Q's Views #1 - #3: Hybrid-Image Portraits for the Post-Truth Era

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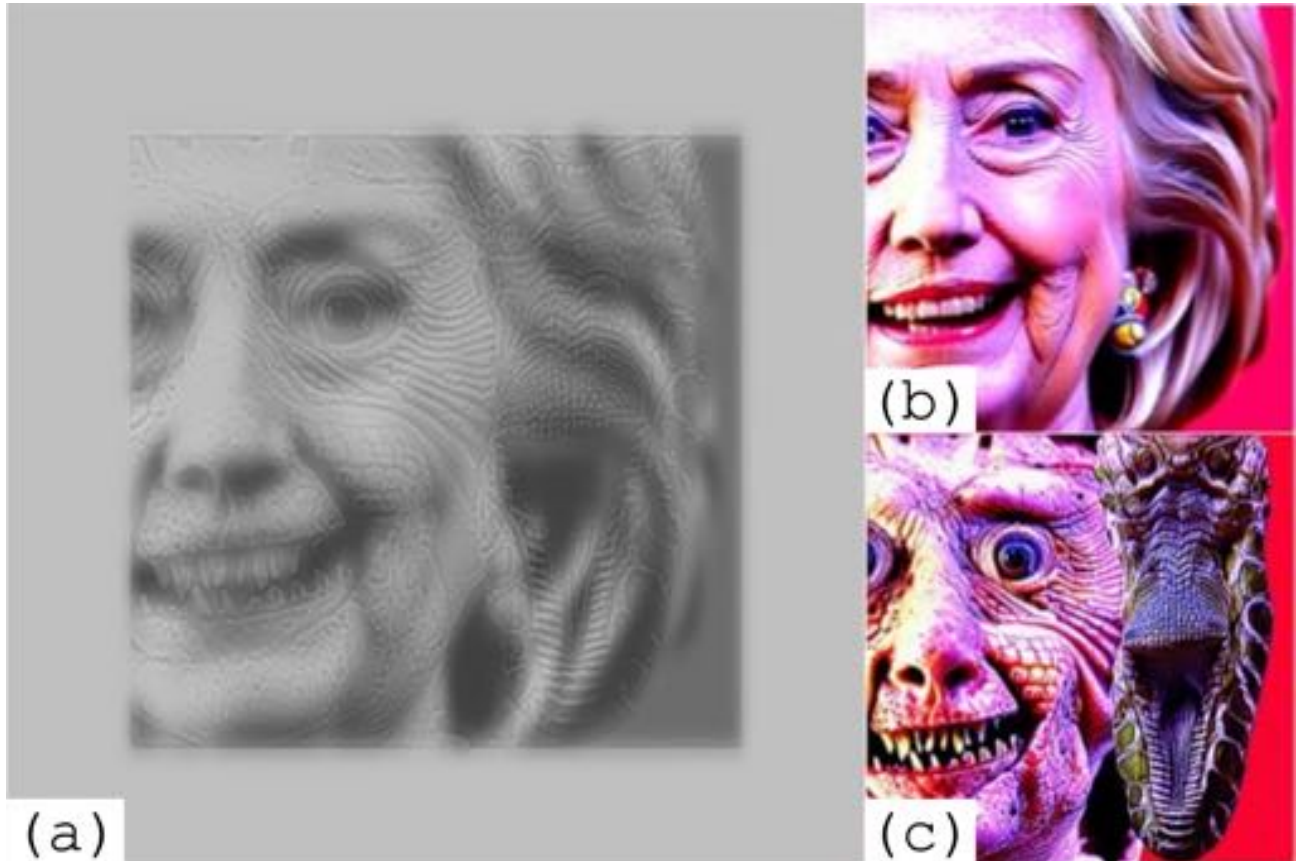Contact Emails LEAVE BLANK FOR SUBMISSION

Figure 1. (a) *Q's Views #1*, (b) the source image for its lower spatial frequencies, and (c) the source image for its higher spatial frequencies. The hybrid image (a) is perceived as the image (b) from a distance, and as the image (c) when viewed up close.

Abstract

A hybrid image is an image synthesized from two source images in such a way that viewers perceive one of the source images when viewed up close but perceive the other source image when viewed from a distance. An ongoing visual sarcasm series, *Q's Views #1-#3*, utilizes this perceptual illusion with the aim of letting the audience visually experience the estrangement between believers and non-believers of conspiracy theories in the post-truth era.

