PHOTOGRAPHY POST-PRODUCTION

AI vs. Human Retouchers

A HEAD-TO-HEAD COMPARISON IN PRODUCT PHOTO RETOUCHING

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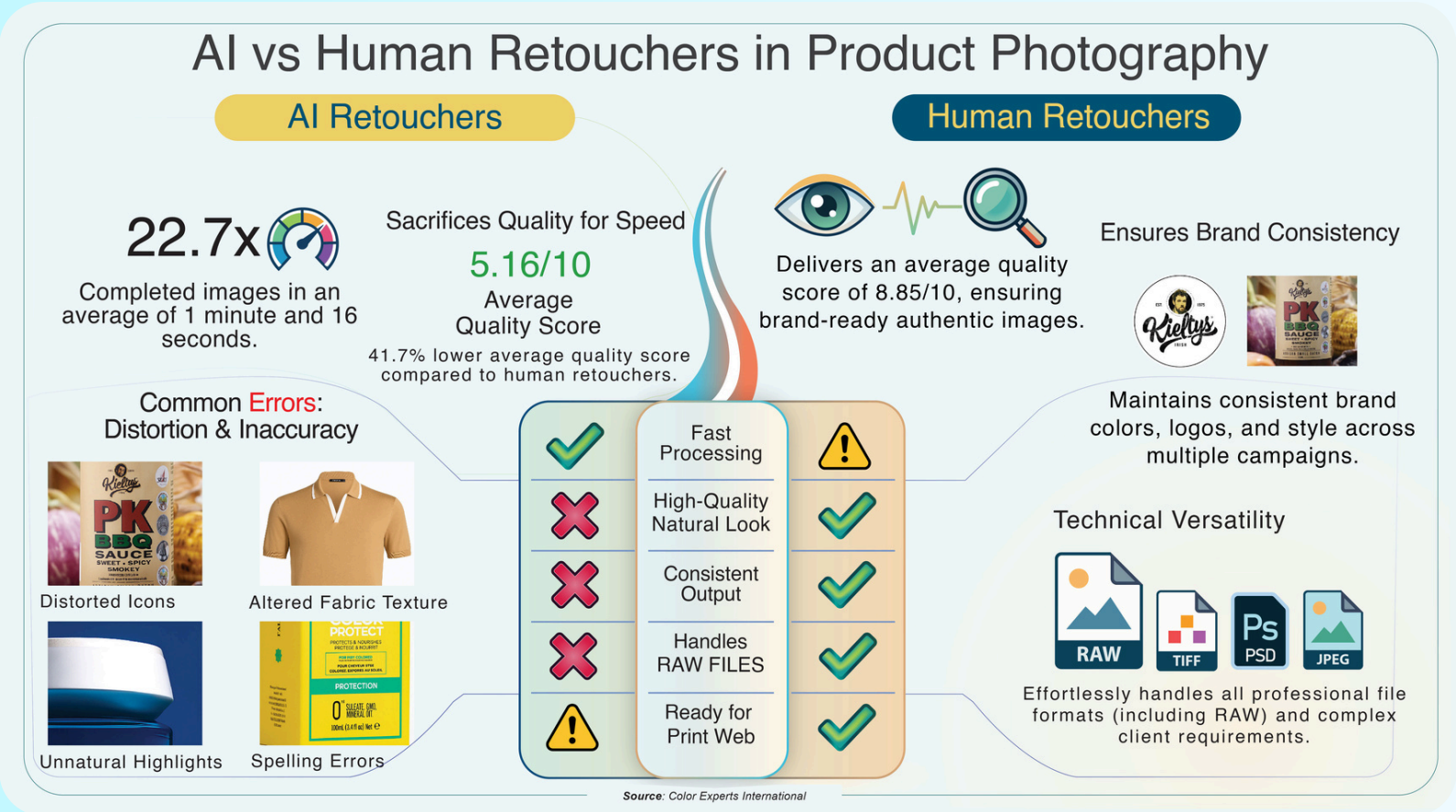
Index

Executive Summary

This study by Color Experts International, Inc. compares the performance of AI-based retouching tools with professional human retouchers across multiple categories of product photography. While AI image models such as GPT Image 1, GPT Image 1.5 and Nano Banana Pro demonstrated impressive speed and handled simple edits efficiently, they struggled with consistency, fine detail accuracy, and complex technical requirements. Human retouchers remained the strongest performers in quality, reliability, and brand-safe output, especially for high-stakes or technically demanding images.

A hybrid workflow emerged as the most effective approach: using AI to accelerate low-complexity steps while relying on human expertise for refinement and final quality control. This model allows CEI to deliver faster turnaround times without compromising the accuracy and authenticity expected by global brands. As AI tools evolve, CEI will continue integrating the latest technologies to enhance efficiency while maintaining the craftsmanship that defines professional post-production.

A Quick Snapshot of the Study



Download the snapshot here.

Abstract

This study presents a head-to-head comparison between AI models; GPT Image 1, GPT Image 1.5 and Nano Banana Pro and CEI's professional human retouchers across ten product photo categories. The highest performing AI tool Nano Banana Pro completed edits an average of 67.6× faster but achieved a lower quality score (6/10) compared to human retouchers (8.85/10) based on 11 performance fields. Key limitations included structural distortions, incorrect text reconstruction, and inconsistent results on unsupported formats such as RAW and high-resolution TIFF.

Hybrid testing showed that when AI output met a minimum reusability threshold, overall retouching time decreased by 28.2%. However, effectiveness varied significantly depending on the AI model used. The study concludes that while AI offers meaningful speed advantages, human oversight remains essential for achieving publication-ready results.

Introduction

At Color Experts International, we've built our system on transforming images into visual masterpieces, serving clients like Amazon, Vogue, Nordstrom, Nike, and more with bespoke solutions. Building on that foundation of quality and expertise, we designed a rigorous head-to-head challenge to explore the emerging landscape of AI photo retouching.

Photo retouching plays a crucial role in modern visual production, especially in product photography where accuracy, brand consistency, and technical clarity are essential for attracting customers and building trust. Retouching involves a combination of tasks such as refining reflections, correcting labels, adjusting color and lighting, removing distractions, enhancing textures, and ensuring proper geometry to make an image publication-ready while preserving the authenticity of the original product.

Professional retouchers bring a high level of visual judgment to this process. Their work involves understanding brand standards, interpreting client requirements, and making context-aware decisions that maintain realism while elevating the final image. This blend of technical skill and creative intuition has traditionally been essential for producing high-quality commercial visuals.

As AI-generated and AI-assisted image tools continue to mature, they have begun to automate portions of these tasks, especially background cleanup, initial corrections, and rapid previews. Tools like OpenAI's GPT Image 1, GPT Image 1.5 and Google's Nano Banana Pro can process images quickly and provide helpful starting points, raising important questions across the industry:

How well can AI handle the nuances of production-grade product photo retouching? Which tasks does it perform reliably? Where does human expertise remain essential? And how do the two approaches fit together in high-volume workflows?

To explore these questions, we conducted this structured, head-to-head comparison between automated AI retouching and human retouching. We selected product photos that required key retouching tasks such as removing unwanted reflections, preserving product label accuracy, refining backgrounds, and maintaining product geometry and processed each image using GPT Image 1, GPT Image 1.5, Nano Banana Pro and CEI's in-house team.

This report summarizes the methodology, results, and key insights from that evaluation. We pay particular attention to the areas where each approach excels and the ways they complement each other in a modern, high-volume production environment.

Methodology

Tasks and Image Categories: We selected representative image sets solely for product photo retouching. For example, product photos included reflective surfaces and detailed labels.

AI Tools: Automated edits were carried out using OpenAI's GPT Image 1, GPT Image 1.5 and Google's Nano Banana Pro AI model, representing one of the latest generations of AI tools capable of handling detailed product imagery.

Human Retouching: A team of professional retouchers at Color Experts International processed the same images using advanced raster or non-destructive editing tools and advanced techniques.

The human retouching workflow included precision clipping paths and masking for background removal, detailed dodge-and-burn adjustments, and meticulous reflection removal and label correction for product shots.

