Unity 3D. To achieve this, the camera identifies and tracks surface areas, utilizing the Google AR Core to retrieve pointers and establish the projection model. This process culminates in seamlessly integrating the imported three-dimensional virtual model into the real-world view.

III. PROPOSED METHODOLOGY

The proposed project seeks to develop an inventive interior design application based on Augmented Reality (AR), aiming to transform the way individuals conceptualize and plan their living spaces. The central objective is to craft an intuitive and user-friendly app interface that delivers a captivating and immersive AR design experience. To achieve this, the application will utilize ARCore for Android or ARKit for iOS, ensuring real-time spatial mapping and object recognition for precise and lifelike placement of virtual furniture and decor within the physical environment. The app will encompass a diverse catalog of 3D models and textures, providing users with the ability to explore and select virtual furniture and decor options from a broad range. Users will be afforded the flexibility to interact

with these virtual elements, allowing them to move, resize, and customize the items to align with their interior design preferences. This interactive design functionality empowers users to experiment with different design concepts and layouts, fostering creativity and innovation throughout the interior design process.

➤ System Design :

The system primarily utilizes the integrated camera of a mobile phone, capable of supporting augmented reality, to capture images representing the actual scene perceived by the human eye. It also displays three-dimensional models of furniture on the device screen. Initially, we configure views in Unity 3D to design the user interface elements, including buttons, text fields, background images, and virtual objects for the application. Subsequently, 3D models are crafted using Autodesk Maya and then imported into Unity 3D. To achieve this, the camera identifies and tracks surface areas, utilizing the Google AR Core to retrieve pointers and establish the projection model. This process culminates in seamlessly integrating the imported three-dimensional virtual model into the real-world view.

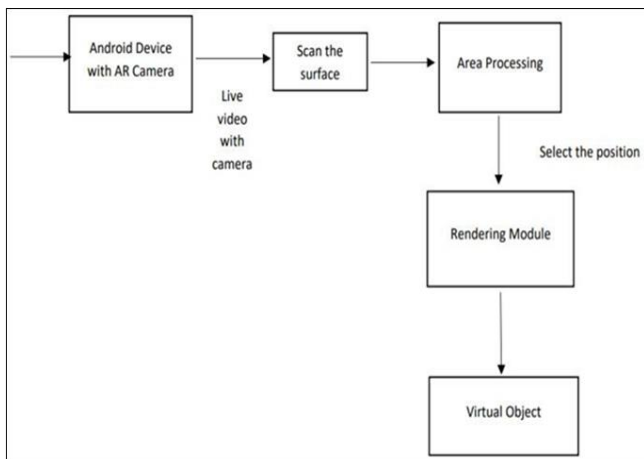


Fig 1 System Design

• Working :

AR projections can be displayed on various devices: various screens, glasses, handheld devices, smartphones, and headsets. For the computer-generated perceptual information to show up correctly, it calculates the position and orientation of the surrounding objects in real life. Usually, it works like this:



Fig 2 Working of AR

• Sensors:

AR devices, such as smart phones or specialized AR glasses, use various sensors to understand the real-world environment. These sensors may include cameras, GPS, accelerometers, gyroscopes, and depth sensors.

• Computer Vision:

The device captures real-time data from its sensors, which is then processed by computer vision algorithms. These algorithms analyze the input to identify objects, surfaces, and the spatial relationships between them.

• Registration:

Once the device understands the real-world environment, it "registers" the virtual objects or information to the appropriate locations in this environment. This ensures that the virtual elements align correctly with the physical world.

• Display:

The registered virtual elements are then superimposed onto the user's view of the real world. This is usually displayed on the device's screen (in the case of smartphones) or directly in the user's field of view (with AR glasses)

➤ Screenshot:

• Sign up Module

The process where user can create account on the platform by providing personal information like name, e-mail address and password. This account allows users to access various features and make purchases. Registration is the process by which individuals create an account or profile on a website, application, or platform.

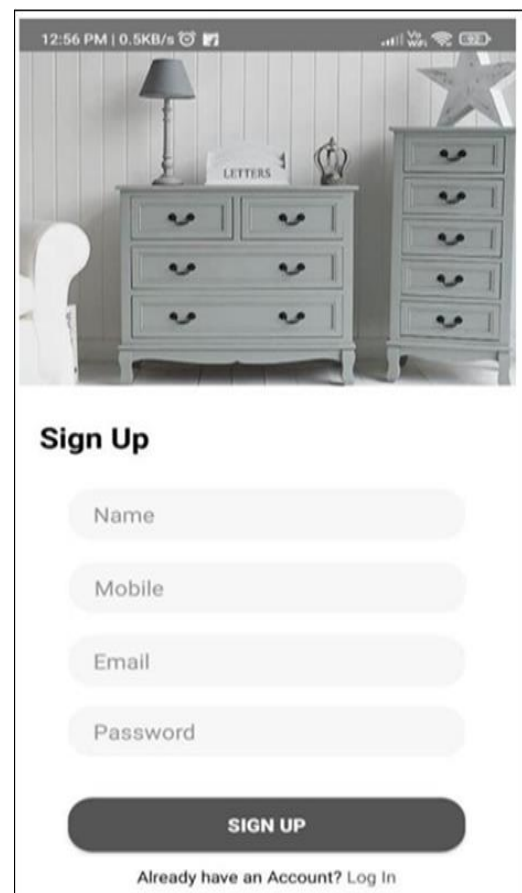


Fig 3 Sign up Module

• Forgot Password :

"Reset password module" is a component or feature within a software application, website, or system that facilitates the process of resetting a user's forgotten or lost password. It is typically implemented for security and user convenience purposes. The reset password module is a critical component for user account security and ensures that users who have forgotten their passwords can securely regain access to their accounts.