The current series consists of three portraits of Hillary Clinton, each of which is synthesized as a hybrid image from two ``fake'' portraits. One is AI-generated and the other is transformed from the first. The resulting image is perceived as a regular portrait of Hillary Clinton when viewed at a distance. Yet, as the viewer approaches closer, the portrait transforms,

revealing a grotesque depiction of Hillary Clinton as portrayed by conspiracy theorists.

Thus, as viewers approach near to the portrait beyond the threshold of visual perception of the hybrid image, the artwork triggers a sudden realization that conspiracy theorists perceive Hillary Clinton as an entirely different person. Such a transformation of an image highlights the insurmountable divergence in perceived realities between believers and non-believers of conspiracy theories. However, even the "regular" portraits are AI-generated fabrications, rendering them as fake images devoid of authenticity. Hence, as works of visual sarcasm, *Q's Views #1-#3* refer to this post-truth era, where AIs are used to produce high-fidelity images for fake news and propaganda, significantly increasing the alienation and division of perceived realities in the same world we share.

Introduction

The proliferation of conspiracy theories and its consequential impact on the realm of political affairs constitutes a seemingly improbable phenomenon that is, in fact, an ongoing reality in our contemporary world. The assertions made by these conspiracy theories often appear absurd to non-believers and the fact that such theories hold a significant sway in society can seem surreal. This is particularly striking given the ease with which access to fact-checked information can be obtained through the Internet, both from authoritative sources and from citizens with appropriate knowledge and skills. The rift between those who espouse conspiracy theories and those who do not appears almost irremediable. Furthermore, those who subscribe to such theories seem to exist within an "alternative" reality, one that is almost incomprehensible to those who do not share their beliefs. This is further exacerbated by the tendency of conspiracy theorists to alienate themselves from non-believers, leaving little room for communication and an unwavering adherence to their own belief.

Q's Views #1-#3 (Figure 1, Figure 8, and Figure 9) reference this estrangement between believers and non-believers of conspiracy theories, with the aim of allowing the audience to visually experience such a seemingly irreparable divide among citizens through the use of a hybrid-image generation technique, which generates "static pictures with two interpretations that change depending on the image's viewing distance" [8].

For each work in the series, we first use a generative AI to create a regular "fake" portrait of Hillary Clinton. We then transform this portrait into a grotesque image, also using the generative AI, by providing text prompts that reflect conspiracy theorists' claims about her. These two images serve as the source materials for synthesizing a hybrid-image portrait. At a distance, the portrait is perceived as a 'regular' portrait of Hillary Clinton. However, when viewed up close, it undergoes a transformation, revealing a grotesque version of Hillary Clinton as often depicted by conspiracy theorists. Thus, as viewers approach each hybrid image portrait, they experience the unbridgeable gap in perceived realities between conspiracy theory believers and non-believers, seeing two entirely different 'realities' embedded in a single image of the same person.

However, in this work, all the source images are AI-generated and hence lack any authenticity. In other words, they are all 'fake' images. In this regard, as a work of sarcasm, *Q's Views #1-#3* visually embodies the intensification of alienation between individuals in the age of 'post-truth', where facts and reality are all questioned.

Related Work

Double Image in Art History The 'double image' technique typically refers to a visual effect or artistic method in which two separate images or layers are combined to create a single, composite image. Throughout the history of visual arts, artists have frequently used this technique to merge two distinct images, thereby creating a visually engaging and thought-provoking experience for the viewer.

For instance, Giuseppe Arcimboldo, a 16th-century Italian painter, is renowned for his distinctive portraits, composed entirely of objects such as fruits, flowers, and vegetables. Among his most well-known works is *Vertumnus* (Figure 2), a unique portrayal of Rudolf II, Emperor of the Holy Roman Empire. The title, *Vertumnus,* is derived from the Roman god of the seasons. By assembling a composition of more than 50 different types of vegetables, fruits, and flowers, the painter creates a masterful double image. This symbolic representation conveys the emperor's reign as enduring and influential over all elements and seasons, by displaying Rudolf II's ``metamorphoses of power over the world for a rule'' [4].