All human edits followed our three-step quality control process to ensure consistency with client specifications.

AI Prompting Approach: Each photo was prompted once to thrice with the AI tools. The highest-quality output from these attempts was selected for scoring. Prompts were structured based on client requirements to ensure consistent evaluation alongside human edits.

Performance Fields: To compare the two workflows, we scored each output across 11 performance fields, including how well soft edges were handled, whether product geometry was preserved, the realism of the shadow and reflection work, retention of image resolution, re-utilization (the editor's ability to work through the images), cutouts, or recessed areas, and the degree of control over background-to-subject transitions.

We also evaluated time-to-completion and overall precision in meeting client-level requirements for clarity, color and lighting, branding accuracy, and product authenticity. We additionally reviewed technical versatility, including compatibility with professional file formats, layer handling, and export/import constraints. Although not scored, these factors significantly shaped reusability and the reliability of the editing workflow. Aggregating all performance fields revealed areas where AI performed adequately and where human retouchers maintained a decisive advantage.

Performance Fields Assessment

Image Quality & Accuracy These fields assess accuracy, detail preservation, and authenticity. They can also influence editing control and the overall reusability of the output.	**Editing Control & Reusability** Fields affecting how well an output can be reused, extended, or reworked	**Process Efficiency** Time, consistency, and meeting client requirements
Keeping Product Authenticity/Shape/Texture	Re-utilization Benefit	Time It Takes
Work On Shadows/Reflection	Working With Product Labels	Precision and Accuracy to Clients Requirement
Image Background	Working With Soft Edges	
Color/Lighting Consistency/Correction	Work On Curved Areas	
Maintain Image Resolution	* Technical Versatility	

Table 1: This framework outlines the 11 performance fields, each scored out of 10 across three categories. [*] Technical versatility is assessed separately, acknowledging its significant effect on reusability and streamlined editing workflows.

Results - 1

Product Photo Retouching

Figure 1: Original Photo

We selected photos that required reflection removal while maintaining clear product details and original label consistency.

Nano Banana Pro performed the highest among the AI tools although its AI scans made the brand details clearer but still showed visible differences from the original product.

Human retouchers excelled at carefully removing and refining reflections, improving textures like fabric or metal, and making sure every detail from logos to shapes matched the client's needs. For a high-stakes campaign, human retouchers deliver polished images that elevate brand trust.

Product Photo Retouching

GPT Image 1

GPT Image 1.5

Nano Banana Pro

Human Retoucher

Download the photos without annotations

Product Photo Retouching

AI retouching tool handled some surface-level corrections quickly but introduced notable compromises.

In our test with a CPG product (Figure 1), Nano Banana Pro preserved much of the background, yet the edits applied to the product itself altered its authenticity (Figure 2).

Figure 2: AI Retoucher (Nano Banana Pro)

AI Prompt: *Do high-end retouching for this product photo. Remove the unwanted reflection. Also maintain clear product details and original label consistency.*

Download the photos with annotations

While it reduced some reflections, it did not fully remove the unwanted glare. The text corrections, although well-intentioned, introduced spelling errors and distortions. Recent findings from OpenAI indicate that their model struggles with dense, small-scale text.[1]

Although the latest image generation models from both Google and OpenAI have improved in handling small text and there is still room for further improvement. Additionally, the brand logo and other product label details such as the various icons showed noticeable inconsistencies.

Product Photo Retouching

In contrast, human retouchers approached the same image with precision and restraint.

They maintained the original background and product angle to preserve the natural perspective, removed unwanted reflections while retaining material realism for a cleaner and distraction-free appearance (Figure 3). The original product label details preserved without introducing errors or typographic distortions.

Figure 3: Human Retoucher

Download the photos with annotations

The result was a store-ready image that met both the technical demands of product photography and the brand's aesthetic standards, demonstrating why, for high-stakes campaigns, human expertise remains unmatched in delivering trustworthy and polished visuals.

Product Photo Retouching

Close-up

AI Retoucher
(Nano Banana Pro)

Human
Retoucher

Product Photo Retouching

Close-up

AI Retoucher
(Nano Banana Pro)

Human
Retoucher

Results - 2

Product Photo Retouching

Figure 4: Original Photo

Product Photo Retouching

When comparing edits on this watch (Figure 4), the contrast between AI and human retouching work is clear right from the start.

The AI tool, Nano Banana Pro, delivered a fast clean-up that looked sleek at first glance. But beneath the polish, it trimmed away some of the watch's original character (e.g. the bezel and dial engravings have lost some of their crisp texture and fine detail.) (Figure 5)

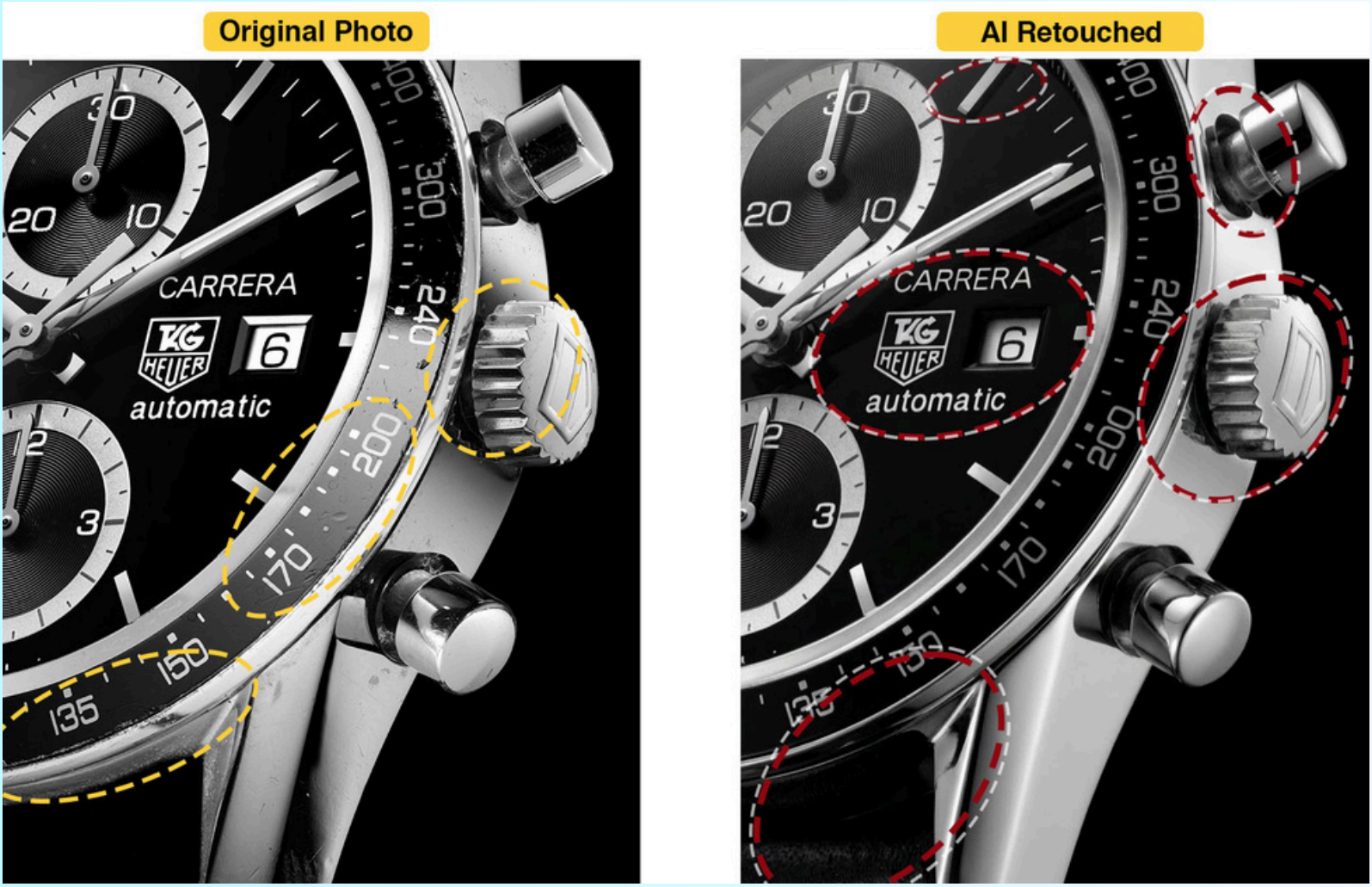


Figure 5: AI Retoucher (Nano Banana Pro)

AI Prompt: Do a high-end retouching. Make sure to remove extra glare, spots and scratches from the watch and dials.

