

# Ten-Week Progress Report

## Project: Interior Design Advisor

### Week 1 & 2 — Project Finalization and Proposal Development

During the first week, the team finalized the core concept of the Interior Design Advisor system. The problem domain was clearly defined, focusing on the difficulty users face when selecting suitable color schemes, furniture styles, and interior themes. A comprehensive project proposal was drafted, covering the objective, problem statement, intended audience, system scope, and expected outcome.

### Week 3 & 4 — Completion of SRS Version 1.0

A complete version of the SRS (v1.0) was documented. This included finalized functional requirements, non-functional requirements, system constraints, detailed use cases, system features, and assumptions. The document structure was aligned with IEEE-style standards. The team conducted internal reviews and resolved inconsistencies.

### Week 5 — High-Level Architecture Design

A high-level architectural structure of the system was prepared. This included identification of major subsystems such as image preprocessing, feature extraction, the ML classification module (MobileNetV2), recommendation engine, frontend, backend API, and database. A UML-based architectural diagram was developed to represent system flow, component interactions, and module boundaries.

### Week 6 — Detailed Architecture Explanation and Refinement

A complete written explanation of each architectural component was prepared for internal clarity. The team refined understanding of data flow, internal processing steps, and integration among ML, rule-based logic, and database components. The rationale behind selecting MobileNetV2, transfer learning strategy, preprocessing pipeline, and recommendation flow was documented in detail so all team members could understand the system.

## **Week 7 — Competitor Application Research**

During this week, the team analyzed existing applications in the interior design and AI-assisted room styling domain. Applications studied included Houzz, IKEA Place, DecorMatters, RoomGPT, and Planner 5D. A comparison matrix was created highlighting their features, limitations, user experience strengths, and weak areas. The research also helped identify unique opportunities for the proposed system.

## **Week 9 — MobileNetV2 Model Study and Technical Analysis**

A detailed study of MobileNetV2 architecture and its relevance to the project was conducted. The team learned about feature extraction layers, bottleneck blocks, depthwise separable convolutions, and transfer learning strategy. Sample implementation scripts were reviewed to understand the training workflow, model input dimensions, and performance considerations.

## **Week 10 — Color Extraction Research and Tool Review**

The team evaluated various color extraction tools and algorithms for dominant palette detection. Tools such as OpenCV (K-Means-based extraction), Adobe Color, ColorThief, and Colormind were analyzed. The feasibility of integrating color palette extraction into the recommendation pipeline was finalized. Pros and cons of each method were documented along with examples.

## **SRS Version 1.1 Revision and Design Document Framework**

Updates were made to produce SRS v1.1, addressing gaps identified by the team. Revisions included enhanced use cases, extended descriptions, updated constraints, and refined system features. Additionally, the structure for the full Design Document was created. System architecture explanations, diagrams, component roles, and module responsibilities were prepared for integration into the final document.