

AI-Powered Visual Product Measurement System

Background

Product catalogs increasingly depend on visual understanding to describe and organize items at scale. Rather than relying on manual tagging or business-driven categorization, modern systems can use AI to extract **objective, observable visual characteristics** directly from product images.

This assignment explores how a system can be designed to analyze product visuals and produce **structured, machine-readable measurements** based purely on appearance.

Objective

Design and implement a **visual product measurement system** that analyzes product images and outputs consistent, structured descriptions of their observable visual properties.

The system must focus strictly on **what can be seen in the images**, without applying merchandising logic, recommendations, or user-specific interpretation.

What You Should Build

Create a working prototype that demonstrates:

- Accepting one or more images for a product
- Analyzing images using a vision-capable AI model
- Producing structured visual measurements across multiple dimensions
- Displaying or exporting the results in a usable format

The exact system architecture, AI provider, and interface design are up to you.

Expected Capabilities (High Level)

Your system should reasonably support:

Visual Measurement

- Producing continuous, floating-point scores (-5.0 to +5.0) along multiple visual dimensions:
 - Gender Expression
 - Visual Weight
 - Embellishment
 - Unconventionality
 - Formality
- Detecting other clearly observable visual attributes
Few examples
 - Presence of visible wirecore
 - Frame or structural geometry
 - Transparency or opacity
 - Dominant color characteristics
 - Visible textures or surface patterns
 - Suitable for kids
- Extracting basic visual metadata when it is unambiguous

All outputs should reflect **visual appearance only**, not inferred intent or business context.

AI / Vision Integration

- Using a vision-enabled AI model to analyze product images
- Structuring prompts and responses to produce consistent, repeatable outputs
- Handling ambiguity and partial visual information gracefully

You may design for one LLM provider or for extensibility across multiple providers.

Data Handling

- Supporting multiple images per product
 - Handling invalid or unreachable image URLs
 - Processing requests asynchronously or non-blocking where appropriate
 - Returning results in a structured, machine-consumable format (e.g., JSON)
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User Experience

- A clean interface to submit product images or datasets
- Clear visualization or presentation of measurement results
- Ability to export or inspect raw outputs

UI polish is not required; clarity and usability matter more.

Technical Constraints

- Programming language and frameworks are your choice
 - The system does not need to be production-ready
 - Long-term persistence is optional
 - Time and resource limits should be considered realistically
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Visual Measurement Dimensions

The system evaluates products along the following **independent visual dimensions**, each expressed on a scale from **-5.0 to +5.0** (for eg 0 in gender expression indicates unisex, **+1 = slightly feminine**):

- **Gender Expression:** masculine → feminine visual appearance
- **Visual Weight:** sleek/light → bold/heavy visual presence
- **Embellishment:** simple → ornate design complexity
- **Unconventionality:** classic → avant-garde visual style
- **Formality:** casual → formal visual tone

Measurements must be derived **exclusively from visual inspection** of images.

What We're Evaluating

We are primarily interested in your **engineering and design thinking**, including:

- System and API design
 - Prompt and output structuring for vision models
 - Handling non-deterministic AI outputs
 - Separation of concerns and modularity
 - Trade-offs between accuracy, latency, and complexity
 - Code clarity and documentation
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Deliverables

Please submit:

1. **Code repository**

- Setup and run instructions
 - Sample inputs and outputs
2. **Short design write-up** (README or 1–2 pages)
- High-level architecture
 - Key assumptions and decisions
 - Limitations and future improvements
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3. Short md document on How was your experience working on this problem
4. *(Optional)*
- Architecture diagrams
 - Example prompts and responses
 - Tests or validation logic
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Time Expectation

This assignment is intentionally open-ended and scoped for **3 * 8 hours** of effort.

Bonus Ideas (Optional)

If you want to explore further, consider:

- Multiple AI provider support or fallback logic
 - Confidence scoring or uncertainty representation
 - Caching repeated analyses
 - Introduce sales trends across user segments as another data point
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Notes

Sample Images ->  product_images

There is no single “correct” solution.

We value **clear reasoning, sound architecture, and thoughtful trade-offs** over feature completeness.

We look forward to seeing how you approach visual intelligence systems.