

CAPA's Judges Generative Artificial Intelligence (Gen-AI) Clues

Introduction

To maintain the integrity of our photographic competitions, it is crucial that our pre-screening committee members and judges possess a general understanding of artificial intelligence (AI) and its applications in image creation and manipulation. This knowledge will enable each judge to recognize AI-generated or AI-enhanced images and identify the telltale signs of such alterations.

As AI technology rapidly evolves, we are committed to keeping our judges informed about the latest developments in generative AI (Gen-AI) and its impact on image manipulation and enhancement. To this end, we are providing this document to all CAPA judges prior to the commencement of each competition they will be adjudicating.

While we do not expect our judges to become AI detection experts, we strongly encourage them to familiarize themselves with this technology and remain vigilant about its potential inclusion in submitted images. Some key areas to be aware of include:

- a. Inconsistencies in image quality and resolution
- b. Unnatural blending of elements or textures
- c. Peculiarities in lighting, shadows, or reflections
- d. Unusual or physically impossible details

We recommend that judges approach each image with a critical eye, considering both its artistic merit and its adherence to competition rules regarding image manipulation.

If a judge suspects the use of AI in an image that violates competition guidelines, we ask that respective judge to advise the Competition Coordinator of any suspicious image. The image then will be analyzed and the results will be reported back to each respective judging team members.

Our primary goal is to uphold the conditions and specifications of our competitions, ensuring a fair and transparent judging process for all participants. By staying informed about AI technology and its potential impacts, our judges play a crucial role in maintaining the integrity and credibility of CAPA competitions.

We appreciate your dedication to this evolving aspect of photography and welcome any questions or concerns you may have regarding AI in our competitions.

Background

The following two images were AI-generated and submitted into the noted competitions. Judges awarded each image a 1st place award.

2022 Colorado State Fair – 1st Place Digital Art category



Jason Allen enter his image entitled "Théâtre d'Opéra Spatial" into the 2022 Colorado State Fair.

Reportedly, Jason Allen clarified to the judging panel that his submission was created using AI-generated technology. For this competition, the judges were advised that the image was Gen-AI created but permitted the image to remain in the competition because they had no idea about this technology.

Jason remained unapologetic, emphasizing that he strictly adhered to the competition's rules. The judges, lacking awareness of what constituted an AI-generated image, ultimately awarded Jason 1st place in the Digital Art category of this competition.

2023 World Sony World Open Competition – 1st Place Creative



Boris Eldagsen entered his image “The Electrician” into the 2023 Sony World Open Competition.

Upon being informed of the 1st Place Award, Boris Eldagsen declined it, revealing that his image was not an authentic photograph but rather an AI text-to-image generated creation. He openly admitted to utilizing AI in his submission, expressing the intention to prompt the photographic community to embrace AI images as a distinct competition category.

In response to this revelation, the Sony Open Competition modified its rules to prohibit the submission of AI-generated images. Subsequently, a majority of the world’s photographic societies and associations have also enforced bans on the inclusion of AI-generated images in their respective competitions.

General

The rapid advancement in Gen-AI technology has resulted in the development of incredibly realistic synthetic images, presenting a challenge for photographic organizations in distinguishing them from authentic photographic-based images.

In the Fall of 2023, we established ‘guard-rails’ designed to address potential submission of AI-generated text-to-image and photos enhanced with AI-generative technology:

1. *For the purposes of our competitions, a photographic image is defined “as being a captured image on a light-sensitive device (e.g. film camera, digital camera, smartphone, tablet, etc...) and recorded on film or in a digital format.”*
2. *An artificial intelligence (AI) generated image is not deemed to be a photographic image because it was created from scratch by the AI system and contains no image captured by the photographer. Therefore, this type of image will not be accepted into our competitions.*
3. *Use of AI features contained within a post processing application (e.g. masking, sharpening, de-noise, enlarging, etc...) are permitted.*
4. *Images that involve the use of AI generative techniques like **in-painting** (where AI fills in generated elements not captured by the photographer or where AI removes elements from a photograph and replaces these elements with AI generated element) or **out-painting** (where the AI extends the image beyond its original boundaries by generating new elements) are not permitted for submission into CAPA competitions, regardless of whether text prompts were used or not.*
5. *Potential winning images may be required to have supporting images (sky, texture, etc...which must have been captured by the submitting photographer) submitted on request by the Director of Competitions.*

Furthermore, the Editing Criteria for all our competitions will be revised to include the following:

The Director of Competitions has the right to request and receive the original un-retouched JPEG or RAW file for a potential winning image in a competition for the purposes of verifying competition compliance.

