

# Universal Consistency Engine: System Overview

The **Universal Consistency Engine** is a deterministic AI-powered platform designed to automate technical copyediting. It ensures that complex documents adhere to specific style guides regarding spelling, unit notation, and punctuation.

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## 1. Core Capabilities

- **Dynamic Rule Extraction:** Uses Gemini to transform human-readable style guides into structured JSON logic.
  - **Deterministic Editing:** Applies rules with zero "creative drift," ensuring only violations are changed.
  - **Audit Transparency:** Provides a step-by-step playback of changes, including confidence scores and reasoning for every edit.
  - **Portability:** Supports "Style Packs" for instant importing and exporting of established rule sets.
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## 2. Workflow: How it Works

The system operates in a three-phase cycle to ensure high precision:

### Phase A: The Knowledge Build (Architect Mode)

1. **Input:** User uploads a Style Guide (e.g., "Always use British spelling and no apostrophes in decades").
2. **Parsing:** The backend sends this to the AI with a "Style Architect" prompt.
3. **Output:** A JSON configuration is generated, defining **Triggers** (what to look for) and **Instructions** (how to fix it).

### Phase B: The Processing Loop (Editor Mode)

1. **Input:** User pastes "messy" technical text into the dashboard.
2. **Matching:** The engine scans the text for patterns that match the JSON Triggers (e.g., it finds "1990's" or "modeled").
3. **Correction:** The AI generates a `corrected_text` block and a `changes` array containing the "Original" vs. "New" strings.

### Phase C: The Visual Audit (User Review)

1. **Highlighting:** The UI uses the `changes` array to wrap corrected words in `<span class="hl">` tags.
2. **Playback:** The user uses the Playback Slider to see each correction happen in sequence.

3. **Validation:** Users review the "Why" (explanation) and "Confidence" score for each pill-style audit log.

### 3. Technical Stack

Component	Technology	Role
<b>Backend</b>	<b>Python (Flask)</b>	Handles routing, file parsing, and API communication.
<b>AI Engine</b>	<b>Gemini 1.5 Flash</b>	Powers the Architect (rules) and the Editor (corrections).
<b>Frontend</b>	<b>HTML5 / JS / CSS3</b>	Manages the interactive playback, mini-map, and highlighting.
<b>Data Format</b>	<b>JSON</b>	The "bridge" that ensures the AI instructions are readable by the UI.

### SNAPSHOTS:

**Universal Consistency Engine**

**1. Knowledge Extraction**  
 Upload your Style Guide (PDF/DOCX/TXT) to generate JSON logic.  
 input.txt

[EXTRACT JSON RULES](#)

[DOWNLOAD JSON](#)

[EXPORT STYLE PACK](#)

Import Style Pack (JSON)  
 No file chosen  
Style packs include rules + examples so teams can reuse your guide.

```

[{"category": "Decades", "instruction": "Use the British English spelling conventions (e.g., '1990s', '2020s').", "rule_id": "decade_apostrophe_001", "triggers": [ "1990", "1990s", "1990's", "2020" ]}, {"category": "Spelling", "instruction": "Use British English spelling conventions (e.g., 'lead physicist').", "rule_id": "spelling_001", "triggers": [ "mocked" ]}, {"category": "Units", "instruction": "Use the correct symbol and spacing for micro-liters (µL).", "rule_id": "units_spacing_001", "triggers": [ "µL" ]}, {"category": "Units", "instruction": "Omit the space between the number and the unit."}]

```

**2. Deterministic Correction**

**TECHNICAL AUDIT: QUANTUM PROCESSOR THERMAL LOAD (REV. 2026)**  
 The refrigeration manifold, which was originally prototyped in the late 1990's, demonstrated a significant thermal drift of  $\pm 0.85$  K during the sub-Kelvin cooling phase. We modeled the superconducting state transitions using the 2024 program logic, but the sequence was canceled when the micro-leak reached 15  $\mu\text{L}$  per minute.

[APPLY & HIGHLIGHT](#)

**Corrected Output:**  
**TECHNICAL AUDIT: QUANTUM PROCESSOR THERMAL LOAD (REV. 2026)**  
 The refrigeration manifold, which was originally prototyped in the late 1990s, demonstrated a significant thermal drift of  $\pm 0.05$  K during the sub-Kelvin cooling phase. We modelled the superconducting state transitions using the 2024 program logic, but the sequence was canceled when the micro-leak reached 15  $\mu\text{L}$  per minute.

[APPLY & HIGHLIGHT](#)

**Audit Trail:**  
 punctuation\_001: lead physicist, the hardware specialist and the cryogenic technician → lead physicist, the hardware specialist, and the cryogenic technician  
 spelling\_001: modeled → modelled  
 decade\_apostrophe\_001: 1990's → 1990s  
 decade\_apostrophe\_001: 1990's → 1990's  
 units\_spacing\_002: 98.5 % → 98.5%  
 decade\_apostrophe\_001: 1980's → 1980s  
 units\_spacing\_001: µL → µL  
 units\_spacing\_002: 3 % → 3%

**Consistency Playback**  
 Scrub the timeline to see each rule applied step by step.

category: Write  
"instruction": "Write the space between the number and

Play Step 10 of 10: Final output

TECHNICAL AUDIT: QUANTUM PROCESSOR THERMAL LOAD (REV. 2026)

The refrigeration manifold, which was originally prototyped in the late 1990s, demonstrated a significant thermal drift of  $\pm 0.05$  K during the sub-Kelvin cooling phase. We modelled the superconducting state transitions using the 2024 program logic, but the sequence was canceled when the micro-leak reached 15  $\mu\text{L}$  per minute.

A secondary anomaly was detected in the color-coded fiber optics at a frequency of  $\sim 4.5 \times 10^9$  Hz. The lead physicist, the hardware specialist, and the cryogenic technician must re-calibrate the modelling software before the 2020s end. Currently, the reliability margin is 98.5%, which is a 3% improvement over the legacy 1980s benchmarks. If the modelled data is not verified, the color-coding will be reset.

Compare Models

Foundry: gemini-2.0-flash  OpenAI (Foundry): gpt-4o-mini  Vertex AI (Anthropic): claude-3-haiku@20240307  Groq (Foundry): llama-3.3-70b-versatile

Add Foundry models (comma-separated), e.g. gemini-2.0-flash, gemini-1.5-flash

COMPARE MODELS

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