Download the photos with annotations

Nano Banana Pro demonstrates clear improvement over the other models in the test, significantly reducing unwanted reflections and scratches from the watch while also achieving a higher product labeling score. Although a small amount of reflection remains, overall clarity is notably enhanced.

Product Photo Retouching

Whereas, the human retoucher worked with a careful balance of correction and restraint. They cleaned away scratches and glare without sacrificing the micro-textures that make fine watchmaking stand out. (Figure 6)

Engraved numbers were clarified so they remained bold and dimensional.

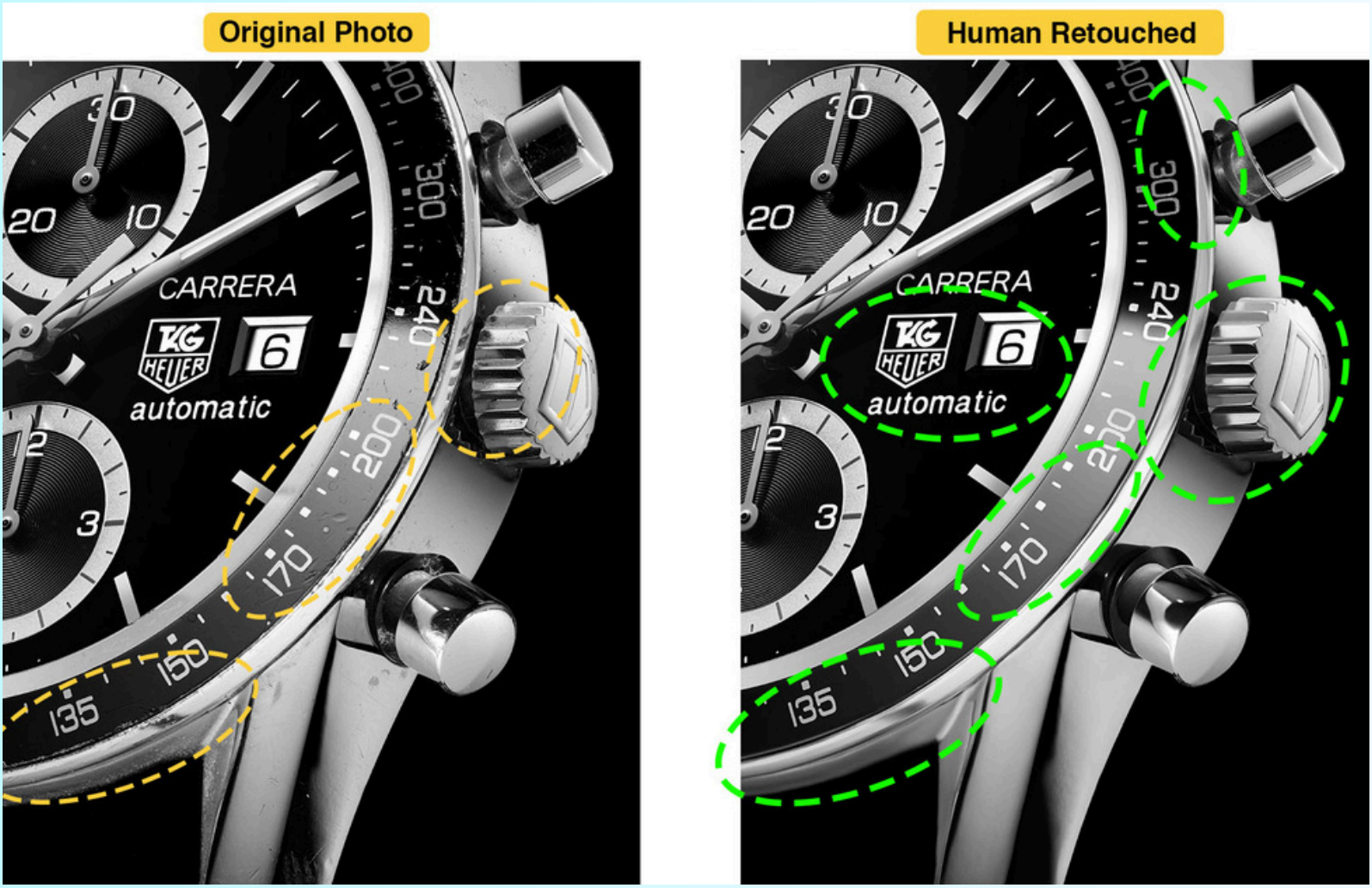


Figure 6: Human Retoucher

Download the photos with annotations

The crown's knurled ridges stayed distinct, and highlights on the pushers were refined rather than flattened. Light was adjusted to maintain the way polished steel naturally plays with its surroundings, giving the image a lifelike gleam instead of an artificial shine.

In the final images, the hand-retouched version feels authentic to the product and brand while meeting the standard of a luxury advertising photo. It shows that for intricate pieces where material quality is part of the story, human expertise remains the surest way to balance clarity and authenticity.

Product Photo Retouching

Download the photos without annotations

Product Photo Retouching

Close-up

AI Retoucher
(Nano Banana Pro)

Human
Retoucher

Product Photo Retouching

Close-up

AI Retoucher
(Nano Banana Pro)

Human
Retoucher

Results 3-5

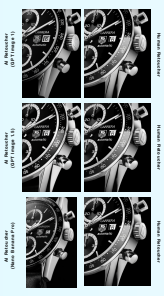
Product Photo Retouching

Accuracy level by		Accuracy level by		Accuracy level by	
AI (GPT Image 1)	□□□□□ 5.3/10	**AI** (GPT Image 1)	□□□ 3.3/10	**AI** (GPT Image 1)	□□□□ 4.7/10
AI (GPT-Image 1.5)	□□□□□□ 6.8/10	**AI** (GPT-Image 1.5)	□□□□ 4.6/10	**AI** (GPT-Image 1.5)	□□□□□ 5.6/10
AI (Nano Banana Pro)	□□□□□□□ 7.0/10	**AI** (Nano Banana Pro)	□□□□□ 5.4/10	**AI** (Nano Banana Pro)	□□□□□□ 6.4/10
Human Retoucher	□□□□□□□□□ 8.9/10	**Human Retoucher**	□□□□□□□□□ 8.9/10	**Human Retoucher**	□□□□□□□□□ 8.9/10
Time to Completion (AI - GPT Image 1)	**2m and 30s**	**Time to Completion (AI - GPT Image 1)**	**2m and 12s**	**Time to Completion (AI - GPT Image 1)**	**2m and 52s**
Time to Completion (AI - GPT Image 1.5)	**37s**	**Time to Completion (AI - GPT Image 1.5)**	**1m and 20s**	**Time to Completion (AI - GPT Image 1.5)**	**51s**
Time to Completion (AI - Nano Banana Pro)	**19s**	**Time to Completion (AI - Nano Banana Pro)**	**29s**	**Time to Completion (AI - Nano Banana Pro)**	**25s**
Time to Completion (Human)	**20-25m**	**Time to Completion (Human)**	**10-15m**	**Time to Completion (Human)**	**50-60m**
Download Image		Download Image		Download Image	

Table 2: From Left to Right - Cosmetic Product, Ghost Mannequin & Luxury Watch Product Photo. The full scoring breakdown can be found in the appendix.

AI Prompt: Remove the background and replace with a white color. Create realistic laying shadow of the product. And retouch the product to remove unwanted reflection and refine the product labels.

AI Prompt: Here's the garment parts. Do ghost mannequin effect retouching. And replace the background with a white background.



AI Prompt: Do a high-end retouching. Make sure to remove extra glare, spots and scratches from the watch and dials.

