MULTIVIEW TECHNOLOGY — CTC GRADER SYSTEM UPDATE v2.1 Consolidated Revision Summary Release Date: October 2025 Prepared & Certified by: Shawn Wiederhoeft • Multiview Technology Document Type: Official System Architecture & Process Revision Previous Baseline: v2.0 (Strict++ Framework Integration)

1. PURPOSE This document defines all structural, architectural, and procedural updates to the Multiview Cinnamon Toast Crunch Grading System following implementation of the Local Cereal Detection Subsystem and the v1.6 Strict++ Framework. It consolidates recent enhancements to the grading pipeline, validation flow, and data schema—ensuring that every specimen entering the Multiview archive undergoes validated classification, provenance detection, and deterministic grading logic.

2. CORE UPDATES OVERVIEW Framework Logic: Upgraded to Multiview Grading Standards v1.6 (Strict ++) incorporating MV/VO verification and the Gem Mint Clause. System Architecture: Expanded to CTC Grader v2.1, adding Local AI Validation, Official/Visual upload distinction, Debug Tools, and Automated Documentation. Cereal Validation AI: New local MobileNetV3 classifier trained on 400+ images (Cereal vs Non-Cereal). Replaces dependency on OpenAI Vision for moderation. Box ID Detection: AI-based OCR automatically extracts “Box Code / Best By” data for official MV submissions. Manual field removed. Public Upload Flow: Visual-Only Specimen Analysis now restricted to verified cereal images. Non-cereal uploads are rejected with user-friendly messaging. Debug Interface: Added buttons for Erase Archive, Reset Documents, and Train Local Model, each with confirmation modal. UI/UX Theme: Unified Frutiger Aero × ’90s Web aesthetic across all pages and modals.

3. PIPELINE FLOW User Upload → Local Cereal Detector (MobileNetV3) → Not Cereal → Reject Upload (■) Cereal → Continue → (If MV) OCR Box Code Detection → AI Grading System (v1.6 Strict ++) → Report + JSON Generation → Archive Entry + Database Sync

4. LOCAL CEREAL DETECTOR SUBSYSTEM Purpose: Replaces remote vision calls with a self-contained AI module that distinguishes Cinnamon Toast Crunch pieces from non-cereal images before grading. Folder Structure: /ml_cereal_detector/ ■■■ dataset/ ■ ■■■ cereal/ ■ ■■■ not_cereal/ ■■■ train_classifier.py ■■■ predict.py ■■■ cereal_model.h5 ■■■ cereal_labels.json ■■■ HOW_TO_TRAIN.md ■■■ __init__.py

Training: Uses TensorFlow MobileNetV3 Small pretrained on ImageNet. Requires ~200 cereal + 200 non-cereal images. Trained locally with one command: python ml_cereal_detector/train_classifier.py Outputs cereal_model.h5 (learned weights) and cereal_labels.json.

Prediction Logic: Returns JSON like {"label": "cinnamon_toast_crunch", "confidence": 0.94}. Confidence ≥ 0.8 passes moderation, else rejection with message “■ This image does not appear to be a Cinnamon Toast Crunch specimen.” Integration: Used in all upload routes as the primary validation gate.

5. FRAMEWORK v1.6 STRICT++ SUMMARY Verification Types: MV (Measurement-Verified) and VO (Visual-Only) Gem Mint Paths: Empirical Gem Mint (MV): All subgrades ≥ 9.8, curvature ≤ 3 %, AI confidence ≥ 0.95. Anomalous Gem Mint (VO): All subgrades ≥ 9.8, curvature ≤ 3 %, AI confidence ≥ 0.98. Subgrade Weights: Geometry 0.30 • Corners 0.20 • Surface 0.20 • Alignment 0.18 • Coating 0.12. Curvature Bands: Flat ≤3% (Eligible for PSA10), Nominal 3–5% (≤9.5), Bowed 5–8% (≤9.0), Warped 8–12% (≤8.0), Severe >12% (≤7.5) Strict Deductive Mode: All specimens start at 10 and lose points for flaws. No round-up allowed.

6. JSON DATA MODEL (v1.6 Strict ++) { "specimenId": "A-32", "frameworkVersion": "v1.6 (Strict++)", "verificationType": "VO", "finalGrade": "PSA 8.5 (NM+)", "dateGraded": "2025-10-07T21:10:00Z", "reportPath": "A-32_CTC_Grading_Report.pdf", "images": { "front": "A-32_front.jpg", "side": "A-32_side.jpg" }, "curvature": 5.2, "aiConfidence": 0.946, "systemHash": "ae9341...fb27", "subgrades": { "geometry": 8.5, "corners": 8.0, "surface": 8.5, "coating": 9.0, "alignment": 8.3 }, "provenance": { "boxCode": "CE150002", "bestBy": "24 MAR 2026" } }

7. UI / USER-FLOW UPDATES Official Access (Secret): No Box ID field—auto-detected by OCR. Visual-Only Analysis: Accepts up to 4 images, runs Local Detector → Strict ++ grading logic. Archive Page: New columns (Verification, Curvature, AI Confidence), clickable thumbnails. Debug Page: Erase Archive / Reset Documents / Train Local Model, all with confirmation modals.

8. FILE SYSTEM INTEGRATION /public/ ■■■ Specimens/ ■■■ Documents/ /ml_cereal_detector/

9. ERROR HANDLING & REJECTIONS Non-cereal image upload: rejection. Missing model file: training required. OCR failure: Proceed unverified with warning. Curvature >12%: Auto cap ≤7.5.

10. DOCUMENTATION POLICY All future versions must include: updated framework PDFs, system docs, ML guide. Markdown is master source; PDFs are archival copies.

11. PHILOSOPHICAL NOTE “Precision through futility — discipline in absurdity.” Each line of code serves the same function as each paper stamp before it— to prove that someone was paying attention.

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