ColorLang IP Assessment: Patentability and Trademark Review

Date: November 7, 2025

Audience: Founders, technical leads, and counsel (informational only; not legal advice).

Executive Summary

ColorLang packages a machine-native, color-encoded program representation with a VM, compression tuned for program images, and a color-grid UI framework (ColorReact). Several elements could be patent-eligible if they are novel and non-obvious over prior art (notably color/esoteric languages and image codecs). Distinctive branding is likely registrable as trademarks. We recommend: (1) targeted prior-art search, (2) a US provisional application covering the most defensible inventions, and (3) trademark filings for the core brands.

Candidate Inventions (Patent Targets)

Color-native executable representation with HSV-banded opcode classes and S/V operand quantization, unifying code and data into a single image artifact with spatial execution policy.

Patentability: Medium — visual languages exist (e.g., Piet), but this specific HSV mapping + operand quantization + spatial VM combo may be distinguishable if claimed narrowly with integrity/ECC and compression synergy.

Hybrid compressor specialized for color-program grids (palette→RLE pipeline over opcode-indexed tiles) and corresponding container format for lossless program interchange.

Patentability: Medium — palette and RLE are old; novelty hinges on joint optimization for instruction grids, tile semantics, and decode-time guarantees (e.g., integrity/ECC, program semantics preserved).

Integrity/ECC for hue-banded instruction images: parity or redundancy across pixels with decode rules that tolerate small hue perturbations while preserving opcode class.

Patentability: Medium/High — error-correcting over a color-coded program IR with band-aware majority voting is less common; viability improves with concrete schemes and proofs/benchmarks.

ColorReact: React-style component system rendering state to HSV grids, with serialization to a compressed color-program artifact and deterministic rehydration into executable VM instructions.

Patentability: Medium — UI frameworks are abundant; novelty rests on the end-to-end pipeline: component state→HSV grid→program image→compressed artifact→VM execution with equivalence guarantees.

Cognition strip as a first-class, reserved meta-state channel within executable images driving behavior/external consumers.

Patentability: Low/Medium — mapping affect/intent to pixels is likely obvious without a concrete, novel consumption mechanism. Improve by specifying protocol semantics and a consumer that alters execution in a non-trivial, measurable way.

Semantic hashing and Merkle trees over instruction tiles for region-level provenance and tamper detection integrated into the VM.

Patentability: Medium — known techniques applied to a novel artifact (instruction tiles). Focus claims on integration points with color decoding and execution guarantees.

Prior Art Landscape (Non-exhaustive)

Esoteric visual/color languages: Piet, Befunge-like 2D languages, prior color→opcode experiments.

Image compression: palette/RLE, PNG filtering, WebP lossless; general-purpose compressors (zstd).

IRs and VMs: LLVM IR, WASM, graphical block languages; visual debuggers.

Error-correction and integrity: parity schemes, Reed–Solomon, Merkle trees.

Implication: Claims must emphasize the specific coupling of HSV-banded semantics, operand quantization rules, spatial execution, integrity/ECC tuned for hue bands, and compression tailored to program-grid properties.

Patentability Analysis (US-centric)

35 U.S.C. §101 (Subject Matter): Methods/systems/storage media claims are generally eligible if tied to concrete computation and not abstract ideas alone.

§102 (Novelty): Risk at the level of "image-as-program" is high; mitigate with specific HSV banding + operand schemes, ECC decoding rules, container semantics, and equivalence guarantees to the VM.

§103 (Non-obviousness): Combination of known visual languages + standard compression could be argued obvious; counter with unexpected results (e.g., robust decode under hue noise with semantic ECC; measurable compression/throughput gains on program grids) and integrated pipeline claims.

§112 (Enablement/Written Description): Provide full decoding tables, operand quantization, ECC logic, and container specs; include performance and robustness measurements.

Claim Strategy (Sketch)

Independent Method Claim: Decoding a color-grid program by mapping hue bands to opcode classes and S/V to operands, executing via a spatial policy; with ECC that majority-votes redundant pixels within a band to correct hue perturbations; and emitting side-effect traces for provenance.

