



Anyone Can Design!

With a little help from Generative AI

Ajay (zwz3wu), Anushruti (rba7cb), Changhong (hmw4yz), Mohamad (anz8av),
Uday (rfn3ua) and Yash (ys4yh)

Motivation

andreesen.
horowitz

It's time to build

The Generative AI Revolution in Games


by James Gwertzman and Jack Soslow

AI, machine & deep
Generative AI • ma

CNBC
www.cnbc.com

Generative AI: Silicon Valley's next trillion-dollar companies?


Oct 8, 2022 — Generative AI has gotten so much better that it's inspired people to leave their jobs, start new companies and dream about a new generation ...



The New York Times
https://www.nytimes.com/ai-gener...

A.I.-Generated Art Is Already Transforming Creative Work - The New York Times

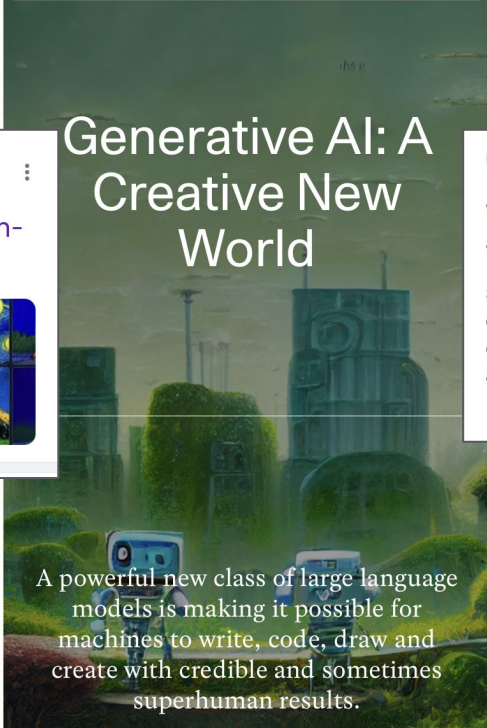
Oct 21, 2022 — Only a few months old, apps like DALL-E 2, Midjourney and Stable Diffusion are changing how filmmakers, interior designers and other ...



SEQUOIA

Generative AI: A Creative New World

A powerful new class of large language models is making it possible for machines to write, code, draw and create with credible and sometimes superhuman results.



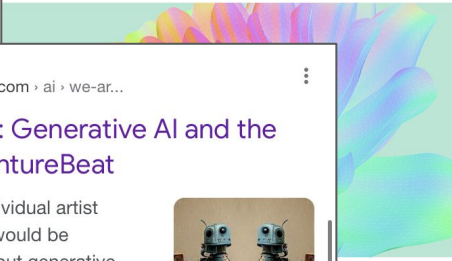
Harvard Business Review

Sign In

How Generative AI Is Changing Creative Work

by Thomas H. Davenport and Nitin Mittal


November 14, 2022



VentureBeat
https://venturebeat.com/ai/we-ar...

We are the artist: Generative AI and the future of art | VentureBeat


Sep 3, 2022 — If an individual artist created an image they would be compensated. What about generative artwork created by AI systems?



Digital Arts
https://www.digitalartsonline.co.uk/...

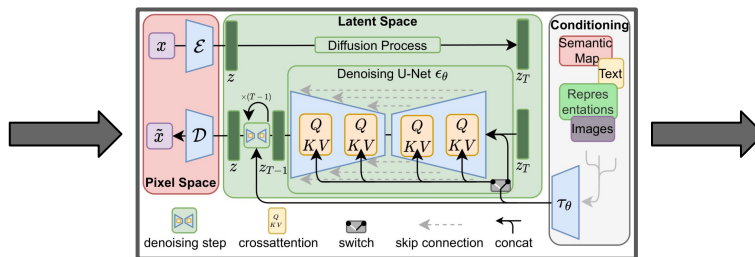
How generative AI is changing art and design - Features

Dec 22, 2017 — Generative AI will drive the next generation of apps for autoprogramming, content development, visual arts, and other creative, design, ...