Upon notification that their image is a potential winning entry, photographers may be required by the Director of Competitions to submit all original images, such as unretouched JPG or RAW files, along with other image files that were integrated into the submitted image.

Failure to comply with the Director’s request for image files will result in the potential winning image being withdrawn from the competition and the competition results will be re-sorted.

These requirements aim to ensure transparency and verify adherence to the competition’s specifications regarding image authenticity and compliance with the editing criteria.

For the purpose of our competitions, the Gen-AI created images or photographs enhanced with Gen-AI features are contained in the following subjects and are grouped into sections:

- Gen-AI text-to-image Creations – page 5
- Hyper-Realistic Gen-AI Images – page 6
- Gen-AI Text-to-Image Creations - Common Characteristics – page 8
- Abstract – Altered Reality – Fire Art – page 9
- Gen-AI Imperfections – Text – page 12
- Gen-AI Imperfections – Fine Details – page 14
- Gen-AI Imperfections – Landscapes – page 15
- Gen-AI Imperfections – Human Form – page 17

Gen-AI text-to-image Creations

Gen-AI text-to-image is an artificial system where you provide written instructions and it produces an image based on that text.

For example, if you type into the Gen-AI prompt “a cat on a chesterfield,” the application will create an image exactly that – without any human drawing or manipulating the image creation.



Some Gen-AI text-to-image creations contain imperfections or commonly referred to as AI hallucinations.

This occurs when the Gen-AI system generating visual elements were not explicitly contained in the text prompt or the Gen-AI's system down not contain the details within its dataset.

Figure 1 – Gen-AI creation of cat sitting a chesterfield (Image created by Sheldon Boles using Dream Studio AI)

Humans usually excel at identifying errors or logical inconsistencies in images due to their innate ability to recognize visual patterns. However, the performance of humans is quite variable and depends on personal experience and diligence and cannot be relied upon in many instances in the recognition of AI images.

As technology progresses, relying on subjective image analyses to identify AI clues will become progressively even more difficult to differentiate AI-generated images from photographs.

Gen-AI text-to-image generator website continue to enhance their image creation every three or four months.

Hyper-Realistic Gen-AI Images

Many Gen-AI images appear to be hyper-realistic and well beyond an average image captured image. Figures 2, 3, 4, and 5 are examples of hyper-realistic Gen-AI images.



Figure 2 – Gen-AI creation of a luxurious European estate. (Image generated by Dr. Bob Ito using Midjourney AI).



Figure 3 – Gen-AI creation of a treed leopard. (Image generated by Sheldon Boles using Dream Studio).



Figure 4 – Gen-AI creation of wolf at rest. (Image generated by Sheldon Boles using Dream Studio AI).



Figure 5 – Gen-AI creation of of still life fruit. (Image generated by Sheldon Boles using Leonardo AI).

Gen-AI Text-to-Image Creations - Common Characteristics

Many Gen-AI text-to-images appear too realistic or beyond traditional post processing. Hint for judges is ***“to use your eyes, ears, and intuition in assessing an image presented to you.”***

All Gen-AI text-to-images lack embedded camera metadata or location information.

CAPA employs an online AI detection tool to recognize AI-created images. Our extensive evaluation indicates this tool achieves 98% accuracy in identifying such artificially generated visuals.

