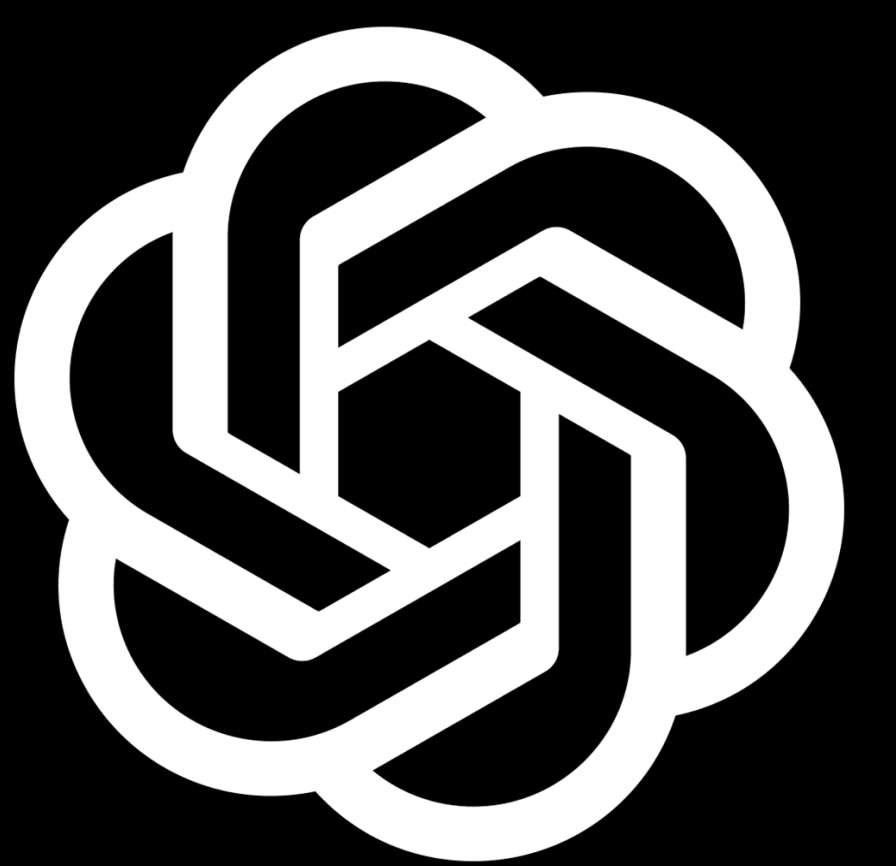




Adjectivally -Oriented: Women Through the Decades

Stylistic Shifts In Magazines As Represented By Image -Generating AI



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Abstract

My investigation aims to analyze how adjectives could impact AI's representation and image generation of women through the decades. By considering how women have been represented in fashion magazines, I examine how AI may stylistically interpret different adjectives with different depictions of women in editorial magazines. This project also set out to analyze AI's response to being asked to formulate images of women across the span of the last nine decades, from 1930 until now. After gathering over 150 "photographs" of AI-generated women, I carefully parsed through each set of images to look for common themes within each image. I analyze the extent to which AI can arguably successfully display fashion styles from decade to decade and explore the impact of an AI's semantic interpretation of adjectives describing women. What sort of results does it generate when the adjective "hot" is input? Does a "pretty" woman look different? Is there a distinction between that and "beautiful"? What are those distinctions? Is there cultural bias present?

Introduction

Arguably, describing a woman as "hot" may imbue readers with different associations than the adjective "pretty" might. Linguists have argued that the term "hot" tends to remain closely associated with the concept of sex appeal. The Merriam-Webster Dictionary associates the adjective "hot" with the synonym *sexy*. However, the word "pretty" is defined as *artful, clever, or having conventionally accepted elements of beauty*. Another definition offers *'easy to enjoy : pleasant* '. While the dictionary defines "beautiful" as *having qualities of beauty : exciting aesthetic pleasure* , it also connotes the word as being associated with being *generally pleasing : excellent*. How might these adjectivally-based representations of women visually shift through the last several decades as perceived by AI? Since the arrival of the classic editorial magazine style, women have always been expected to appear culturally presentable.

One study published in June of 2022 analyzed AI machine learning found that robots have been discovered to be "acting out toxic stereotypes with respect to gender, race, and scientifically-discredited physiognomy, [...] the audited methods are less likely to recognize [...] People of Color" (Hundt, 744). Another recent study found "identified bias in face detection where Men with the lightest skin tones are most accurately detected, Women with the lightest skin tone less so, and Women with the darkest skin tones with dramatically lower accuracy" (Hundt, 745). These findings suggest that white men sort of set the visual AI standard, as they are easiest to detect. Do the DALL-E 2's results match these results?