Figure 2. *Vertumnus* (1591) by Giuseppe Arcimboldo[1].

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[1] public domain image: https://upload.wikimedia.org/wikipedia/commons/7/74/Giuseppe_Arcimboldo_-_Rudolf_II_of_Habsburg_as_Vertumnus_-_Google_Art_Project.jpg

Figure 3. *All is Vanity* (1892) by Charles Allan Gilbert[2].

For a more recent example, Charles Allan Gilbert's *All Is Vanity* (1892) (Figure 3) is one of the widely recognized works that utilizes the double image technique. The work is a visual allegory of death, which illustrates the futility of pleasure and the certainty of death through the use of a double image: a woman gazing at her beautiful face in a mirror while seated before a vanity table (seen from close-up perspective) and a large skull (seen from a distance).

Figure 4 presents another well-known contemporary example of this technique - Salvador Dali's *Invisible Bust of Voltaire* (1941). By the utlization of double images, the painter aimed "to raise doubts about the supposed reality of objects of the external world, and in terms of iconography, to apply the erotic metaphor on a universal scale'" [5].

Figure 4. *Invisible Bust of Voltaire* (1941) by Salvador Dali[3].

Thus, throughout the history of art, artists have effectively utilized the double image technique in their works to convey various philosophical and psychological meanings, thereby enhancing their artistic and aesthetic qualities.

Hybrid Image As Audo Oliva, one of the original inventors of the hybrid-image generation technique, denotes in [8] , a hybrid image "s a picture that combines the low spatial frequencies of one picture with the high spatial frequencies of another picture producing an image with an interpretation that changes with viewing distance." This optical illusion, which allows the viewer to perceive either of the two source images depending on the viewing distance, results from the characteristics of the human visual system. Specifically, our visual system is unable to simultaneously process and integrate information of differing spatial frequencies.

They describe their original hybrid image generation technique in [8]. To create a hybrid image, Gaussian filters are applied to two source images. One image, intended to be viewed from a distance I_1, is filtered using a low-pass filter G_1 to remove high spatial frequency components. The other image I_2, intended to be viewed up close, is filtered using a high-pass filter $(1 - G_2)$ to remove low spatial frequency components. The Gaussian filters (G_1 and G_2) used have specific parameters associated with them, such as the expected viewing distance for the high spatial frequencies image I_2. The resulting hybrid image H is produced by adding these two filtered images together: $H = I_1 \cdot G_1 + I_2 \cdot (1 - G_2)$.
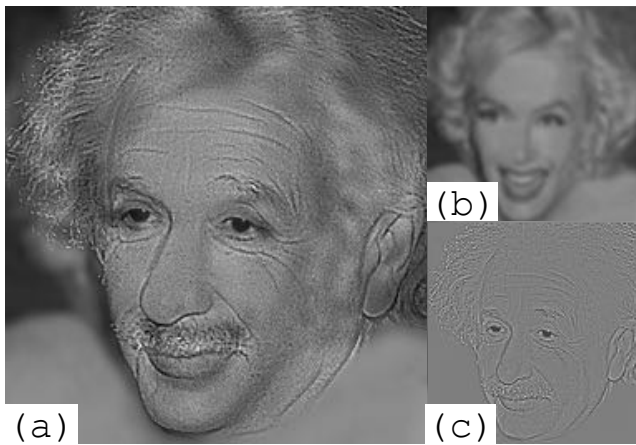
Figure 5. (a) A hybrid-image example, (b) The low-frequency image of the hybrid image, and (c) The high-frequency image[4].

Figure 5 (a) illustrates a well-known example of hybrid image composed of two portraits: Marilyn Monroe in low spatial frequencies (Figure 5(b)), which can be perceived from distance, and Albert Einstein in high spatial frequencies (Figure 5(c)), which can be perceived up close.

While this technique is widely used for generating hybrid images, it requires that the two source images have a significant degree of similarity in their shapes (edge alignment) to be effectively presented. If not, the high-frequency image may appear as if it were superimposed on the low-frequency image, regardless of the viewing distance, thus losing the effect of hybrid image. Figure 6 illustrates such a failure in hybrid-image generation. As shown, a picture of a duck simply appears on a picture of a puppy without any hybrid image illusion, since these two pictures lack the similarity in shapes. For our artworks in this paper, we generally maintain overall shapes of source images. Hence, Oliva's hybrid-image generation technique suffices.