How will humans interact with these tools?

Write your
PROMPT



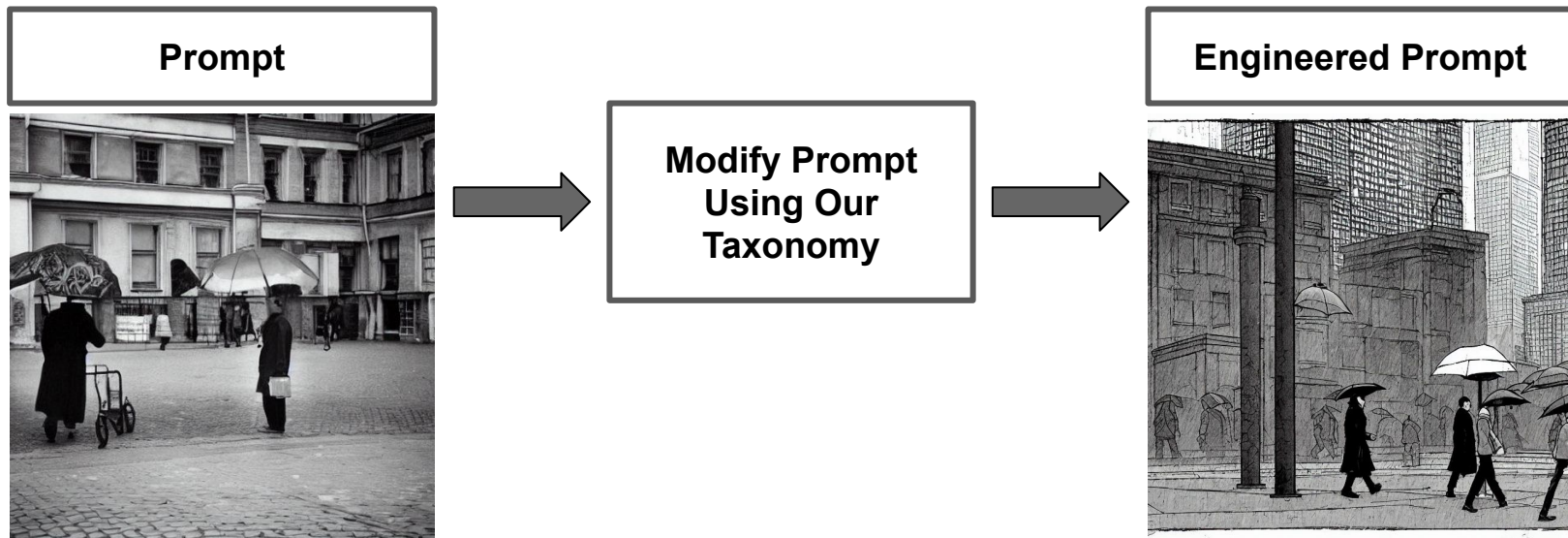
**AI System -
Text-to-Image Model**

- Role of AI has changed from decision-maker to **human supporter**
- Focus on **prompt-engineering**
- **Text-to-image** systems is on the verge of becoming a **mainstream** phenomenon



Research Question

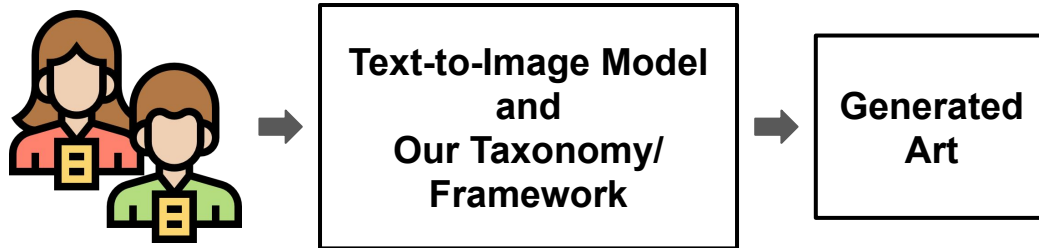
- Can we design a taxonomy for prompt engineering the desired generative art?
- Can our designed taxonomy quicken the generation process and lead to the desired result in less time?