Materials

DALL-E 2 is a relatively new image-generating AI program (as of Nov 2022) that can create realistic images and art from a description given in natural language. DALL-E 2 uses a text prompt encoder that maps a prompt to a representation space. Another model maps the text encoding to a corresponding image code that can present the semantic information that can then be decoded to generate an image in a visual representation of the given semantic information. It can pull the visual representations through another OpenAI model known as contrastive language-image pre-training (CLIP) which is trained on millions of images and their descriptions. Using an AI practice known as diffusion, which begins with a pattern of random dots that gradually alters towards an image once it can recognize specific aspects of the image along with several other OpenAI models, the AI can create semantically-plausible and stunningly-lifelike images.

Methodology

By using the AI in conjunction with journals documenting women's fashion in magazines such as *Vogue* and *Life*, I could create connections and comparisons between what types of images were being created compared to what photographs were appearing in the magazines correlated with each decade. To successfully engineer prompts for visual AI, several elements need to be considered: the style you want your image to appear in, the format, the distance you want the subject from the camera, what qualities you want it to have, along with vibe and perspective. In trying to refine a search that resulted in the kind of image, many adjustments had to be made. The first prompt I tried was:

"a professional black and white editorial photograph of a [pretty] woman on a [2020] magazine cover" I planned to switch out the adjective and the decade for each group of searches. I encountered difficulties when I realized that black and white photographs failed to properly display certain elements of fashion of the time. Further, the inclusion of the phrase "magazine cover" resulted in images rife with words across the images, which distracted from the faces and qualities of the women represented. Many of the images appeared incredibly disjointed and generated by AI. Using careful prompt engineering, I eventually came up with the types of images we were looking for and settled on the following prompt:

"a professional editorial photograph of a [pretty] woman in a magazine from [2020]"

As images generate, I began changing out the decade and adjective, from "hot" to "beautiful" to "pretty" within the confines of 1930 to 2020.

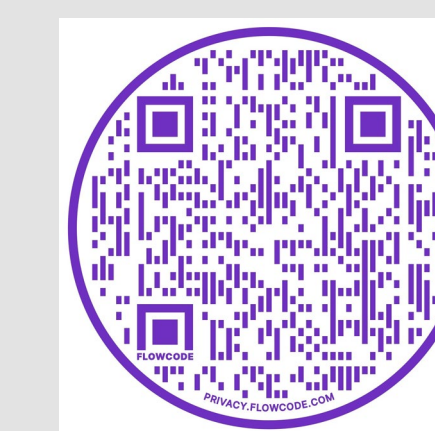
Results

DALL-E 2 appeared to perform adequately when it came to decade-by-decade specifications. The images from the "1920s" that it generated maintained common characteristics from magazines of the time such as Vogue. The other most successful and stylistic images resulted within the decades of 1950, 1970, and 1980. Makeup and hair trends successfully translated and were congruent with specified decades. While there failed to be a massive difference between the "beautiful" women and the "pretty" women, as expected the category of AI-generated "hot" women generated an entirely new slew of images with different types of suggestions. That said, the images of "pretty" women tended to be considerably more smiley than those of "beautiful" women, whose faces maintained a wider range of expression, from straight faces to ones captured mid-laugh.

While the results were not overt, around 46% of the "hot" images showed significantly more skin than the "beautiful" and "pretty" images did. The latter category tended to present — with a closer lens — images of women smiling or simply posing for the camera in a typical editorial photograph style. The "sexy" element of the defined word "hot" presented images rife with increased nudity and an easily recognized somewhat sultry look. In many cases, the AI did not include the women's faces in the results when told to create "hot" images. Instead, many of the results feature images of the female body in seductive poses and cut the face out of the frame entirely. More legs appeared in these images than the "pretty" and "beautiful" ones did.

Overall, many of the women looked similar regarding their facial features, likely because the AI was not trained with images of celebrity faces, which deteriorated its ability to create lifelike images of faces. Many features are skewed and lopsided; sometimes, the eyes were not linear or realistic. Only 10 of the 130 images produced through DALL-E's system represented images of non-white women, which was not surprising given the result of Hundt's study of robots aligning with malignant stereotypes.

You can click on the above Results tab or scan the QR code and it will take you to a Google folder with some of the DALL-E 2 images.



From left to right: "beautiful" woman (1950), "hot" woman (1950), beautiful" woman (1980), "hot" woman (1980)

Conclusion

To conclude, DALL-E 2 seems to comprehend the differentiation of the words "pretty and beautiful" from the connotations of a word like "hot" and can apply those semantic connections throughout the decades without much slippage. It is telling that an AI trained on millions of photographs can comprehend "hot" as something relating to the body in a sensual sense. "Beautiful" and "pretty" were defined very similarly by Merriam-Webster and are used somewhat interchangeably within American English, which explains why there was no clear separation between the two categories. The most recognizably decade-matched images were likely most successful because of the clear stylistic trends that those time periods hosted: the 1950's hair, the 1970's clothes and design elements, and the 1980s makeup and somewhat retro vibe. If I had more time and resources, I likely would have looked into more specific years and hand-matched them to specific magazines, along with potentially exploring the database that the API learned from. I could have also tried entering prompts in different languages to examine how DALL-E 2 may have interpreted differences across cultures. Perhaps that would have resulted in an increased diversity of results.

Bibliography & Acknowledgments

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