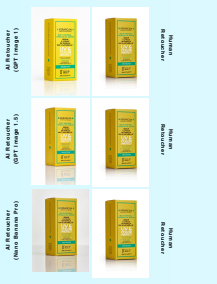
Results 6-8

Product Photo Retouching

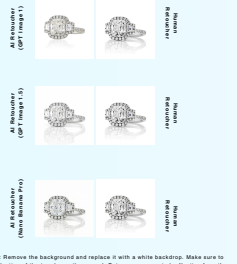
Accuracy level by		Accuracy level by		Accuracy level by	
AI (GPT Image 1)	□□□ 3.7/10	**AI** (GPT Image 1)	□□□□ 4.3/10	**AI** (GPT Image 1)	□□□ 3.6/10
AI (GPT-Image 1.5)	□□□□□□ 6.5/10	**AI** (GPT-Image 1.5)	□□□□ 4.7/10	**AI** (GPT-Image 1.5)	□□□□□ 5.6/10
AI (Nano Banana Pro)	□□□□□ 5.7/10	**AI** (Nano Banana Pro)	□□□□□ 5.4/10	**AI** (Nano Banana Pro)	□□□□□□ 6.3/10
Human Retoucher	□□□□□□□□□ 8.9/10	**Human Retoucher**	□□□□□□□□ 8.8/10	**Human Retoucher**	□□□□□□□□ 8.8/10
Time to Completion (AI - GPT Image 1)	**3m and 4s**	**Time to Completion (AI - GPT Image 1)**	**2m and 12s**	**Time to Completion (AI - GPT Image 1)**	**1m and 34s**
Time to Completion (AI - GPT Image 1.5)	**1m and 17s**	**Time to Completion (AI - GPT Image 1.5)**	**1m and 18s**	**Time to Completion (AI - GPT Image 1.5)**	**44s**
Time to Completion (AI - Nano Banana Pro)	**27s**	**Time to Completion (AI - Nano Banana Pro)**	**23s**	**Time to Completion (AI - Nano Banana Pro)**	**25s**
Time to Completion (Human)	**50-60m**	**Time to Completion (Human)**	**8-10m**	**Time to Completion (Human)**	**30-35m**
Download Image		Download Image		Download Image	

Table 3: From Left to Right - Food & Beverages, Hair and Cosmetic Care Product & Jewelry Product Photo. The full scoring breakdown can be found in the appendix.

AI Prompt: Do high-end retouching for this product photo. Remove the unwanted reflections. And also refine the product labels. Also don't change the image background.



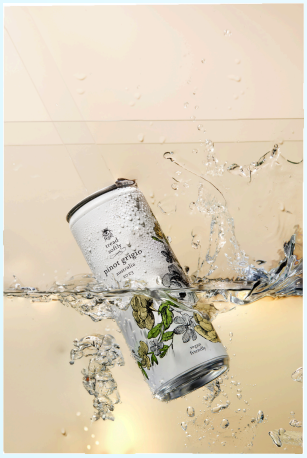
AI Prompt: Replace the image background with a white background. Remove unwanted objects. But make sure you keep the reflection of the product. Also retouch the product packaging where it is needed.



AI Prompt: Remove the background and replace it with a white backdrop. Make sure to keep the reflection of the jewelry on the ground. But remove unwanted reflection from the jewelry. And do high-end jewelry retouching.

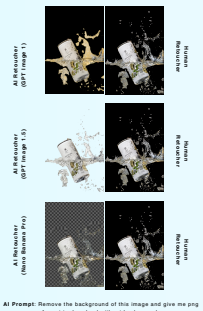
Results 9-11

Product Photo Retouching



Accuracy level by		Accuracy level by		Accuracy level by	
AI (GPT Image 1)	□□□□ 3.9/10	**AI** (GPT Image 1)	□□□□□ 4.9/10	**AI** (GPT Image 1)	□□ 2.6/10
AI (GPT-Image 1.5)	□□□□□□ 5.9/10	**AI** (GPT-Image 1.5)	□□□□□□ 6.1/10	**AI** (GPT-Image 1.5)	□□ 2.7/10
AI (Nano Banana Pro)	□□□□□ 5.7/10	**AI** (Nano Banana Pro)	□□□□□□ 6.5/10	**AI** (Nano Banana Pro)	□□□□□ 5.7/10
Human Retoucher	□□□□□□□□ 8.8/10	**Human Retoucher**	□□□□□□□□□ 8.9/10	**Human Retoucher**	□□□□□□□□□ 8.9/10
Time to Completion (AI - GPT Image 1)	**1m and 38s**	**Time to Completion (AI - GPT Image 1)**	**2m and 38s**	**Time to Completion (AI - GPT Image 1)**	**2m and 42s**
Time to Completion (AI - GPT Image 1.5)	**39s**	**Time to Completion (AI - GPT Image 1.5)**	**1m and 16s**	**Time to Completion (AI - GPT Image 1.5)**	**1m and 15s**
Time to Completion (AI - Nano Banana Pro)	**28s**	**Time to Completion (AI - Nano Banana Pro)**	**26s**	**Time to Completion (AI - Nano Banana Pro)**	**21s**
Time to Completion (Human)	**10-15m**	**Time to Completion (Human)**	**10-15m**	**Time to Completion (Human)**	**45-50m**
Download Image		Download Image		Download Image	

Table 4: From Left to Right - Ghost Mannequin 2, CPG Product & Water Splash Product Photo. The full scoring breakdown can be found in the appendix.



Key Findings

Our evaluation of product photo retouching revealed a distinct split in strengths between AI and human retouchers in the areas of their speed, quality, consistency, and technical versatility:

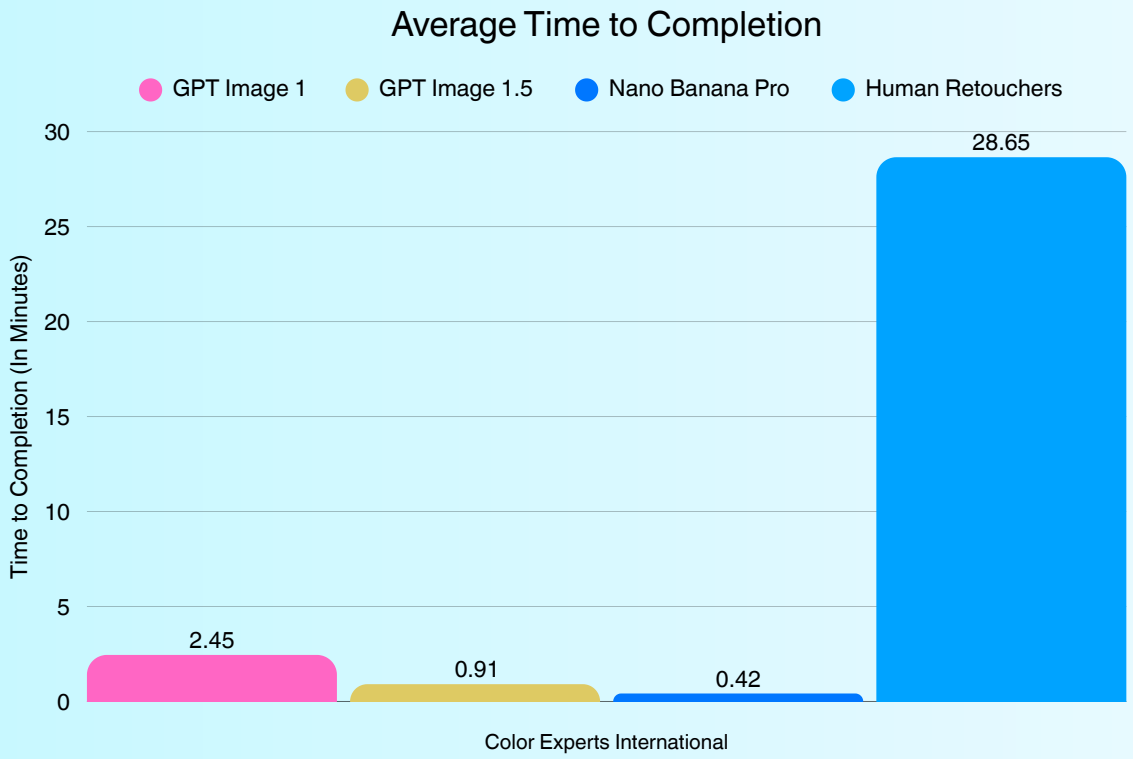


Figure 7: Average time to completion for GPT Image 1, GPT Image 1.5, Nano Banana Pro and human retouchers.