Related Works

- Liu, Vivian, and Lydia B. Chilton. "**Design Guidelines for Prompt Engineering Text-to-Image Generative Models.**" CHI Conference on Human Factors in Computing Systems. 2022.
- Liu, Vivian, Han Qiao, and Lydia Chilton. "**Opal: Multimodal Image Generation for News Illustration.**" arXiv preprint arXiv:2204.09007 (2022).
- Pavlichenko, Nikita, and Dmitry Ustalov. "**Best Prompts for Text-to-Image Models and How to Find Them.**" arXiv preprint arXiv:2209.11711 (2022).
- Oppenlaender, Jonas. "**A Taxonomy of Prompt Modifiers for Text-to-Image Generation.**" arXiv preprint arXiv:2204.13988 (2022).

Approach: Design poster for a New Yorker article



Experiment Design:

- Between-Subjects design
- Independent variable: Our taxonomy (binary)
- Dependent variable: task completion time

Quantitative Evaluation:

- One-way ANOVA of task completion time

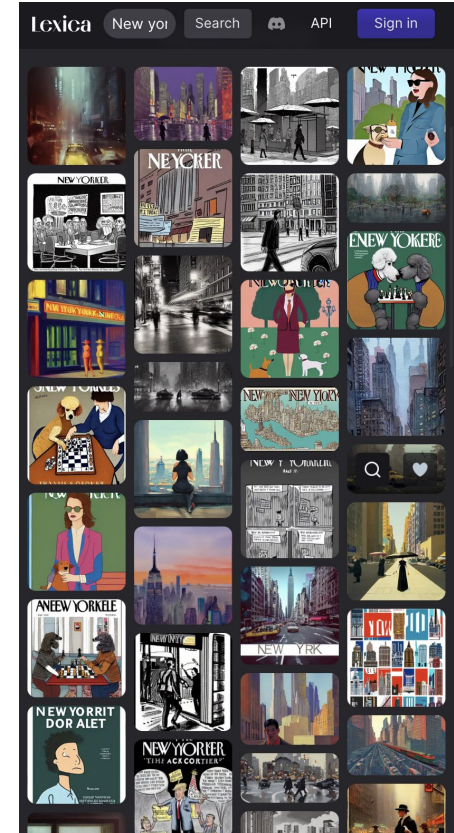
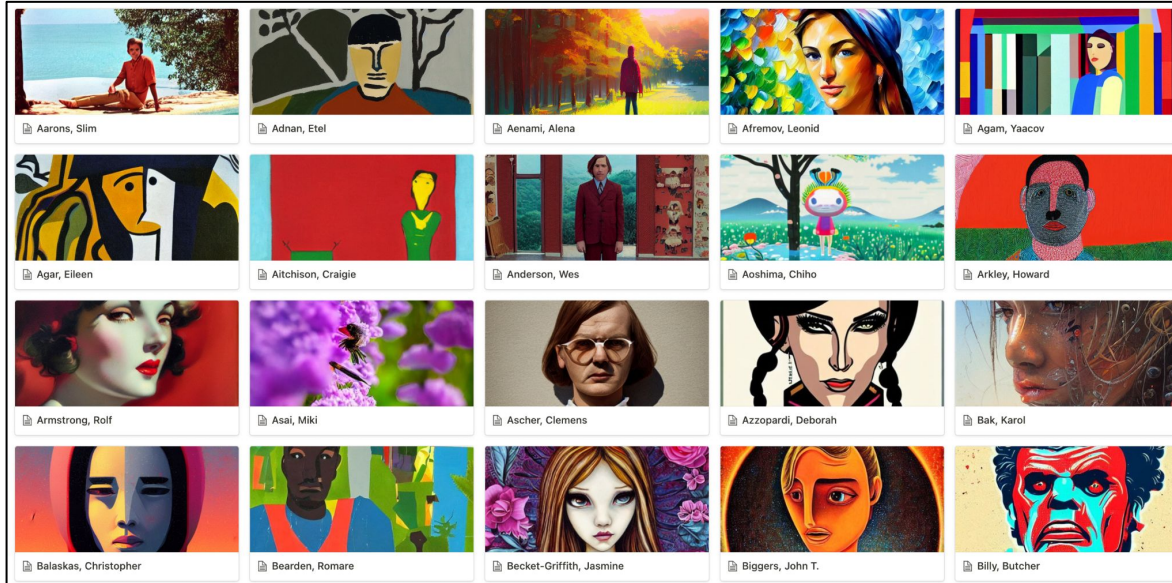
Qualitative Evaluation:

- Post-study survey
- Does developed taxonomy help improve the generation experience and enhance user self - satisfaction?

Designing a Taxonomy

Conducted a detailed literature and resource review and performed multiple design tasks to understand prompt structure.

Our Taxonomy



HCI Task

Generate a **New Yorker Poster** using the **Stable Diffusion text-to-image model**.



- Submit the **final prompt**, **design**, and **time taken** for each poster.
- Complete Survey



NICOLE RIFKIN'S "SUN-DAPPLED"

The artist on her creative process and finding inspiration among artistic friends.



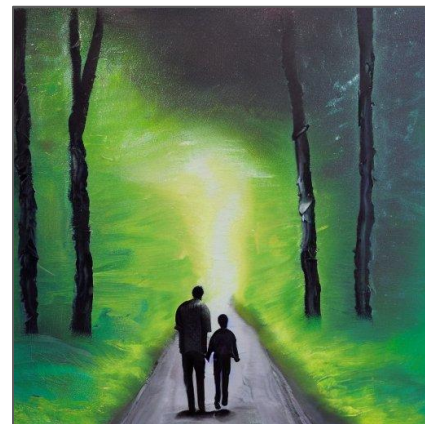
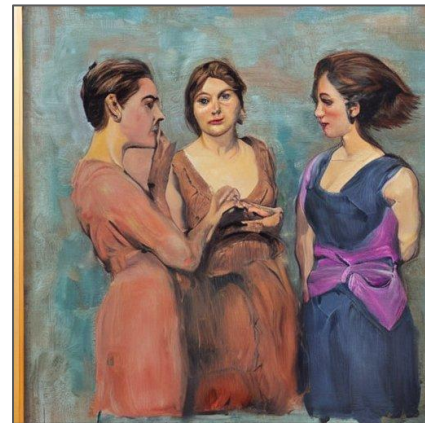
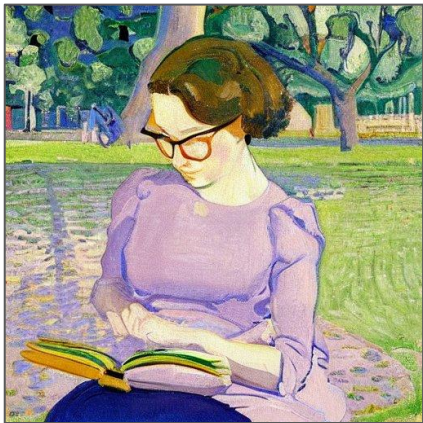
GAYLE KABAKER'S "SUMMER WALK"

The artist on loosening up and the rewards of keeping a sketchbook.