In [9], Oliva contextualizes the hybrid-image technique that she invented, as a new approach to create `the art of double images,' referring to the history of visual arts as described in the previous section. However, the examples of hybrid images presented in the article appear to primarily serve as illustrations of the optical illusion of hybrid images, rather than highlighting artistic and aesthetic qualities. For example, the works include hybrid images of Albert Einstein and Sigmund Freud, a cat and a dog, and a bicycle and a motorcycle, which seem to primarily demonstrate the technical process of hybrid image generation, and hardly convey any artistic background context, unlike in the famous masterpieces Oliva referred to earlier[5]. We also would like to note

many works of `hybrid-image' searchable on the Internet to focus solely on illustrating the optical illusion of the hybrid image, rather than conveying a deeper, more profound artistic meaning.

Figure 6. Hybrid-image generation can fail when two source images have significantly different shapes[6].

AI Image Generation and Rising Concern about Fake News The break-through in deep learning techniques around the beginning of 2010 [7] also gave a significant impact on the application of AI to visual art, particularly after the emergence of Generative Adversarial Network (GAN) in 2014 [6]. Researchers have been actively engaged in inventing its variants since then [3]. GANs have been successfully applied to artistic practices [15]. For example, *Portrait of Edmond de Belamy* by *Obvious*, a collective of artists in Paris, is probably one of the most well-known examples to apply GAN to artworks. The portrait was generated by DCGAN trained by Renaissance-style images and was sold at Christie's Auction for USD 432,500 [10]. As GAN artworks are increasingly prevalent, the specific look and feel of GAN-generated images, particularly those created using the relatively early GAN techniques with lower fidelity, became often referred to as 'GANism' by art critics [15].

Figure 7. AI-generated images used for fake news: Pope Francis in a puffer jacket(left) and Mr. Trump being arrested (right)

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[4] public domain images: https://en.wikipedia.org/wiki/Hybrid_image##/media/File:Hybrid_image_decomposition.jpg

[5] However, this is justifiable as Oliva's article primarily intends to introduce the technique of hybrid image generation as a new approach that can be applied to the art of double images, and to provide a brief explanation of the technique and the underlying principles of human visual perception.