Independent System Claim: A VM configured with band-aware decoders, ECC, and tile-level integrity; a compressor that applies palette→RLE over opcode indices; and a container storing palette, runs, and integrity metadata.

Independent Article Claim: A non-transitory medium storing a color-program artifact with encoded bands, ECC redundancy pattern, tile checksums, and a manifest enabling deterministic rehydration.

Dependent Claims: Specific band partitions; operand quantization; cognition strip schema; ColorReact pipeline; hybrid compression parameters; Merkle over tiles; GPU shader decode.

Evidence Plan to Bolster Non-Obviousness

Benchmarks showing hybrid compression outperforming PNG+zstd on Tier A/B corpora (≥5% median savings).

Robustness tests demonstrating misdecode rate < 1e-6 under ±δ hue noise with ECC.

Deterministic rehydration from compressed artifacts into byte-identical instruction grids.

GPU prototype equivalence, showing consistent decode results.

Trade Secret vs. Open Source

Open source (recommended): Core language (parser/VM), examples, and ColorReact to encourage adoption.

Proprietary/Patent-backed candidates: ECC decoding rules, container spec optimizations, and benchmark-tuned hybrid compressor parameters.

If patenting, open-source after filing provisional to capture community while preserving priority date.

Trademarks (Branding)

Candidate word marks (distinctive, suggestive):

- "ColorLang" — primary brand for the language.

- "ColorReact" — UI layer brand.

- "ColorCompressor" — compressor suite name (consider more coined options: "Chromapress", "HuePack").

- "Cognition Strip" or "MindStrip" — meta-state channel name (higher distinctiveness preferred).

Assess registrability:

- Distinctiveness: Suggestive/coined terms favored; avoid generic/descriptive (e.g., "Color Language").

- Likelihood of confusion: Search USPTO/TESS and WIPO Global Brand DB for similar marks in classes covering software (IC 9), developer tools, and cloud services (IC 42).

- Specimen: Provide website/docs showing mark used as a source identifier.

- Style: Consider a stylized/logo mark alongside the word mark.

Recommendation: File word marks first for "ColorLang" and "ColorReact" (if available), then a logo mark. Maintain consistent brand usage in docs and repos.

Copyright

Source code, docs, and images are automatically copyrighted. Choose a license (e.g., Apache-2.0 or MIT) for open-source components. Consider dual-licensing for commercial modules.

Freedom to Operate (FTO)

Commission a targeted search focusing on: visual programming languages using colors; image-based opcode encoding; error-correcting decoding of color-coded instructions; palette/RLE compressors specialized for instruction grids; image container formats with integrity trees.

Immediate Next Steps

1) Run a prior-art and trademark clearance search (USPTO TESS, WIPO) for "ColorLang" and "ColorReact".

2) Draft and file a US provisional patent application covering: banded HSV decoding + operand quantization; ECC over hue bands; hybrid compressor + container; deterministic rehydration; optional cognition strip.

3) Capture enabling details: decoding tables, operand quantization math, ECC redundancy layout, container schema, and benchmark results.

4) Establish branding guidelines and consistent mark usage; prepare specimens.

Appendix A — Provisional Outline (Template)

Title: "Systems and Methods for Color-Encoded Program Representation with Band-Aware Decoding, Integrity, and Compression."

Background and prior art.

Summary of the invention.

Brief description of the drawings: decoding pipeline, ECC layouts, tile integrity trees, compressor flow.

Detailed description: HSV band tables, operand quantization, algorithms, container schemas, performance data.

Claims (broad method/system/article + dependent claims).

Appendix B — Trademark Checklist

Shortlist 2–3 brand candidates per product.

Search TESS/WIPO; record hits and classes.

Pick goods/services identifications (IC 9, IC 42).

Decide jurisdictions (US first; EU/UK as needed).

Prepare specimens and usage guidelines.