Survey Questions

- Demographic Information
- Indicate difficulty of the task (1-7)
- Describe your strategy for poster generation
- Most useful keywords/ modifiers
- Only for Taxonomy candidates:
 - Did you find taxonomy useful?
 - Any suggestions for taxonomy

Some Designs



Quantitative Analysis

Effect of **Image Type** and **Taxonomy** on Completion Time. *: significant at 0.05 level

| Effect | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|-------------------------|----|--------|---------|---------|-----------------|
| Image Type | 1 | 34.21 | 34.21 | 4.645 | 0.0379 * |
| Taxonomy | 1 | 10.87 | 10.87 | 1.476 | 0.2323 |
| Image Type: Taxonomy | 1 | 1.00 | 1.00 | 0.135 | 0.7153 |
| Residuals | 36 | 36 | 265.09 | 7.36 | |

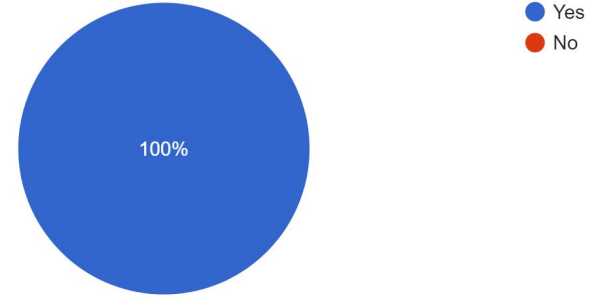
- Taxonomy did **NOT** have a **significant** main effect on **completion time**
- Image **type** had a **significant** main effect on **completion time**

Qualitative Analysis

- **Taxonomy users** found the task **easier**.
- **100%** of taxonomy users found the taxonomy useful.
- No consensus in keywords/ modifiers. Different users choose, **different** artist names and modifiers.
- Prompt Strategy:
 - Describe desirable art in great details
 - Add prefix and keywords for style modification
 - **Iterate**

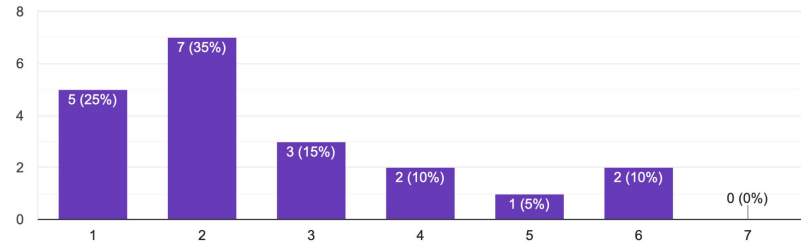
SKIP IF INAPPLICABLE Did you find the taxonomy useful?

11 responses



On a scale from 1 to 7 (1 being very easy, 7 being very difficult), please indicate how difficult the task was:

20 responses



Limitations and Future Work

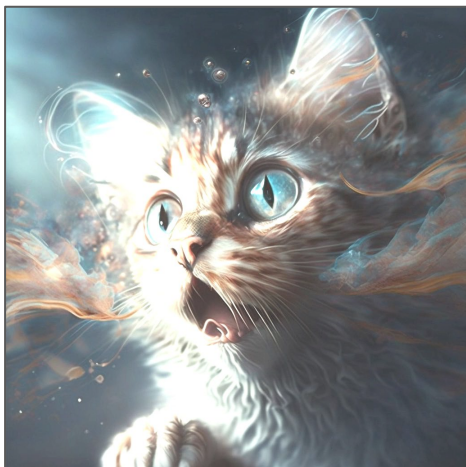
- Completion time may not be the best metric for this task.
- Completion time depends on task context and prompt.
- Future work includes:
 - Larger sample size
 - Larger number of tasks per participant
 - Same participant performing non-taxonomy and taxonomy task
 - Evaluation by artists
 - More detailed post-study survey

Conclusion

- Generative AI algorithms can be used for poster generation tasks.
- Taxonomy can help the designer in the design process.
- The gains might not necessarily come in terms of completion time but in the quality of generated images.
- Taxonomy helped designers in coming up with new innovative ideas.
- The type of posters impacts the design process, completion time, and prompt keywords.



Thank you!



Structure Plan (10 minutes):

1. Introduction (motivation/problem) (*30 second*)
2. Related work (this can be brief - 1 page) (*30 second*) - *Ajay*
3. Taxonomy - Anushruti
4. Your approach (method/implementation/approach)
5. Results
6. Discussion/Conclusion