[6] The low frequency image: *A Puppy Playing Tug Of War By Biting Its Collar Sling* by Andrea Hamilton, URL: https://www.pexels.com/video/a-puppy-playing-tug-of-war-by-biting-its-collar-sling-3144446/ (Creative Commons License). The high frequency image: *Duck Cub Chick Cute Water Bird* by NickyPe (Pixabay License), URL: https://pixabay.com/videos/duck-cub-chick-cute-water-bird-108438/
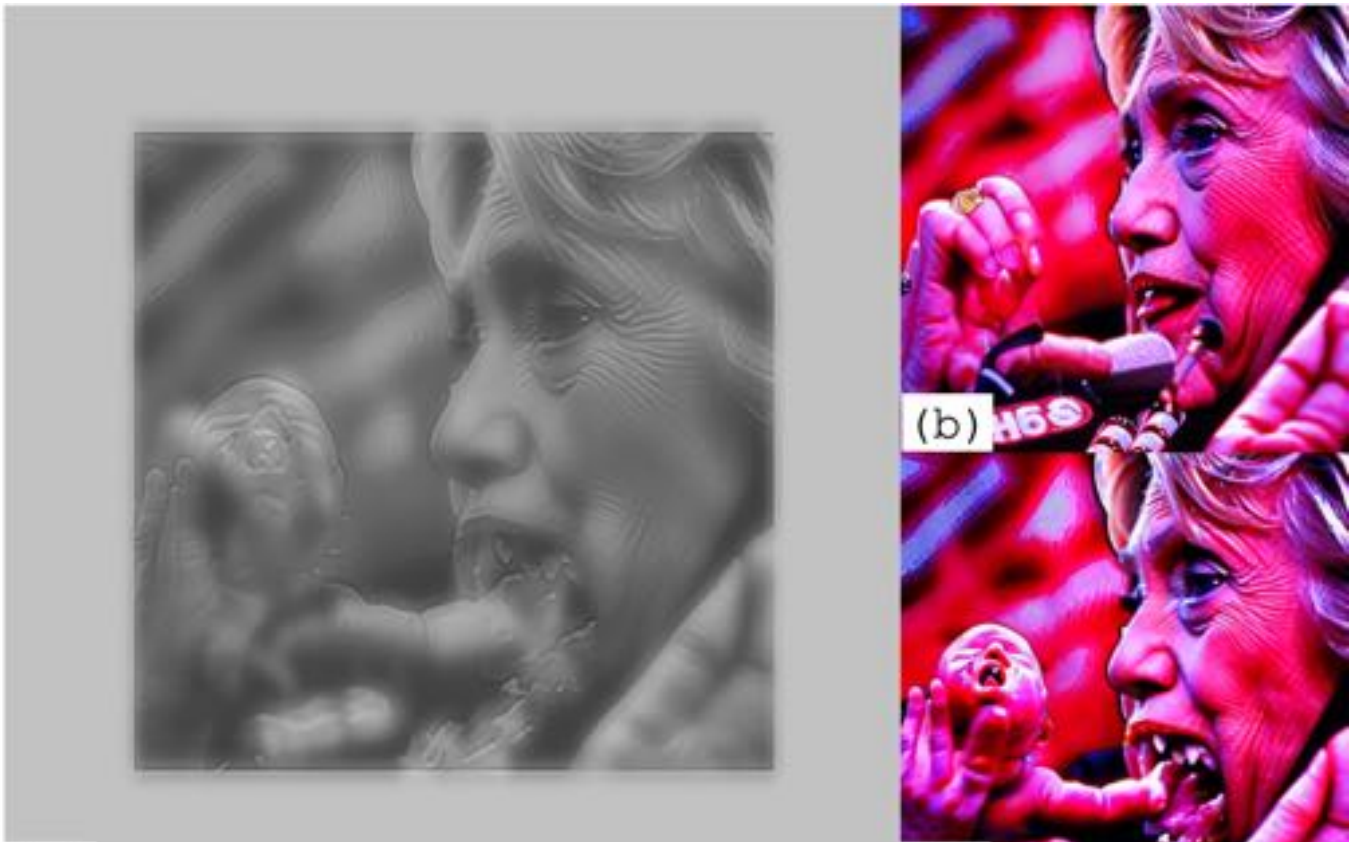
Figure 8. (a) *Q's Views #2*, (b) the source image for its lower spatial frequencies, and (c) the source image for its higher spatial frequencies. The hybrid image (a) is perceived as the image (b) from a distance, and as the image (c) when viewed up close.

While GANs have seen rapid advancements and improvements in their ability to generate high-fidelity images, researchers and artists have recently begun to pay significant attention to *diffusion models* as an innovation in AI image generation. Advancements in AI, such as text-to-image generation and image-to-image generation using diffusion models with transformers, as seen in Imagen by Google [12], DALL-E2 by Open.AI [11], have made it possible to easily create photo-realistic images from text prompts or a combination of text prompts and input images. The recent release of *Stable Diffusion* built by Rombach upon their previous work [17] is an open-source high-fidelity diffusion model for text-to-image and image-to-image generation, strongly assisted the democratization of such advanced AI image generators and lead to the emergence of man variants trained upon their models.

However, as the AI image generation techniques are rapidly advancing and becoming more prevalent, there arises a significant concern that they may be utilized for nefarious purposes, particularly in the creation and dissemination of fake news and propaganda [1][2]. For example, in early 2023, High-fidelity fake images created by generative AIs, such as Mr. Donald Trump being arrested and Pope Francis in a puffer jacket, went `viral' online and many believed that they are real (Figure 7) [13][14]. For another example, in the Russia-Ukraine war of 2022, deepfake technology was used to fabricate a video of Volodymr Zelensky, in which he is depicted encouraging Ukrainians to lay down their arm [16]. These incidents also highlight the growing problem of the 'post-truth' phenomenon, where facts and reality are increasingly being called into question, potentially leading to the reinforcement of alienation among individuals who subscribe to conspiracy theories and their immersion in an 'alternative reality.'