Speed: OpenAI's GPT Image 1.5 processed straightforward product images in an average of **54.5 seconds** (0.91 minutes), making it approximately **2.7× faster** than its previous multimodal version, GPT-4o or Image Model GPT Image 1. Google's Nano Banana Pro led this test, completing images in an average of **25.4 seconds**. In comparison, human retouchers required an average of **28 minutes and 39 seconds** (Figure 7). Nano Banana Pro's quick turnaround is valuable for large batches of simple e-commerce photos or catalog updates.

Key Findings

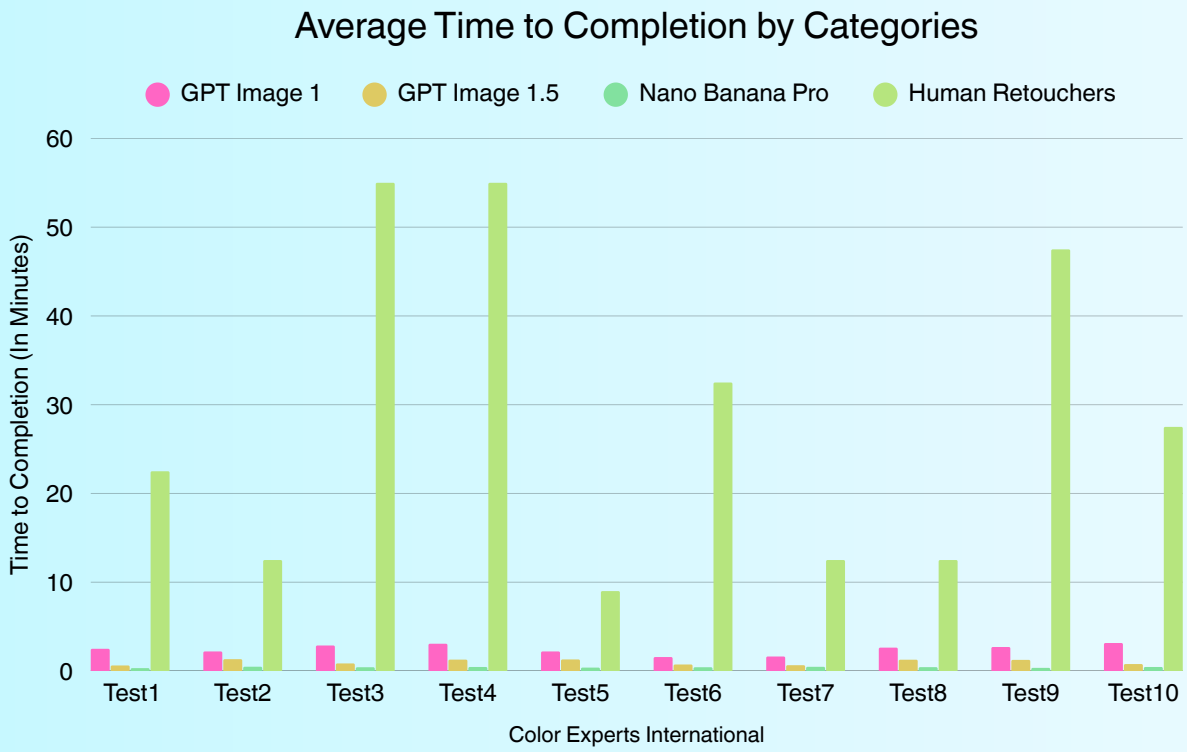


Figure 8: Average time to completion for GPT Image 1, GPT Image 1.5, Nano Banana Pro and human retouchers across multiple product photo categories.

Test1 = Cosmetic Product Photo
Test2 = Ghost Mannequin Photo 1
Test3 = Luxury Watch Photo
Test4 = Hair Care Product Photo
Test5 = Hair and Cosmetic Care Product Photo
Test6 = Jewelry Product Photo
Test7 = Ghost Mannequin Photo 2
Test8 = CPG Photo
Test9 = Water Splash Product Photo
Test10 = Food & Beverages Photo

Download All the Test Visuals

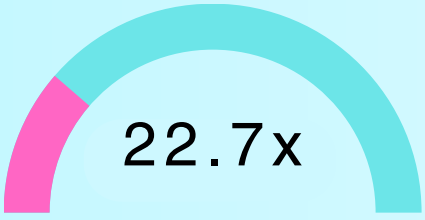


Figure 9: AI retouchers are on average 22.7 times faster than a human retoucher at retouching the given product photos.

Across all ten product photo retouching tests, Nano Banana Pro completed retouching 67.6x faster than human retouchers (Figure 9), finishing most images in under 25.4 seconds while human workflows ranged from 9 to 55 minutes depending on complexity (Figure 8). This makes AI roughly 22.7 times faster on average. However, human retouchers can still handle multiple images in a rush through express delivery, ensuring quality even under tight deadlines.

Key Findings

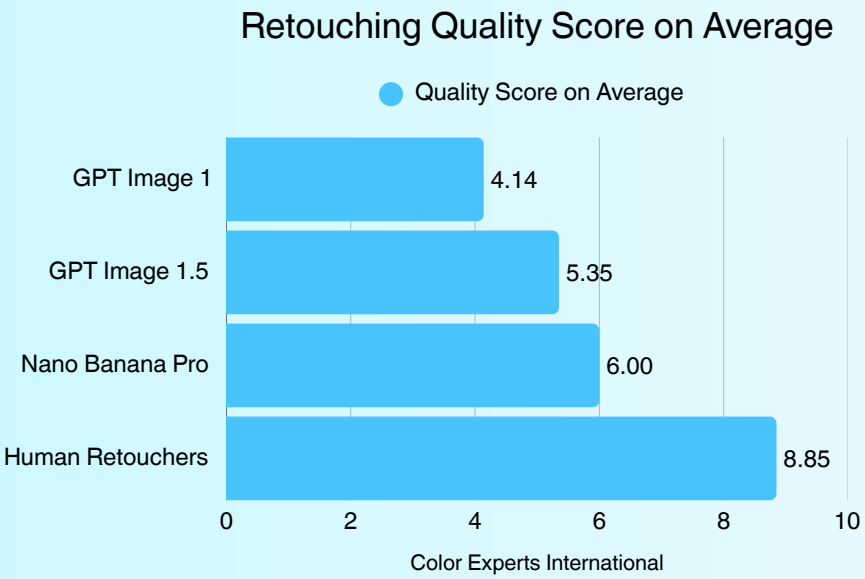


Figure 10: AI retouchers quality score is on average 41.7% lower than a human retoucher's quality score.

Quality: Human retouchers produced images that were visually authentic and brand-ready. They preserved true product geometry, accurate label typography, and natural surface textures such as metal, glass, or fabric.

AI often softened or warped fine lettering, introduced synthetic highlights, or flattened reflections, which reduced realism. A recent study from the University of Melbourne reflects an almost identical pattern: 66% of users rely on AI outputs without verification, and 56% say this leads to errors.[2]

Overall, AI image models achieved an average quality score of 5.16 out of 10, representing a 41.7% lower quality than human retouchers. GPT Image 1 showed a 53.2% quality gap relative to human performance, despite previously ranking among the stronger multimodal image-generation models. OpenAI's newest image model marks a significant step forward, improving performance by 29.23% and narrowing the gap to 39.55%. Among AI tools, Google's Nano Banana Pro performed best, achieving the highest quality score while still trailing human retouchers by 32.2%.

Key Findings

AI tools demonstrated strong performance in background transitions and curved areas, and its speed advantage is evident. Although some outputs showed reusability potential, they still required manual correction to meet production standards.