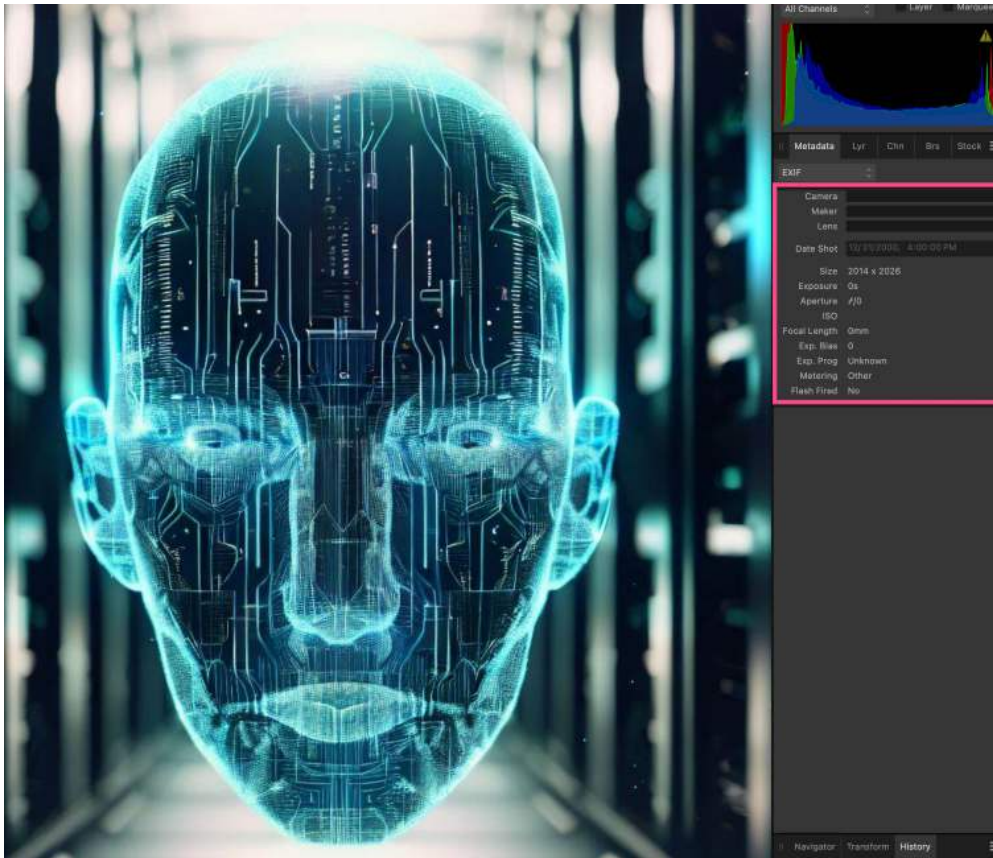


Figure 6 – Gen-AI creation of perceived image of AI-generative technology (image generated by Sheldon Boles).

Abstract – Altered Reality – Fire Art

In photo competitions, the genres of Abstract, Altered Reality and Fine Art are prime targets for Gen-AI text-to-image submissions. These genres, characterized by their emphasis on creative interpretation and manipulation, align closely with the capabilities of Gen-AI text-to-image creations.

As such, CAPA faces an increasing likelihood of receiving Gen-AI text-to-image submissions in these genres, along with other traditional photo genres.

Figures 7, 8, 9, 10 and 11 are examples of Gen-AI text-to-image creations that might be submitted in these genre competitions, so be forewarned.



Figure 7 – Gen-AI creation of a fine image of a black dog. (Image generated by Sheldon Boles using NightCafe AI).



Figure 8 – Gen-AI creation of an altered reality of Bob Fett from Star Wars. (Image generated by Sheldon Boles using Dream Studio AI).

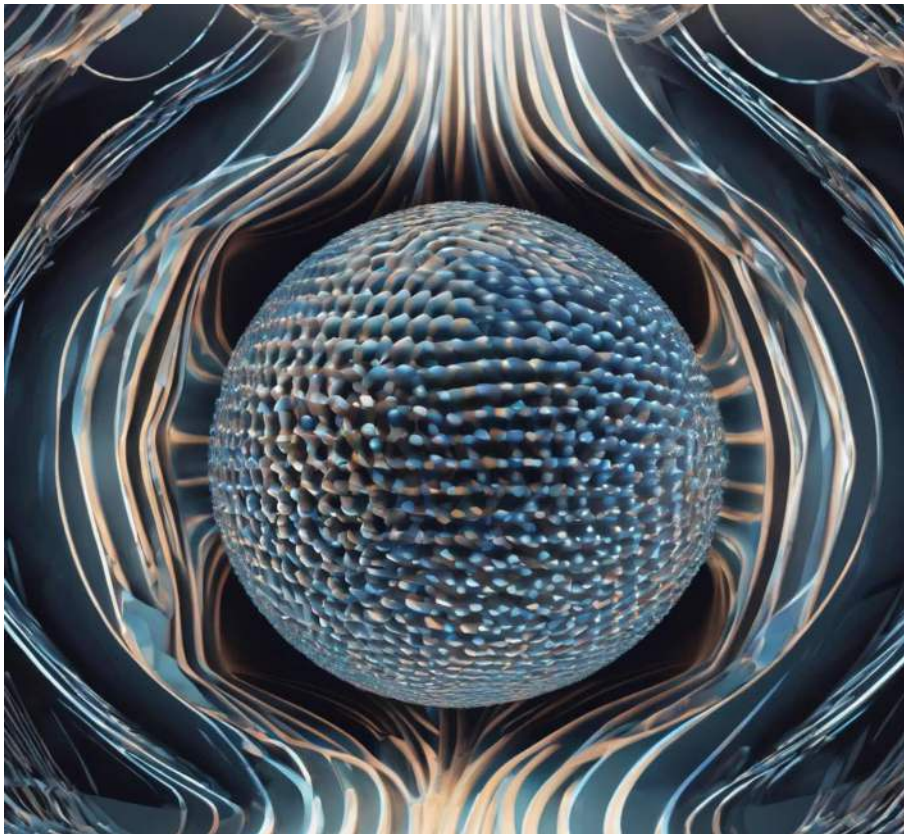


Figure 9 – Gen-AI creation of an abstract image. (Image generated by Sheldon Boles using NightCafe AI).