Description of Our Work

Q's Views #1 - #3 are the first three works in a series of hybrid-image artworks of sarcasm to comment on the surrealistic political phenomenon of the proliferation of conspiracy theories in the United States. The intention of the work is not to criticize believers of conspiracy theories, but rather to provoke a sense of irreparable estrangement that alienate them. The decision to feature Ms. Hillary Clinton as the subject of this hybrid-image portrait series was made because she is frequently targeted by conspiracy theorists, as exemplified by the infamous 'Pizzagate' conspiracy theory in 2016.

We utilized Oliva's technique to synthesize a hybrid-image portrait of Hillary Clinton: from a distance, the image appears as a normal portrait of Clinton as seen in news media,
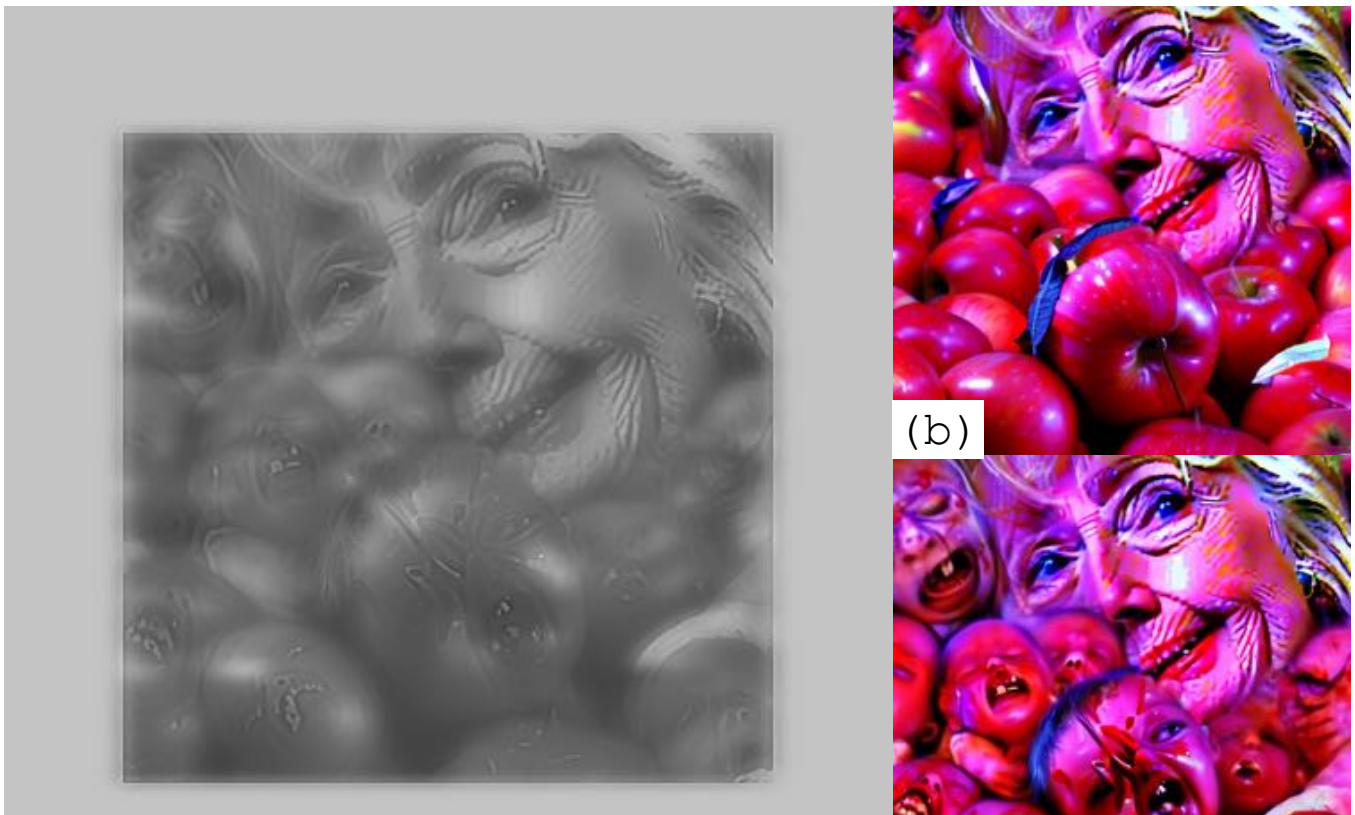
Figure 9. (a) *Q's Views #3*, (b) the source image for its lower spatial frequencies, and (c) the source image for its higher spatial frequencies. The hybrid image (a) is perceived as the image (b) from a distance, and as the image (c) when viewed up close.

however, when viewed up close, the image transforms into a grotesque and surrealistic portrayal of Clinton as conspiracy theories that some QAnon supporters believe. Thus, by moving back and forth before the portraits, viewers can visually experience how believers of conspiracy theories perceive a vastly different reality, the perception of which is virtually almost impossible to share and understand by non-believers, hence further alienating conspiracy theories from individuals with differing perspectives.