Another research from BetterUp Labs and Stanford shows that AI-related error resolution can take an average of two hours.[3] This is why we measure reusability scores closely and apply a hybrid workflow only when the score is acceptable; otherwise, the file moves to a fully manual process to ensure a publication-ready result.

Human retouching at CEI follows a structured, 3-step quality control process designed to maintain accuracy and consistency. This process also remains essential when evaluating AI-assisted outputs, as an inherent quality control mechanism is currently absent in AI tools for these tasks.

Figure 11: Where AI performs better.

Key Findings

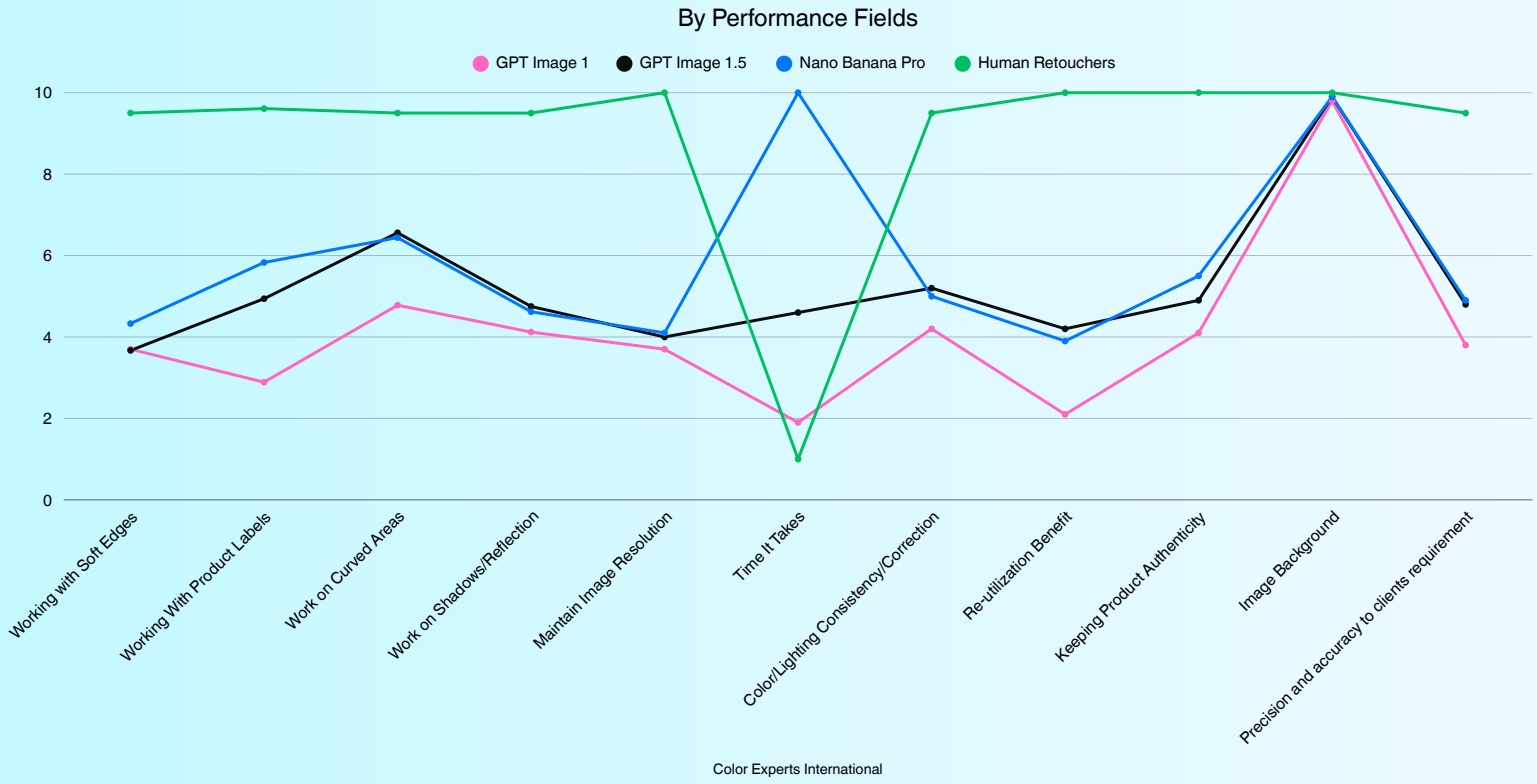


Figure 12: AI tools demonstrated a broad performance range, from 2 to 10, which reflects both its emerging strengths and the space for continued advancement. Human retouchers, in contrast, maintained a highly consistent standard, achieving average scores between 9.5 and 10 in most of the areas.

Consistency: Across 11 performance fields, human retouchers delivered uniform and predictable results. They maintained precise standards for every image, ensuring consistent color, tone, and style throughout an entire campaign.

AI, while capable of adding creative variation, also introduced inconsistencies such as uneven lighting or shifts in texture sharpness. For brands that rely on a stable, repeatable visual identity across many assets, the human approach continues to offer the most dependable outcome.

Key Findings

Technical Versatility: AI tools performed well on standard formats, but specialized formats and larger image files revealed their current limitations.[4]

GPT Image 1.5 correctly interprets input images when they are in supported formats. However, for unsupported formats like RAW or high-resolution TIFF, the model may fail to recognize the image, effectively skipping it and generating content based solely on the prompt.

For example, when asked to remove the background from a RAW image of a slingback heel, GPT Image 1.5 produced a white-background image of a stainless steel water bottle (Figure 14). When prompted again, describing the product as a slingback heel, it generated a slingback heel that matched the description but not the original product. These cases illustrate how the model can overlook the input image in unsupported formats, highlighting areas where AI still requires further development.

Nano Banana Pro currently supports only a limited set of file formats and does not include RAW files. In contrast, human retouchers effortlessly handled all professional formats and sizes (Figure 15). This adaptability means human retouchers can meet nearly any technical requirement or unusual file type, underscoring the capability to handle the diverse needs of photographers and studios.

Figure 13: Input photo (.crt format) for removing the background and replace it with a white backdrop.

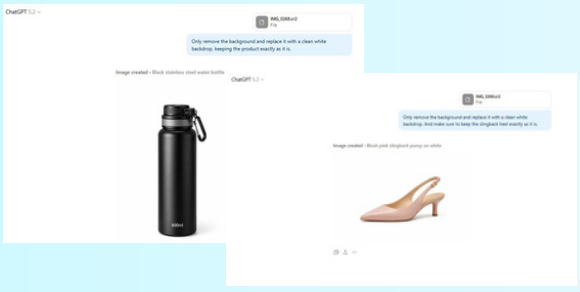


Figure 14: GPT Image 1.5 results.

Figure 15: Human retouched.

Key Findings

Hybrid Retouching: When AI and Human Workflows Align

Our findings show that AI tools, while effective for speed and surface-level corrections, often produced outputs with low reusability scores. In many cases, distortions in product geometry, incorrect text reconstruction, or non-recoverable artifacts made the AI output unsuitable as a foundation for hybrid retouching.

When the reusability score falls below the acceptable threshold, a hybrid workflow becomes impractical, and the image must be retouched fully by hand.

Because of this limitation, we explored the possibility of hybrid editing using other AI tools designed specifically for image-consistent refinement. These tools, which offer more control over pixel-level adjustments and better preservation of product structure, allowed us to test whether hybrid workflows could become more viable under different AI systems. In these trials, the hybrid process became more feasible. The AI output preserved geometry more reliably, allowing human retouchers to focus on the remaining details.

Figure 16: Original Photo

Key Findings

Hybrid Retouching: When AI and Human Workflows Align

This suggests that the hybrid workflow is not solely dependent on the concept of “AI + human,” but on the specific capabilities of the AI model used. AI tools provide strong speed performance but often lack the structural reliability needed for reusable intermediate outputs. In contrast, tools with stronger consistency controls and compatibility with non-destructive editing workflows may better support hybrid editing, though their performance also varies across image types.

