

GenAI Framework Documentation

1. Problem Statement

Redesigning a room often feels intimidating—but it shouldn't. Whether you're a student furnishing a hostel room, a renter updating an apartment, or a family revamping your home, it's tough to truly picture how the changes will look. It is expensive to hire designers, and most computer software is either complex or designed for simple 2D visuals, which means costly errors. Our solution makes the process easier. Users can scan their room and tell the system what they like about their style in simple terms, and the system converts it into a switchable 3D layout. No design background needed—just imagination, supported by smart tools and a touch of AI.

2. Target Audience and Context

This is intended for anyone who enjoys decorating but struggles with execution. Picture first-time homebuyers dreaming of their perfect home, young apartment dwellers making a new space cozy, college students equipping their dorm rooms, or artists creating their aesthetic. These users are inspired by do-it-yourself projects and social media trends, but bringing a moodboard into existence is often hard and impossible. No matter their level of experience, our tool fills that gap by providing an enjoyable, AI-powered way to experiment with styles, view changes in real-time, and make confident design decisions.

3. Use of GenAI

Generative AI is the artistic brain behind our solution. Rather than selecting from pre-constrained templates, users just tell us how they would like their space to look and feel like "a cozy boho vibe with earthy tones and lots of natural light." Our software, fuelled by models such as GPT-4, takes these descriptions and converts them into actionable design ideas that propose furniture styles, colour schemes, textures, and layout concepts that fit the mood. Then, with the help of tools such as DALL·E or Stable Diffusion (augmented with models such as ControlNet), we create visual ideas that capture the ambiance in a way images can't. Once a style is selected, it's converted into a 3D edit-able space where all furniture from rugs to lamps can be replaced, resized, or repositioned. GenAI also suggests smart choices in route, such as suggesting indoor plants for a natural appearance or lighting for a warm atmosphere. It makes anyone irrespective of experience their own interior designer with AI power.

4.Solution Framework

We are creating a mobile app that simplifies interior design, making it visual and available to all. Users take a photo of their room with a smartphone to set up a digital floor plan, and then they describe how they want the room to look. The application creates realistic design ideas based on their space and design preferences. Users can enter an interactive editor to personalize layouts , change furniture, change colours, and see different solutions in real time. The platform also provides smart suggestions to edit the design. The solution gives users—of any skill level the confidence to explore and reimagine their environments using a user-friendly, AI-driven design process.

5.Feasibility and Execution

The solution can be built using current technologies. Room scanning and floor plan generation can be handled using smartphone cameras. User design inputs will be translated into formalized parameters, and visual stimulation can be delivered via sophisticated image generation software. The interactive 3D editor will be built using Unity, with high-fidelity assets sourced from Sketchfab and Quixel. With mobile support and cloud-based design, the app can be easily developed, deployed, and scaled for Android and iOS platforms.

6.Scalability And Impact

This model is highly scalable and designed to be appealing to a wide range of users, such as homeowners, renters, students, and design professionals. It can be readily deployable across geographies with minimal infrastructure since it's cloud-based and portable. Its modularity allows for potential collaborations with furniture and real estate companies and integration with e-commerce sites. The advantage is gained by democratizing interior design, which allows individuals to make informed decisions, avoid costly mistakes, and engage in creative ways with their homes. The greater the adoption, the more it would change the manner in which people everywhere perceive, organize, and customize their homes.

7.Conclusion

Our concept lets users personalize spaces using a camera and simple descriptions. With intuitive tools and smart automation, we turn rough ideas into interactive, editable layouts. The MVP includes room scanning, suggestion-based styling, and a 3D editor with three design themes. It's fun, approachable, and practical—bringing interior design within reach for everyone.