To create each portrait, we first generated a non-existent portrait of Hillary Clinton using *Stable Diffusion* and then applied minor modifications using image-to-image generation to the image generated in the text-to-image generation phase. This portrait image of Clinton was partly transformed into a grotesque variant of the portrait that depicts claims made by conspiracy theorists, through image-to-image generation with text prompts, such as 'reptilian,' 'eat babies,' together with prompts that control the expected tones of the resulting image.

After generating these two source images (the normal portrait and the transformed grotesque portrait), we applied Oliva's technique to them and obtained a hybrid-image. In this phase, as it is more effective to apply the hybrid-image generation technique for monochrome images, source images were first converted to grayscale before the synthesis of a hybrid image. Edge enhancement for the high-

frequency image was also performed to increase visibility when viewed closely. As we transformed the normal portrait image without significant alteration of its shape, the original hybrid-image generation technique by Oliva was sufficient to effectively exhibit the hybrid-image illusion.

Each of the three works (*Q's Views #1 - #3*) is depicted in Figure 1, Figure 8, and Figure 9, respectively. Figure 1 (a) illustrates *Q's Views \#1*, which presents a hybrid-image portrait, combining a close-up, normal portrait of smiling Hillary Clinton (in Figure 1 (b); to be viewed from a distance) with an AI-generated portrait that transforms it into a terrifying reptilian form (in Figure 1 (c); to be viewed up close). Similarly, Figures 8 (b) and 8 (c) illustrate a portrait of Clinton answering in an interview before microphones (to be viewed from a distance) and a transformed image of the portrait that depicts her eating babies alive (to be viewed up close), respectively. These images are synthesized to the hybrid image portrait, *Q's Views #2* in Figure 8 (a).

Q's Views #3 depicted in Figure 9 (a) presents a hybrid-image portrait, which combines a portrait of Clinton ecstatically smiling surrounded by apples (Figure 9 (b); to be viewed from a distance), and another portrait that transforms them into bloody baby heads with the expression of agony (Figure 9 (c); to be viewed up close).

Discussion

As discussed in previous sections, our work employs Oliva's hybrid-image technique to create double-image portraits, which integrate a reality perceived by non-believers of conspiracy theories and an alternative reality perceived by believers into one image. Our goal in using this hybrid-image technique is to allow the audience to directly experience such an `alternative reality,' which non-believers may find difficult to comprehend. While hybrid-image is a well-known optical illusion and many example works exist, they typically lack the artistic context present in our work and often focus on the illusion itself.

Q's Views #1-#3 provide rare examples of the kind with an artistic and socio-political context. The decision to use the hybrid image generation technique with AI generated images is rooted in our artistic intention to visually depict the surrealistic phenomenon of `post-truth' that we currently face and to refer to concerns that about the use of AI image generators for creating fake news that is nearly indistinguishable from genuine images.

Additionally, our work differentiates itself from other AI-generated artworks that focus on whether or not artificial intelligence can be considered creative. Critics often point out that this is a naive question that has been repeated and needs to be further examined, as discussed in [15]. On the contrary, we utilize AI to generate source images which are photorealistic but do not exist in reality. As already mentioned earlier, this aligns with current concerns regarding AI in our post-truth era.

In other words, our works focus on 'why we use AI for artworks,' avoiding a 'repeated naive question' whether or not AIs are creative. Thus, our work is a form of double sarcasm, commenting both on the estrangement between believers and non-believers conspiracy theorists in the post-truth era and the optimistic views of artists regarding AI's creativity.