As AI models continue to evolve, the practicality of hybrid workflows will likely shift. Our findings reflect the current state of available tools and underscore the importance of evaluating reusability scores before integrating AI into production pipelines (Figure 17).

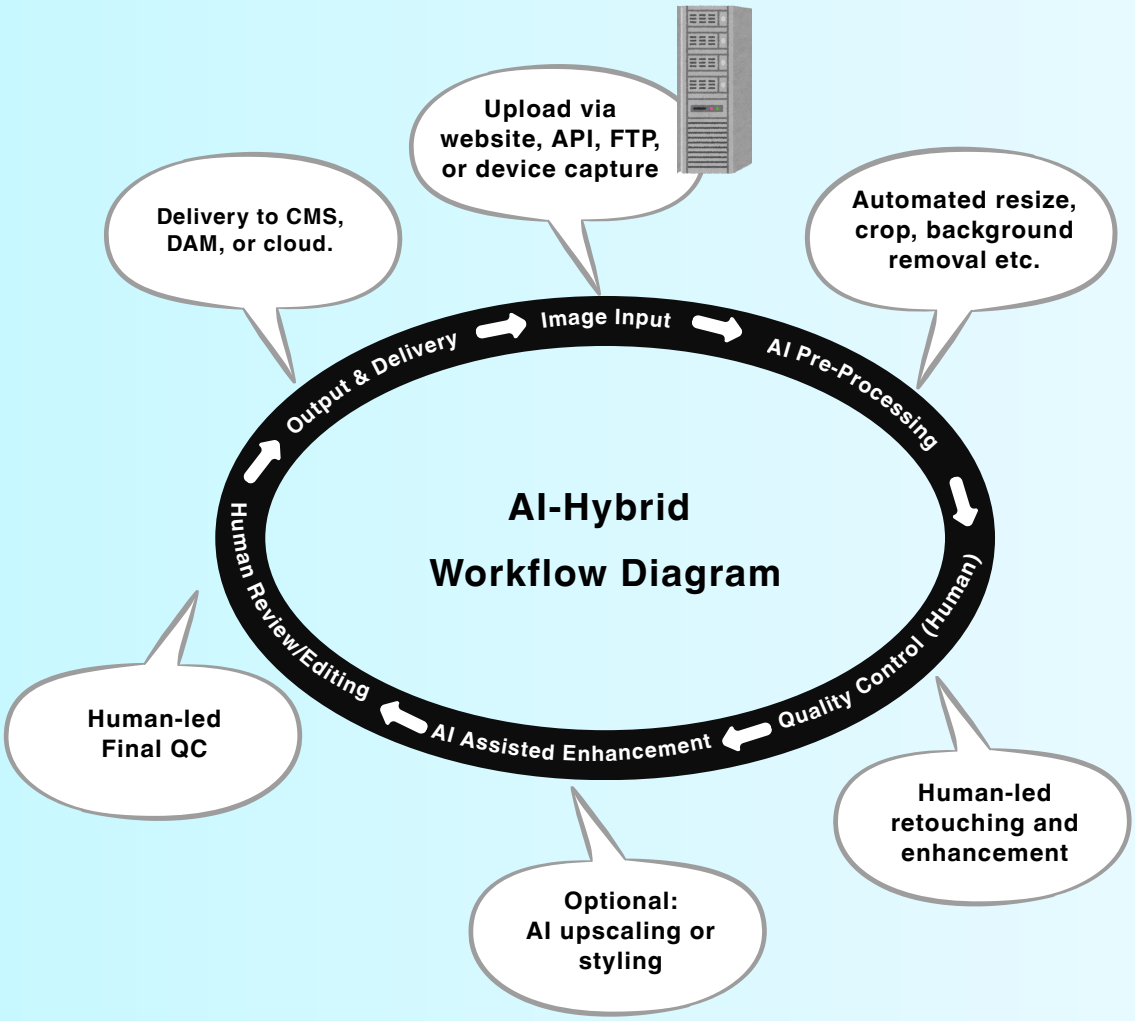


Figure 17: AI-Hybrid Workflow Diagram

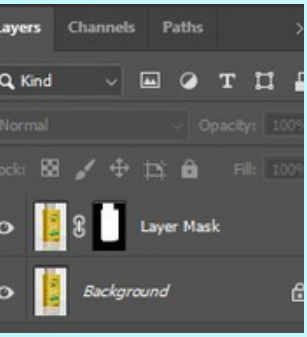
Key Findings

Hybrid Retouching: When AI and Human Workflows Align

Removing the background with Adobe Photoshop's latest cloud auto background removal tool.

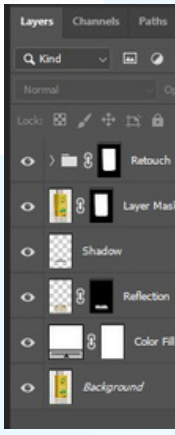
The remaining edits were completed manually by human retouchers, including spot and scratch removal, realistic reflection and shadow creation, refinement of the AI-generated version, and replacement of the background with white.

AI Retouching + Human Retouching



AI Output

with the layer mask



Hybrid Output

with all the layers

Figure 18: AI and hybrid output.

Key Findings

Hybrid Retouching: When AI and Human Workflows Align

Figure 19: Time to completion for hybrid retouching, and human retouchers to retouch this particular hair and cosmetic care product photo (as shown in Figure 16). Using the hybrid workflow, human retouchers finished the edits 28.2% faster.

In one of our test cases involving a hair and cosmetic care product (Figure 16), we compared completion times across two workflows: Hybrid retouching, and full human retouching.

The hybrid workflow, applied using a more consistency-focused AI tool, reduced the overall retouching time to 7.18 minutes (Figure 19) by shortening the time needed to draw the clipping path and separate the product from the background (Figure 18). Although the AI removed the background, the remaining edits were completed manually by human retouchers, including spot and scratch removal, realistic reflection and shadow creation, refinement of the AI-generated output, and replacement of the background with white. A fully manual workflow required 10 minutes, reflecting the time needed to hand-draw the clipping path, refine shadows and reflections, adjust labels, and preserve product geometry from scratch.

This comparison illustrates a key insight from our study: hybrid retouching can shorten production time when the initial AI output is structurally reliable, but this depends heavily on the tool's ability to maintain product accuracy. In the hybrid approach, when the AI-generated result keeps the product consistent with the original, it meets our reusability threshold and moves into additional manual retouching to achieve the final result (Figure 18). When the AI output is not consistent enough for hybrid integration, as observed in some instances with AI tools, we complete the work manually to craft a polished, production-ready outcome.

Key Findings

Quick Feature Overview

✅	Fully supports or performs the task well
⚠️	Can assist or partially support, but needs manual input.
❌	Does not support or performs poorly.

Feature	AI Tools	Human Retouchers
Fast Processing	✅	⚠️
High-Quality Results	⚠️	✅
Natural Look	❌	✅
Consistent Output	❌	✅
Handles RAW Files	❌	✅
Layered File Export	❌	✅
Custom Edits	⚠️	✅
Ready for Print/Web	⚠️	✅

Discussion

Our findings highlight that AI and human retouching play complementary roles. AI's speed and automation can greatly accelerate basic edits, while human retouchers ensure the final image meets world-class quality and brand standards.

"At Color Experts International, we are actively integrating new AI systems into our workflow. And this hybrid approach will allow us to optimize both quality and turnaround time, giving our customers the best of both worlds and enabling them to scale their visual content production seamlessly and affordably," said Soel Molla, the chairperson and CEO of Color Experts International, Inc.

Color Experts International's hands-on experience confirms that human insight is still irreplaceable. Whether it's capturing a subject's personality or ensuring a product photo conveys trust, the skilled human eye adds the emotional and contextual understanding that current AI lacks. However, AI becomes an amplifier, speeding up preliminary edits and freeing human talent to focus on high-value refinement.

In summary, human retouchers win on quality and precision, while AI wins on speed. But ultimately, it's not about who wins because AI is unlocking new possibilities across creative workflows and beyond, making it essential to harness the new era of technology into our daily workflows.

