IBM Innovation Centre for Education

PHEMESOFT Software That Matters

Project Proposal Report / Synopsis

for

Augmented Reality for Furniture Visualization

BINIL SIMON
22BCMGG07
BCA-METAVERSE, GAMING, GRAPHIC DESIGN , AR&VR WITH IBM
The Yenepoya Institute of Arts, Science, Commerce and Management
Balmatta-Mangalore
17/03/2025

Guided by:
Mr. Shashank- IBM SME

YENEPOYA
(DEEMED TO BE UNIVERSITY)
Recognized under Sec 3(A) of the UGC Act 1956
Accredited by NAAC with 'A' Grade

YENEPOYA INSTITUTE OF ARTS, SCIENCE, COMMERCE AND MANAGEMENT
BALMATTA, MANGALORE
YENEPOYA (DEEMED TO BE UNIVERSITY)

I. Title of the Project

Augmented Reality for Furniture Visualization

This project '**Augmented Reality for Furniture Visualization'** aims to develop an Augmented Reality (AR) mobile application that allows users to visualize furniture within their living space before purchasing. By leveraging AR technology, users can place, move, rotate, and resize 3D furniture models in real-world environments using their device's camera. The application will provide a realistic view of furniture placement and include product details such as dimensions, colors, and pricing. Additionally, the app will integrate e-commerce functionality, allowing users to browse and purchase products.

II. Statement of the Problem

Traditional furniture shopping often leaves customers uncertain about how a piece will fit into their space. Many rely on measurements and images, which do not provide an accurate representation of how furniture will look in their home. This project addresses this issue by enabling users to visualize furniture in AR before purchasing, improving confidence in their buying decisions.

III. Why this particular topic chosen?

The increasing adoption of AR technology in e-commerce and interior design makes this project highly relevant. By creating an AR-based furniture visualization tool, this project aims to bridge the gap between online shopping and real-world placement, providing a more immersive and interactive shopping experience. Additionally, the project enhances skills in AR development, UI/UX design, and e-commerce integration.

IV. Objective and Scope

Objectives:

- Develop an AR-based furniture visualization application
- Enable users to place, move, rotate, and resize 3D furniture models in real-world environments.
- Provide detailed product information, including dimensions, colors, and pricing.
- Implement a user-friendly interface for easy navigation and interaction.
- Integrate e-commerce features for browsing and purchasing furniture directly from the app

Scope:

- **AR Functionality:** Real-time object placement and interaction**.**
- **Furniture Models:** A library of 3D models for various furniture types**.**

- **User Interaction:** Resize, move, rotate, and delete furniture models**.**
- **Surface Detection:** Detect floors and walls to ensure correct furniture placement.
- **E-commerce Integration:** Link to purchase furniture.

V. Methodology

Requirement Analysis – Identify necessary features, UI components, and AR functionalities.

3D Modeling & Design – Create and optimize furniture models using Blender.

AR Development – Implement AR features using ARKit (iOS) and ARCore (Android) in Unity.

Integration – Combine AR functionalities with UI and e-commerce APIs.

Testing & Optimization-Conduct usability testing and optimize performance.

VI. Process Description

User Interaction: The app opens the camera view and allows users to select furniture from a catalog.

AR Placement: Users can preview, move, rotate, and resize furniture models.

Surface Detection: The app identifies valid surfaces (floors and walls) for placement**.**

Product Information: Users can view dimensions, colors, and pricing**.**

VII. Resources and Limitations

Resources:

- **Game Engine/Dev platform:** Unity for AR development.
- **AR SDKs:** ARKit (iOS), ARCore (Android)
- **3D Modeling Software:** Blender
- **Programming Language:** C#
- **Development Tools:** Visual Studio for scripting in C#.

Limitations:

- **Device Compatibility:** The app requires AR-compatible devices**.**
- **Performance Optimization:** Ensuring smooth AR rendering for all users**.**
- **Limited Product Catalog:** Initial version will have a limited number of furniture models.

VIII. Testing Technologies used

Unit Testing: AR placement, object scaling, and UI functionality.

Multiplayer Stress Testing: Evaluating server performance with multiple concurrent players.

Performance Testing: Optimizing rendering and interaction smoothness.

User Testing: Collecting feedback on usability and experience.

IX. Conclusion

This project will deliver an innovative AR-based furniture visualization application that enhances the online shopping experience. By allowing users to visualize, interact with, and purchase furniture through AR, this app bridges the gap between digital and physical shopping. The project contributes to the growing field of AR in e-commerce while developing valuable technical skills in AR development, UI/UX design, and integration.