**App Vision & Functional Requirements for ContractorLens**

**1. Project Goal: Automated "Scan-to-Estimate"**

The primary objective is to create an iOS application that allows a user to perform a 3D scan of a room and **automatically** receive a detailed, line-item construction estimate. The workflow should be seamless, moving from AR scan to a finished estimate with minimal user input beyond the initial scan.

The analysis is broken into two parts: the required user experience for scanning (modeled after the "Canvas" app) and the required automated output (modeled after the "Handoff" app).

**2. The Envisioned User Experience (The "How")**

This section describes the required front-end functionality for the scanning process. The user demonstrated the app "Canvas" as the benchmark for the desired user interface and experience.

**A. Scan Initiation & Guidance**

* **Project Creation:** The user flow should begin by creating a new project with a name (e.g., "Project 42").
* **Guided Onboarding:** The app should feature a tutorial section (e.g., "How to Scan") that provides clear, illustrated instructions on best practices for scanning.
* **Automatic Room Detection:** The app should **not** ask the user to pre-select a room type (e.g., "Kitchen," "Office"). The type of room and its contents should be inferred by the Gemini ML service from the scan data.

**B. The Live AR Scanning Process**

* **Real-Time Mesh:** When the scan begins, the camera view must be augmented with a live, visible 3D mesh or grid that shows what has already been captured. This provides critical feedback to the user.
* **Contextual Instructions:** The app should provide real-time, on-screen prompts to guide the user to a better scan (e.g., "Point camera at a feature-rich corner to start," "Move slowly," "Ensure all window corners are visible").
* **Processing Feedback:** After the user stops the scan, the app must display a clear, multi-step progress indicator while the 3D model is generated (e.g., "Step 1 of 3: Computing geometry...").

**C. Post-Scan Interaction**

* **3D Model Viewer:** Once processed, the scan should be viewable as a 3D model. The user should be able to manipulate it (pan, zoom, rotate)

**3. The Automated Estimation Output (The "What")**

This section describes the required back-end processing and the final output the user must receive. The user demonstrated the app "Handoff" as the benchmark for the desired final estimate.

**A. The Automated Data Pipeline**

1. **Scan Completion:** The user completes the room scan as described above.
2. **Data Extraction:** The app automatically extracts all relevant data:
   * **Dimensional Data:** All measurements from the RoomPlan/ARKit scan (wall lengths, ceiling height, dimensions of doors/windows).
   * **Visual Data:** Key frames or images captured during the scan for AI analysis.
3. **Backend Submission:** This data is sent to the backend API.
4. **Dynamic Prompt Generation:** The **most critical requirement** is that the Gemini ML Service must use the received data to **automatically and dynamically generate a detailed prompt** for the estimation engine. The user's explicit goal is to **eliminate manual entry**. The system should infer the scope of work (e.g., "remodel a 9x12 room," "remove carpet," "repaint walls," "it has two windows," etc.) from the combined dimensional and visual data.

**B. The Final Estimate Screen**

* **Automated Generation:** After the backend processes the dynamically generated prompt, it should produce a complete estimate.
* **Immediate Presentation:** This estimate should be the **next screen the user sees** after the scan processing is complete.
* **Line-Item Granularity:** The estimate must be broken down by construction category (e.g., Demolition, Framing, Drywall, Electrical, Painting, etc.).
* **Detailed Items:** Each category should contain detailed line items for both **materials** and **labor**, including quantities, unit costs, and totals.
* **Real-World Pricing:** Where applicable, material costs should be linked to real-time pricing from suppliers (the Lowe's logo was shown as an example in the video).
* **No Subscription Block:** The user demonstrated being blocked by a subscription paywall in the "Handoff" example. The core "Scan-to-Estimate" functionality in ContractorLens must be available.

**C. Post-Estimate Interaction**

* **Chat-Based Edits:** After the initial estimate is generated, the user should be able to request changes or make adjustments using a chat interface.
* **Secondary Features:** Functionality such as formal proposal generation, invoicing, and CRM are considered secondary to the core Scan-to-Estimate workflow.