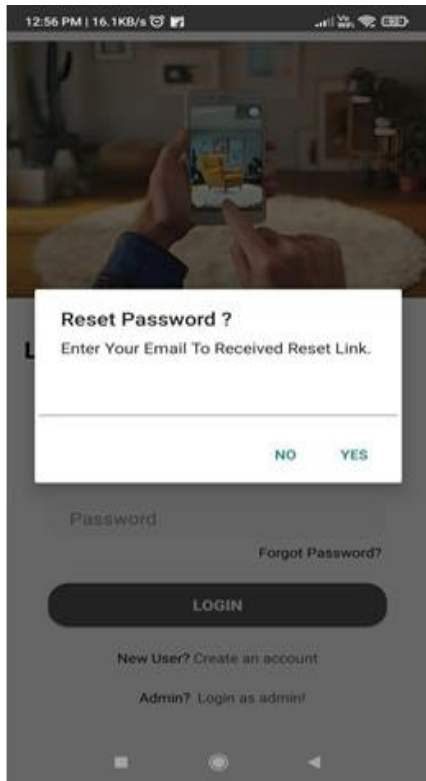


Fig 4 Forgot Password

• *User Dashboard :*

A dashboard is a user interface element in software applications or websites that provides users with a centralized view of their account, activities, and relevant information. The specific content and features of a dashboard can vary depending on the type of platform, its purpose, and the user's role.



Fig 5 User Dashboard

• *Virtual Object :*

Augmented reality allows you to overlay virtual objects onto the real-world environment captured by the camera. Implement object detection and tracking to understand the real-world environment. This allows your app to recognize surfaces, objects, or markers where virtual objects can be placed. Create or import 3D models or virtual objects that you want to display in the AR environment. These objects are rendered onto the camera feed at appropriate positions and orientations.



Fig 6 Virtual Object

• *View Product*

When users visit an e-commerce platform, they can browse through a catalog of products or listings. Upon accessing an e-commerce platform, users are presented with a curated catalog featuring a diverse array of products or listings. This catalog is thoughtfully categorized, allowing users to effortlessly navigate through various sections. Additionally, users have the convenience of employing a search function to locate specific items swiftly. To delve into the details of a particular product, users can initiate the selection process by clicking on either the product's image or its title. This action seamlessly transports them to the dedicated product details page.

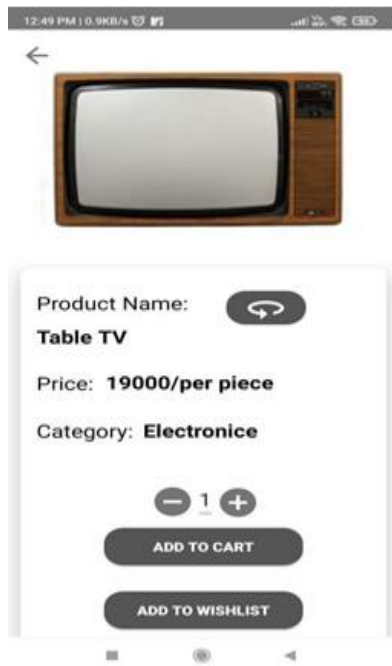


Fig 7 View Product

- **View Profile :**

A “View profile” module is a common component in many user-oriented software applications and websites. This module allows users to access and manage their personal information and account settings.

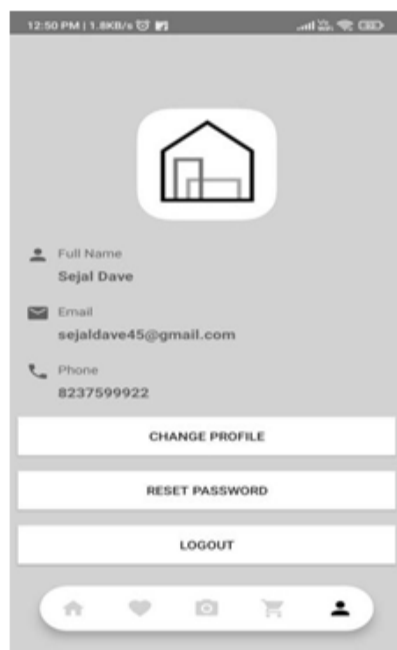


Fig 8 View Profile

IV. CONCLUSIONS

In conclusion, the Augmented Reality (AR) interior design app has big potential to change how we design our homes. It lets us see and place virtual furniture and decor in our real rooms, making it easier to create personalized living spaces. The app is user-friendly and fun to use. In the

future, it could have more virtual items to choose from, ways to share your designs with others, and even make it easier to buy the items you like. This app is a major step forward in interior design, which makes it more interactive and exciting. It could revolutionize how we design our homes, giving us more creative control.

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