Public Presentation

Q's Views #1-#3 have been presented/accepted internationally at academic conferences and art exhibitions. The work was first showcased at the [anonymized] 2023 in Tokyo, where it received an award, which led to the invitation to the [anonymized] 2023 in San Francisco. The work has also received a favorable review (strong accept) at one of the most prestigious international academic conferences in artificial intelligence/machine learning and was selected for public presentation at the conference venue. The work has also been accepted for an academic conference in Japan for the demo session in 2024. We also would like to particularly note that some reviewers showed a strong concern about its socio-political aspects, which may reflect their political stances.

Conclusion and Future Work

In this article we described *Q's Views #1-#3*, which are hybrid-image artworks of visual sarcasm that combine AI-generated/transformed images. While existing hybrid-image `artworks' have often ended up in the mere presentation of optical illusions, it uses hybrid-image to comment on the alienation in realities not shared between believers and non-believers of conspiracy theories in our post-truth era. The use of an AI image generator is justified by the need to address concerns that AI could be used to generate fake news, which would further increase alienation in our society.

We plan to further explore such issues by creating more variations in different styles. We are currently working on another hybrid-image portrait series, *W's Views*, reflecting the review comments received after the acceptance/rejection to academic conferences or art exhibitions. Recognizing that some individuals may prioritize personal political prefer-

(a)

(b)   (c)
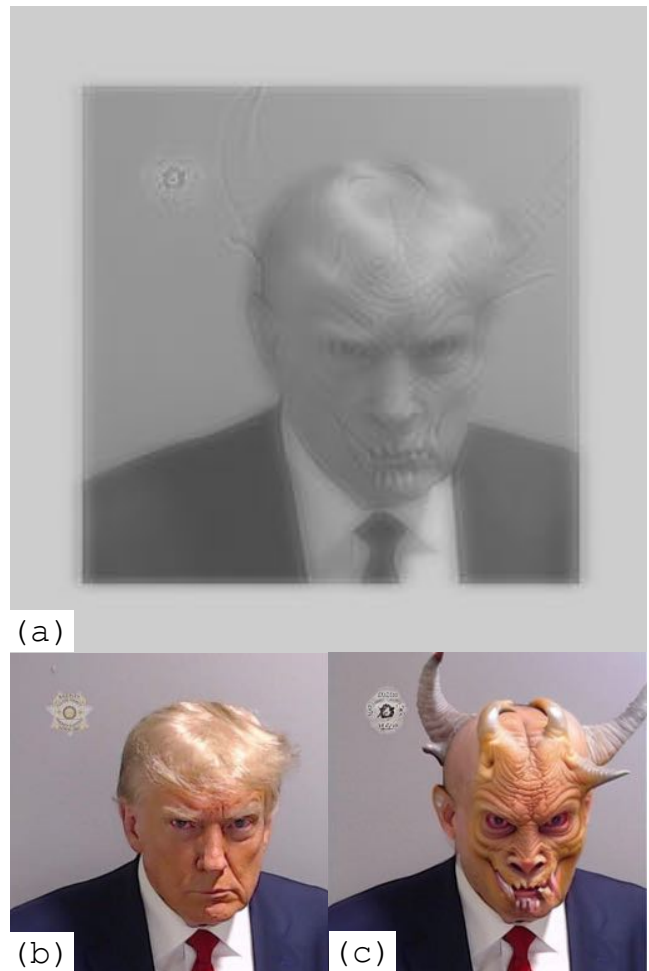
ences over artistic considerations when evaluating artwork,

Figure 10. (a) *W's Views prototype*, (b) the source image for its lower spatial frequencies, and (c) the source image for its higher spatial frequencies. The hybrid image (a) is perceived as the image (b) from a distance, and as the image (c) when viewed up close.

we have portrayed another well-known politician. This politician is noted for holding political views often considered opposite to those of Hillary Clinton and is frequently demonized by her supporters. This approach aims to cater to audiences with diverse political backgrounds, enhancing their political satisfaction.

Figure 10 displays a prototype of *W's Views #1*, a hybrid-image that, from a distance, appears as a conventional portrait of the politician. However, when viewed up close, it transforms into a demonic figure, reflecting how he is often portrayed by those with opposing political views. Similar to *Q's Views #1-#3*, this work aims to integrate two drastically different perceptions of the politician into a single image, visually representing the profound societal divisions characteristic of our post-truth era.

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Anonymized.