Limitations

AI Tool Maturity: Current AI models have known limitations. They can misinterpret visual context (e.g. warping product shapes) and struggle with fine details. They also cannot yet guarantee client-ready results without human review. As AI technology evolves, these limitations may diminish, but our study reflects the current state of available tools.

Image Selection Scope: We tested a specific set of product photos for this study. And the results may vary on other types of images (e.g. complex illustrations, extreme low-light photos). Additionally, our products were commercial shots. AI performance might differ on other genres.

Prompt Variability: AI outputs can change significantly based on prompt phrasing, order of instructions, or level of detail. While we used carefully structured prompts based on client requirements and selected the best result for each image, different prompt strategies might produce different outcomes. This variability is an important consideration when evaluating AI for consistent production workflows.

Subjective Scoring: Although our scoring was based on structured evaluation criteria across 11 performance fields, aspects of quality assessment remain subjective. Different analysts might weigh specific visual attributes differently, which could influence scoring outcomes.

Scalability and Throughput: While human retouchers delivered higher quality, they required far more time per image. In real-world high-volume operations, purely manual workflows can become bottlenecks. This underscores why AI can be good addition for initial passes, accepting that final approval by human retouchers remains necessary.

Tool Coverage: We evaluated a representative sample of AI tools (OpenAI's GPT Image 1, GPT Image 1.5 and Google's Nano Banana Pro) but did not exhaust every available solution. New AI services or future updates could alter the balance. Likewise, CEI's human retouching workflow reflects our proprietary techniques and standards; other studios or sources might report different results depending on expertise and processes.

Conclusion

In this head-to-head comparison, human retouchers continue to lead in quality, consistency, and versatility, while AI tools offer remarkable speed and efficiency for routine edits. Human retouchers particularly excel at preserving natural texture, ensuring brand consistency, and handling challenging images, such as those with complex backgrounds or professional file formats. At the same time, selecting the right AI model or tool for the post-production workflow can further streamline processes and help serve clients faster.

Moving forward, CEI is adopting hybrid workflows that combine the two: employing AI to accelerate low-complexity tasks and dedicating human talent for more complex tasks, refinements, and creative finishing touches. This balanced strategy delivers top-tier imagery at scale, optimizing both turnaround time and the high quality that our clients expect.

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About Color Experts International

Founded by Dr. R.K. Molla and led by CEO Soel Molla, Color Experts International, Inc. has been a global leader in photography and videography post-production, graphic design, and multimedia services for over 30 years and has delivered more than 8 million edited images. With offices in the USA, Bangladesh, and UAE, and a team of 250+ skilled designers, CEI provides high-end retouching, video editing, and 3D modeling services supported by a 3-step quality control process, hybrid workflows, dedicated project managers, and 24/7 global support.

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Appendix

Scoring Breakdown for GPT Image 1, GPT Image 1.5, Nano Banana Pro and human retouchers across diverse categories of product photography, including cosmetics, hair care products, luxury goods, high-gloss materials, detailed labels, and products with complex textures.

Table 5

GPT Image 1 Results

Performance Fields	Cosmetic Product	Ghost Mannequin	Luxury Watch	Hair Care Product	Hair and Cosmetic Care Product	Jewelry Product	Ghost Mannequin 2	CPG Product	Water Splash Product	Food & Beverages
Working with Soft Edges	n/a	4	n/a	4	n/a	n/a	n/a	n/a	3	n/a
Working With Product Labels	9	0	4	4	4	n/a	0	4	0	1
Work on Curved Areas	8	4	4	2	n/a	4	5	6	2	8
Work on Shadows/Reflection	4	n/a	6	2	4	3	n/a	8	2	4
Maintain Image Resolution	4	4	4	2	4	3	4	6	2	4
Time It Takes	1	2	2	2	2	3	3	2	1	1
Color/Lighting Consistency/Correction	4	3	6	4	5	3	2	3	4	8
Re-utilization benefit	3	2	2	4	2	0	3	2	0	3
Keeping Product Authenticity	5	2	5	4	4	3	4	5	3	6
Image Background	10	10	10	9	10	10	10	9	10	10
Precision and accuracy to clients requirement	5	2	4	4	4	3	4	4	2	6
Score	5.3	3.3	4.7	3.7	4.3	3.6	3.9	4.9	2.6	5.1

Appendix

Table 6

GPT Image 1.5 Results

Performance Fields	Cosmetic Product	Ghost Mannequin	Luxury Watch	Hair Care Product	Hair and Cosmetic Care Product	Jewelry Product	Ghost Mannequin 2	CPG Product	Water Splash Product	Food & Beverages
Working with Soft Edges	n/a	3	n/a	6	n/a	n/a	n/a	n/a	2	n/a
Working With Product Labels	9.5	4	7	8	4	n/a	3	5	0	4
Work on Curved Areas	7	5	6	8	n/a	6	8	9	2	8
Work on Shadows/Reflection	5	n/a	4	7	4	5	n/a	8	2	3
Maintain Image Resolution	4	4	4	4	4	4	4	6	2	4
Time It Takes	5	4	5	4	3	6	7	3	3	6
Color/Lighting Consistency/Correction	6	6	5	5	6	5	6	5	4	4
Re-utilization benefit	8	3	5	7	3	4	5	4	0	3
Keeping Product Authenticity	7	3	5	6	4	5	5	6	3	5
Image Background	10	10	10	10	10	10	10	9	10	10
Precision and accuracy to clients requirement	6	4	5	7	4	5	5	6	2	4
Score	6.8	4.6	5.6	6.5	4.7	5.6	5.9	6.1	2.7	5.1

Appendix

Table 7

Nano Banana Pro Results

Performance Fields	Cosmetic Product	Ghost Mannequin	Luxury Watch	Hair Care Product	Hair and Cosmetic Care Product	Jewelry Product	Ghost Mannequin 2	CPG Product	Water Splash Product	Food & Beverages
Working with Soft Edges	n/a	4	n/a	4	n/a	n/a	n/a	n/a	5	n/a
Working With Product Labels	9.5	5	8	8	4	n/a	3	5	6	4
Work on Curved Areas	8	5	5	4	n/a	8	4	9	7	8
Work on Shadows/Reflection	5	n/a	4	5	3	5	n/a	7	4	4
Maintain Image Resolution	4	4	4	2	4	4	5	6	4	4
Time It Takes	10	10	10	10	10	10	10	10	10	10
Color/Lighting Consistency/Correction	5	6	5	5	5	6	6	4	4	4
Re-utilization benefit	5	3	6	4	3	4	4	4	3	3
Keeping Product Authenticity	7	3	6	6	5	5	5	6	6	6
Image Background	10	10	10	10	10	10	10	9	10	10
Precision and accuracy to clients requirement	6	4	6	5	5	5	4	5	4	5
Score	7	5.4	6.4	5.7	5.4	6.3	5.7	6.5	5.7	5.8

Appendix

Table 8

Human Retoucher Results

Performance Fields	Cosmetic Product	Ghost Mannequin	Luxury Watch	Hair Care Product	Hair and Cosmetic Care Product	Jewelry Product	Ghost Mannequin 2	CPG Product	Water Splash Product	Food & Beverages
Working with Soft Edges	n/a	9.5	n/a	9.5	n/a	n/a	n/a	n/a	9.5	n/a
Working With Product Labels	9.5	9.5	9.5	9.5	10	n/a	9.5	10	9.5	9.5
Work on Curved Areas	9.5	9.5	9.5	9.5	n/a	9.5	9.5	9.5	9.5	9.5
Work on Shadows/Reflection	9.5	n/a	9.5	9.5	9.5	9.5	n/a	9.5	9.5	9.5
Maintain Image Resolution	10	10	10	10	10	10	10	10	10	10
Time It Takes	1	1	1	1	1	1	1	1	1	1
Color/Lighting Consistency/Correction	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Re-utilization benefit	10	10	10	10	10	10	10	10	10	10
Keeping Product Authenticity	10	10	10	10	10	10	10	10	10	10
Image Background	10	10	10	10	10	10	10	10	10	10
Precision and accuracy to clients requirement	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Score	8.9	8.9	8.9	8.9	8.8	8.8	8.8	8.9	8.9	8.9