Figure 10 – Gen-AI creation of an artistic musical interpretation. (Image generated by Sheldon Boles using Bing AI).



Figure 11 – Gen-AI creation of an artistic sailing boat in a clear glass. (Image generated by Sheldon Boles using NightCafe AI).

Gen-AI Imperfections - Text

Currently, all Gen-AI text-to-image systems do not read words like we do. Instead, they see text as shapes, not as words with meaning. This means they can make pictures of things, but have trouble with writing in those pictures.

When incorporating text into a Gen-AI text-to-image image, the user must explicitly include the desired text within double quotation marks in their prompts. With the provided text, the Gen-AI determines the placement of the text with no input from the user. However, even with precise text specification, the AI may still produce spelling errors in the final output.

In figure 12 below, the “2024 Happy New Year” was entered in the AI prompt in double-quotes. The Gen-AI text-to-image system provides all the remaining text which was nonsensical.



Figure 12 – Gen-AI creation with the AI prompt included the narrative of ‘Happy New Year’ in quotes. All remaining text was generated by the AI system and is nonsensical. (Image generated by Sheldon Boles using Dream Studio AI).

Figures 13 and 14 provide examples where despite entering the text of “Porsche,” the Gen-AI system was unable to generate the correct spelling.



Figure 13 – Gen-AI creation where Porsche was specified in the AI prompt but the system still misspelled “Porsche.” (Image generated by Dr. Bob Ito using Midjourney)



Figure 14 – Gen-AI creation with the misspelling of “Lamborghini.” (Image created by Sheldon Boles using NightCafe AI).

Gen-AI Imperfections – Fine Details

All Gen-AI text-to-image systems are typically programmed to avoid reducing copyright or trademark symbols, as well as specific trademarked or copyrighted wording.

It would appear that this restriction is to avoid legal complications and prevents counterfeit or misleading images that could be used for fraudulent purposes.



Figure 15 - Gen-AI creation lacks the Porsche hood ornament. (Image generated by Sheldon Boles using Dream Studio AI)



Figure 16 – Gen-AI creation of a small custom car which fails to represent any known vehicle body type and the lettering is nonsensical (Image generated by Sheldon Boles using Bing AI)

Gen-AI Imperfections - Landscapes

Landscapes generated by AI text-to-image systems can often appear strikingly realistic. However, when subjected to reverse image searches (e.g. Google AI, Bing AI Reverse Image Search, Bing Reverse Image Search, etc...), these

creations reveal their artificial nature. The results typically show that these landscapes either depict non-existent locations or combine geographical features that don't accurately represent any real place.

This discrepancy arises because AI systems, while capable of producing visually convincing scenes, construct these images by combining elements from their training data rather than replicating actual locations. As a result, the landscapes may contain impossible or mismatched geographical features, creating scenes that are visually plausible but geographically inaccurate.

The scenes as shown in figures 17 and 18 below are examples of Gen-AI text-to-image landscape creations.



Figure 17 – Gen-AI creation of a mountain landscape image. A reverse image search on this image reveals that the scene does not appear to be an existing geographical location. (Image generated by Dr. Bob Ito using Midjourney).



Figure 18 – Gen-Ai creation of Stonehenge which includes a body of water which does not exist in reality (Image created by Sheldon Boles using NightCafe AI)



Figure 19 – Gen-AI creation of an underwater shipwreck which does not exist in reality (Image created by Sheldon Boles using Flux AI).

Gen-AI Imperfections – Human Form

Most Gen-AI text-to-image systems are capable of creating realistic appearing human forms which may exceed what is capable in camera captured images.

However in many cases, these images may include clues that they have been created using a Gen-AI text-to-image generator.

Figures 20, 21 and 22 provide examples of these clues.



Figure 20 – Gen-AI creation lacks eye blood veins (Image generated by Sheldon Boles using Flux AI).



Figure 21 – Gen-AI creation of a senior with two left arms. (Image created in NightCafe AI by Sheldon Boles)



Figure 22 – Gen-AI creation of a ballerino with one extra leg. (Image created by Sheldon Boles in Dream Studio AI).

Photographs Enhanced With Generative Features

On October 10, 2023, Adobe included the following Gen-AI features in their Photoshop Application:

- **Generative Fill - Image In-Painting** – in this feature, AI generates pixels to fill in missing parts, or removes and replaces selected elements from the original photograph, then replaces it with pixel elements from the AI's generative dataset.
- **Generative Expand - Image Out-Painting** – This AI-generative technique extends the visual contents of an image beyond its original dimensions, offering an expansive view or a broader perspective.

A few months ago, the Generative AI Remove tool was added to Lightroom application.

Other post processing applications have also introduced their own versions of Gen-AI features such as: Canva, Clipdrop, Luminar Neo, Photoroom, Picsart, Fixlr and Dzine (formerly Styler AI).

From a photographic community's perspective, photographs enhanced with Gen-AI add elements that were not captured by the photographer. Therefore, these types of images are not permitted in traditional photographic competitions and salons.

Figures 23, 24, 245 and 26 illustrates how Gen-AI features in Photoshop are used to enhance an existing image or element.



Figure 23 – Example of how Photoshop's Generative Fill feature is used to add a desired element into an existing photograph. image. The added element was created by the Adobe's AI Firefly dataset of scrapped image elements from interne and other sources.



Figure 24 – Example of how Photoshop's Generative Fill feature is used to select an element and replace the background. Added element was created by the Adobe's AI Firefly dataset of scrapped image elements from interne and other sources.



Figure 25 – Example of how Photoshop's Generative Fill feature is used to select an element and remove it from the photograph. The replacement area of the image was created by the Adobe's AI Firefly dataset of scrapped image elements from interne and other sources.



Figure 26 – Example of how Photoshop's Generative Fill feature is used to expand the area of the original photograph. The replacement area of the image was created by the Adobe's AI Firefly dataset of scrapped image elements from interne and other sources.

Gen-AI enhanced photographs often struggle to seamlessly blend with the original image, resulting in noticeable differences in the added elements. These discrepancies are typically manifested in two main ways:

1. **Noise and Texture Mismatch** - AI-generated content may appear smoother or lack the natural grain present in the original image.
2. **Resolution and Quality Inconsistencies** - The generative fill tool's current 1024x1024 pixel limitation can lead to pixelation or lower quality in AI-generated areas, especially when applied to larger, high-resolution images.

These issues commonly result in:

- Blurred or soft-edged AI-generated elements
- Visible transitions between original and AI-created sections
- Inconsistent detail levels across the image

It's worth noting that as AI technology advances, identifying these discrepancies may become more challenging. The ability to detect such differences depends on the judge's expertise, the specific image, and the extent of AI-generated content.

As a CAPA judge, approach each image with a critical eye. For example, **carefully scrutinize different elements of the image and look for abnormalities as outlined earlier in this document. Does the too outstanding and unrealistic?**

If a judge feels something is amiss, they should report it to the respective Competition Coordinator. Upon receiving this information, we will initiate our comprehensive verification and authentication process, which includes:

- Image data analysis
- Photo forensic examination
- Possible request for all original source images from the entrant

This thorough approach ensures the integrity of the competition and fair evaluation of all entries.

Concluding Comments

The rapid advancement of AI technology in image creation and manipulation presents both challenges and opportunities for the photography community. As judges and organizers of CAPA competitions, it is our responsibility to stay informed about these developments and maintain the integrity of our events.

While we have implemented measures to address AI-generated and AI-enhanced images, we must remain vigilant and adaptable. The distinction between AI-generated content and traditional photography may become increasingly blurred, requiring us to continually refine our approach.

We encourage all judges to:

- Stay informed about AI technology and its capabilities
- Approach each image with a critical eye
- Report any suspicions of AI use that violates competition rules
- Engage in ongoing discussions about the role of AI in photography

By maintaining open communication, updating our guidelines as needed, and fostering a community that values both innovation and authenticity, we can ensure that CAPA competitions continue to celebrate the art and skill of photography in all its forms.

As we move forward, we must balance the exciting possibilities that AI brings to creative expression with our commitment to preserving the essence of traditional photography. Together, we can navigate this evolving landscape and continue to showcase the best in photographic artistry.

Please email me at competitions@capacanada.ca if you have any questions or have identified a suspicious image in a competition you are judging.

Sheldon Boles – FCAPA
CAPA Director of Competitions

